

**IN THE HIGH COURT OF SOUTH AFRICA
GAUTENG DIVISION, PRETORIA**

CASE NO: 58668/2011

In the matter between:

JULIAN CHRISTOPHER STOBBS	FIRST PLAINTIFF

KATHLEEN (MYRTLE) CLARKE	SECOND PLAINTIFF

CLIFFORD ALAN NEAL THORP	THIRD PLAINTIFF

and

NATIONAL DIRECTOR OF PUBLIC PROSECUTIONS	FIRST DEFENDANT

MINISTER OF JUSTICE AND CONSTITUTIONAL DEVELOPMENT	SECOND DEFENDANT

MINISTER OF HEALTH	THIRD DEFENDANT

MINISTER OF SOCIAL DEVELOPMENT	FOURTH DEFENDANT

MINISTER OF INTERNATIONAL RELATIONS AND COOPERATION	FIFTH DEFENDANT

MINISTER OF TRADE AND INDUSTRY	SIXTH DEFENDANT

MINISTER OF POLICE	SEVENTH DEFENDANT

DOCTORS FOR LIFE INTERNATIONAL INCORPORATED	EIGHTH DEFENDANT

PLAINTIFFS' NOTICE IN TERMS OF RULES 36(9)(a)&(b)
in respect of Vladislav Lakčević

TAKE NOTICE THAT the Plaintiffs intend to call **VLADISLAV LAKČEVIĆ** (*"the expert"*) to give evidence as an expert in this matter.

TAKE FURTHER NOTICE that the Expert's *curriculum vitae*, is annexed hereto and marked "**A**". A summary of the expert's relevant qualifications and experience is, *inter alia*, as follows: -

1. The expert graduated, with distinction, from the Graduate School of Business of the University of Cape Town with a Masters of Business Administration Degree, as part of the requirements for which he authored the thesis, "*Through the smokescreen: Is there a socio-economic case for cannabis legalisation in South Africa?*" (annexure "**B**" hereto, and which will be discovered as part of the Plaintiffs' Supplementary Discovery Affidavit).
2. The expert works for Africa's largest economics-based consultancy, Genesis Analytics and has conducted a number of economic studies across the African continent including South Africa. The expert is a consulting manager at Genesis Analytics.

TAKE NOTICE FURTHER that a summary of the expert's opinions, and his reasons, therefor, are set out hereunder.

1. In order to express the opinions and provide the reasons set out hereunder, the expert:
 - 1.1. has researched relevant topics and extensively read historical and other sources, in order to author the paper referred to above;
 - 1.2. has had regard to, *inter alia*:
 - 1.2.1. the observations and conclusions made by him in reading studies and papers (as have been, or will be, discovered in this litigation and referred to by the expert/s in evidence and are annexed hereto as "**C**" to "**L**"), but which are, *inter alia*:
 - 1.2.1.1. a London School of Economics report entitled "*Ending the Drug Wars: Report of the LSE Expert Group on the Economics of Drug Policy*", in which the authors assert

that “*it is time to end the ‘war on drugs’ and massively redirect resources towards effective evidence-based policies underpinned by rigorous economic analysis*” (Quah et al., 2014, p. 3). In further endorsement, five Nobel Prize economists (among other prominent figures) signed the report’s foreword and confirmed the authors’ findings that “*the current United Nations-governed global strategy of achieving a ‘drug-free world’ has failed. Pursuit of this unachievable goal has proved damaging to human security and socioeconomic development*” (Quah et al., 2014, p. 8);

- 1.2.1.2. a technical report titled “*The impact of marijuana policies on youth: clinical, research and legal update*” authored by, *inter alia*, Seth Ammerman, as appears in Pediatrics, Vol 135, number 3, March 2015;
- 1.2.1.3. a journal article titled, “*Trends in the disapproval and use of marijuana among adolescents and young adults in the United States: 2002 – 2013*”, authored by, *inter alia*, Christopher P. Salas-Wright, published on 7 July 2015;
- 1.2.1.4. a journal article titled “*Childhood abuse, Neglect, and Household Dysfunction and the Risk of Illicit Drug Use: the Adverse Childhood Experiences Study*”, authored by, *inter alia*, Shanta R. Dube, as appears in Pediatrics, Vol 111, number 3, March 2003;
- 1.2.1.5. a review titled “*Cannabis for Therapeutic Purposes and public health and safety: A systematic and critical review*”, authored by, *inter alia*, Sharon R. Sznitman, accepted on 5 September 2014;
- 1.2.1.6. the Country Profile on Drugs and Crime, compiled by the Regional Office for Southern Africa of the United Nations Office on Drugs and Crime, 2002;

- 1.2.1.7. a research report titled, "*Cannabis and crime: findings from a longitudinal study*", authored by, *inter alia*, Willy Pedersen, dated 19 June 2009;
 - 1.2.1.8. an article titled, "*The effect of medical marijuana laws on crime: evidence from state panel data, 1990 – 2006*", authored by, *inter alia*, Robert G. Morris, published on 26 March 2014;
 - 1.2.1.9. a journal article titled, "*The impact of state medical marijuana legislation on adolescent marijuana use*", authored by, *inter alia*, Esther K Choo, as appears in the Journal of Adolescent Health;
 - 1.2.1.10. a technical report titled, "*Legalization of marijuana: Potential impact on youth*", authored by, *inter alia*, Alain Joffe, as appears in Pediatrics, Vol 113, number 6, 6 June 2004; and
 - 1.2.1.11. Ostrowski, 1990; Quah et al., 2014; The World Bank, 2014; UNODC, 2015b; Van Kerken, 2013; Van Niekerk, 2011.
- 1.1.1. the pleadings delivered in the above matter, including any and all requests for further particulars and responses thereto (as at date hereof); and
 - 1.1.2. the First to Seventh Defendants' Notices in terms of Rule 36(9)(a) and (b) in respect of David Bayever and Professor Shabir Banoo, that were delivered on or about **25 January 2016** and **28 January 2016** respectively.
2. A summary of the expert's opinions (incorporating limited reasons therefore, but which are expanded upon in the annexure hereto) follows: -

The “war on drugs”

- 2.1. The “war on drugs” has been widely criticized for its enforcement-led approach, the results of which have often been counter-productive, particularly with regard to cannabis. The aforesaid results have been frequently referred to by the United Nations Office on Drugs and Crime (“UNODC”) as “*unintended consequences*” of the war on drugs.
- 2.2. The war on drugs appears to have undermined human rights, particularly those of cannabis users, who are routinely criminalised by the aforesaid enforcement-led approach. This result is certainly not conducive to principles of “*harm reduction*” (which principles will be expanded upon in the expert’s evidence).
- 2.3. The policy of prohibition is based primarily on moral principles/intentions, and not on its outcomes.
- 2.4. Significant policing resources have been spent on enforcing this policy, which has not resulted in the eradication of supply, but has, rather, resulted in its displacement to another area and/or other areas.
- 2.5. Historically, the vulnerable subsistence farmers of cannabis in the Eastern Cape have been victimised, or exploited, by the South African Police Service (“SAPS”) and other supply chain players as a result of prohibition’s focus on enforcement and supply eradication.

Cannabis uses and economic opportunity costs of prohibition

- 2.6. Cannabis uses range from industrial purposes across a wide array of sectors, to recreational and potential medicinal uses.
- 2.7. A prohibitionist stance towards cannabis, as South Africa has, limits the positive potential that cannabis could have, particularly in a socio-economic sense.

- 2.8. Prohibition has artificially stifled the market for industrial hemp in South Africa and, as such, has hampered the ability to measure the local demand for industrial hemp.
- 2.9. Hemp may be as competitive, if not more so, than many raw materials used in the production of paper, textiles and petrochemicals. The challenges in making it so competitive arise out of competing with more well-established raw material industries. South Africa's opportunities in this regard ought to be explored, as the local commercial production of hemp (presently illegal) is a direct cost of prohibition to the South African economy.
- 2.10. The classification of cannabis as a schedule I drug by the United Nations implies that it has no medicinal uses, although much research recognises that cannabinoid use treats and/or alleviates HIV/AIDS-related weight loss, multiple sclerosis, cerebral palsy, spinal cord injuries, chronic pain and glaucoma, and other ailments, and has potential as an anti-cancer treatment.
- 2.11. The prohibition of the recreational/responsible adult use of cannabis presents a large opportunity cost in terms of taxes, with the UNODC estimating that between 5.0% (five percent) and 9.1% (nine point one percent) of South Africa's total population smoke marijuana. The legalisation of cannabis would yield lower production costs through economies-of-scale and value chains, although the retail price of cannabis would need to remain as close to the current black market as possible in order to further drive government's revenues, which would necessarily maintain prices through the use of taxes.
- 2.12. Taxes ought to take into account the weight of cannabis sold, as well as its THC content. As an aside and as matters stand, law enforcement does not delve into such detail and only considers the weight of plant material seized (some of which contains very low levels of THC).
- 2.13. The aforesaid uses of cannabis indicate the potential for its legalization to provide socio-economic value, generate higher government budgets for social welfare and development programmes, formal employment opportunities and affordable medication.

Harms purportedly prevented by prohibition

- 2.14. There exists a notion that decriminalization or legalisation of cannabis would increase its use and abuse by minors, when in fact, no evidence of this could be found and, rather, studies indicate that adolescent attitudes to relaxing cannabis legislation have consistently resulted in lower rates of its use by minors and, moreover, a decline in youth cannabis prevalence rates.
- 2.15. There is stronger evidence that prohibition curbs adult cannabis use prevalence rates. However, individuals inclined to abuse cannabis are also less inclined to be deterred by prohibition, such that prohibition may be effective in limiting adult use, although less effective in limiting abuse.
- 2.16. Prohibition does serve to prevent mass marketing of cannabis to promote consumption, albeit that it is uncertain that this has any bearing on the usage rates of those wanting to use it. In addition, marketing of cannabis could easily be prohibited without criminally prohibiting the use and possession of cannabis.
- 2.17. Importantly, much research indicates that the consumption of alcohol and tobacco cause more harm to consumers, and broader society, than the consumption of cannabis and, globally, no deaths have been directly associated with cannabis consumption.

Harms not prevented by prohibition

- 2.18. Prohibition does not prevent illicit drug markets, particularly for cannabis, from thriving.
- 2.19. It appears that South Africa's cannabis market is currently experiencing increasing elements of organised crime, with organised crime activities tending to be funded by profits from drug and cannabis sales. In turn, cannabis consumers are exposed to sinister criminal elements. This could be reduced by the legalisation of cannabis, which would ensure a regulated and safe market for cannabis consumers.

- 2.20. Studies show that increased access to legal cannabis does not cause an increase in crime rates.
- 2.21. The UNODC finds that a variety of socio-economic issues contribute to the prevalence of drug and cannabis use and production in South Africa. These include violence, income inequality and poor educational and employment prospects. Other studies indicate that the use and abuse of cannabis by children may be attributed to adverse childhood experiences.
- 2.22. Prohibition does not serve to address any of the aforesaid socio-economic issues and, by resulting in criminal records for cannabis users, rather impedes employment opportunities which may fuel cannabis users' substance abuse and illicit activities as a substitute for a lack of formal income.
- 2.23. Should prohibition displace abuse of legal substances, such as alcohol or tobacco, same cannot be attributed as a harm reduction, both of the aforesaid substances being more harmful to, and addictive for, consumers, than is cannabis.

Harm related to, but not caused by, cannabis

- 2.24. Studies consistently fail to prove causality between legal access to cannabis and exacerbated levels of violent and property crime, nor has causality been proven between cannabis use and mental health disorders.
- 2.25. On this point, it has been stated that, while cannabis may affect the onset, severity and outcome of psychosis, it does not, in and of itself, cause same.

Policy options

- 2.26. Policy options, as alternatives to the commercialisation and commodification of cannabis, include, but are not limited to:
 - 2.26.1. cannabis productions for recreational use with free distribution, whilst regulating industrial hemp separately;

- 2.26.2. government monopoly of parts of, or the entire, supply chain of cannabis; and
- 2.26.3. non-profit models through the use of cooperatives.
- 2.27. The aforesaid policy options ought to be considered, owing to the potential for aggressive marketing that may result from the commercialisation and commodification of cannabis and/or hemp.
- 2.28. Tracking of the entire cannabis supply chain is essential to ensuring that government may respond to market dynamics as the cannabis market develops.
- 2.29. The decriminalization of cannabis, as opposed to its legalisation, does not address the various issues associated with illicit drug markets and the harms caused by prohibition. Similarly, the legalisation of cannabis specifically for industrial and/or medicinal purposes does not address the harms prevented by prohibition and, internationally, has been accompanied with diversion to recreational use.

General

- 2.30. The re-legalisation of cannabis internationally is a recent development, such that there exist uncertainties as to the potential outcomes of its legalisation. Such uncertainties ought not to be considered as a reason for continued prohibition and should, rather, encourage further research and motivate innovative approaches to policy design, implementation and enforcement.
- 2.31. Optimizing socio-economic outcomes through the lifting of prohibition will necessarily require policy experimentation and regular assessment.
- 2.32. Despite cannabis prohibition being in place in South Africa for over a century in some form, the region remains one of the prominent producers of cannabis on a global scale with the United Nations Office on Drugs and Crime estimating that South Africa was the world's third largest producer of cannabis globally in 2009.

- 2.33. Due to its current illegal status, all of the cannabis produced in South Africa is traded as a recreational drug on black markets locally and internationally (UNODC, 2014). This, coupled with the fact that the best-estimate cannabis prevalence rate in southern Africa is 5.0% (which in South Africa is equivalent to 2.65 million people), has led Dr. van Niekerk, editor of the South African Medical Journal (SAMJ), the Anti-Drug Alliance SA, and multiple international stakeholders, to definitively announce that the war on drugs has failed.
- 2.34. Pertinent empirical research is relatively recent and sparse. A few appropriate studies were identified, and supplemented by theoretical research. South Africa-specific data proved inaccurate and unreliable, but transferability from international studies could be justified. The total financial and social costs associated with the enforcement-led policy on cannabis in South Africa have not yet been fully quantified in any published work.
- 2.35. The reporting of the SAPS cannabis seizures best illustrates this point: The SAPS 2015 Annual Report states that 440,200 (four hundred and forty thousand, two hundred) tons of cannabis was seized by the SAPS in 2014 (SAPS, 2015a). This figure implies that over 9 (eight) kilograms of cannabis was confiscated for each person living in South Africa, suggesting a massive local cannabis industry. However, even these official SAPS (2015a) figures must be viewed circumspectly in the light of the UNODC's (2015b) data on global cannabis (herbal and resin) seizures for 2014, which, at 7,180 (seven thousand, one hundred and eighty) tons, is over 60 times less than the SAPS-reported seizure figure for that period.
- 2.36. Cannabis is a very versatile plant because of its many uses. However, its current prohibition in South Africa has limited it to the world of recreational drug use. "Hemp (*cannabis sativa* L) is an industrial crop and is one of the oldest cultivated crops in the world" (Agricultural Research Council, 2014), but cultivating hemp in South Africa is illegal. The Agricultural Research Council (ARC) (2014) of South Africa has *identified "over 25,000 existing consumer products that can be produced from hemp"*. These views are consistent with views expressed in many historical books on the subject of hemp and cannabis (Abel, 1980; Booth, 2003; Herer, 1985).
- 2.37. Literature suggests that cannabis has many uses, ranging from industrial purposes across a wide array of sectors to recreational and potential

medicinal uses. But countries that take a prohibitionist stance towards the plant have limited its positive potential.

- 2.38. The original motivations for cannabis prohibition were not rooted in scientific fact, as confirmed by recent studies such as those conducted by Nutt et al. (2007; 2010). In fact, multiple studies confirm that drugs such as alcohol and tobacco (both legal in South Africa) incur significantly higher harm to both users and society at large relative to cannabis.
- 2.39. The earliest available discussion paper on cannabis produced by the South African government dates back to 1987, six years before prohibition was enforced in this country. The paper appears to be motivated by the premise that cannabis consumption leads to insanity in native Indian immigrants (Natal Colony). Very little evidence of this (beyond anecdotal is provided). Evidently, at its very core, cannabis prohibition in South Africa was initially racially motivated.
- 2.40. The literature on post-prohibition cannabis usage trends reveals some interesting findings, chief of which is that increased availability of cannabis as a standalone factor does not necessarily contribute to increased youth/adolescent use. The literature provides compelling evidence that socio-economic circumstances of youth are a stronger causal factor of substance abuse than availability alone. This is particularly relevant in South African society, given prevalent degrees of economic inequality, crime and unemployment rates (UNODC, 2002).
- 2.41. The literature suggests that the youth tend to be more price-sensitive (than adults) to the cost of drugs, including alcohol. Price controls, through taxation, may prove to be an additional effective tool for discouraging underage consumption in a regulated market
- 2.42. The Youth Risk Behavior Survey of the US Centers for Disease Control and Prevention (CDC) (2015) indicates that in Colorado youth prevalence rates dissociated from the national cannabis usage trends in 2009. This separation coincided with the period when medical marijuana was first commercialised in Colorado, and further relaxation of marijuana policy (recreational use) appears to have had no effect in terms of driving increases in adolescent usage rates. While the survey relies on self-submissions, Raghupathy and

Hahn-Smith (2011) found the reliability of the data collected in it to be robust. Furthermore, other researchers found that there was strong evidence to support the validity of the survey's outputs with specific regard to marijuana usage. The above studies all suggest that increasing availability of cannabis in de-penalised regulatory environments is not necessarily a key factor that drives youth use and abuse.

- 2.43. A comprehensive study of 11,703,100 students' marijuana usage trends over 20 years shows, definitively, that changes in state medical marijuana laws did not increase adolescent marijuana usage (Choo et al., 2014).
- 2.44. With regard to adult use; Hasin et. al. (2015) found a significant increase in adult cannabis use prevalence rates – from 4.1% for the period 2001/2 to 9.5% in 2012/13. However they note that, while marijuana use prevalence rates more than doubled over the period, they did not observe a proportional increase in marijuana-related disorders (primarily abuse) (Hasin et al., 2015). That is, absolute numbers of marijuana-related disorders increased, but not proportionately to the observed increases in usage (Hasin et al., 2015). For the time being, the literature suggests that, as prohibition of cannabis is abandoned, cannabis use prevalence rates will increase among adults, but users are less likely to abuse cannabis.
- 2.45. Some of the main (and relevant) criticisms of the current enforcement-led approach to drug prohibition that are discussed by the London School of Economics' Quah et al. (2014) are as follows:
 - 2.45.1. The strategic logic of a drug-free world ideology is misguided and has had a counterproductive effect, which can be quantified in costs to human security and socio-economic development. States need to redirect resources from focusing on enforcement to focusing on public health-based policies that promote harm reduction.
 - 2.45.2. The current global system has transferred the costs of prohibition from wealthier consumer countries to poorer producer countries, which has led to increased drug-related violence and corruption in these economies.

- 2.45.3. Preconceived and often simplistic ideologies should not drive policy. Countries should rather focus on developing policies that can be judged on their results. This has not been the case in the global war on drugs.
- 2.45.4. Political factors have favoured incarceration as punishment for illicit drug possession/use, but evidence suggests that this has caused more harm to individuals and society in the long run.
- 2.46. As yet, the gateway drug hypothesis, as applied to cannabis, is found to be valid only in a world where cannabis remains an illegal substance, traded in black markets with strong criminal elements. There is no literature proving a direct causal relationship between cannabis use and use of other drugs. In fact, alcohol use was found to have stronger causal links to graduation to more harmful drugs.
- 2.47. Cannabis prohibition inadvertently imposes material socio-economic costs. *"Prohibition entails direct enforcement costs, and prohibition prevents taxation of marijuana production and sale. If marijuana were legal, enforcement costs would be negligible and governments could levy taxes on the production and sale of marijuana. Thus, government expenditure would decline and tax revenue would increase."* (Miron, 2005, p. 2)

Conclusions

- 2.48. Given, *inter alia*, all of the above, the expert will say that:
- 2.48.1. South Africa's drug policy, specifically in relation to cannabis, ought to be judged on outcomes and rooted in genuine harm-minimisation goals, as opposed to be rooted on underlying moral motivation or enforcement process indicators.
- 2.48.2. The prohibition of cannabis limits its potential positive effects, particularly in a socio-economic sense. Moreover, prohibition consumes police and fiscal resources that may be better allocated to socio-economic problems in South Africa, promotes negative stigma towards and discrimination of cannabis uses, enriches

crime organisations and compels users to interact with criminal elements, thereby increasing potential harm to users.

- 2.48.3. Taxation, as a manner of controlling the price of cannabis, may be effective in discouraging the underage consumption thereof in a regulated market, as research suggests that the youth are more price-sensitive than adults to the cost of drugs, including cannabis, and alcohol.
- 2.48.4. The legalisation of cannabis would serve to regulate illicit markets, provide opportunities for new industries and medical innovation and result in a better allocation of police and fiscal resources as well as increase tax collection
- 2.48.5. On balance, the socio-economic gains of the legalisation of cannabis would outweigh its potential losses.

Dated and signed at Melrose Arch on the 30th day of September 2016.

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Professional profile

A results-orientated strategy professional; demonstrates considerable abilities in developing strategies and innovation on behalf of organisations across multiple business sectors. Committed to achieving excellence, consistently identifies opportunities for business growth in accordance with objectives. Demonstrating expertise analysing complex market and company data, manages and delivers projects, building effective working relationships with stakeholders internally and externally. A proven track record for delivering results utilises a high level of commercial awareness in maximising business developments. Committed to achieving customer service standards, works collaboratively or independently as required, leading teams by example.

Education and qualifications

MBA and EMBA elective courses	MBA and Executive MBA elective courses Erasmus, Rotterdam School of Management, Rotterdam, Netherlands (2016)
Exchange Program	Global Network for Advanced Management IE Business School, Madrid, Spain (2016)
MBA	Awarded with Distinction (Cum Laude) Graduate School of Business, University of Cape Town, Cape Town, RSA (2015) <i>Class Medal for Innovation and Entrepreneurship course with the development of an innovative peer-to-peer lending business model for African markets</i>
BCom (Hons)	Financial Analysis and Portfolio Management University of Cape Town, Cape Town, RSA (2008) <i>First-class awarded for final research project – Intra-industry information transfers; the effects of profit warnings on industry returns</i>
Level 1 Certificate	Chartered Financial Analysis (CFA) Institute (2008)
BSc (Hons)	Mechanical Engineering University of Cape Town, Cape Town, RSA (2006) <i>Best Thesis Presentation Award</i> <i>First-class awarded for final year engineering research project – the design and development of a pneumatic bone chisel for use in orthopaedic surgery</i>

Career summary

2012 – Present	Genesis Analytics, Johannesburg, RSA
2015 – Present	Financial Services Strategy Manager
2012 – 2015	Senior Associate

- Developing strategies for organisations across the financial services, technology, FMCG, financial regulatory, petrochemicals and energy industries in a range of African countries
- Providing management for the division, including engaging with senior stakeholders within the financial services industry across Africa, identifying opportunities for business development, managing projects and ensuring quality standards are maintained
- Liaising with teams across the organisation to share information, presenting at board meetings and providing support for internal staff

Projects include:

- Providing project strategic and technical advisory services for the International Finance Corporation with large retail banks in Ghana and Nigeria
 - Identifying opportunities which could grow market share and improving access to finance for

- SMEs with the development of an SME segment strategy together with strategic and inception reports and implemented the recommendations in conjunction with in-country teams
 - o Improving internal processes, approaches to market, value propositions and capabilities
 - o Delivering all project elements in accordance with budgets and deadlines, and achieving positive responses from the banks and the IFC
- Conducting a comprehensive review the investment banking landscape across Sub-Saharan Africa (14 countries) for a large Pan-African bank
 - o Deep-dive assessment of country and industry-specific demand-side factors shaping investment banking currently and for the next two years. Primary focus was on resources and power and infrastructure although other sectors were also analysed in detail.
 - o Assessing potential demand for project finance, debt finance, equity finance, structured finance and long term corporate lending.
 - o Interviews with key government and private sector officials in each country to assess the macro landscape and identify specific opportunities
 - o Presented the project findings to the bank's Executive Committee in London; project was very well received.
- Developing a business model and strategy for a large South African financial services provider's retail bank
 - o Developing a comprehensive strategy, customer value proposition, business and operating models, presenting recommendations to the CEO
- Developing a detailed assessment of investment banking opportunities across nine African countries for a large global law firm; input into the firm's Africa growth strategy
 - o Interviews with management teams of the largest investment banks operating across Africa, including Citi Bank, Standard Bank, Barclays Capital, Rand Merchant Bank, Deutsche Bank and BNP Paribas (among others).
- Completing an extensive review of the efficiency of incentive schemes and the capability to meet with strategic requirements for an FMCG producer and distributor
 - o Developing a financial model to assess effectiveness of historical spend and identify unintended consequences of existing incentive schemes across different classes of trade; a view the client had never seen before.
 - o Identified significant disintermediation that was driven by client's incentives which undermined their overall strategy unintentionally
 - o Providing the client with an extensive analysis of the scheme, identifying areas for improvement and delivering recommendations to the Executive Committee
- Leading the development of the communication strategy on behalf of Sasol Ltd. Regarding engagement with government on the proposed Carbon Tax Bill.
 - o Provided key financial inputs for the presentation that formed part of negotiations with the National Treasury of South Africa

2009 – 2012 Africa International Advisors, Johannesburg, RSA
Associate, rising to Senior Associate

- Accurately analysed a range of qualitative and quantitative data and produced effective financial models for use within comprehensive business strategies
- Financial modelling for strategic investments in oil and gas industry (upstream and downstream) and financial assessment of power generation projects with a focus on renewable energy
- Conducted industry and market research, developed strategic reports and client proposals for organisations in the petrochemical, FMCG, environmental and public sectors

Projects include:

- Developing a mitigation strategy for greenhouse gas for Sasol Group Services following analysis of operations across all 15 business units in South Africa and internationally
 - o Conducting assessments of commercially viable market opportunities and devising business cases for each available option, plotting opportunities on marginal abatement curves for Sasol's GHG emissions.
- Facilitated the execution of a holistic renewable energy strategy with the identification of green growth opportunities in Sub-Saharan Africa following an extensive review of the marketplace

- o Detailed assessment of the energy landscape across Sub-Saharan Africa
 - o Identified commercially viable opportunities and associated risks
 - o The project deliverable was presented to Sasol's Group ExCo and informed the African growth strategy.
- Sasol Petroleum International (SPI) regional strategy development
 - o The lead in designing a downstream monetization model which was used by the team to evaluate the best potential downstream projects for each region considered. The models included highly specialised projects such as: GTL (Gas to Liquids) plants; Ammonia/Urea plants; Power plants (CCGT) and others. Scenario analysis was then performed on all the qualifying projects to test the robustness of each project to external factors.
 - o The project culminated in a presentation and a report that was submitted to the Sasol Group Executive Council where approval was obtained for the budget outlined in the strategy.
- Support to Sasol Group Services (strategy) on multiple projects across all 15 business units
 - o From 2009 to 2012 worked on multiple strategy projects for Sasol Limited.
 - o Developed and maintained a financial model for Sasol Group; the model was used to assess financial implications of strategic greenfield and brownfield investments globally across multiple businesses including power generation, GTL and CTL plants, polymers plants and oil and gas exploration and refining.
 - o The model was used for scenario planning and was key in communicating the impact of potential strategic decisions on Sasol Group's cash flows.
 - o Outputs of the model were validated by Sasol Group CFO and were presented to the Group Executive Committee on multiple occasions to support strategic decisions.

Further skills

IT Proficiency: Advanced Microsoft Office, including Word, Excel, Visual Basic and PowerPoint
Languages: Fluent in English and Serbian, with basic conversational French

Contactable references

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Through the smokescreen: Is there a socio-economic case for cannabis legalisation in South Africa?

A Research Report
presented to

The Graduate School of Business
University of Cape Town

In partial fulfilment
of the requirements for the
Masters of Business Administration Degree

By:
Vladislav Lakčević
December 2015

Supervised by: Thomas Koelble

ABSTRACT

A few American states have legalised recreational cannabis use, and many other jurisdictions are questioning cannabis prohibition. South Africa is a major producer and global supplier of cannabis, despite prohibition being actively enforced. Lacking local academic studies on the topic, this report critically discusses the relevant global literature, and tests its applicability in the South African context to ascertain whether a socio-economic case can be made for cannabis legalisation.

The primary point of analysis constituted the literature review. This provided a broad context for global and South Africa-specific cannabis prohibition and legalisation experiences vis-à-vis the associated socio-economic dynamics and impact of enforcement policies and practices. The literature review's contents were assessed according to the conceptual framework's four themes: harm caused by prohibition, harm prevented by prohibition, harm not prevented by prohibition, and harm related to but not caused by cannabis use.

Pertinent empirical research is relatively recent and sparse. A few appropriate studies were identified, and supplemented by theoretical research. South Africa-specific data proved inaccurate and unreliable, but transferability from international studies could be justified.

The report shows that cannabis prohibition inadvertently imposes material socio-economic costs, and that a reassessment of the current policies in South Africa is warranted to ensure overall harm reduction and optimise socio-economic outcomes. Globally, cannabis re-legalisation is new, and uncertainty about potential outcomes cannot be ignored. A proactive and adaptive approach to policy development and enforcement is needed until outcomes are optimised. Policy should be judged on outcomes, not on underlying moral motivation or enforcement process indicators.

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PLAGIARISM DECLARATION

I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.

I have used a recognised convention for citation and referencing. Each significant contribution and quotation from the works of other people has been attributed, cited and referenced.

I certify that this submission is my own work.

I have not allowed and will not allow anyone to copy this research report with the intention of passing it off as his or her own work.

Vladislav Lakčević

ACKNOWLEDGEMENTS

Firstly I would like to thank my father, Branko Lakčević, without whom I may have never found my way to completing my MBA at the University of Cape Town. Unfortunately, while my father did get to see me begin my MBA, he is no longer around to witness the fulfilment of this piece of work. However, his battle with cancer and his use of legally prescribed medicinal cannabis treatment to alleviate the side-effects of chemotherapy and other cancer-related discomfort he suffered serve as key motivations for this research.

I would like to express my sincere gratitude to my dissertation supervisor Professor Thomas Koelble, who allowed me to choose my research topic and explore a field of research that was completely new to me. Professor Thomas's sound guidance and calming and reassuring words during times of stress were most welcome, and served to ensure the best possible outcome that I could achieve.

James Bernstein was a continuous source of guidance and routinely helped me to better understand and complete the research process. His expertise and genuine desire to help are greatly appreciated.

Dr Simon Howell, of UCT's Centre of Criminology, provided very valuable guidance in helping me to think through my research approach. His attempts to help me source key pieces of data to support my research are greatly appreciated.

My sincere thanks also go to Mary Lister and Kate Hunter of UCT's GSB library, who provided valuable guidance on potential sources of literature and also helped me to reference some of the more obscure pieces of literature that were sourced for this dissertation.

Last, but by no means least, I would like to thank my partner Liza Lakčević who single-handedly supported me and our new-born son, Aleksandar Branko Lakčević, throughout my writing of this research report. I will make up for all of that now.

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GLOSSARY OF TERMS

Term	Definition
Bantustans	Territories set aside for black South Africans as part of apartheid policy
complex adaptive system	A system with a large number of interacting components, whose outcome cannot be derived from the activities of the individual components, i.e., a dynamic and non-linear system
confirmation bias	A tendency for people to seek out or interpret information in such a way that it confirms their preconceptions, which can lead to errors of logic and statistical interpretation (Thaler & Sunstein, 2008)
dagga	A common South African term for cannabis
decriminalisation	The criminal de-penalisation of certain activities; these activities can still remain regulated, accrue monetary fines or in the case of illicit substances be seized by law enforcement officials. Decriminalised activities are not permissible by law
hydroponic	A method of growing plants in nutrient-enriched, water-based solutions
legalisation	The process of changing the legal status of an activity to be permissible by law. The activity may still be regulated by law enforcement or other regulatory bodies
schedule I drug	Drugs with no currently accepted medical use, and with great potential for abuse. This is the highest drug schedule of the United Nations Single Convention on Narcotic Drugs and includes drugs such as cocaine, heroin and cannabis, among others (United Nations, 1972)

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LIST OF ABBREVIATIONS

ARC.....	Agricultural Research Council (South Africa)
CBD.....	cannabidiol (non-psychoactive)
CDA.....	Central Drug Authority (South Africa)
CTP.....	cannabis for therapeutic purposes
DAFF.....	Department of Agriculture, Forestry and Fisheries (South Africa)
GSB.....	(University of Cape Town) Graduate School of Business
LSE.....	London School of Economics
NDMP.....	National Drug Master Plan (South Africa)
SAMJ.....	South African Medical Journal
SAPS.....	South African Police Service
SAPA.....	South African Press Association
SMMS.....	Strategic Market Management System
THC.....	delta-9 tetrahydrocannabinol (psychoactive)
UCT.....	University of Cape Town
UNODC.....	United Nations Office on Drugs and Crime

1. INTRODUCTION

According to the United Nations (UNODC, 2007), the highest levels of cannabis production in the world are to be found on the African continent, estimated at roughly 25% of global production, with Morocco and South Africa leading the way. In fact, it has been estimated that South Africa is the world's third-largest producer of cannabis (Karl Peltzer & Ramlagan, 2007; UNODC, 2009b). This view is supported by Gastrow (2003), who determined that in the year 2000 cannabis seizures by the South African Police Service (SAPS) accounted for 16% of the world total of seized cannabis.

Due to its current illegal status, all of the cannabis produced in South Africa is traded as a recreational drug on black markets locally and internationally (UNODC, 2014). This, coupled with the fact that the best-estimate cannabis prevalence rate in southern Africa is 5.0% (which in South Africa is equivalent to 2.65 million people), has led Dr van Niekerk, editor of the *South African Medical Journal (SAMJ)*, the Anti-Drug Alliance SA and multiple international stakeholders to announce that the war on drugs has failed (Ostrowski, 1990; Quah et al., 2014; The World Bank, 2014; UNODC, 2015b; Van Kerken, 2013; Van Niekerk, 2011). The implication is that the current enforcement-led policy requires drastic revision: Policy should be judged on outcomes, not on inputs or process indicators. This sentiment was echoed in 2014 by a London School of Economics report entitled "Ending the Drug Wars: Report of the LSE Expert Group on the Economics of Drug Policy", in which the authors assert that "it is time to end the 'war on drugs' and massively redirect resources towards effective evidence-based policies underpinned by rigorous economic analysis" (Quah et al., 2014, p. 3). In further endorsement, five Nobel Prize economists (among other prominent figures) signed the report's foreword and confirmed the authors' findings that "the current United Nations-governed global strategy of achieving a 'drug-free world' has failed. Pursuit of this unachievable goal has proved damaging to human security and socioeconomic development" (Quah et al., 2014, p. 8).

The total financial and social costs associated with the enforcement-led policy on cannabis in South Africa have not yet been fully quantified in any published work. Beyond the direct cost of enforcement through arrests, one needs to consider the significant and publically undisclosed costs incurred by the SAPS in terms of intelligence gathering, as well as their systematic destruction of cannabis crops (SAPS, 2015a). In 2015, a lot of media attention has been paid to the cannabis field crop spraying undertaken by the Air Wing division of the

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SAPS. Unfortunately, initial media reports also suggest that this operation, which has been conducted annually for the last 20 years (SAPS, 2015a), causes significant collateral damage to some of the most impoverished communities of South Africa in the Eastern Cape (Berliner, 2015; M. Clarke & Stoobs, 2015; SAPA, 2015). Surely the money and resources spent on enforcing what appears to be a failed policy could be better utilised in South Africa? This research paper seeks to provide an objective answer to this question with regard to cannabis-related policies and practices.

Cannabis is a very versatile plant because of its many uses; however, its current prohibition in South Africa has limited it to the world of recreational drug use. “Hemp (*cannabis sativa* L) is an industrial crop and is one of the oldest cultivated crops in the world” (Agricultural Research Council, 2014), but cultivating hemp in South Africa is illegal. The Agricultural Research Council (ARC) (2014) of South Africa has identified “over 25,000 existing consumer products that can be produced from hemp”. In fact, the Department of Agriculture, Forestry and Fisheries (DAFF) (2012, p. 3) of South Africa issued a report in 2012 which proposes that:

Hemp is one of the most important fiber [sic] crops both for South Africa and the rest of the world. It has been cultivated longer than any other fiber [sic] crop. There seems to be never-ending list of benefits of the hemp plant with products ranging from clothing and textile to cosmetics and insulating boards. However it is the perceived relationship with Marijuana that gave the plant a bad name. Both come from the plant family *Cannabis sativa* L., but from different varieties. Hemp has been grown in South Africa for medical purposes for centuries. It has been illegal in South Africa since 1903 when dagga prohibition was passed.

These views are consistent with views expressed in many historical books on the subject of hemp and cannabis (Abel, 1980; Booth, 2003; Herer, 1985).

At present, commercial cultivation of hemp in South Africa remains prohibited by the same legislation that prohibits any form of *Cannabis sativa* cultivation, production or sale (see section 2.5.1 for details).

The significance of the research topic becomes evident when one considers that a change in South Africa’s stance on cannabis could effectively create industries or reinvigorate existing industries, such as textile production, that have become less competitive in the global context.

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Furthermore, it is important to note that internationally the tide is turning, as more and more countries are seeking decriminalisation or complete legalisation of cannabis (Decorte & Potter, 2015; Quah et al., 2014; UNODC, 2014). There is also increasing pressure on the South African government to reconsider its stance on cannabis through the Medical Innovation Bill, which has been tabled by parliament and discussed by parliament more than once in 2015, as well as through a Constitutional Court challenge on the constitutionality of certain sections of the Drugs and Drug Trafficking Act, 1992, which is scheduled to be heard in March 2016 (M Clarke, personal communication, February 17, 2015).

In 2005 a paper by Professor Jeffrey Miron (2005), Senior Lecturer on Economics and Director of Undergraduate Studies at Harvard University, entitled “The Budgetary Implications of Marijuana Prohibition” received much traction and public support from over 500 leading economists (including three Nobel laureates), such as Milton Friedman. As the title suggests, this paper focused primarily on assessing the potential fiscal benefit of various scenarios in which marijuana prohibition is lifted and has started changing political mind-sets in the United States (US) (Hardy, 2005; Miron, 2005). It is time for a South African equivalent of the Miron report.

Significantly, at present South Africa-specific literature and cannabis-specific data have been found to be severely lacking, outdated or inaccurate. The reporting of the SAPS cannabis seizures best illustrates this point: The SAPS 2015 Annual Report states that 440 200 tons of cannabis was seized by the SAPS in 2014 (SAPS, 2015a). This figure implies that over eight kilograms of cannabis was confiscated for each person living in South Africa, suggesting a massive local cannabis industry. However, even these official SAPS (2015a) figures must be viewed circumspectly in the light of the UNODC’s (2015b) data on global cannabis (herbal and resin) seizures for 2014, which, at 7 180 tons, is over 60 times less than the SAPS-reported seizure figure for that period.

Given these observations, the challenges of and imperative for a research report which seeks to conduct a socio-economic cost–benefit analysis of legalising cannabis in South Africa become clear.

1.1 As Research question and sub-questions

As mentioned, the primary research question that this report seeks to address can be stated as follows: Is there a socio-economic business case to be made for cannabis legalisation in South Africa?

To answer this question, the report conducts a qualitative cost–benefit analysis which attempts to answer the following sub-questions:

- a. What are the socio-economic costs and benefits of the current policies on cannabis?
- b. What are the potential socio-economic implications of legalisation in South Africa?
- c. How could the socio-economic costs of cannabis legalisation be minimised through potential policy interventions?

Once these three sub-questions are answered, one can objectively assess the current landscape against the proposed landscape and determine which is superior for South Africa from a socio-economic perspective.

The cost–benefit analysis relies on the assessment of the available data and literature, which are evaluated against the South African context in order to answer the primary research question by weighing the potential costs against the benefits of cannabis legalisation.

1.2 Clarification of scope

Admittedly the primary research question is quite broad, but given the lack of academic literature on the subject in South Africa, it is the author's view that the first step in opening up such a debate requires this approach in order to enable further work on the subject as South Africa refines its stance.

The report focuses on developing an objective view; it is rooted in fact and supported by sound prior research (the literature) and economic theory.

As noted by both the ARC (2014) and the DAFF (2012), there is likely vast potential for industrial applications of hemp. A thorough assessment of the potential hemp industry would entail an equally substantial piece of work (or multiple pieces of work), which falls beyond the scope of the research report. Nonetheless, the potential impact of cannabis (hemp) legalisation must be assessed to some extent, as it may have the power to bring material benefits to some of South Africa's industries, such as biofuel, textiles, paper, building material and animal feed, among others.

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The physiological effects of consumption – the medicinal and recreational effects – are simply touched on, as this is not the primary focus of the research. Discussion of this issue is limited to providing potential societal and economic impacts of cannabis legalisation, as well as use and abuse trends based on recent published works from prominent journals and researchers.

The research explores policy options that the government may want to consider, with a view to optimising socio-economic outcomes of legalised cannabis. But this, too, is not the primary focus of the study. It may also be somewhat premature given the current lack of direction from the South African government on the subject of future cannabis policy.

1.3 Research assumptions

While literature on the topic is widely available from countries that have taken a more proactive stance on cannabis legalisation than South Africa, it is critical to bear in mind that in the South African context little academic work has been done on the subject, particularly from an economic perspective. This necessitates certain research assumptions to be in place.

International agencies such as UNODC, the World Health Organization (WHO) and the Global Drug Survey provide views based on the best available approximations and/or survey data in terms of production and consumption of cannabis in South Africa. This point serves as a key assumption used throughout this research report. These sources rely on voluntary submissions from national governments, individuals or other stakeholders. Thus survey participants may have underlying motives to under-report the extent of drug prevalence rates. Rather than being a limitation, the incentive to under-report is arguably equal for most survey participants and as a result making comparisons on a relative basis across countries should remain valid.

Another key assumption is that international studies and research with regard to assessing social and economic impacts of cannabis policy changes are comparable to potential outcomes in South Africa. This assumption is tested thoroughly throughout the research.

Any further assumptions that may be required for the purpose of completing the research are clearly communicated where appropriate within the report.

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1.4 Research ethics

The research required for answering the question has been conducted respectfully and transparently.

Each of the authors, companies and government organisations whose research and data have been used is appropriately referenced in the report.

While the research report is primarily a literature review, the author sought guidance from experts in the field of criminology and the cannabis industry. These individuals were made fully aware of the research question, and disclosed information voluntarily. No direct quotes or information gathered from those interviews are used in this report, although with their consent the interviewees have been included in the Acknowledgements.

The author's GSB ethical clearance application was officially approved by the university's Ethics in Research Committee on 5 October 2015.

2. LITERATURE REVIEW

This section provides important historical context for cannabis prohibition internationally and in South Africa. It also reviews the pertinent literature that is used in answering the primary research question and associated sub-questions (as discussed in section 1.1). Applicability/transferability of literature and research to the South African context is discussed in this section wherever appropriate.

The literature on this topic is quite fragmented and focuses on either:

- a. the impact or potential industrial applications of cannabis (hemp) or
- b. the impact of legalising what is currently considered an illegal drug for medicinal and/or recreational use.

No literature is available that directly relates to the research question of assessing the viability of developing a socio-economic case for legalisation of cannabis as a plant for industrial, medicinal and responsible adult use purposes. In the light of this finding, the literature review that follows is structured to optimally combine the various pieces of research that are available on the research topic.

2.1 The turbulent history of the cannabis plant

According to the UNODC (2012, p. 1) “cannabis is produced in nearly every country worldwide, and is the most widely produced illicit drug”. Such extensive cannabis cultivation may be unsurprising given the cultural and industrial applications of the cannabis plant (Abel, 1980; Booth, 2003; Decorte & Potter, 2015). In fact, multiple sources suggest that cannabis (hemp) was one of the first crops to be grown by man, with cultivation first occurring between 4 000 and 6 000 years ago, in China (Booth, 2003; Fortenbery & Bennett, 2004; Herer, 1985; Kraenzel et al., 1998).

2.1.1 The early years in Europe and the United States

Booth (2003) and Roulac (1997) note that during the 16th century hemp became a dominant crop in Britain and Russia's primary export crop. In fact, Herer (1985) recounts that one of Napoleon's primary motives for invading Russia in 1812 was to compel Czar Alexander I to stop exporting hemp to Britain, as at the time Russian hemp accounted for 90% of Britain's marine hemp, which was used for sails, ropes, rigging and nets.

According to Kraenzel et al. (1998, p. 16), colonials arriving in America found hemp growing in the wild, and the plant grew in importance to the point that it:

played a key part in our nation's independence. The first two drafts of the Declaration of Independence were printed on it, colonial soldiers dressed in it, and the first flag was sewn from it. Presidents Washington and Jefferson both grew hemp on their plantations to meet market demand. Benjamin Franklin began his penny printing press with it. After America gained its freedom and began to expand west, it was hemp that covered the wagons. When Levi Garret began selling his jeans to miners in California, he made them from hemp. Hemp was even used as legal tender to make up for the lack of printed money and promote its growth.

By the 1800s, the US began importing hemp from Russia. The Russian technology which separated the fibres from the plant stalk was much more cost-effective and resulted in better properties of products (Kraenzel et al., 1998).

In the late 1800s, the U.S. hemp industry began to decline, however. Reasons included the development of the cotton gin (which reduced labor [sic] costs for Southern cotton production), the advent of steam- and petroleum-powered ships (which reduced the demand for cordage and sailcloth materials), and imports of cheaper jute and abaca. Abaca gradually replaced hemp for use in marine cordage due to its weight, ability to float, and greater resistance to salt water corrosion. (Fortenbery & Bennett, 2004, p. 98)

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2.1.2 Cannabis prohibition in South Africa

The earliest available discussion paper on cannabis produced by the South African government dates back to 1987, six years before prohibition was enforced in this country. The paper appears to be motivated by the premise that cannabis consumption leads to insanity in native Indian immigrants (Natal (Colony). Indian Immigrants Commission, 1987). The report in fact recommends that:

rules be passed by His Excellency the Governor Council, under Section 70 of Law No. 2 of 1870 to the following effect:-

- a. Prohibiting the cultivation by Indian Immigrants, of any variety of cannabis, the hemp plant.
- b. Prohibiting the smoking or the possession, by Indian Immigrants of any portion of the hemp plant, whether wild or cultivated, save by medical advice, the proof whereof shall be on the smoker or possessor.
- c. Prohibiting the sale, to Indian Immigrants, of any portion of the hemp plant, whether wild or cultivated, by any person other than duly licensed vendor, who shall require, before such sale, the production of a satisfactory certificate.
- d. Imposing a stamp duty upon all licenses issued under the rules.
- e. Authorising the destruction of any variety of the hemp plant cultivated or found without any authority, in possession of Indian Immigrants, by order of the Resident magistrate of the district. (Natal (Colony). Indian Immigrants Commission, 1987, p. 7)

Paterson (2009, p. 46) suggests that “the findings of the Indian Immigrant Commission Report framed the future debates on cannabis in South Africa. The themes presented in this report (labourer indolence, crime and insanity) recurred throughout debates on cannabis, up to the point of national prohibition” in 1928.

Evidently, at its very core, cannabis prohibition in South Africa was initially racially motivated.

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2.1.3 The beginning of global prohibition, through international control systems

In 1921 the Council of the League of Nations called for an Advisory Committee on the Traffic in Opium and Dangerous Drugs, to which the South African Government submitted the following:

Pretoria November 28th 1923

With reference to your letter no. 12/A/22951/17217 dated September 6th 1922, on the above subject and to my letter no. 29/8/85 dated December last, forwarding copies of the Regulations promulgated under Proclamation no. 181 of 1922, I have the honour to inform you that, from the point of view of the Union of South Africa, the most important of all the habit-forming drugs is Indian Hemp or 'Dagga' and this drug is not included in the International List. It is suggested that the various Governments being parties to the International Opium Convention should be asked to include in their lists of habit-forming drugs the following:

Indian hemp: including the whole or any portion of the plants *Cannabis indica* or *Cannabis sativa*.

Signed, J.C. Van Tyen, for Secretary to the Prime Minister. (As cited in Paterson, 2009, p. 53)

At the second sitting of the Opium Conference in 1924/25 a new International Opium Convention was adopted, the main achievement of which was to "institutionalize [sic] the international control system and to extend the scope of control to cannabis" (UNODC, 2009b, p. 193). While this piece of law was limited to the international dimension of the cannabis trade and did not request signatories to control domestic production or consumption, it does indicate a change in countries' attitudes towards the plant. In effect this marked the beginning of global cannabis prohibition, at least in part through a motion brought forward by South Africa and supported by Egypt.

From 1925, most nations began changing their laws either to totally prohibit the use of cannabis or to restrict it for scientific and medical purposes (Booth, 2003; Kraenzel et al., 1998; Paterson, 2009; UNODC, 2009b). These moves also severely restrict commercial hemp farming, as the local laws tend to target the cannabis plant (of which hemp is a variety).

2.1.4 Emerging global trends and attitudes towards cannabis

As Decorte and Potter (2015, p. 221) explain:

Historically, the spread of cannabis cultivation across the globe primarily reflected the industrial utility of hemp. It is [only] with the emergence of modern patterns of cannabis use in the developed world that we have seen major changes in patterns of cannabis production. As demand for cannabis increased globally, fuelled by the developments of the ‘counter-culture’ of the 1960s and 1970s, so cultivation in the developing world began to take on new dimensions.

Decorte and Potter (2015) further argue that demand in developed countries for cannabis as a drug has led to large-scale cultivation of the plant in developing markets that did not have the traditions of cannabis cultivation found in Asia and the Middle East. This view is still observable in the UNODC (UNODC, 2007, 2009a, 2009b, 2012, 2014) studies that consistently highlight increasing cannabis production trends in developing markets, and point out that the major trafficking routes primarily lead to developed markets (see Figure 1).

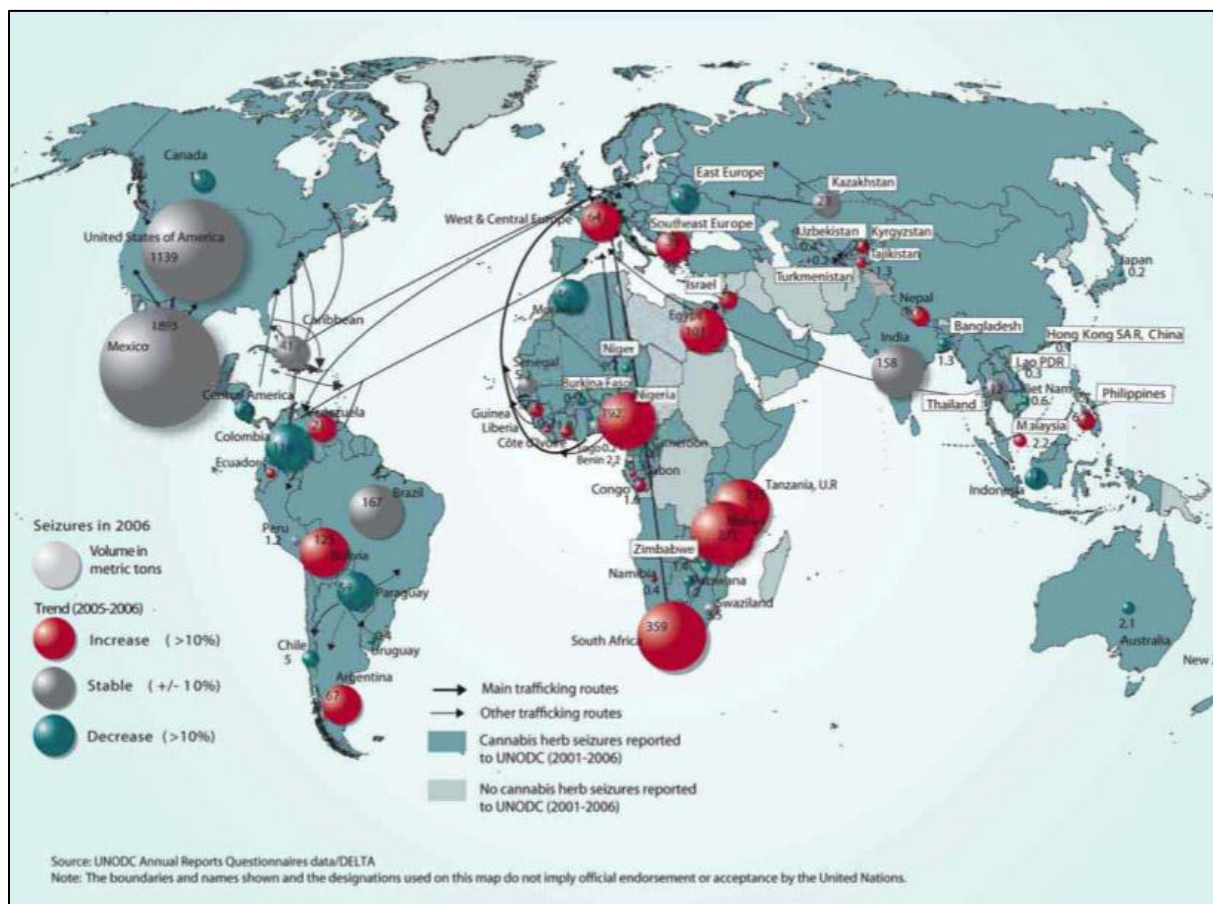


Figure 1: Trafficking trends and routes of cannabis (UNODC, 2009b, p. 106)

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Globally the perceived risks of cannabis consumption have been on a downward trend for some time, and countries are beginning to reassess their position on cannabis prohibition (Decorte & Potter, 2015; Quah et al., 2014; UNODC, 2014). While legal approaches to cannabis vary around the world and are changing, as of April 2015 the recreational use of cannabis is completely legal (at national level) only in Uruguay and North Korea. However, many countries either do not strictly enforce cannabis prohibition or have decriminalised its use (Decorte & Potter, 2015). In the US, four states have legalised cannabis use, but it remains illegal at federal level. The general consensus is that if the trend of state-level legalisation continues, a push for national-level legalisation is possible within the next 10 years (Quah et al., 2014).

Nonetheless, the United Nations (1972) Single Convention on Narcotic Drugs of 1961 serves as a key international treaty that prohibits production and supply of cannabis, among other drugs, globally. This Convention classifies the cannabis plant's flower and cannabis resin as a schedule I drug, together with cocaine and heroin (United Nations, 1972). The Convention does however distinguish between the uses of the cannabis plant, and explicitly exempts cannabis if it is grown for industrial purposes (industrial hemp fibre and seed) or horticultural purposes (United Nations, 1972). The Convention is further supported by the United Nations (1988) Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988.

In 2016, a Special Session of the United Nations General Assembly on the World Drug Problem (UNGASS 2016) has been scheduled in which debate on the current emphasis on punitive approaches to drugs classified as illicit will be discussed (UNODC, 2015a). Undoubtedly this session will also raise the issue of cannabis as a schedule I drug given that Uruguay (a signatory to both conventions discussed above) has legalised cannabis at national level.

2.2 A brief overview of the cannabis plant

Indian hemp, ganja, kif, marijuana and dagga, among many other names (Abel, 1980; Booth, 2003; Crampton, 2015; Gastrow, 2003; Herer, 1985), refer to the species of plant known as *Cannabis sativa*. This plant, according to the UNODC (2015b, p. 277), is “grown almost everywhere in the world”, yet taxonomists are unable to reach consensus in terms of the sub-species associated with it (R. Clarke & Watson, 2007). Some taxonomists divide the species into two sub-species based primarily on cannabinoid content and uses (medicinal/recreational and industrial), for example. Other taxonomists divide the cannabis plant into three separate species: *Cannabis sativa*, *Cannabis indica* and *Cannabis ruderalis*. Another group refuses to acknowledge *Cannabis ruderalis* as a sub-species (R. Clarke & Watson, 2007). In this research report, *Cannabis sativa* is considered to include all wild, hemp and drug cannabis races, much as Clarke and Watson (2007) treat the issue.

This confusion in biological sub-definitions explains to a large extent why hemp cultivation, other than for research purposes (often commissioned or at least controlled by the respective governments), is forbidden in many countries around the world, including South Africa (Abel, 1980; Agricultural Research Council, 2014; Booth, 2003; Herer, 1985; Johnson, 2015; South Africa. Department of Agriculture, Forestry and Fisheries, 2012). How does a regulator cost-effectively distinguish between a cannabis plantation for the purposes of industrial hemp and for the purposes of the illicit drug trade?

There are many varieties of cannabis plant and, quite often, colloquial terminology broadly refers to cannabis used for its psychoactive (narcotic) properties as “marijuana” and to cannabis used for industrial purposes as “hemp”. Marijuana and hemp come from the same species of plant, *Cannabis sativa*, but from different varieties of this species (Booth, 2003; Johnson, 2015).

The primary distinction between the varieties of cannabis called hemp and marijuana is observable at the genetic level and can mainly be discerned by the plant’s chemical properties (Johnson, 2015). “Cannabis can be separated into psychoactive and non-psychoactive cultivars according to the ratio of Delta-9 tetrahydrocannabinol (THC), the primary psychoactive agent, and cannabidiol (CBD). Hemp plants have a relatively low THC:CBD ratio compared with marijuana” (Datwyler & Weiblen, 2006, p. 371). While differing at the genetic level, hemp and marijuana are identical in appearance (Booth, 2003; Fortenbery & Bennett, 2004; Herer, 1985; Johnson, 2015).

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The only distinction between hemp and marijuana visible to the naked eye results from the cultivation practices (see Figure 2). Hemp is usually planted very densely so as to focus plant growth in the stalk, as this maximises fibre strength and content of the plant. By contrast, cannabis grown for its psychoactive properties is planted less densely, and the plants are encouraged to produce multiple branches that maximise flower production, as the psychoactive agent THC is most abundant in the flowers (Booth, 2003; Johnson, 2015).

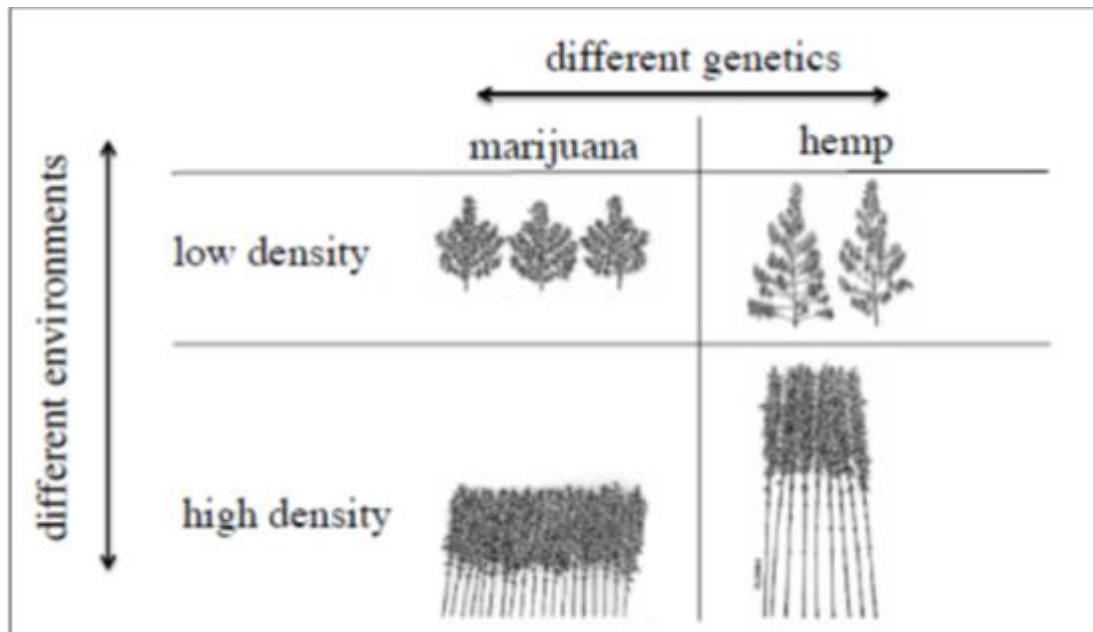


Figure 2: Differences between cannabis grown for industrial and for narcotic purposes (Johnson, 2015, p. 3)

Despite this distinction, definitively identifying cannabis grown for industrial purposes (hemp) and cannabis grown for its psychoactive properties, based on observation alone, can be extremely difficult – as demonstrated by the plantations shown in Figure 3. Wynn's (1998) South African Hemp Feasibility Report proposes that narcotic cannabis-producing parts of South Africa need to be excluded as potential industrial hemp-growing sites for precisely this reason.

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Figure 3: The differing cultivation patterns of industrial and psychoactive cannabis plantations(Ap Dewi, 2014; Harris, 2010 respectively)

2.3 Industrial uses of cannabis

Hemp, also called ‘industrial hemp,’ refers to cannabis varieties that are primarily grown as an agricultural crop (such as seeds and fibre, and by-products such as oil, seed cake and hurds) and is characterized [sic] by plants that are low in THC. (Johnson, 2015, p. 1)

The parts of the cannabis plant that are relevant for industrial applications can be broadly divided into (a) the hemp seeds, which are found in the flowers of the plant, and (b) the plant stalks, which are made up of fibre and hemp hurd (Kraenzel et al., 1998). These components can be further processed in various ways to produce the vast array of industrial and consumer products, as identified by Fortenbery and Bennett (2004), Herer (1985) and Kraenzel et al. (1998), among others. Figure 4 highlights some of the major potential uses of industrial hemp.

Regardless of the plant’s varied uses, Fortenbery and Bennett (2004) found that while hemp can compete on margin with traditional row crops, it may be less profitable than other specialty crops. This observation may be related to the decline in industrial hemp that was observed in the US in the late 1800s (Fortenbery & Bennett, 2004; Herer, 1985). Fortenbery and Bennett (2004) suggest a major constraint to a viable commercial hemp industry in the US to be the high cost of harvesting and processing, as these are found to be very labour-intensive. As hemp farming is illegal in the United States (Johnson, 2015), it is likely that more cost-effective harvesting and processing technology has not been developed. This situation may be rectifiable over the longer term with the aid of appropriate investment.

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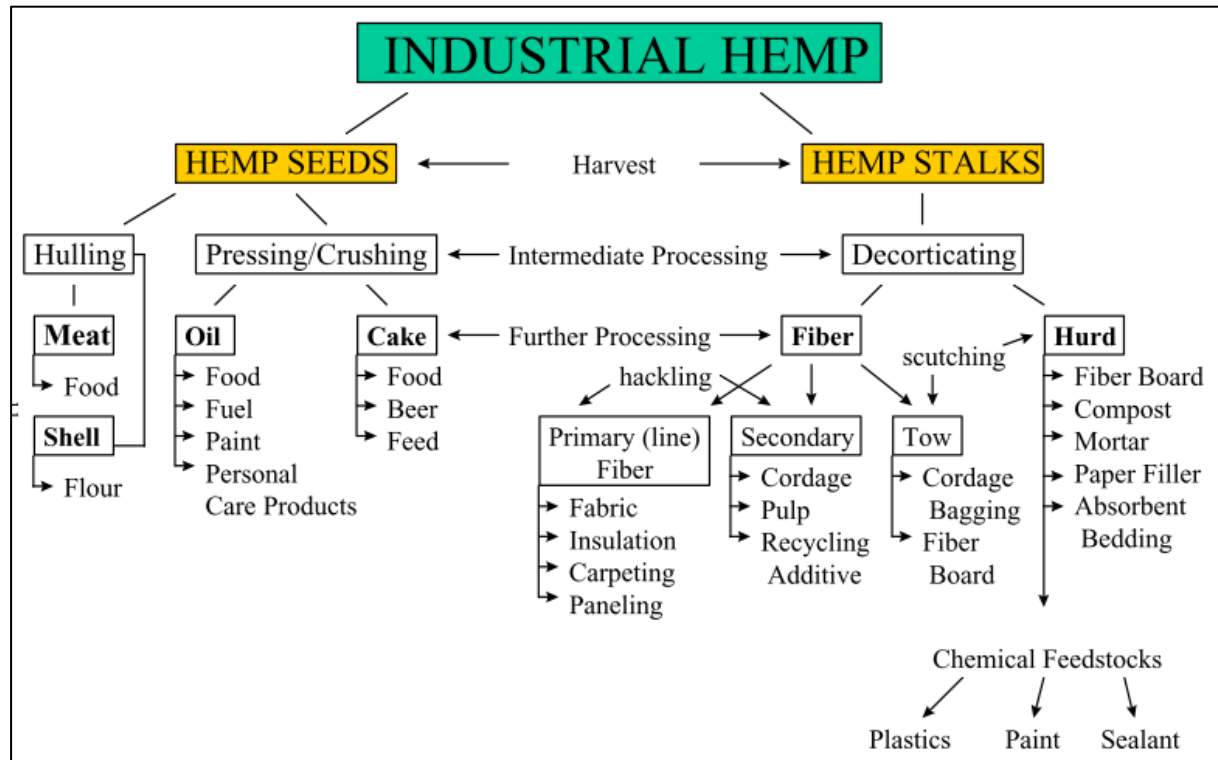


Figure 4: Potential uses of industrial hemp (Kraenzel et al., 1998, p. 10)

As confirmed by Johnson (2015) and Kraenzel et al. (1998), the ARC (2014) identifies 25 000 consumer products that can be produced from hemp, with applications in many industries including but not limited to:

- automotive
- construction material
- food and beverage
- cosmetics
- agriculture
- paper
- textiles

While the above examples support the versatility argument for industrial hemp, it is important to note that:

With such a wide variety and large number of uses, there is a great amount and rather diverse group of competitive commodities, raw materials and products. Cotton, lumber, and fossil fuels are some of the biggest and more powerful of these competitors. There are also minor crops such as jute, flax, abaca, and kenaf that might compete with or substitute for industrial hemp based on certain similarities. (Kraenzel et al., 1998, p. 5)

More detail and supporting research on the potential applications of industrial hemp in various sectors of the economy are provided in Appendix A (section 8) of this report.

2.3.1 The agronomics of industrial hemp

In “A Profile of the South African Hemp Market Value Chain”, the DAFF (2012) refers to hemp trials that have been conducted in South Africa, suggesting that industrial hemp can be grown in several of the country’s provinces. The South African Agricultural Research Institute has hemp trails running in seven provinces (South Africa. Department of Agriculture, Forestry and Fisheries, 2012), implying that the South African climate is favourable for cultivation of industrial cannabis.

Kraenzel et al. (1998) conducted an assessment of the agronomics of hemp and found that optimal conditions for industrial hemp cultivation require a mild, humid climate, though they concede that because the plant is so resilient, it is able to grow in almost any kind of climate, provided there are four (fibre) to six (seed) months free of killing frosts.

Multiple studies cite hemp as having been found to be an extremely effective weedkiller that does not require chemicals in production (Fortenbery & Bennett, 2004; Kraenzel et al., 1998; Van der Werf & Turunen, 2008). Van der Werf and Turunen (2008) further argue that hemp needs less water than many other natural sources of fibre that are mass-cultivated globally.

Certain of its properties have revealed hemp to be an excellent rotational crop that maintains, and in some instances enhances, the quality of the soil in which it is planted, while helping to minimise weeds from farmers’ fields, if not eradicate them altogether (Fortenbery & Bennett, 2004; Johnson, 2015; Kraenzel et al., 1998).

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2.3.2 The state of the industrial hemp market

As of 2015, there appear to be only 30 countries that allow hemp farming. This can to a large extent be explained by the international treaties discussed above, coupled with the difficulty that authorities may have in distinguishing between industrial and narcotic cannabis (Fortenbery & Bennett, 2004; Johnson, 2015; South Africa. Department of Agriculture, Forestry and Fisheries, 2012).

Johnson (2015) found that hemp cultivation measured in acreage has been stagnant at around 200 000 acres globally in 2011, but production has varied annually on an upward trend from 113 million kilograms in 1999 to more than 172 million kilograms in 2011, mostly driven by growth in hemp seed production.

Studies by Fortenbery and Bennett (2004), Johnson (2015) and Kraenzel et al. (1998) conclude that the current global hemp market is artificially constrained by the regulatory regimes that prevent production globally. Fortenbery and Bennett (2004) point out that hemp appears to be slightly more profitable than traditional row crops. But it is critical to keep in mind that countries unable to produce hemp locally must factor in a transport cost, which may very well negate the relative cost advantage that hemp may have over traditional alternatives. This could support the cited observations of the hemp market being artificially constrained.

Kraenzel et al. (1998) attempted to assess the market for hemp in the US by applying a strategic market management system (SMMS) framework which explores the internal and external factors shaping a market. The framework is outlined in Figure 5. The approach is not dissimilar to the use of Porter's five forces analysis, but this SMMS framework requires a higher degree of granularity in its interpretation.

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Figure 5: The SMMS framework (Kraenzel et al., 1998, p. 8)

While the SMMS framework provides a robust assessment of the market, the level of detail (data and analysis) that is required to populate the framework's components may render it inappropriate for this research report. Furthermore, as the research question focuses on the legalisation of the cannabis plant rather than industrial hemp alone, this framework may not be suitable due to the vastly differing markets for industrial hemp and cannabis that is used for its psychoactive properties. The SMMS framework also does not explicitly take into account social considerations, which is a key component of the research question.

2.4 Medical applications of cannabis

Despite evidence that cannabis has been used in medicine for over 2 000 years, the United Nations conventions treat it as a schedule I drug on the basis that it has no medicinal uses (Nutt, King, & Nichols, 2013; United Nations, 1972). A review of the pharmacological actions of cannabis and its components (cannabinoids) by Kumar, Chambers and Pertwee (2001) confirms that multiple studies have proven cannabis to have medicinal and/or therapeutic value, particularly with regard to multiple sclerosis, cerebral palsy, spinal cord injuries, chronic pain, nausea and vomiting associated with chemotherapy and other anti-cancer drugs, appetite stimulation (particularly with regard to AIDS-related illness or terminal cancer), epilepsy, glaucoma, bronchial asthma, and certain mood disorders and psychiatric

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conditions. The report indicates that there is a need for further controlled studies, which historically have been lacking as a direct result of government and international policy with respect to cannabis (Kumar et al., 2001; Nutt et al., 2013).

An article in the *SAMJ* highlights the need for the South African government to be more supportive of research into medical uses of cannabinoids, particularly with regard to benefits for HIV/AIDS patients (Parry & Myers, 2014). Parry and Myers (2014) examine the harm associated with cannabis use. While noting that their prior studies suggest a link between cannabis use and road traffic accidents, property crime, sexual HIV-risk behaviours and murder, the authors concede that these studies fail to prove causality (Parry & Myers, 2014). Indeed, they caution that the harm associated with cannabis use “should not be overstated, as they do not affect all people who use cannabis. Certainly, at a community level the harms are a lot fewer than those associated with alcohol and tobacco use” (Parry & Myers, 2014, p. 400).

A more recent *SAMJ* article argues that the South African Government needs to go beyond exploring legalisation of cannabis for medical purposes:

There is good evidence that decriminalisation of the use of drugs reduces the harms of drugs, reduces the power of the drug lords, and generates revenue for the government. Marijuana is much less harmful than the two legalised drugs, alcohol and tobacco, and has potential medical benefits. A good case can be made for its legalisation and regulation. This would also enable the longer and more complicated medical research to proceed legally, and for those who use marijuana for medical or social purposes to do so of their own accord and without persecution. Bold leadership and action, rather than further revisions of the NDMP [National Drug Master Plan], are required. (Van Niekerk, 2014, p. 387)

Sznitman and Bretteville-Jensen (2015, p. 6) conducted a robust regression analysis of two nationally representative samples of adults in Norway and Israel in order to explore “the relationship between support for medical cannabis legalization [sic] and three beliefs commonly underlying medical cannabis debates, namely that (1) cannabis has medical benefits, (2) cannabis is addictive and (3) medical cannabis legalization [sic] leads to spillover [sic] effects”. The researchers suggest that “public support for medical cannabis legalization [sic] is likely to continue to grow” (Sznitman & Bretteville-Jensen, 2015, p. 7). This suggestion is based on their observations that “the scientific evidence supporting medical

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benefits of cannabis seems continuously to grow” and that “the belief in the medical benefits of cannabis is particularly important to public support for medical cannabis legalization [sic]” (Sznitman & Bretteville-Jensen, 2015, p. 8). The study also notes that public health, harm and crime (the spill-over effects) have less bearing on public support for medical cannabis legalisation (Sznitman & Bretteville-Jensen, 2015).

2.5 Cannabis as a drug

As discussed in section 2.1.3, the primary reason for cannabis prohibition being the norm globally is the real and perceived harm that is associated with consumption of the plant as a narcotic.

2.5.1 Laws, policies and enforcement in South Africa

As of November 2015, three pieces of local legislation support the prohibition of cannabis in South Africa:

1. The **Drugs and Drug Trafficking Act, 1992 (Act No 140 of 1992)**, which prohibits the possession, processing, transportation and commercialisation of any part of the cannabis plant. This Act is enforced by the SAPS and is supplemented by Acts such as the Prevention and Treatment of Drugs Dependency Act (No 20 of 1992), the Prevention of Organised Crime Act (No 121 of 1998), the Financial Intelligence Centre Act (No 38 of 2001) and the Pharmacy Act (No 53 of 1974) (Marks & Howell, 2015).
2. The **Medicines and Related Substances Act, 1965 (Act No 101 of 1965)**, which allows possession and cultivation of cannabis for research purposes only (South Africa. Department of Agriculture, Forestry and Fisheries, 2012). Section 22A (9) (a)(i) of this Act requires a permit to be obtained from the Department of Health.
3. “The **Environmental Conservation Act, 1989 (Act No 73 of 1989)**, which describes *Cannabis sativa* as a declared weed or invasive alien plant species. This Act is enforced by the Department of Environmental Affairs and Tourism,” (South Africa. Department of Agriculture Forestry & Fisheries, 2012, p. 30).

The key piece of legislation is the Drugs and Drug Trafficking Act, 1992, which supports a punitive model of regulation focused on removing drugs and drug users from society through seizure and arrest (Marks & Howell, 2015).

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The CDA [Central Drug Authority] was established as an advisory body in terms of the Prevention of and Treatment for Substance Abuse Act (Act No. 70 of 2008) and is mandated to assist in the fight against substance abuse in the country. (Central Drug Authority, 2015a)

In 2013 the CDA (2013) issued a new version of the National Drug Master Plan (NDMP). The most apparent difference between the 2013 NDMP and its 2006 predecessor is that the latter aimed to realise “a drug-free society” (Central Drug Authority, 2006, p. 13) while the former has the more grounded aspiration of realising “a society free of substance abuse” (Central Drug Authority, 2013, p. 71). The new NDMP supports continued supply reduction techniques which include “destroying cannabis (dagga) crops in the field” (Central Drug Authority, 2013, p. 29). Despite efforts by the SAPS to quell production, the UNODC (UNODC, 2007, 2009a, 2014, 2015b) has consistently reported increased supply of cannabis from southern Africa. The NDMP concedes, however, that given the shifting global stances on cannabis,

there is a need for an in-depth investigation of (1) the dynamics of cannabis use and related harm in South Africa, as well as (2) the relevance of current international/local policies regarding cannabis use, including measures such as legalisation and/or decriminalisation. (Central Drug Authority, 2013, p. 132)

Significantly, the CDA (2015b) emphasises that the level of government spending on drug-related issues is “difficult to estimate as expenditure is spread across national, provincial and local government departments, agencies and statutory organisations.”

The CDA’s (2013) new NDMP appears to take a more progressive stance in terms of reform of drug policies and includes harm reduction as a third pillar, along with reductions in production and distribution of drugs. But the plan has been found to be:

riddled with internal inconsistencies and impractical resolutions. As a result, it will be extremely difficult to implement and unlikely to find utility in many South African cities and communities. The authors further argue that the plan has been designed in such a way that it absolves the government of any responsibility should it fail. It does so by subtly ensuring that blame for drug use can continue to be placed on the individual. This requires a punitive understanding of drug use, which is in direct contrast to the stated framework of the plan. (Howell & Couzyn, 2015, p. 1)

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Echoing this view, a yet to be published ethnographic exploration of the policing of illegal substances in South Africa found that:

the plans [NDMPs] are, however, not well distributed, and are often completely unknown to the very officials (the police in particular) who are tasked with the regulation of illegal substances and users on a daily basis. No real guidelines for harm reduction programmes/strategies exist within the plans. (Marks & Howell, 2015)

South African crime statistics show that drug-related crimes have increased at a compound annual growth rate of 10.9% per annum over the last 10 years, as shown in Figure 6 (SAPS, 2015b). Thus, drug-related crime, as a share of total crimes, has increased from 4.2% in 2006 to 11.9% in 2015, suggesting that police resources (officers and time) are increasingly being allocated to drug-related crimes (SAPS, 2015b).

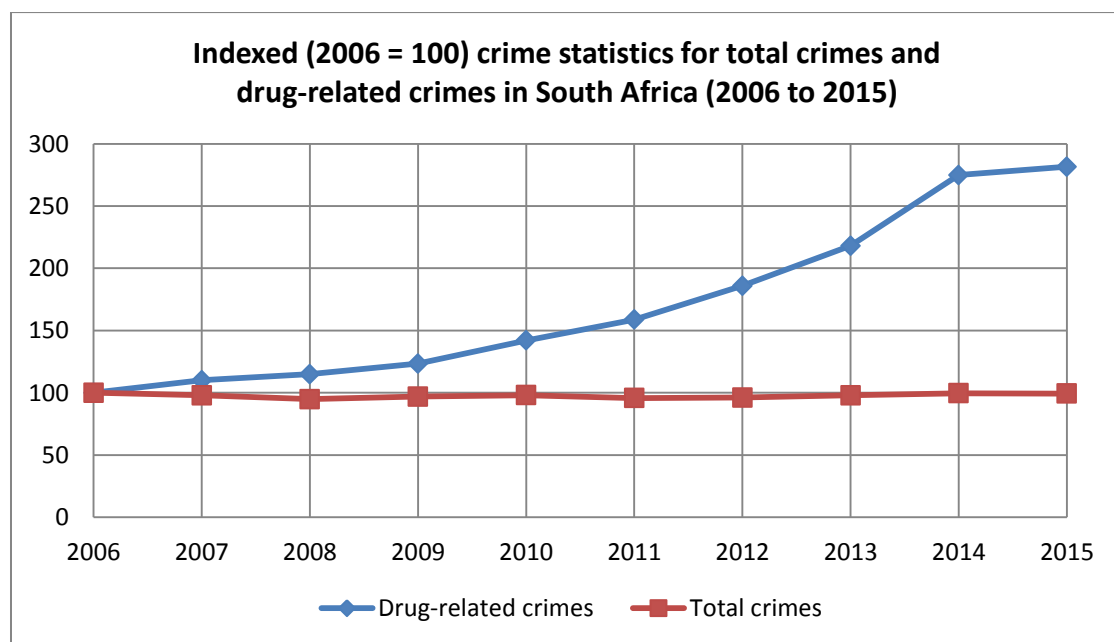


Figure 6: *Drug-related crimes have increased exponentially over the last 10 years* (SAPS, 2015b)

Perhaps the most concerning emerging trend pertains to the ratio of reported drug-related crimes to individuals incarcerated for narcotics charges in South Africa. The most recent available data for incarcerations given by the Department of Correctional Services (DCS) (2012) is for 2011/12: The official inmate count for narcotics-related charges stood at 4 645 individuals. This is a far cry from the 134 687 reported drug-related crimes for 2010/11, allowing a one-year lag for court processes (SAPS, 2015b). Comparing these two figures suggests a ratio of 1:29 in terms of incarcerations to recorded drug-related crime. This ratio is conservative – it does not take into account the possibility that some of the

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4 645 inmates were serving long-term sentences for offences prior to 2010. Nonetheless, this gap implies that the vast majority of reported drug-related crimes either do not result in arrests (due to difficulty of apprehension or lack of evidence) or are not significant enough to warrant prison terms. This suggests that many reported drug-related crimes involve narcotics possession¹ rather than distribution, which raises the question of whether police efforts could be better deployed to enforce/foster harm reduction with regard to drug-related crimes.

Figures on cannabis-related crimes are not publically available, but perhaps more worrying is the fact that the SAPS statistics do not distinguish between crimes related to distribution of drugs and possession of drugs. This is a particular concern given that the SAPS Annual Report provides a quantitative growth target of “13%” for the reporting of unlawful possession of and dealing in drugs for 2016 (SAPS, 2015a, p. 130). A report published by UCT’s Centre of Criminology discusses the concerns that emerge: “It is relatively easy to accelerate the arrest of users, while having very little impact on suppliers or the overall size or harm of the market” (De Kock, Kriegler, & Shaw, 2015, p. 41). The growth target clearly poses a direct challenge to police officers attempting to enact the NDMP’s harm-reduction goal.

The SAPS Air Wing had sprayed “529.2 hectares of cannabis fields in the Eastern Cape, valued at R685 314 000” (SAPS, 2015a, p. 183) in an effort to curb supply. Subsequently, the SAPS (2015c) issued a media brief commenting that their helicopters “sprayed over 500 hectares of these plantations which had the potential street value of billions of rands”, revealing inconsistency in reporting the rand value of cannabis destroyed.

The SAPS (2015c) states that the cannabis plantation-spraying operations have been taking place for the last 20 years, and that the chemical used to neutralise the cannabis plants is called Kilo Max, a glyphosate-based herbicide. A comprehensive review of studies pertaining to the safety of glyphosate-based herbicides concludes that these herbicides do not pose health risks to humans or other mammals (Williams, Kroes, & Munro, 2000).

¹ The Drugs and Drug Trafficking Act, 1992 stipulates that possession of less than 115 grams of cannabis may be considered a minor offence.

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However, the SAPS (2015c) concedes that:

unfortunately, in these dagga-spraying exercises no arrests are made as one cannot identify who is actually responsible for the cultivation of these plantations. These plants are generally found in communal areas and therefore, it will be practically impossible to prove possession.

The SAPS approach, which is largely informed by the NDMP in terms of supply eradication, also appears to be misguided and suggests that the costs associated with the annual spraying of cannabis plantations in the Eastern Cape may be yielding very little by way of absolute supply reductions of cannabis. Research confirms that supply eradication, particularly of crop-based drugs, is ineffective and results in the balloon effect hypothesis, which proposes that eradication of plantations in one area simply displaces plantations to another area (Decorte & Potter, 2015; MacCoun & Reuter, 2001; Quah et al., 2014). This may be particularly true of South Africa's rural dagga farmers, whose plantations tend to be in areas that are difficult for police to reach and where the small-scale nature of each plantation allows for easier dispersion (Kepe, 2003; Legget, 2001; Paterson, 2009).

Despite all of the SAPS efforts, it concedes that "cannabis remains the most prevalent illicit drug" on the local market (SAPS, 2015a, p. 155). This, coupled with the rising volume of cannabis seizures and drug-related crime, suggests that the enforcement-led approach appears to be failing to curtail demand or supply of cannabis in South Africa.

In 2013 Van Kerken (2013), of the Anti-Drug Alliance (South Africa), attempted to quantify the cost of drug law enforcement in Gauteng province based on publically available information. He determined that the cost of arrests and subsequent incarceration was in the region of R290 million in 2012, a substantial figure which needs to be explored further and expanded to national level in order for one to begin understanding the true cost of enforcing South Africa's current policy on cannabis (Van Kerken, 2013). Van Kerken's (2013) approach, while logically sound, suffers from a lack of data and therefore necessitates significant use of assumptions, which may raise questions about the validity of his findings. In order to account for this, Van Kerken (2013) suggests that the R290 million is a conservative estimate. Furthermore, the estimate does not include the full cost of policing as he was unable to determine the costs associated with information and intelligence gathering, as well as the above-discussed police efforts in sizable seizures and

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destruction of cannabis (and other drugs) that did not result in any arrests (Van Kerken, 2013).

Nevertheless Van Kerken's (2013) research can be used to determine that the cost of enforcement for each drug-related crime (cost of reporting, arrest and incarceration, if applicable) is in the region of R12 609 on average. If extrapolated to the national data on drug-related crimes for 2013, the cost of enforcement amounts to R2.61 billion (SAPS, 2015b). Notably, Van Kerken (2013) found that on average each arrest yielded just R565 worth of seized drugs. Comparing the extrapolated cost of enforcement to drugs seized yields a cost to seizure ratio of 223:10 (R2 607 m:R117 m).

In possible testament to the observation that the current globally accepted enforcement-led policies on cannabis are failing, the UNODC (2015b) estimates global cannabis use prevalence rates at between 3.9% (best estimate) and 4.9% of the global population, representing between 182 and 232 million people. The 2015 World Drug Report does not include prevalence rates for South Africa, although these have previously been reported at 8.9% by the UNODC (2009c; 2015b). However, the 2015 report does provide guidance on cannabis use prevalence rates for southern Africa:² between 5.0% (best estimate) and 9.1% (upper bound) (UNODC, 2015b). Applying this range of prevalence to the latest available South African population statistics indicates that the country has between 2.65 and 4.82 million cannabis users, all of whom are effectively considered to be criminals under the current prohibitionist/enforcement-led regime (The World Bank, 2014; UNODC, 2015b).

² As defined by the UNODC (2015b), southern Africa includes South Africa, Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe.

2.5.2 Crime and cannabis

The argument that access to cannabis leads to increased crime rates, which pose a greater threat to public health and safety, has been used to justify the enforcement-led approach that many jurisdictions still adopt today (Joffe & Yancy, 2004; Quah et al., 2014). Yet very little empirical evidence has been provided to support these claims (Morris, TenEyck, Barnes, & Kovandzic, 2014).

Sznitman and Zolotov (2015) conducted the most recent and comprehensive literature review study currently available on the effects of cannabis for therapeutic purposes (CTP) on public health and safety. Their research subjected 28 prior studies to a robust set of exclusion criteria which included peer review status, empirical evidence and publication/journal reputation (Sznitman & Zolotov, 2015). The results of their study can be viewed through three lenses:

1. **CTP and illegal cannabis use.** Only two out of the 28 studies suggest that relaxations in CTP policy led to increased illegal cannabis use. This implies that most of the currently available literature sees no link between easing CTP policy and illegal cannabis use (Sznitman & Zolotov, 2015).
2. **CTP and other public health issues.** This area has had much less attention from researchers, and as a result Sznitman and Zolotov (2015) were able to identify only five qualifying studies for their review. Nevertheless, “collectively, findings suggest that CTP legalization [sic] may on one hand reduce alcohol use and suicide rates, while on the other hand increase unintentional ingestion by children” (Sznitman & Zolotov, 2015, p. 25). Some geographic variability is noted, and further research may be required.
3. **CTP, crime and neighbourhood disadvantage.** Sznitman and Zolotov (2015) identified four qualifying studies for this content theme. Only one of the studies confirmed a positive relationship between cannabis dispensaries and higher localised rates of crime (Sznitman & Zolotov, 2015). However, this study explains the finding by observing that dispensaries tend to be disproportionately established in communities already experiencing high crime rates (Sznitman & Zolotov, 2015). Two studies identified by the authors confirm no or a negative relationship between dispensaries and crime rates, while the final study proved inconclusive (Sznitman & Zolotov, 2015).

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Sznitman and Zolotov (2015) hesitate to make conclusive statements regarding their findings because, as they note, the current literature – which supports the notion that CTP does not pose a threat to public health and safety – is insufficient. They postulate that because CTP policies are changing and incorporating greater commercialisation, CTP's full effect on public health and safety is yet to be fully experienced (Sznitman & Zolotov, 2015). Ongoing research supported by scientific data on this subject is clearly required.

Morris et al. (2014) conducted a study relying on US state panel data, for the period 1990 to 2006, to analyse the association between state medical marijuana laws and state crime rates for homicide, rape, robbery, assault, burglary, larceny and motor vehicle theft. Their findings show no evidence that crime rates increased as a result of changes to medical marijuana laws; in fact, their research suggests that slight reduction in personal crimes may be expected as a result of more relaxed medical marijuana laws (Morris et al., 2014).

The findings of the above study are echoed by a 2010 Norwegian longitudinal study spanning 14 years, which proposes that “the use of cannabis does not seem to represent a risk factor for a general criminal involvement but that it may be associated with a considerable risk of receiving a drug-specific criminal charge” (Pedersen & Skardhamar, 2010, p. 116). Furthermore, this study demonstrates that the associated cannabis-related criminal charges may have “a real, detrimental impact” on the lives of youths charged with these crimes (Pedersen & Skardhamar, 2010, p. 116). This is not counter-intuitive, particularly as finding employment with a criminal record may be challenging and could lead youths to seek alternative methods of earning a living, often through illicit activities.

Pedersen and Skardhamar's (2010) study also suggests that socio-demographic, family and personal factors may have greater influence in driving criminal behaviour than cannabis use alone.

2.5.3 Harm caused by cannabis as a narcotic

In 2010 the United Kingdom's Independent Scientific Committee on Drugs published a report that sought to assess the harm caused by the misuse of different licit and illicit drugs, with a view to informing policymakers of potential intervention focus areas (Nutt, King, & Phillips, 2010). The authors conducted a multi-criteria decision analysis in which 20 drugs were scored according to 16 criteria that were divided into nine sets of sub-criteria – one relating to harm caused to the individual consuming the respective drug, and the other eight criteria being associated with the effect or harm on others (Nutt et al.,

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2010). Appropriately weighted to indicate their relative importance, the 16 criteria were further clustered into types of effect (physical, psychological and social), as indicated in Figure 7. The criteria were developed by the Advisory Council on the Misuse of Drugs, and the relative scores assigned to each respective drug and criterion were informed by a panel of drug-harm experts. While the criteria were sufficiently broad, the approach adopted for the research left room for subjectivity on the experts' part. However, the fact that the panel included independent experts may have minimised subjectivity.

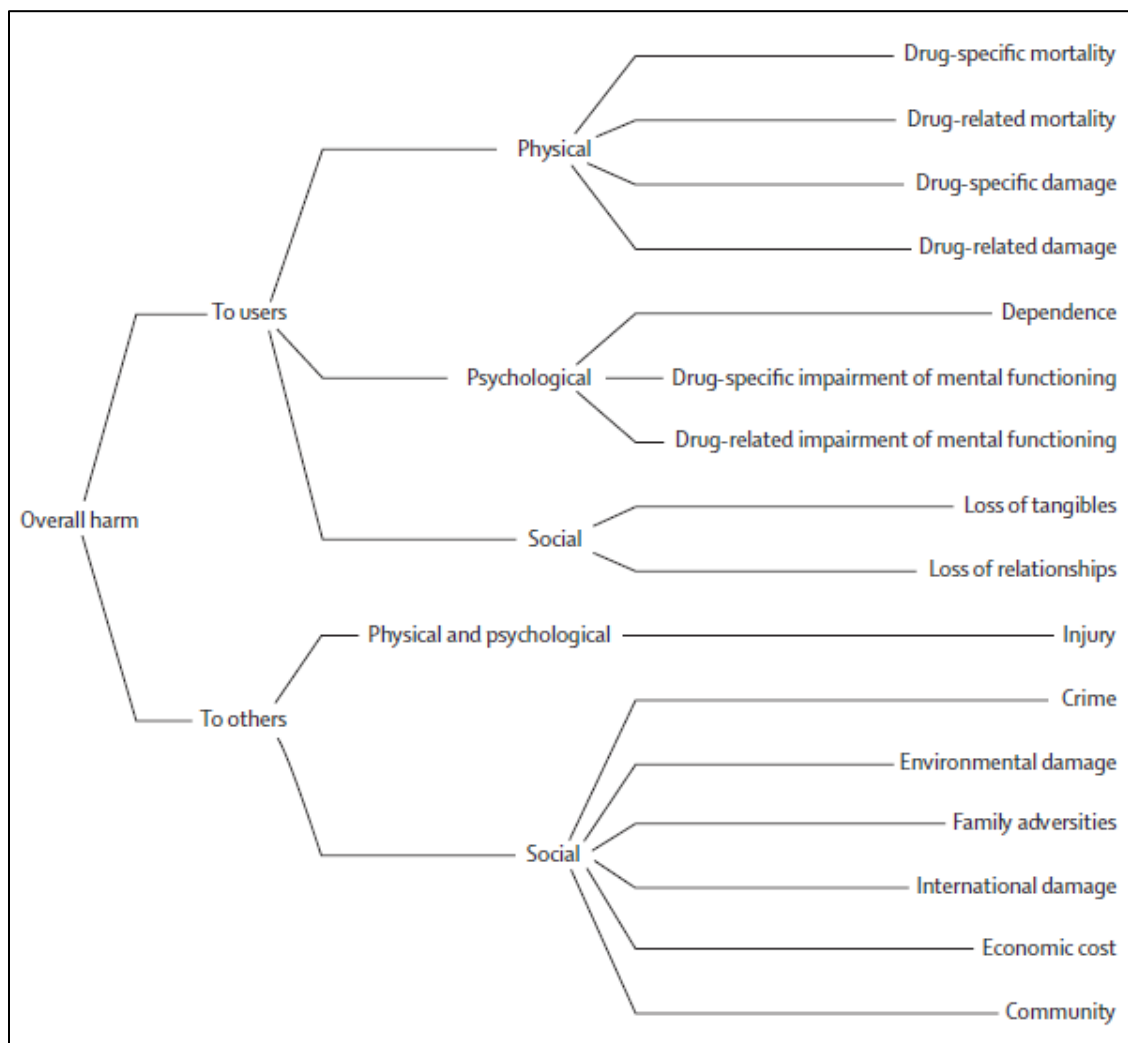


Figure 7: Division of the evaluation criteria used in multi-criteria decision analysis of drug harm (Nutt et al., 2010, p. 1559)

Nutt, King and Phillips' (2010) report encompasses social and economic costs associated with the use of various drugs, which may contribute some insight to the research question in that it quantifies the cost component of the cost–benefit analysis, albeit only relative to other drugs. While the validity of this study may be difficult to dispute, its methodology alone does not sufficiently lend itself to answering the research question.

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The results of Nutt, King and Phillips' (2010) study determine that the harm of cannabis use on a relative basis are fewer than those of both tobacco and alcohol (see Figure 8). This study is specific to the United Kingdom, but the harm associated with drug use should be transferable geographically, and therefore inferences based on this study can be made for the South African context. In a US-based study Macleod et al. (2004, p. 1586) echo the sentiment that the harm of cannabis use has been exaggerated in the public domain, concluding that "despite widespread concern, we have found no strong evidence that use of cannabis in itself has important consequences for psychological or social health".

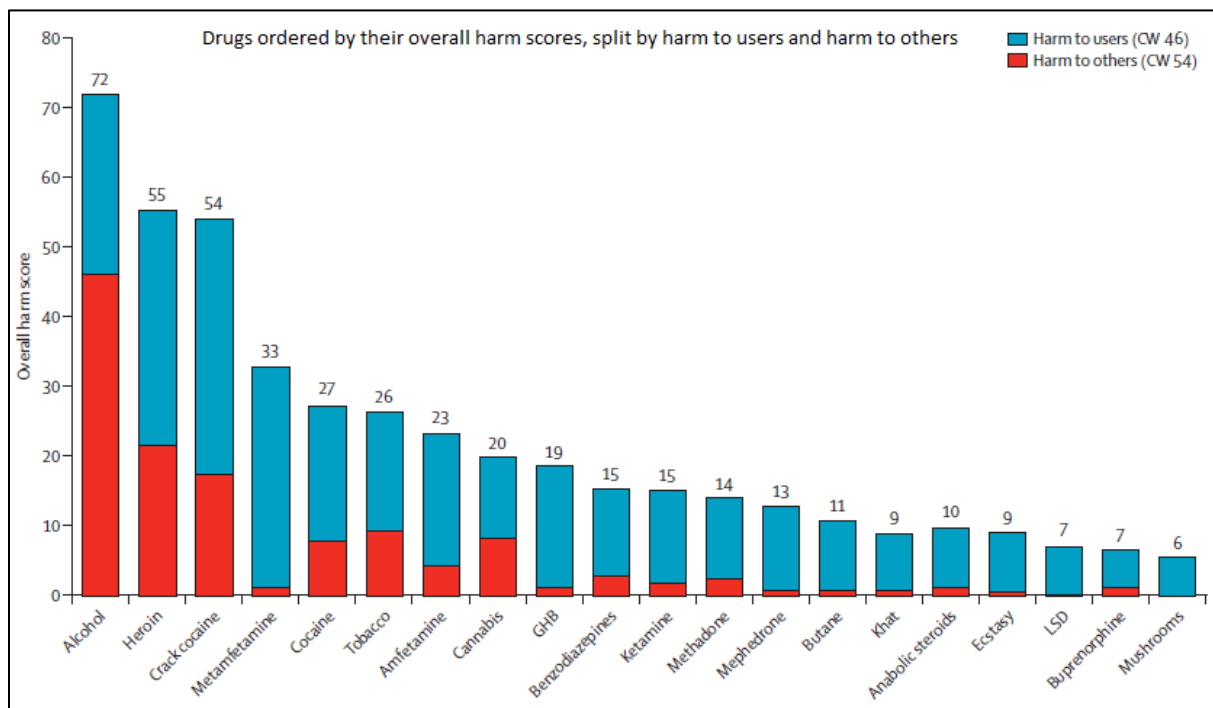


Figure 8: Component and overall drug-specific harm scores (Nutt et al., 2010, p. 1561)

A previous article by Nutt, King, Saulsbury and Blakemore (2007) conclusively determines that the current classification of drugs appears to be arbitrary. This finding is not surprising when one considers the historical context of cannabis prohibition, which does not appear to be rooted in scientific principles (as discussed in section 2.1.2 with regard to the South African context).

A Harvard Medical School study by Proal, Fleming, Galvez-Buccollini and DeLisi (2014) sought to definitively assess the well-publicised and widely upheld causality link between cannabis use and schizophrenia, which has often been cited as a major risk of cannabis consumption (Central Drug Authority, 2013; Macleod et al., 2004; Peltzer & Ramlagan, 2007). The research found that the majority of prior studies identifying an

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association between cannabis use and schizophrenia consistently fail to demonstrate causality – cannabis was rather viewed as a catalyst (Proal et al., 2014). Proal et al. (2014, p. 287) conclude that “cannabis does not cause psychosis by itself. In genetically vulnerable individuals, while cannabis may modify the illness onset, severity and outcome, there is no evidence from this study that it can cause the psychosis”. Perhaps the persistent rhetoric surrounding cannabis-induced schizophrenia by the mass media and prohibitionists is a result of confirmation bias?

Kumar, Chambers and Pertwee (2001), citing multiple prior studies, confirm that acute toxicity of cannabis and/or cannabinoid consumption is very low and that no deaths have ever been recorded globally as a direct result of therapeutic or recreational use of cannabis. This is in stark contrast to alcohol consumption, which in 2004 was found to be responsible for 3.8% of global deaths (Rehm et al., 2009). This problem appears to be even more severe in South Africa – the Medical Research Council found that in the year 2000 alcohol was responsible for just under 37 000 deaths, or 7.1% (95% confidence interval 6.6 to 7.5%) of deaths recorded in the country (Peltzer, Davids, & Njuho, 2011; Schneider, Norman, Parry, Bradshaw, & Plüddemann, 2007).

2.5.4 The gateway drug hypothesis

With regard to cannabis, the “gateway drug” argument has played an important role in developing drug-use policy globally (Kleinig, 2015). Yet studies have consistently failed to distinguish whether cannabis use and the subsequent progression to more dangerous drugs is as a result of causality or mere correlation (Kleinig, 2015; Secades-Villa, Garcia-Rodríguez, Jin, Wang, & Blanco, 2015; Trautmann, Kilmer, & Thurnbull, 2013). A robust study of the available literature on the topic by Kleinig (2015, p. 1) concludes that “drug use policies that have drawn on versions of the [gateway drug] hypothesis have involved an unjustified oversimplification of the dynamics of drug use, reflecting the interests of certain stakeholders rather than wise social policy. The hypothesis should be retired”.

2.5.5 Cannabis use in a post-prohibition world

A major argument for maintaining the status quo of cannabis prohibition is related to the perception that decriminalisation or legalisation would lead to increased use and abuse, by minors in particular (Quah et al., 2014; UNODC, 2014). The motivation for this argument seems to be predicated on the fact that more permissive cannabis legislation reduces the perceived risk of use, which is deemed a predictor of future use. But a 2015 nationally representative longitudinal study of adolescent attitudes to cannabis spanning 2002 to 2013 (a period of significant easing of cannabis legislation in the US) found that in fact reported marijuana use in adolescents was lower in 2013 than in 2002, and that disapproval had actually increased in this group (Salas-Wright, Vaughn, Todic, Córdova, & Perron, 2015). Salas-Wright et al. (2015) believe that the changing cannabis policies may have had a normative effect on adolescents, but that this has not necessarily influenced their use of the substance. The findings of this study are supported by studies which have sought to assess the ex-post impact on minor consumption of easing cannabis legislation in the US (Ammerman, Ryan, & Adelman, 2015; Choo et al., 2014; MacCOUN & Reuter, 2001). These fact-based studies put pressure on prohibitionists to prove that legalisation would lead to increased harmful use, failing which the arguments for prohibitionist policies carry little weight, if any.

A comprehensive study of 11 703 100 students' marijuana usage trends over 20 years shows definitively that changes in state medical marijuana laws did not increase adolescent marijuana usage (Choo et al., 2014). While this study is limited to medical marijuana laws, MacCoun and Reuter (2001) reached a similar conclusion by analysing general cannabis prevalence rates in the US, the Netherlands, Denmark and Germany. MacCoun and Reuter (2001, p. 127) suggest "that removal of the prohibition against possession itself (decriminalisation) does not increase cannabis use". However, these authors caution against commercialisation of cannabis, which they argue would result in active promotion by legal suppliers and may lead to more material increase in marijuana use and abuse (MacCoun & Reuter, 2001). This suggests that tight (regulatory) controls need to be in place to balance promotion of marijuana with any commercial interests, in order to limit significant increases in prevalence rates post prohibition.

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Quah et al. (2014, p. 77) also propose that current cannabis-related policies need to be changed, while explicitly warning against commercialisation because:

commercial interest in promoting heavy use will prove difficult to control through taxes and regulations. Not-for-profit-only production and sale on the one hand, and state monopoly on the other, are options to consider before rushing headlong into a replication for cannabis of something resembling the existing alcohol industry.

Quah et al. (2014) go so far as to suggest that cannabis commercialisation may be the second-worst policy option to consider, next only to continued prohibition on a potential socio-economic outcome basis.

Bearing in mind the outputs of the two studies discussed above, interestingly the Youth Risk Behavior Survey³ of the US Centers for Disease Control and Prevention (CDC) (2015) indicates that in Colorado youth prevalence rates dissociated from the national cannabis usage trends in 2009. This separation coincided with the period when medical marijuana was first commercialised in Colorado, and further relaxation of marijuana policy (recreational use) appears to have had no effect in terms of driving increases in adolescent usage rates. Figure 9 demonstrates the separation.

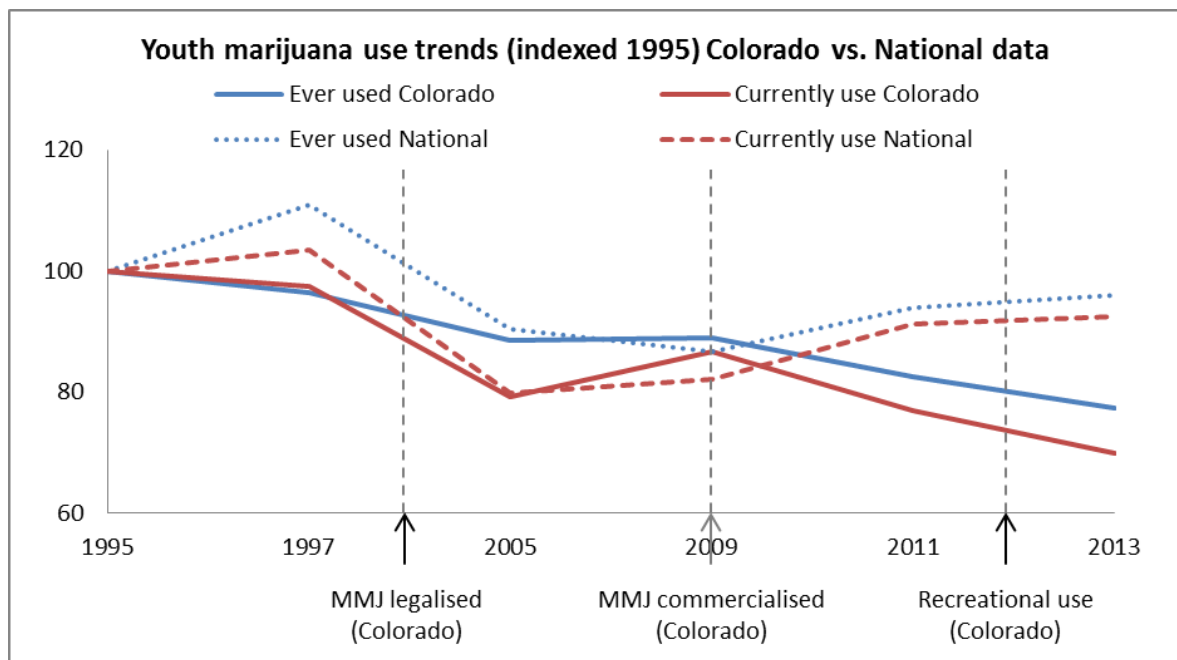


Figure 9: The dissociation of Colorado youth prevalence rates from national cannabis usage trends (Centers for Disease Control and Prevention, 2015)

³ This is a US school-based survey conducted by the CDC (2015) which monitors six types of health-risk behaviour that contribute to the leading causes of death and disability among youth and adults.

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While the survey relies on self-submissions, Raghupathy and Hahn-Smith (2011) found the reliability of the data collected in it to be robust. Furthermore, Brener, Billy and Grady (2003) determined that there was strong evidence to support the validity of the survey's outputs with specific regard to marijuana usage.

The above studies all suggest that increasing availability of cannabis in de-penalised regulatory environments is not necessarily a key factor that drives youth use and abuse.

A 2003 California-based *Pediatrics* study found a powerful link between illicit drug use and “adverse childhood experiences [that] transcend secular changes such as increased availability of drugs, social attitudes toward drugs and recent massive expenditures and public information campaigns to prevent drug use” (Dube et al., 2003, p. 564). This suggests that availability of drugs alone does not lead to increased drug use in adolescents, but rather that adverse childhood experiences are a strong precursor to potential drug abuse problems.

Adult use and abuse in a post-prohibition world paints a slightly different picture. Hasin et al. (2015) studied the changes in US marijuana prevalence and marijuana-related disorder rates nationally before (2001 to 2002) and after (2012 to 2013) the significant easing of medical marijuana laws as well as legalisation of recreational use in four American states. They found a significant increase in cannabis use prevalence rates – from 4.1% for the period 2001/2 to 9.5% in 2012/13 (Hasin et al., 2015). Part of the increase in prevalence rates may have to do with the fact that as laws were relaxed, individuals became more comfortable admitting to using marijuana, but the extent to which easing marijuana laws has driven increases in use must not be discounted (Hasin et al., 2015). Furthermore, they note that while marijuana use prevalence rates more than doubled over the period, they did not observe a proportional increase in marijuana-related disorders (primarily abuse) (Hasin et al., 2015). That is, absolute numbers of marijuana-related disorders increased, but not proportionately to the observed increases in usage (Hasin et al., 2015). It may be plausible to assume that individuals with a tendency to abuse cannabis are less likely to have been deterred by prohibition in the first place compared to more restrained (existing and potential) users.

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Hasin et al. (2015, p. E1) conclude that “given changing laws and attitudes toward marijuana, a balanced presentation of the likelihood of adverse consequences of marijuana use to policy makers, professionals, and the public is needed”. For the time being, the literature suggests that as prohibition of cannabis is abandoned, cannabis use prevalence rates will increase among adults, but users are less likely to abuse cannabis.

2.5.6 The effects of the war on drugs

In its review of a century of international drug control, the UNODC (2009a, p. 81) concedes that “global production and consumption of cannabis was lower a century ago” (than in 2008). The UNODC (2009a) largely lays blame for this phenomenon on the fact that historically governments have had to prioritise scarce resources to deal with drug issues based on the evaluation of the respective drugs’ health risks and broader social costs. These statements may partly indicate why “some countries have seen the de-facto de-criminalization of cannabis” (UNODC, 2009a, p. 82).

A report of the London School of Economics (LSE) Expert Group on the Economics of Drug Policy argues that:

the United Nations has for too long tried to enforce a repressive, ‘one-size-fits-all’ approach. It must now take the lead in advocating a new cooperative international framework based on the fundamental acceptance that different policies will work for different countries and regions.

This new global drug strategy should be based on principles of public health, harm reduction, illicit market impact reduction, expanded access to essential medicines, minimization [sic] of problematic consumption, rigorously monitored regulatory experimentation and an unwavering commitment to principles of human rights. (Quah et al., 2014, p. 3)

The report cites evidence that drug prices have been declining while purity and potency have been increasing. The drastic recent increased potency of cannabis cultivated for its psychoactive properties is very well documented (Brenneisen, 2007).

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Some of the main (and relevant) criticisms of the current enforcement-led approach to drug prohibition that are discussed by Quah et al. (2014) are as follows:

- The strategic logic of a drug-free world ideology is misguided and has had a counterproductive effect which can be quantified in costs to human security and socio-economic development. States need to redirect resources from focusing on enforcement to focusing on public health-based policies that promote harm reduction.
- The current global system has transferred the costs of prohibition from wealthier consumer countries to poorer producer countries, which has led to increased drug-related violence and corruption in these economies.
- Preconceived and often simplistic ideologies should not drive policy; countries should rather focus on developing policies that can be judged on their results. This has not been the case in the global war on drugs.
- Political factors have favoured incarceration as punishment for illicit drug possession/use, but evidence suggests that this has caused more harm in the long run.

Quah et al. (2014) also provide analysis with regard to cannabis legalisation, arguing that policy experimentation with close government monitoring and flexibility is critical to ensuring optimal outcomes of any cannabis legalisation efforts. The analysis concludes that it is not possible to make any dogmatic statements about the effect of cannabis legalisation without carefully considering the country-specific socio-economic context, as well as potential local post-prohibition regulatory regimes. This finding confirms the need for a South Africa-specific study on the subject.

2.5.7 The potential effect of legalisation on public budgets

Perhaps the most famous paper to be issued on the subject is the Miron (2005) report, the hypothesis of which is as follows:

Prohibition entails direct enforcement costs, and prohibition prevents taxation of marijuana production and sale. If marijuana were legal, enforcement costs would be negligible and governments could levy taxes on the production and sale of marijuana. Thus, government expenditure would decline and tax revenue would increase. (Miron, 2005, p. 2)

Miron's (2005) approach was firstly to quantify state and local authority expenditure on marijuana (cannabis) prohibition, followed by an assessment of federal expenditure on enforcing prohibition. He went on to estimate the potential tax revenues that may be generated from legalised marijuana sales (Miron, 2005).

Miron's (2005) approach necessitated certain assumptions to be in place as exact data was not available, particularly with regard to state and federal budgets for marijuana prohibition enforcement. Miron (2005) relied on state and federal prosecution and incarceration data to estimate these budgets and costs. This approach is somewhat similar to that adopted by Van Kerken (2013) for his South African study, and is probably the second-best possible approach to having the actual data from authorities.

Much more uncertainty was introduced in Miron's (2005) work when he attempted to quantify the potential tax revenues of legalised marijuana sales. Miron (2005) made assumptions related to:

- potential legalised marijuana demand based on previous studies that determined the elasticity of demand; marijuana, like most other illicit drugs, appears to have a steep demand curve, that is, demand for recreational marijuana tends to be price inelastic
- the potential tax rate for companies involved in sales, assumed at 30%
- the sin tax for marijuana being assumed to be equivalent to that of alcohol in the US.

Any adjustments to the above assumptions were found to have profound implications for potential government revenues (Miron, 2005). Therefore, Miron (2005) biased his calculations to more conservative figures. Nonetheless he determined that based on the above assumptions the government would save US\$7.7 billion and potentially earn US\$6.2 billion through taxes, a potential net gain of US\$13.9 billion per annum if cannabis were

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legalised nationally (Miron, 2005). Despite the assumptions underlying Miron's (2005) calculations, over 500 economists, including Milton Friedman, endorsed his report (Hardy, 2005), thereby confirming the robustness of his approach.

Miron's (2005) approach may be replicated for South Africa, but there is very little reliable data available on current prevalence rates of cannabis consumption and prices of marijuana which vary wildly depending on locality, strain type, strength (THC concentration) and method of growth (indoor vs outdoor) (Paterson, 2009). These uncertainties significantly complicate any attempt at quantifying potential tax revenues for South Africa. Nonetheless, Miron's (2005) approach to quantifying the costs of prohibition can play a critical role in answering the research question.

As of August 2015, over a year since Colorado legalised cannabis for recreational use, the state has collected more than US\$117 million in marijuana-related taxes (US\$70 million alone for the 2014/15 fiscal year), suggesting that the upsides identified by Miron (2005) are real (Colorado Department of Revenue, 2015). The figure of US\$70 million is particularly impressive when one considers that as of 2014 Colorado's marijuana-using population comprised 558 681 people, implying government revenues in the region of US\$125.30 per marijuana user per annum (Colorado Department of Public Health & Environment, 2015; Colorado Department of Revenue, 2015).

Kilmer et al. (2010) conducted a study similar to Miron's (2005), but with a focus on quantifying the potential impact on the state of California alone. This report acknowledges the multi-faceted complexity associated with the question in a more robust manner than Miron's (2005) report, but it also relied on much more granular data that was available as a result of California's well-established medical marijuana industry (Kilmer et al., 2010). Notably, California's medical marijuana has exhibited trends of diversion to recreational use (Reinarman, Nunberg, Lanthier, & Heddleston, 2011; Thurstone, Lieberman, & Schmiede, 2011), which provided Kilmer et al. (2010) with more robust data for determining potential demand and tax regimes. The approach of Kilmer et al. (2010) relied on a logic model, depicted in Figure 10, to determine how legalisation may influence demand for legal marijuana and public budgets.

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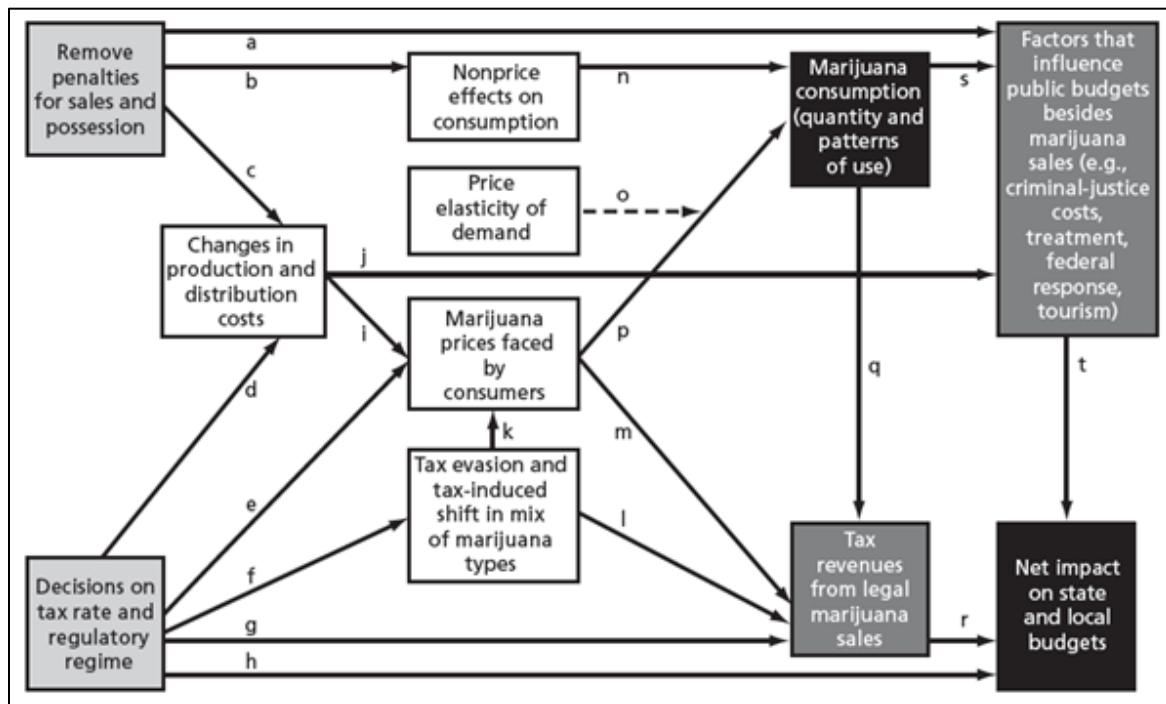


Figure 10: Logic model for estimating consumption and tax impact of cannabis legalisation (Kilmer et al., 2010, p. 16)

This approach, while more robust than Miron's (2005), may be less applicable to the current South African context, as a result of the different starting points for analysis: California had a well-established and well-documented medical marijuana market, while South Africa does not. Nonetheless, the logic model adopted by Kilmer et al. (2010) can provide guidance in terms of the dynamics of a legalised marijuana market.

The two reports reviewed in this section both sought to quantify the cost associated with enforcement of prohibition only and the potential tax benefits of legalised recreational cannabis use. While concepts discussed in these reports can go some way to answering the research question, it is not feasible to adopt either of the approaches in its entirety due to significant differences in data availability, as well as the time and effort required to quantify the costs and potential benefits.

On 30 October 2015, Uruguay's National Drug Board chief, Milton Romani, announced that Uruguay, the first country to nationally legalise marijuana, is aiming to produce between six and 10 metric tons of marijuana for the 160 000 Uruguayans that frequently or occasionally consume it (AFP, 2015). The Uruguayan model is one of a state-controlled recreational and medicinal marijuana industry whereby all cultivation, distribution, sales and consumption require registration with the government (Walsh & Ramsey, 2015). Romani explained that marijuana will be sold to registered users at a government-regulated

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price of US\$1.40 per gram (AFP, 2015). Using Romani's figures one is able to determine that average annual consumption is expected to be between 37.5 and 62.5 grams of marijuana per customer per annum – well below the government-stipulated cap of 40 grams per person per month (AFP, 2015). These figures suggest that the gross gain from retail sales of marijuana in Uruguay is anticipated to be between US\$8.4 million and US\$14 million for 2016. This range may appear small when compared to Colorado's marijuana tax collections of over US\$70 million, but the Uruguayan market is also significantly smaller (Colorado Department of Revenue, 2015).

The government-regulated price of cannabis in Uruguay will be US\$1.40 per gram in 2016. This is particularly interesting because the 2008⁴ World Drug Report states that the average price for one gram of cannabis was between US\$0.90 and US\$1.50 (UNODC, 2009b). The import of these prices becomes clear when one considers the argument of Quah et al. (2014) that the pricing of legal cannabis must remain as close as possible to prohibition prices. The reasoning is intuitive in that pricing significantly above the incumbent black market pricing would not reduce demand for the black market materially (if at all), and pricing significantly below black market prices would effectively encourage use and may lead to higher incidence of abuse. A more permissive regime on cannabis production could result in greater economies of scale for farmers, which could allow them to produce cannabis at lower costs (Decorte & Potter, 2015; Hall & Weier, 2015; Keliman, 2015; Kilmer et al., 2010; Quah et al., 2014) (see Figure 11). As Hall and Weier (2015, p. 611) point out, cannabis farmers in a post-prohibition world would “no longer include a black market premium to cover the risk of arrest or drug market violence”. Price regulation alone (introduction of floors to be at or near existing black market prices) would drive suppliers to increase production, and if demand at regulated prices is below supply, the likelihood of parallel market formation would increase. This contradicts the logic behind the legalisation.

⁴ The last year for which average cannabis prices per country were provided.

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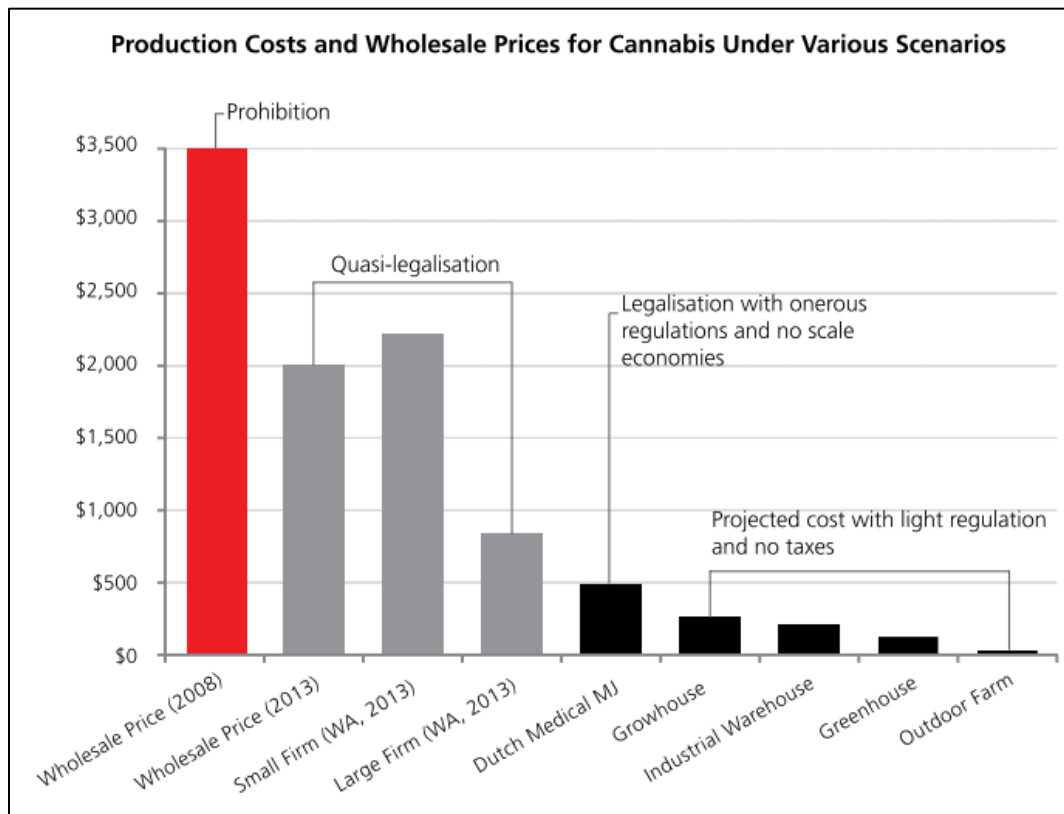


Figure 11: Easing regulatory requirements reduce production costs of cannabis (Quah et al., 2014, p. 21)

Regulation clearly has a critical role to play here, and the method by which price maintenance is achieved is probably best suited to an excise (or sin) tax. Studies of excise tax as a tool for increasing prices and therefore limiting consumption of alcohol and tobacco are plentiful, and there is consensus that this is an effective mechanism for deterring demand for these substances, especially among adolescent populations (Chaloupka, Straif, & Leon, 2011; Cook & Moore, 2002; Wagenaar, Salois, & Komro, 2009). But caution is required: While cannabis may resemble tobacco in terms of its mode of consumption, excise taxes that tax cannabis on weight may elicit unintended consequences. Hall and Weier (2015) argue that taxation of cannabis needs to focus on gross weight but also (and perhaps more importantly) on THC content.⁵ In this sense, any excise tax that is introduced as a mechanism to control demand of cannabis must resemble the alcohol excise tax (rather than tobacco) regimes that incorporate alcohol content in the tax calculation (Hall & Weier, 2015; Wagenaar et al., 2009).

⁵ Different strains of cannabis contain varying amounts of THC, the active psychoactive ingredient. Farmers can develop more potent strains of cannabis by selective breeding to increase THC content (Booth, 2003; Datwyler & Weiblen, 2006).

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The high likelihood that cannabis farmers would realise cost savings through lower cost distribution channels and economies of scale under more liberal cannabis policy is at odds with the need to maintain prices at levels that are not seen to incentivise increased demand. This dichotomy is not a particular concern and may in fact strengthen the case for cannabis. As farmers benefit from economies of scale cost of production would drop, but retail prices would be maintained through excise tax. This would make room for additional excise revenues over time. These government revenues could then be used, as Quah et al. (2014) suggest, to cover the costs of regulating the market, and to finance NGOs or public agencies whose mandate is to provide consumer education and reduce harm associated with cannabis (and potentially other drug) abuse through enhanced prevention and treatment efforts.

2.5.8 The South African context of suppliers of cannabis

For what appears to be the most comprehensive piece of academic literature on cannabis in southern Africa, Rhodes University-based historian Craig Paterson (2009) interviewed a variety of cannabis growers, smugglers and dealers in order to begin to comprehend the complex and ever-changing socio-political dynamics of the cannabis trade. The historical context for cannabis prohibition in South Africa to some extent influenced global prohibition (as discussed in section 2.1.2). According to Paterson (2009), this context has very much shaped the current sources of cannabis supply. He notes that “by forcing large numbers of people into these Bantustans with very little opportunity for economic growth or farming potential, the apartheid government created the perfect environment to ‘drive’ people towards cannabis cultivation” (Paterson, 2009, p. 82). Furthermore, the fact that the migrant labour system effectively saw Bantustans as labour force reservoirs from which the apartheid government occasionally forced people to urban centres for work facilitated an efficient distribution channel for cannabis to these centres (Paterson, 2009). Kepe (2003, p. 607) believes that cannabis farming persists in rural parts of the Eastern Cape precisely because “broken countryside – gorges, enclaves and ravines – makes it difficult for the police to gain access to the cannabis plantations”.

Legget (2001) notes that the cannabis plantations of the Transkei are not commercial farms by any stretch of the imagination, but rather are the crops of an army of poor, rural subsistence farmers who supplement their agriculture with “dagga” as an easy-to-grow cash crop. Paterson’s (2009) study of the region confirms that this observation remained

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true in 2009 (see Figure 12), having been the case since the early 1970s. In support, Kepe (2003, p. 614) suggests that cannabis farming in the former eastern Pondoland region is key to the livelihoods of many villagers, but that it makes only “a steady contribution to the livelihood of a household”, rather than leading to any genuine wealth creation.



Figure 12: Cannabis (dagga) grown around a rural homestead in the Eastern Cape (Paterson, 2009, p. 82)

The explanation for cannabis farming as simply a supplementary source of income is summarised in this way by Kepe (2003, p. 613): “Cannabis growers from the village seem to be content with getting the smallest share of the revenue, as they feel they have less amandla, or strength, to survive the fines and jail terms”. To an extent, the current supply chain of cannabis from the Eastern Cape can be interpreted as exploiting some of South Africa’s poorest rural communities (Kepe, 2003; Paterson, 2009). As Alcock (2015, p. 18) observes, “the distribution chain in informal markets is long and expensive – the dagga garden ladies, the ferryman, the bakkie distributor, the urban dagga wholesaler and on to the street seller”. A change in policy with regard to cannabis could generate efficiencies within this distribution chain and provide farmers with a more equitable outcome for their efforts.

Around 2001/2, indoor growing of specialised strains of cannabis emerged in South Africa, though it was limited to South Africans that Paterson (2009, p. 107) describes as “westernised” and wealthier – production tended to occur in urban centres, and the cannabis typically carried a much higher price tag than cannabis strains grown outdoors. The SAPS Annual Report (2015a, p. 218) notes that 31 hydroponic cannabis-growing sites

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(referred to as “labs”) have been dismantled in 2015. Furthermore, the NDMP confirms that “the latest vogue is hydroponic cannabis” (Central Drug Authority, 2013, p. 42), suggesting that local demand for higher potency and more expensive cannabis strains is increasing. This development has affected the rural cannabis farmers thus: “The former Transkei in particular has seen an increase in production and a decrease in value of trade, due to a reduction in the quality of the cannabis being produced there, and a demand for higher quality in the market” (Paterson, 2009, p. 115). Paterson (2009) further notes that while cannabis trade in South Africa traditionally existed independently of supply chains of other drugs, the advent of urban cannabis growing has dramatically increased the involvement of organised crime in the cannabis trade, leading to wider overlaps between cannabis trade and trade of other illicit substances.

Turning to the international scene, with reference to the small-scale domestic cultivation of cannabis, Decorte and Potter (2015, p. 222) argue that “the diversity of reasons why people grow cannabis goes way beyond the usual motivations for criminal involvement, and includes avoiding contacts with drug dealers and other criminal elements”. Yet by virtue of growing the plants domestically, these individuals are committing a crime.

Furthermore, the UNODC (2002) proposes that the high degree of violence, income inequality, widespread decline in traditional social relationships, and poor educational and employment prospects in South Africa contribute significantly to both prevalence of drug use and production in the country.

2.6 Conclusion of the literature review

It is clear from the literature review that answering the research question requires unbundling relatively complicated relationships, motives and potential (uncertain) outcomes. The broad nature of the research question – in that it pertains to the cannabis plant rather than industrial hemp or marijuana (cannabis) as a narcotic or medicine – further complicates the research. However, it is the author's opinion that such an approach is required, particularly given the on-going debate in the South African parliament about the Medical Innovation Bill, which in its current form seeks to legalise cannabis for medicinal, commercial and industrial purposes (South Africa, 2014).

Previous research on the topic is quite fragmented and not directly applicable to answering the research question, but key issues/themes that need to be considered have been availed through the literature review process.

As the literature suggests, cannabis has many uses, ranging from industrial purposes across a wide array of sectors to recreational and potential medicinal uses. But countries that take a prohibitionist stance towards the plant have limited its positive potential. The original motivations for cannabis prohibition were not rooted in scientific fact, as confirmed by recent studies such as those conducted by Nutt et al. (2007; 2010). The war on drugs has been widely criticised for its enforcement-led approach, which has often yielded counter-productive results, particularly with regard to cannabis. Many countries are rethinking their stance on the issue. The UNODC frequently refers to these effects as unintended consequences of the war on drugs. However, it should be increasingly difficult for the UNODC to continue arguing that these effects are unforeseen, more than 50 years after the initiation of the global war on drugs.

Of concern is the fact that the war on drugs appears to have undermined human rights, particularly those of cannabis users, who are routinely criminalised by the current enforcement-led approach. This approach is not conducive to principles of harm reduction that much of the literature refers to, and that the CDA appears to support, at least on paper.

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The literature provides compelling evidence that significant policing resources (globally and in South Africa) are spent on enforcing a policy based on moral principles/intentions rather than on its outcomes. Moreover, an assault on supply does not appear to function as desired, because all that eradication of supply in one area seems to achieve is a displacement of the supply to another area, rather than an absolute reduction in supply of cannabis – demand will continue to drive the market.

Industrial hemp's applications face competition from now well-established raw materials and industries. Understanding the technology and associated investment that are required to develop an industrial hemp industry in South Africa is key to assessing such an industry's viability and competitiveness in incumbent sectors. Nonetheless, the labour-intensive process that Fortenbery and Bennett (2004) cite may serve as a positive incentive for the industry from the government's perspective, as it has the potential to create employment. Measuring local demand for industrial hemp may be difficult given the observation that the market has been artificially stifled by the prohibitionist stance on cannabis taken by the South African government. It is apparent that further research of this topic is required. And outputs from the government-supported hemp pilot programmes, once completed, may provide further guidance on this issue.

While the literature presents multiple approaches to assessing the potential economic impact of legalisation of cannabis for recreational use, it is important to keep in mind the South Africa-specific data availability constraints in this regard. Future efforts to quantify the potential tax revenues as a result of legalisation can rely on approaches similar to those of Kilmer et al. (2010) and Miron (2005), but the value of this analysis will depend heavily on availability of data and the willingness of government entities to supply relevant data to researchers. In lieu of obtaining hard data, informed approximations and assumptions can be made akin to Miron's (2005) approach, which yields strong support from prominent economists. Miron (2005) was able to source well-documented data on the developed medical marijuana markets in the US. By contrast, a South African approach to a quantitative cost–benefit analysis must rely on scenario analysis, given the high degree of uncertainty resulting from the lack of local market data.

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The literature on post-prohibition cannabis usage trends reveals some interesting findings, chief of which is that increased availability of cannabis as a standalone factor does not necessarily contribute to increased youth/adolescent use. The literature provides compelling evidence that socio-economic circumstances of youth are a stronger causal factor of substance abuse than availability alone. This is particularly relevant in South African society, given prevalent degrees of economic inequality, crime and unemployment rates (UNODC, 2002).

Furthermore, and interestingly, the literature suggests that youth tend to be more price-sensitive than adults to the cost of drugs, including alcohol. Price controls through taxation may prove to be an additional effective tool for discouraging underage consumption in a regulated market. As yet the gateway drug hypothesis, as applied to cannabis, is found to be valid only in a world where cannabis remains an illegal substance, traded in black markets with strong criminal elements.

From a policy perspective, the literature may appear to be a little less forthcoming, but the overarching theme suggests that cannabis policy needs to be location specific, taking into account the particular context of the local cannabis market. This once again relates closely to South Africa and its high number of rural cannabis farmers, as well as to how they may be affected in a post-prohibition world. While these farmers may not be considered criminals in a post-prohibition South Africa, thereby raising their potential share of the cannabis supply chain, their cannabis crops may have to compete with those of much more sophisticated (and wealthier) commercial cannabis farmers that would emerge. Much of the literature cautions against the effects that commercialisation of cannabis could have on cannabis consumption (similar to the alcohol and tobacco markets). This highlights the need for policy to be carefully considered, and puts forward not-for-profit markets and state monopoly markets as policy considerations.

The research question is topical both globally and locally. The author hopes that this research report will go some way to providing initial guidance with regard to informing policy on the issue of cannabis legalisation in the context of optimal socio-economic outcomes, and may yield inputs that lead to the establishment (and/or formalisation) of new industries in the South African economy.

3. RESEARCH METHODOLOGY

The concluding paragraph of the Introduction of this report (section 1) suggested the need for a cost–benefit analysis of legalising cannabis. Quah et al. (2014, p. 78) point out that “doing so in practice would require one to predict the extent of changes in variables that cannot even be accurately measured in the present, and to perform implausible feats of relative valuation”. This, coupled with the lack of reliable and accurate data for South Africa with regard to cannabis, implied that the research report had to seek to form an objective view of the potential benefits and costs of cannabis legalisation from a primarily qualitative perspective, supported by appropriate quantitative research.

The analysis drew on international research, literature and case studies which were supported by South African socio-economic data (where available) to test the working hypothesis. Fink (2014, p. 3) defines a literature review as “a systematic, explicit, and reproducible design for identifying, evaluating, and interpreting the existing body of recorded documents”. As such the literature review played an important role in the research and informed the adopted analytical approach.

3.1 Research approach and strategy

The research approach was primarily deductive – hypotheses and theories put forward by previous researchers in the field were examined in the South African context in order to develop specific and logical conclusions and test the author’s working hypothesis (Hyde, 2000).

The working hypothesis of this report states that a net socio-economic gain for South Africa would result from lifting cannabis prohibition. Confirming or refuting this hypothesis answers the primary research question as stated in section 1.1 of this report.

The research has been supported by elements of inductive reasoning, because there was a need to assess previous researchers’ observations in order to establish generalisations about the phenomenon under investigation (Hyde, 2000). These generalisations were then used as part of the deductive process of testing the working hypothesis (Arthur, 1994). Arthur (1994) argues that this mixed approach – whereby inductive reasoning leads to theory formation that is then used to carry out localised deductions based on current hypotheses – lends itself to addressing problems in complex adaptive systems. Concomitantly, the research question

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aimed to assess the potential impact of cannabis legalisation on South African society and the economy, both of which are complex adaptive systems (Beinhocker, 2006).

As Hyde (2000, p. 88) furthermore argues:

A balance of induction and deduction is required in all research. Extreme induction could deprive the researcher of useful theoretical perspectives and concepts which can help guide exploration of a phenomenon; extreme deduction could preclude the researcher from developing new theory.

The approach, coupled with the lack of accurate and reliable South Africa-specific data on the topic, implied that the research had to consist of a combination of qualitative and quantitative analysis.

Hyde (2000) points out that for the purposes of a qualitative-deductive study, two circumstances need to be in place:

1. The concepts to be studied are clear from the outset.
2. Hypothesised relationships between concepts can be stated before data gathering commences.

Both circumstances were satisfied for the purpose of testing the working hypothesis.

3.2 Sampling

For quantitative aspects of the analysis, sampling sought to ensure nationally representative data based on publically available information and/or prior research conducted in a relevant field. There were however instances where provincial-level or state-level data was necessarily utilised.

Sampling of literature containing international research done in the field for the purpose of qualitative analysis relied primarily on prior journal articles, dissertations, books, proceedings and industry reports, which were selected based on their quality and on their respective impact factors (with regard to journal articles) as stated in the Social Sciences edition of the Journal Citation Reports.

While prior literature/research may not necessarily have been directly representative or transferable to the South African context, the author – in a process akin to a multi-case comparative study – took care to evaluate the similarity of the external conditions in South Africa and the market where the original research had been conducted. This implied the need

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for theory testing through pattern-matching, which Hyde (2000, p. 88) defines as “a deductive procedure which actively employs rival explanations and exposes case evidence and conclusions to independent peer review”.

3.3 Data collection

Data was necessarily collected from multiple sources:

- a. The UNODC (2002; 2007; 2009a; 2009b; 2009c; 2014; 2015a; 2015b) reports and databases contained perhaps the most comprehensive data in terms of nationally and regionally comparable cannabis consumption trends, cultivation and seizures. Therefore the UNODC represented an important source of data for the purpose of this research report. Assumptions related to this data have been discussed in section 1.3.
- b. SAPS crime statistics were critical to indicating the economic and social costs related to enforcing cannabis prohibition policies. This data was available on the SAPS website, and through prior research that had been conducted on crime statistics in South Africa. The collected data has been discussed in the literature review section.
- c. Data on industrial hemp in South Africa was sourced from the DAFF and the ARC, as these are the only entities tasked with running the hemp pilot programmes in South Africa. Given that the pilot programmes are yet to be completed at the time of writing this report, the author’s ability to quantify the opportunity cost of cannabis prohibition with regard to industrial hemp production has been somewhat limited.
- d. The CDA, which in partnership with South Africa’s Department of Social Development, is responsible for the current NDMP, provided the most comprehensive view of the South African government’s stance on cannabis policy.
- e. The report of the LSE Expert Group on Economics of Drug Policy (Quah et al., 2014) contained insights into and analysis of the effects of the current enforcement-led approach to drug and, more specifically, cannabis prohibition.
- f. Relevant journal articles fitting the criteria discussed in section 3.2 were sourced from the EBSCOhost, Emerald, Google Scholar and Science Direct databases.

3.4 The conceptual framework for analysis

The primary point of analysis constituted the comprehensive literature review (section 2). This provided a broad context of the socio-economic dynamics and impact of cannabis, and associated policies and underlying enforcement practices, globally and in South Africa.

The contents of the literature review were then systematically reviewed according to the themes of the conceptual framework, discussed below.

Ostrowski (1990) provides a conceptual framework that proved suitable for the purpose of testing the working hypothesis (section 3). The conceptual framework comprised four mutually exclusive and collectively exhaustive themes, as follows:

1. **Harm caused by prohibition** – the unintended effects of prohibition caused directly or indirectly by enforcement of prohibitionist policies.
2. **Harm prevented by prohibition** – harm to users and society that is prevented by virtue of cannabis being illegal or less available.
3. **Harm not prevented by prohibition** – the failure of prohibition to prevent drug use and abuse, drug-related crime and harm to society.
4. **Harm related to, but not caused by, cannabis use** – the association of illegal drug use with various social and criminal problems such as violence, sexual abuse, unemployment (complacency), theft, etc.

While the conceptual framework appeared to be focused on harm (or rather cost), the nature of the various themes was such that socio-economic benefits were implicit in each component of the framework. For example, the first theme (“harm caused by prohibition”) implicitly highlighted the socio-economic benefits of legalisation, and the second theme (“harm prevented by prohibition”) directly related to the socio-economic benefits that had been realised through prohibition of cannabis.

Once analysis of each of the four framework’s themes was completed, an objective assessment of the current landscape against the proposed landscape was carried out in order to determine which scenario has the most potential to provide optimal socio-economic outcomes for South Africa. For the purpose of this objective assessment, the author sought to objectively falsify his working hypothesis because, as Hyde (2000) indicates, the deductive process remains intact only if new data could be used to confirm the initial hypothesis.

4. RESEARCH ANALYSIS, DISCUSSION AND FINDINGS

While the literature review provides a comprehensive breakdown and analysis of the global and South African cannabis landscapes, this section of the report systematically categorises the literature into the four themes of the conceptual framework (as discussed in section 3.4), with a view to testing the working hypothesis and answering the stated research question and sub-questions (section 1.1).

4.1 Research analysis and discussion

This section provides a summary of how the research presented in the literature review relates to the themes of the conceptual framework. The relevant findings relating to each theme are drawn out, and where the literature presents conflicting findings a discussion follows. All of the findings that are presented below have been drawn directly from the comprehensive literature review (section 2).

4.1.1 Harm caused by prohibition

As discussed, this theme relates primarily to the unintended effects of the enforcement-led approach to prohibition. The literature overwhelmingly relates the costs/harm of prohibition directly or indirectly to law enforcement. The direct costs concern policing/enforcement, prevention, incarceration and corruption. The indirect costs entail the opportunity costs to law enforcement due to diversion of scarce resources to enforcing drug law rather than to fighting other, potentially more harmful, crimes. These indirect costs are important, as the implication of resource diversion to cannabis prohibition enforcement is that there is a cost to non-consumers as well as consumers of cannabis.

Economic costs of enforcement

Kilmer et al. (2010) and Miron (2005) demonstrate that significant law enforcement costs need to be allocated in order to enforce prohibition. Van Kerken's (2013) research, coupled with SAPS (2015b) national crime statistics data, confirms that the cost of prohibition associated with law-enforcement is material. Quah et al. (2014) suggest that there is significant evidence to support transferability of these findings globally.

Despite notable efforts by the SAPS to eradicate the supply of cannabis in South Africa, the UNODC and other researchers report that South Africa remains one of the largest producers of cannabis in the world (Peltzer & Ramlagan, 2007; UNODC, 2009c). This suggests that the supply eradication approach is not effective (Quah et al., 2014). These

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observations are made at global level, implying that both credibility and transferability requirements are being met.

Social costs of enforcement

The exponential growth in drug-related crimes reported in South Africa, exacerbated by growth target-setting by the SAPS, suggests that users of cannabis (as well as other drugs) are potentially being increasingly targeted by law enforcement officials (De Kock et al., 2015; SAPS, 2015b). As more users of cannabis are apprehended in law enforcement efforts, social spillover effects can be expected. Rehm and Fischer (2015, p. 543), citing multiple empirical studies, believe that “in many countries, cannabis constitutes the primary focus of drug law enforcement, and arrests disproportionately involve marginalized [sic] individuals”. The issue of criminal records has been found to be detrimental to obtaining employment, which may in turn compel individuals to seek revenue-making opportunities in illicit activities (Pedersen & Skardhamar, 2010; Rehm & Fischer, 2015). Corruption is another emerging issue. Individuals who are apprehended with cannabis (users and distributors) and face getting a criminal record or being incarcerated have high incentives to offer law enforcement officers bribes, and indeed are inclined to do so (Howell & Couzyn, 2015; Quah et al., 2014).

Ostrowski (1990) and Quah et al. (2014) propose that criminalising drug users inadvertently creates disrespect for the law, which has a spillover effect into other forms of illicit behaviour.

Prohibition implies that individuals who use the illicit substance are fundamentally immoral, as such individuals who develop drug problems tend to be stigmatised by society (Kleinig, 2015; UNODC, 2015b; Van Niekerk, 2011). According to Bernholz (2000), Trautman et al. (2013) and Van Niekerk (2011), stigma – already a major barrier for people in need of recovery from substance abuse – is amplified if the substance in question is regarded as illegal.

Economic opportunity costs of prohibition

The literature suggests that three distinct opportunities may emerge from cannabis legalisation. At present the law in South Africa prevents these industries from existing legally.

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1. **Industrial cannabis (hemp).** The ARC (2014) has identified 25 000 consumer products that can be produced from industrial cannabis (hemp), a proposal confirmed by Johnson (2015) and Kraenzel et al. (1998). Furthermore, indications are that many parts of South Africa provide a favourable environment for hemp cultivation (South Africa. Department of Agriculture, Forestry and Fisheries, 2012). At present no indications of the total market potential in South Africa exist, but the DAFF (2012), working together with the ARC, has recognised the potential opportunity that industrial cannabis could generate, and as a result multiple hemp plantation trials are currently underway in South Africa.

Studies have confirmed that hemp is as competitive, if not more so (once environmental considerations are taken into account), than many incumbent raw materials used in paper production, textiles and petrochemicals (De Bruijn, Jeppsson, Sandin, & Nilsson, 2009; Li, Stuart, Li, & Parnas, 2010; United States. Department of Agriculture, 1916; Van der Werf & Turunen, 2008). Still, it is important to bear in mind that industrial hemp would need to compete with well-established incumbent raw materials such as cotton, lumber and petrochemicals, which would pose challenges in terms of the commercial viability of industrial hemp as an alternative feedstock to existing industry (Kraenzel et al., 1998). South Africa-specific opportunities need to be explored further.

Local commercial production of hemp is not allowed by law, and therefore can be viewed as a direct cost of prohibition to the South African economy.

2. **Medical and therapeutic cannabis.** Cannabis is classified as a schedule I drug by the United Nations, implying that the plant has no medical uses. This is at odds with emerging medical research which recognises the promise cannabinoid use has in treating/alleviating, among others, HIV/AIDS-related weight loss, multiple sclerosis, cerebral palsy, spinal cord injuries, chronic pain and glaucoma, as well as showing potential for new anti-cancer drug development (Kumar et al., 2001; Nutt et al., 2013; Ostrowski, 1990; Parry & Myers, 2014; Van Niekerk, 2014). Developing and researching lower cost, plant-based treatment for some of these ailments (particularly HIV/AIDS-related weight loss and cancer treatment) should be a priority for the South African government, a sentiment echoed in certain *SAMJ* articles (Parry & Myers, 2014; Van Niekerk, 2014).

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Sznitman and Bretteville-Jensen's (2015) studies suggest that public support for medical cannabis legalisation is likely to grow as the body of research into the field expands. South Africa may already be experiencing this, through the Medical Innovation Bill that is being discussed in parliament (South Africa, 2014).

Evidence from jurisdictions where medical cannabis has been legalised observes a high degree of diversion (beyond real medical use of marijuana), proposing that easing of medical marijuana laws tends to be a precursor to the broader relaxation of cannabis regulations (Reinarman et al., 2011; Sznitman & Bretteville-Jensen, 2015; Thurstone et al., 2011).

3. **Recreational/responsible adult use of cannabis.** Miron (2005) argues that legalisation of marijuana would lead to lower government expenditure on enforcement coupled with higher tax revenues. In Colorado tax revenues of US\$70 million for the financial year 2014/15 suggest that Miron's (2005) view is correct (Colorado Department of Revenue, 2015). Uruguay's official projected sales revenue from marijuana sales for 2016 is anticipated to be between US\$8.4 million and US\$14 million (AFP, 2015).

While making inferences about the South African market may be premature, it is worth noting that in Colorado an estimated 558 681 people or 10.4% of the total state population consume marijuana (Colorado Department of Public Health & Environment, 2015), and in Uruguay the official estimate is 160 000 consumers or 4.7% of total population (AFP, 2015). The UNODC (2015b) estimates that between 2.65 and 4.82 million people (between 5.0% and 9.1% of total population) smoke marijuana in South Africa, suggesting a much larger opportunity cost in terms of taxes.

Furthermore, and significantly, while legalisation would yield lower production costs through economies of scale and value chains that need not be concerned with avoiding law enforcement, the retail price of cannabis would need to remain as close to the current black market rate as possible (Decorte & Potter, 2015; Hall & Weier, 2015; Keliman, 2015; Kilmer et al., 2010; Quah et al., 2014). This would further drive revenues of the government, which would necessarily maintain prices through the use of taxes, taking into account both the weight of cannabis sold and its THC content (Chaloupka et al., 2011; Cook & Moore, 2002; Quah et al., 2014; Wagenaar et al., 2009).

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These three applications of the cannabis plant demonstrate potential to generate socio-economic value to South African society through unlocking higher government budgets for social welfare and development programmes, formal employment opportunities as well as potentially providing affordable medication to patients over the longer term.

Exploitation and victimisation of Eastern Cape dagga farmers

The historical context of cannabis legalisation in South Africa, coupled with the SAPS enforcement-led and supply eradication approaches to prohibition of cannabis, has resulted in a situation in which the vulnerable subsistence farmers of the Eastern Cape are routinely victimised or exploited by both the SAPS and players in the cannabis supply chain (Decorte & Potter, 2015; Kepe, 2003; Paterson, 2009; SAPS, 2015c).

4.1.2 Harm prevented by prohibition

This theme refers to harm of users and society that is prevented by virtue of cannabis being illegal or less available, that is, a success of prohibition. For Ostrowski (1990), this is the main practical argument for prohibition, but at the same time it is a category that is immeasurable due to the uncertainty associated with potential human behaviour – a view that is implicitly supported by Rothbard (1977). Nonetheless, this very uncertainty may be seen as an argument in support of prohibition because, when viewed in isolation, it favours the status quo. A weak argument such as this would need to be challenged.

Youth use and abuse of cannabis

A major argument for maintaining the status quo of cannabis prohibition relates to the fear that decriminalisation or legalisation would lead to increased use and abuse by minors (Quah et al., 2014; UNODC, 2014). But there is no evidence in the reviewed literature to support this notion. Nationally representative studies of adolescent attitudes to cannabis over periods of relaxing cannabis legislation consistently demonstrate lower rates of use by minors (Ammerman et al., 2015; Choo et al., 2014; MacCoun & Reuter, 2001; Salas-Wright et al., 2015). Perhaps the strongest evidence disputing the notion relates to the fact that since recreational sales of cannabis began in 2012, youth cannabis prevalence rates have been on the decline and are below the national average in the US (Centers for Disease Control and Prevention, 2015). The reviewed literature considers a variety of countries, including the US, the Netherlands, Denmark, Germany, Norway and Israel, suggesting

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some degree of transferability. Unfortunately no studies from developing markets are available at the time of writing.

Adult use and abuse of cannabis

With regard to adult populations, there appears to be somewhat stronger evidence that prohibition has been successful in curbing cannabis use prevalence rates. Hasin et al. (2015) conducted a nationally representative study of adult prevalence rates in the US between 2001/2 and 2012/13. They found that as prohibition of cannabis was abandoned in certain states, cannabis use prevalence rates more than doubled to 9.5% among adults, though users were also less likely to abuse cannabis, as indicated by a less than proportionate increase in reported incidents of abuse (Hasin et al., 2015). As postulated by Hasin et al. (2015), supported by Quah et al. (2014), individuals inclined to abuse cannabis are also less inclined to be deterred by prohibition. This suggests that while prohibition may be effective in limiting adult use of cannabis, it is less effective in limiting abuse.

The push factor

Prohibition provides an efficient solution to preventing mass marketing of cannabis to promote consumption. The literature proposes that commercialisation of cannabis, like the commercialisation of alcohol and tobacco prior to the 1990s, would lead to increased incidence of use and abuse by both youths and adults (Hasin et al., 2015; MacCoun & Reuter, 2001; Quah et al., 2014).

With regard to the gateway drug hypothesis, the literature overwhelmingly suggests that the hypothesis is an oversimplification of drug use dynamics, particularly as the literature consistently fails to demonstrate causality above mere correlation (Kleinig, 2015; Secades-Villa et al., 2015; Trautmann et al., 2013).

Challenges measuring harm reduction through prohibition

The argument that prohibition of cannabis prevents harm to society requires some degree of evidence that potential harm is caused to society by cannabis in the absence of prohibition. Critically, multiple pieces of research found that legal drugs such as alcohol and tobacco cause more harm to the consumer and the broader society than consumption of cannabis (Kumar et al., 2001; Macleod et al., 2004; Nutt et al., 2010; Parry & Myers, 2014; Van Niekerk, 2014). In fact, Kumar et al. (2001) failed to identify a single death directly associated with cannabis consumption globally, while alcohol has been found to be

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responsible for 7.1%, or 37 000, deaths in South Africa alone (Peltzer et al., 2011; Schneider et al., 2007).

The South African NDMP speaks the language of harm reduction as a pillar of policy enforcement, but has yet to manifest in practice within the SAPS (Central Drug Authority, 2013; Marks & Howell, 2015; SAPS, 2015a). No guidelines for harm-reduction programmes exist within the SAPS, suggesting that harm reduction is still equated with supply reduction through arrests and seizures (Marks & Howell, 2015; SAPS, 2015a).

4.1.3 Harm not prevented by prohibition

This theme concerns the failure of prohibition to prevent drug-related crime and harm. It also includes the fact that illicit drug markets (particularly for cannabis) thrive even under prohibition (UNODC, 2014), but are not regulated and therefore expose participants to potential harm.

Any harm resulting from the use of illegal drugs falls into the category of either harm caused by prohibition or harm not prevented by prohibition. From this, we can further conclude that no evidence of the harm caused by current illegal drug use, by itself, can be utilized [sic] as evidence in support of prohibition. Without additional data showing that the repeal of prohibition would increase the level of harmful drug use, evidence of current harm from illegal drug use—even excluding harm caused by prohibition is of no use to the prohibitionist argument. (Ostrowski, 1990, p. 14)

Organised crime and violence under prohibition

Organised crime activities tend to be funded by drug profits. Given the prevalence of cannabis globally and in South Africa, it stands to reason that cannabis contributes to the social costs incurred by organised crime. A concerning trend emerging from the literature is that South Africa's cannabis market is currently experiencing increasing organised crime elements (Paterson, 2009). This typically results in overlaps between cannabis trade and trade of other illicit substances as well as activities. The implication is that a growing proportion of the 2.65 to 4.82 million South African cannabis consumers is being exposed to increasingly sinister criminal elements (Ostrowski, 1990; Paterson, 2009; Pedersen & Skardhamar, 2010; Quah et al., 2014).

Quah et al. (2014) argue that a major gain of legalising cannabis would be a reduction in the risks of cannabis consumption, as consumers would have access to labelled and

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regulated products. This view is supported by Decorte and Potter (2015), as well as Rehm and Fischer (2015).

Cannabis and other forms of crime (excluding organised and drug-related crime)

The prohibitionist hypothesis is that access to cannabis leads to increased levels of crime. Evidence to support this hypothesis has been found to be severely lacking. Studies that look for causality between easier access to legal cannabis and crime suggest that there has been no increase in crime rates that can be associated with increased access to legal cannabis (Morris et al., 2014; Pedersen & Skardhamar, 2010; Sznitman & Zolotov, 2015).

Pedersen and Skardhamar (2010) further believe that socio-demographic, family and personal factors may exert stronger influence in driving criminal behavior than cannabis use alone. This interesting observation is implicitly consistent with the UNODC's (2002) argument that the high degree of violence, income inequality, widespread decline in traditional social relationships, and poor educational and employment prospects in South Africa contribute significantly to both the prevalence of drug use and the drug's production in the country. These views imply that cannabis prohibition alone has had little influence on crime levels experienced in South African society, although the UNODC's (2002) view suggests that the relatively high use prevalence rate in South Africa is a result of broader socio-economic issues which prohibition does not address in any way.

Social harm not prevented by prohibition

The high growth in drug-related arrests in South Africa, coupled with quantitative growth targets for the future, poses serious concerns related to the tendency for law enforcement to more frequently target drug (cannabis) users (De Kock et al., 2015). Cannabis users who have been arrested and charged receive a criminal record, which has been found to impede employment opportunities and as a consequence may fuel further substance abuse or illicit activity to substitute for the lack of a formal income (Pedersen & Skardhamar, 2010).

In order to prove that absolute harm reduction has resulted from prohibition one needs to demonstrate that cannabis consumption (assuming that it is harmful) has not been merely displaced by abuse of other legal substances such as alcohol or tobacco, or other harmful and addictive behaviour. Interestingly, while none of the literature assesses the substitution effect of this approach, there is evidence in multiple studies that as marijuana consumption

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increased with the relaxation of relevant laws, the consumption of alcohol decreased, confirming the substitution hypothesis (Hall & Weier, 2015; Sznitman & Zolotov, 2015). Joffe and Yancy (2004), however, identify an Australian study which found that cannabis and alcohol were complementary goods. It appears that research on this hypothesis remains equivocal, a view confirmed by Quah et al. (2014).

Prohibition fails to address drivers of cannabis use and abuse by children

Assuming that prohibition is able to limit availability of cannabis, according to multiple studies increased availability of cannabis through relaxed laws does not in itself lead to increased incidence of child use and abuse of cannabis (Ammerman et al., 2015; Dube et al., 2003; Salas-Wright et al., 2015). Researchers have rather been able to determine that adverse childhood experiences are a much more significant predetermining factor influencing potential future substance abuse in children (Dube et al., 2003). This relates to much broader challenges than those that prohibition seeks to alleviate; in this instance it appears that prohibition is seeking to alleviate a symptom of the harm, but failing to address its true cause.

4.1.4 Harm related to but not caused by cannabis use

Supporters of prohibition tend to be significantly influenced by confirmation biases, which results in scapegoatism (Ostrowski, 1990).

The association of increased violent crime with easing cannabis legislation

Relating various criminal problems – such as violence, sexual abuse, unemployment (complacency), theft, and so on – to the use of illegal drugs, with very little or no evidence of actual causality, is common in the literature (Joffe & Yancy, 2004; Morris et al., 2014; Quah et al., 2014).

Most profound is that the underlying motivation for cannabis prohibition in South Africa is based on the premise that cannabis consumption leads to labourer indolence, crime and insanity, yet only minimal and (sparse) anecdotal evidence is provided in support of these claims (Crampton, 2015; Natal (Colony). Indian Immigrants Commission, 1987; Paterson, 2009).

More recently, in a South African study on cannabis usage trends Peltzer and Ramlogan (2007) conclude that cannabis is often associated with crime, but they give no further insight into whether this is a causal or correlational phenomenon. Parry and Myers (2014)

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also claim an association between cannabis and crime, but admit that causality has not been demonstrated. Perhaps it is no surprise that cannabis use is associated with crime, since merely possessing the plant is considered a crime in many countries.

Studies that sought to prove causality between easing cannabis laws and crime have consistently failed to do so, suggesting that the current reality negates the hypothesis of legal access to cannabis leading to exacerbated levels of violent and property crime (Keliman, 2015; Macleod et al., 2004; Morris et al., 2014; Pedersen & Skardhamar, 2010; Sznitman & Zolotov, 2015).

Adding credibility to these findings is the fact that Sznitman and Bretteville-Jensen's (2015) nationally representative study demonstrates that public health, harm and crime have less bearing on public support for medical cannabis legalisation. While the study focuses on medical cannabis legalisation, its findings implicitly apply to general cannabis law relaxation, as multiple studies confirm that medical cannabis legalisation tends to be a stepping stone towards de facto decriminalisation or legalisation of cannabis (Reinarman et al., 2011; Thurstone et al., 2011).

In instances where an increase in crime is noted, the crime is identified as being drug-related, suggesting that these studies' findings relate to the "harm caused by prohibition" theme of the framework (section 4.1.1).

Mental health

Multiple pieces of literature associate cannabis use with mental health disorders, yet they fail to conclusively demonstrate causality (Central Drug Authority, 2013; Hall & Weier, 2015; Hasin et al., 2015; Macleod et al., 2004; Peltzer & Ramlagan, 2007; Proal et al., 2014). Proal et al. (2014, p. 287) conducted a comprehensive review of the available literature and conclude that "cannabis does not cause psychosis by itself. In genetically vulnerable individuals, while cannabis may modify the illness onset, severity and outcome, there is no evidence from this study that it can cause the psychosis".

Based on the observations provided in this section of the analysis, there is a notable tendency to attribute antisocial behaviour to drugs rather than individuals.

4.2 Research findings and implications for policy

This section seeks to tie the outputs of the theoretical framework to the working hypothesis and research question and sub-questions.

The above analysis definitively demonstrates that there is a need to reassess the prohibitionist approach to harm reduction with regard to cannabis. While individual studies may not always meet the requirement of transferability to the South African context, collectively the global studies confirm that greater cost is borne by society and the economy through prohibition than through a more progressive stance on cannabis.

The research suggests that cannabis prohibition has had similar effects globally and in South Africa. Prohibition:

- consumes significant police resources (time and money) that may be better allocated to reducing overall harm in society
- promotes stigma and discrimination of cannabis users
- undermines public perceptions of the police force
- enriches crime organisations
- compels cannabis users to interact with criminal elements, exposing them to potential harm
- ignores potential upsides of legitimate industrial and medicinal applications of the cannabis plant.

Unfortunately, there is very little evidence provided by prohibitionists to confirm the extent to which their policies have been effective in reducing overall social harm globally and in South Africa. In fact, the UNODC's (2007, 2009a, 2012, 2014) reports repeatedly imply that efforts to control large-scale production and trafficking of cannabis have not yielded the expected results. Furthermore the UNODC reports do not quantify the economic and social costs that have been avoided as a result of prohibition enforcement. The measurement of seized cannabis, numbers of arrests and use prevalence rates do not equate to harm-reduction measurement. This confirms the observation, first made in the literature review, that cannabis prohibition and the enforcement-led approach are rooted in moral principles rather than in the intended genuine harm-minimisation goals.

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Most of the well-intended hypotheses that underline the prohibitionist agenda have consistently been disproved by empirical evidence. In instances where prohibitionist hypotheses have been shown to carry some validity, cheaper and more effective policy options than prohibition may be better suited to minimising the net social and economic costs.

The economic implications of easing cannabis legislation for South Africa cannot be quantified due to a lack of local data, but international studies confirm that the potential benefits to the economy are multiple and may be significant.

Table 1 summarises the findings of the analysis by listing the potential gains, losses and uncertainties of lifting cannabis prohibition in South Africa, based on the available data, literature and analyses.

Table 1: Potential gains, losses and uncertainties of cannabis legalisation in South Africa

Potential gains	Potential losses	Uncertainties
Formalisation of illicit cannabis industry revenues, leading to increased government revenues, somewhat less drug-related crime ⁶ and increased formal employment	Increased absolute incidence of cannabis abuse as adult prevalence rates increase with eased legislation, leading to higher strain and cost on the healthcare system	The magnitude of the demand-side response to legalisation through removal of stigma and penalties for cannabis use cannot be estimated reliably
Police resources can be better deployed to focus on greater social ills (some of which have been found to be stronger drivers of substance abuse than availability alone)	Commercialisation and subsequent marketing efforts may lead to increased prevalence through aggressive encouragement campaigns	It remains uncertain whether cannabis and alcohol are alternatives or complementary goods
Less indirect harm caused by arrests and incarceration for possession of cannabis	Regulation is not perfect, and some leakage to minors may be observed as general access to cannabis increases	Commercial viability of hemp in South Africa is still under investigation through the hemp pilot programmes

⁶ Quah et al. (2014, p. 77) suggest restraint regarding claims that legalisation of cannabis would materially reduce drug-related violence, observing that other illicit (and some licit) drugs dominate drug-related violence and that many of these “costs of the war on drugs would remain in place after cannabis legalisation”.

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A regulated cannabis market is safer for the 2.65 to 4.82 million South African cannabis users, through less contact with organised crime and more certainty regarding product contamination by other illicit substances	In the short run, the cost (financial and human capital) of enforcing a regulated market may be high, but as the market matures less enforcement would be required	
Low youth cannabis use prevalence rates. Formalised industry would have greater incentive not to market or sell cannabis to minors – current illicit markets have no such incentive	Incumbent industries whose raw materials compete with industrial hemp may suffer over the longer term if hemp proves to be a more attractive alternative feedstock	
Higher potential to earn income for impoverished subsistence farmers in the rural Eastern Cape, which could be further supported by policy		
Generating an industrial hemp value chain locally could create new industries and encourage innovation, resulting in further economic gains, including employment opportunities		
Research and development into medical marijuana locally could lead to innovation with economic advantages, and provide low-cost alternative medication		
The SAPS and the CDA could put their espoused policies of harm reduction into practice		

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Interestingly, the potential losses stated in the table can to a large extent be addressed through effective policy design that is informed by the research provided in this report. For example, the fact that prices of cannabis in a formalised industry would need to be maintained at black market prices through tax mechanisms suggests that government would continue to reap disproportionate revenues as the market matures. These revenues could be used to fund education and prevention campaigns as well as healthcare facilities related to general substance abuse (as opposed to cannabis abuse alone). Commercialisation may not be the only option to consider as a policy – alternatives that negate the potential for aggressive marketing and encouragement must also be explored. These alternative policies include but are not limited to:

- production of cannabis for recreational use with free distribution, while regulating industrial hemp separately
- government monopoly of the entire supply chain, or parts of it (the approach adopted by Uruguay)
- non-profit models through the use of cooperatives, which may be well suited to empowering rural Eastern Cape dagga farmers and increasing their earnings.

The uncertainties associated with cannabis legalisation suggest that policy formulation would need to be carefully considered. Government would be well placed to enact an evolutionary approach to cannabis policy that is responsive to market dynamics, at least in the early days of market maturity. In order to achieve this, a robust tracking mechanism for the end-to-end cannabis supply chain may need to be developed. Policy design needs to ensure that the costs associated with regulation of a legalised cannabis industry can be fully borne by the cannabis industry itself. This may not be a tall ask if one considers the “disproportionate tax revenues” that are likely to accrue as a result of the need to maintain prices of recreational cannabis at pre-legalisation levels (discussed above).

Internationally, it is apparent that incremental changes to policy have been preferred to support the learning process of policymakers. This requires a reduction in penalties for possession of cannabis, coupled with increased access to medical marijuana. Once policymakers have learned from this experience, the next step could be decriminalisation of small amounts, to be followed up later by larger scale legalisation.

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While the case for cannabis legalisation (as opposed to other options such as decriminalisation) has not been explored explicitly, it is important to note that decriminalisation⁷ or any other forms of de-penalisation are normatively flawed, particularly since they do not address the issues associated with illicit markets nor the bulk of the “harm caused by prohibition” as discussed in section 4.1.1 of this report.

Use-specific legalisation of *Cannabis sativa* for industrial and/or medical purposes also does not present an optimal long term socio-economic alternative to prohibition as it does not comprehensively address the identified “harm caused by prohibition” or the “harm not prevented by prohibition.” Internationally, regimes that have permitted access to medical marijuana have recorded notable diversion to recreational use; there is no reason that alternative outcomes should be expected in South Africa. While few countries such as France and Ukraine do have industrial cannabis industries without legalisation of cannabis for human consumption, this approach may prove challenging in the South African context (South Africa. Department of Agriculture Forestry & Fisheries, 2012). The dagga farmers of the Eastern Cape might wish to build on their established knowledge of *Cannabis sativa* and begin developing cottage industries from hemp production, but distinguishing between industrial and recreational cannabis plantations is challenging; this will raise costs of enforcement and allow room for diversion to illicit recreational cannabis production (Booth, 2003; Fortenbery & Bennett, 2004; Herer, 1985; Johnson, 2015; Wynn, 1998).

Overall, the research findings of this report confirm that South Africa’s prohibitionist policy on cannabis requires revision in order for socio-economic outcomes to be optimised. To this end, the working hypothesis has been shown to be valid: The research suggests that a net socio-economic gain could be realised for South Africa by lifting cannabis prohibition.

4.3 Research limitations

As Rothbard (1977) explains, the challenge of conducting a cost–benefit analysis (or any form of utilitarian analysis) is that social costs and benefits are exceedingly difficult to measure and weight objectively. Ostrowski (1990) confirms this view, noting that the notions of harm, value, cost and happiness are by their very nature subjective and would differ greatly

⁷ Under a decriminalised or de-penalised regime, cannabis possession for personal use would not be considered a criminal offence but sale of cannabis would. No tax revenues would accrue to government under this regime

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from region to region and person to person. This suggests that conducting a definitive and completely objective socio-economic cost–benefit analysis may be impossible.

The research has not assessed the political motivations for maintaining the status quo of cannabis prohibition in South Africa. Government may very well be aware of the potential advantages of abolishing cannabis prohibition, but incumbent political factors (such as general public perceptions) could be hindering progress in policy change.

The lack of reliable, accurate, South Africa-specific data has limited the ability to make definitive and quantifiable claims regarding current and potential costs and benefits to the country of prohibition versus legalisation of cannabis. Nonetheless, the research has highlighted the potential sources of these costs and benefits, which are able to directionally suggest the net effect of prohibition versus legalisation.

A few researchers suggest that prohibitionist drug (particularly cannabis) policies constitute a violation of basic human rights. This notion is based on the premise of self-determination, which implies “a right to engage in any action which is peaceful; which does not deprive others of their right to free action” (Ostrowski, 1990, p. 19). This issue is intentionally excluded from the research as it is better suited to legal, sociological and philosophical debates, but this does not undermine the validity of its role in future policy considerations.

Spill-over effects in terms of potential economic impact of new (cannabis-related) industries relative to incumbents are not explored, as this constitutes a substantial piece of work in its own right (on a per-industry basis), which is thus beyond the scope of the current research. However, it is recommended for future research.

While the research presented in this report has incorporated the most robust literature available, cannabis re-legalisation is at an early stage globally, and the socio-economic implications presented in this report may change. Increased global commercialisation and legalisation trends may uncover as yet unforeseen costs and/or benefits to societies and economies that abolish prohibition.

Given the broad nature of the research question, none of these limitations poses a serious threat to the credibility of the research outputs. However, any future researcher who builds on this research report would be well advised to consider incorporating the above in their respective research.

5. RESEARCH CONCLUSIONS

This report set out to answer the primary research question: Is there a socio-economic business case to be made for cannabis legalisation in South Africa? In order to support the deductive research approach and strategy a working hypothesis was formulated, it stated that: A net socio-economic gain for South Africa would result from lifting cannabis prohibition.

Despite its deceptively simple nature, the research question uncovers significant sources of complexity. This leads one to conclude that while the research findings confirm the validity of the working hypothesis, South African policymakers would be well advised to tread with caution when developing much needed new cannabis-related legislation.

Research sub-question 1: What are the socio-economic costs and benefits of the current policies on cannabis?

The current enforcement-led approach to cannabis prohibition in South Africa demonstrates very little evidence of having reduced overall harm to society when viewed through the lens of the chosen conceptual framework. In fact, internationally the evidence overwhelmingly suggests that the current state of cannabis prohibition results in more costs than benefits to the economy and society; these observations have been found to be transferable to the South African context. The UNODC routinely refers to these effects as unintended consequences of the war on drugs. However, it will be increasingly difficult for the UNODC and member states to continue arguing that these effects are unforeseen, more than 50 years after the initiation of the global war on drugs. The need for a change in policy is clear.

Research sub-question 2: What are the potential socio-economic implications of legalisation in South Africa?

The case for legalisation, however, is not clear-cut, chiefly because of the high degree of uncertainty associated with the effects of legalisation. Globally, cannabis re-legalisation remains in its infancy and care must be taken when making inferences from the few studies that are available on this topic. Nonetheless, the available research and literature highlight multiple potential sources of both social and economic gains that could be realised through lifting prohibition on cannabis.

The potential socio-economic gains that could be realised through cannabis legalisation in South Africa are broad and do require further quantification. Nevertheless the formalisation

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and regulation of illicit markets, opportunity for new industries and medical innovation coupled with better allocation of police resources all serve as strong incentives in support of legalisation.

For the most part the potential socio-economic costs appear to be manageable through careful cannabis policy design. While not all costs would be mitigated through policy and regulation, the research suggests that on balance the socio-economic gains would outweigh potential losses. The ensuring of adequate health services for substance abuse (beyond cannabis alone) could be funded from cannabis-related taxes. This is an example of how policy could revise the negative aspects of lifting cannabis prohibition. This example also demonstrates how legalisation of cannabis can be consistent with the NDMP's stated goal of harm reduction.

The potential harm and uncertainties associated with the effects of legalisation cannot themselves be used as justifications for continued prohibition. Particularly given the lack of evidence that cannabis prohibition has resulted in reduced levels of harm; in fact the bulk of the evidence suggests the contrary.

Research sub-question 3: How could the socio-economic costs of cannabis legalisation be minimised through potential policy interventions?

With cannabis re-legalisation being so new globally, the uncertainties related to potential outcomes of legalisation cannot be planned for or negated based on past experiences of other countries, chiefly because these uncertainties are not necessarily transferable and little research has been done to fully understand them. They must not be interpreted as a reason for continued prohibition, which has been found to incur more costs to society and the economy. Instead, the identified uncertainties should serve as motivation for innovative approaches to policy design, implementation and enforcement.

The research undertaken in this report, suggests that commercialization of cannabis along the lines of alcohol or tobacco is not supportive of overall harm reduction; although it may still be better than continued prohibition. Alternatives need to be explored.

Ensuring optimal socio-economic outcomes with regard to cannabis-related policy design requires some degree of policy experimentation. Policymakers must have vigorous oversight, and policy outcomes must be measured systematically and assessed regularly. Policymakers

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need to be prepared to change policies quickly if and when challenges emerge. Optimising socio-economic outcomes through changes in cannabis policy would have to be an iterative, learning process that assesses policy efficacy on measured outcomes.

While this research report does not deliver a definitive and quantifiable socio-economic business case for cannabis legalisation in South Africa, it does highlight that there is a case to be made. By identifying the shortcomings of cannabis prohibition as well as the potential challenges of legalisation, this research report lays the groundwork for future researchers to begin building the quantitative business case for cannabis legalisation in South Africa.

6. FUTURE RESEARCH DIRECTIONS

This report represents just the first step in developing a robust business case for cannabis legalisation in South Africa. Future research needs to build on the themes discussed herein with a view to quantifying the costs and benefits of cannabis legalisation and comparing them with those of continued prohibition.

With regard to industrial hemp, future research will be well placed to capitalise on the outputs of the South African government's hemp pilot programmes. At the time of writing this report, the programmes are on-going and no interim results are available for public consumption. Research may need to focus on specific applications, geographies or industries. Industry-specific analysis is probably warranted given that hemp would effectively be seen as an alternative feedstock that either complements or competes with incumbent feedstocks in industry.

In order to understand the potential revenue-generating opportunity of recreational cannabis sales, future research would be well placed to assess the robustness of published cannabis use prevalence rates in South Africa. The researcher will also need to develop a view on current black market prices of cannabis in the country, which may prove to be challenging in the near term, given the lack of research in this field and the plant's current legal status. No meaningful quantification of the potential recreational cannabis market can be conducted without this data. This research will also provide guidance in terms of quantifying the potential tax revenues that could accrue to government from legalisation, and would allow the researcher to truly develop South Africa's version of the Miron (2005) report.

There is at present no definitive understanding of the financial costs of cannabis abuse in South Africa. Research into this issue will require the unpacking of public health costs associated with cannabis abuse, law enforcement and so on, and insurance costs that are borne by individuals and employers. The matter is further complicated by the fact that government spending on drug-related issues is distributed across national, provincial and local government departments, as well as state-owned agencies and statutory organisations. An incremental approach may need to be adopted in attempting to understand these costs.

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Future researchers in this field would be well placed to assess public perceptions of cannabis and cannabis-related harm in South Africa, as no such studies are currently available. This research could help ascertain the political appetite to drive change in the Government's stance on cannabis. International cases suggest that public opinion is a major catalyst to lifting cannabis prohibition policies.

7. REFERENCES

- Abel, E. L. (1980). *Marijuana: The first twelve thousand years*. New York, NY: Springer.
- AFP. (2015). *L'Uruguay produira six à dix tonnes de cannabis par an*. Uruguay: AFP. Retrieved from <https://www.youtube.com/watch?v=Mt3QByGMaaY>
- Agricultural Research Council. (2014). *Hemp*. Retrieved from <http://www.arc.agric.za/arc-iic/Pages/Hemp.aspx>
- Alcock, G. G. (2015). *Kasinomics: African informal economics and the people who inhabit them*. Johannesburg, South Africa: Tracey McDonald Publishers.
- Ammerman, S., Ryan, S., & Adelman, W. P. (2015). The impact of marijuana policies on youth: Clinical, research, and legal update. *American Academy of Pediatrics*, 135(3), e769–e785. <http://doi.org/10.1542/peds.2014-4147>
- Ap Dewi, T. (2014). Malawi weed farm [photograph]. Retrieved from <http://www.weirdafrica.com/2014/01/reasons-malawi-economy-may-be-about-to.html>
- Arthur, B. (1994). Inductive reasoning and bounded rationality. *The American Economic Review*, 84(2), 406–411.
- Beinhocker, E. (2006). *Origin of wealth: Evolution, complexity, and the radical remaking of economics*. Watertown, MA: Harvard Business Review Press.
- Berliner, D. (2015, February 28). Cops spraying dagga on Wild Coast a deadly risk. *Dispatch Live*. Retrieved from <http://www.dispatchlive.co.za/news/cops-spraying-dagga-on-wild-coast-a-deadly-risk/>
- Bernholz, C. D. (2000). The drug nexus in Africa. *Journal of Government Information*, 27(6), 914–916. [http://doi.org/10.1016/S1352-0237\(00\)00248-3](http://doi.org/10.1016/S1352-0237(00)00248-3)
- Booth, M. (2003). *Cannabis: A history* (2nd ed.). London, England: Bantam.
- Brener, N. D., Billy, J. O. ., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. *Journal of Adolescent Health*, 33(6), 436–457. [http://doi.org/10.1016/S1054-139X\(03\)00052-1](http://doi.org/10.1016/S1054-139X(03)00052-1)
- Brenneisen, R. (2007). Chemistry and analysis of phytocannabinoids and other cannabis constituents. In M. A. ElSohly (Ed.), *Marijuana and the cannabinoids* (pp. 17 – 50). Totowa, NJ: Humana Press.
- Callaway, J. C. (2004). Hempseed as a nutritional resource: An overview. *Euphytica*, 140(1-2), 65–72. <http://doi.org/10.1007/s10681-004-4811-6>
- Centers for Disease Control and Prevention. (2015). Youth risk behavior surveillance system. Retrieved from <http://www.cdc.gov/healthyyouth/data/yrbs/index.htm>
- Central Drug Authority. (2006). *National drug master plan: 2006 - 2011*. Pretoria, South Africa: Department of Social Development Republic of South Africa. Retrieved from [https://www.westerncape.gov.za/text/2009/5/national_drug__master_plan__\(2006-2011\).pdf](https://www.westerncape.gov.za/text/2009/5/national_drug__master_plan__(2006-2011).pdf)

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- Central Drug Authority. (2013). *National drug master plan: 2013 – 2017*. Pretoria, South Africa: Department of Social Development Republic of South Africa. Retrieved from <http://www.dsd.gov.za>
- Central Drug Authority. (2015a). Central Drug Authority ready to implement national drug master plan. Retrieved from <http://www.dsd.gov.za/cda>
- Central Drug Authority. (2015b). Cost of substance abuse. Retrieved from <http://www.dsd.gov.za/cda>
- Chaloupka, F. J., Straif, K., & Leon, M. E. (2011). Effectiveness of tax and price policies in tobacco control. *Tobacco Control*, 20(3), 235–238. <http://doi.org/10.1136/tc.2010.039982>
- Chapagain, A. K., Hoekstra, A. Y., Savenije, H. H. G., & Gautam, R. (2008). *The water footprint of cotton consumption*. (Research Report Series No. 18) Value of Water, Institute for Water Education, UNESCO-IHE. Retrieved from <http://waterfootprint.org/media/downloads/Report18.pdf>
- Choo, E. K., Benz, M., Zaller, N., Warren, O., Rising, K. L., & McConnell, K. J. (2014). The impact of state medical marijuana legislation on adolescent marijuana use. *Journal of Adolescent Health*, 55(2), 160–166. <http://doi.org/10.1016/j.jadohealth.2014.02.018>
- Clarke, M., & Stooos, J. (2015). *Dagga: Police in helicopters 2015*. [Video file]. Retrieved from <https://www.youtube.com/watch?v=qG9ymmOTjp0&t=65>
- Clarke, R., & Watson, D. (2007). Cannabis and natural cannabis medicines. In M. A. ElSohly (Ed.), *Marijuana and the cannabinoids* (pp. 1 – 17). Totowa, NJ: Humana Press.
- Colorado Department of Public Health & Environment. (2015). 2014 adult marijuana use in Colorado. Retrieved from <http://www.chd.dphe.state.co.us/MJ/2014-Adult-Marijuana-Use-In-Colorado.html>
- Colorado Department of Revenue. (2015). *Colorado marijuana tax data*. Retrieved from <https://www.colorado.gov/pacific/revenue/colorado-marijuana-tax-data>
- Cook, P. J., & Moore, M. J. (2002). The economics of alcohol abuse and alcohol-control policies. *Health Affairs*, 21(2), 120–133. <http://doi.org/10.1377/hlthaff.21.2.120>
- Crampton, H. (2015). *Dagga: A short history*. Johannesburg, South Africa: Jacana.
- Datwyler, S., & Weiblen, G. D. (2006). Genetic variation in hemp and marijuana (*cannabis sativa* L.) according to amplified fragment length polymorphisms. *Journal of Forensic Sciences*, 51(2), 371–375. <http://doi.org/10.1111/j1556-4029.2006.00061.x>
- De Bruijn, P. B., Jeppsson, K.-H., Sandin, K., & Nilsson, C. (2009). Mechanical properties of lime–hemp concrete containing shives and fibres. *Biosystems Engineering*, 103(4), 474–479. <http://doi.org/10.1016/j.biosystemseng.2009.02.005>

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- De Kock, C., Kriegler, A., & Shaw, M. (2015). *A citizen's guide to SAPS crime statistics: 1994 to 2015*. Cape Town, South Africa: Centre of Criminology, University of Cape Town. Retrieved from https://webcms.uct.ac.za/sites/default/files/image_tool/images/225/PDFs_CRI/CITIZEN_GUIDE/CRI_doc_protected_CrimCitGuideSAPS.pdf
- Decorte, T., & Potter, G. R. (2015). The globalisation of cannabis cultivation: A growing challenge. *International Journal of Drug Policy*, 26(3), 221–225. <http://doi.org/10.1016/j.drugpo.2014.12.011>
- Dewey, L. H., & Merrill, J. L. (1916). *Professional paper: Hemp hurds as paper-making material*. (Bulletin No. 404) United States Department of Agriculture, Washington DC. Retrieved from <http://www.gutenberg.org/files/17855/17855-h/17855-h.htm>
- Dube, S. R., Felitti, V. J., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: the adverse childhood experiences study. *Pediatrics*, 111(3), 564–572. <http://doi.org/10.1542/peds.111.3.564>
- Eires, R., Nunes, J. P., Fanguero, R., Jalali, S., & Camões, A. (2008). New eco-friendly hybrid composite materials for civil construction. *Materials Science Forum*, 587-588, 908–912. <http://doi.org/10.4028/www.scientific.net/MSF.587-588.908>
- Fink, A. (2014). Reviewing the literature: Why? For whom? How? In *Conducting research literature reviews: From the internet to paper* (4th ed.). Thousand Oaks, CA: Sage Publications.
- Fortenbery, T. R., & Bennett, M. (2004). Opportunities for commercial hemp production. *Review of Agricultural Economics*, 26(1), 97–117. <http://doi.org/10.1111/j.1467-9353.2003.00164.x>
- Gastrow, P. (2003). *Mind-blowing : The cannabis trade in southern Africa*. Cape Town, South Africa: Institute for Security Studies.
- Hall, W., & Weier, M. (2015). Assessing the public health impacts of legalizing recreational cannabis use in the USA. *Clinical Pharmacology & Therapeutics*, 97(6), 607–615. <http://doi.org/10.1002/cpt.110>
- Hardy, Q. (2005, June 2). Milton Friedman: Legalise it. *Forbes*. Retrieved from http://www.forbes.com/2005/06/02/cz_qh_0602pot.html
- Harris, M. (2010). Industrial hemp plantation [photograph]. Retrieved from <http://beforeitsnews.com/african-american-news/2010/08/black-farmers-and-pot-131419.html>
- Hasin, D. S., Saha, T. D., Kerridge, B. T., Goldstein, R. B., Chou, S. P., Zhang, H., ... Grant, B. F. (2015). Prevalence of marijuana use disorders in the United States between 2001-2002 and 2012-2013. *JAMA Psychiatry*, 20852. <http://doi.org/10.1001/jamapsychiatry.2015.1858>
- Herer, J. (1985). *The emperor wears no clothes* (11th ed.). Van Nuys, CA: Ah Ha Publishing. Retrieved from <http://www.hampapartiet.se/25.pdf>
- Howell, S., & Couzyn, K. (2015). The South African national drug master plan 2013-2017: A critical review. *South African Journal of Criminal Justice*, 28(1), 1–23.

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- Hyde, K. (2000). Recognising deductive processes in qualitative research. *Qualitative Market Research: An International Journal*, 3(2), 82–90.
<http://doi.org/10.1108/13522750010322089>
- Joffe, A., & Yancy, W. S. (2004). Legalization of marijuana: potential impact on youth. *American Academy of Pediatrics*, 113(6), e632–e638.
<http://doi.org/10.1542/peds.113.6.e632>
- Johnson, R. (2015). *Hemp as an agricultural commodity*. (RL32725) Congressional Research Service Report, Washington DC, WA. Retrieved from
<https://www.fas.org/sgp/crs/misc/RL32725.pdf>
- Karus, M., & Vogt, D. (2004). European hemp industry: Cultivation, processing and product lines. *Euphytica*, 140(1-2), 7–12. <http://doi.org/10.1007/s10681-004-4810-7>
- Keliman, M. A. R. (2015). *Legal commercial cannabis sales in Colorado and Washington: What can we learn ?* (Report) Foreign Policy at Brookings, Washington DC. Retrieved from <http://www.brookings.edu/research/papers/2015/04/global-drug-policy>
- Kepe, T. (2003). Cannabis sativa and rural livelihoods in South Africa: Politics of cultivation, trade and value in Pondoland. *Development Southern Africa*, 20(5), 605–615.
<http://doi.org/10.1080/0376835032000149252>
- Kilmer, B., Caulkins, J. P., Pacula, R. L., MacCoun, R. J., & Reuter, P. H. (2010). *Altered state? Assessing how marijuana legalization in California could influence marijuana consumption and public budgets*. (Occasional paper) RAND Corporation, Drug Policy Research Center, Santa Monica, CA. Retrieved from
http://www.rand.org/pubs/occasional_papers/OP315.html
- Kleinig, J. (2015). Ready for retirement: The gateway drug hypothesis. *Substance Use & Misuse*, 50(8-9), 1–5. <http://doi.org/10.3109/10826084.2015.1007679>
- Kraenzel, D. G., Petry, T., Nelson, B., Anderson, M. J., Mathern, D., & Todd, R. (1998). *Industrial hemp as an alternative crop in North Dakota: A white paper study of the markets, profitability, processing, agronomics and history*. (No. 402) Agricultural Economics Report, The Institute for Natural Resources and Economic Development (INRED), North Dakota State University.
- Kumar, R. N., Chambers, W. A., & Pertwee, R. G. (2001). Pharmacological actions and therapeutic uses of cannabis and cannabinoids. *Anaesthesia*, 56(11), 1059–1068.
<http://doi.org/10.1046/j.1365-2044.2001.02269.x>
- Legget, T. (2001). *Rainbow Vice: The drugs and sex industries in the new South Africa*. Cape Town, South Africa: New Africa Books.
- Leizer, C., Ribnicky, D., Poulev, A., Dushenkov, S., & Rskin, I. (2000). The composition of hemp seed oil and its potential as an important source of nutrition. *Journal of Nutraceuticals, Functional & Medical Foods*, 2(4), 35–53.
http://doi.org/10.1300/J133v02n04_04
- Li, S.-Y., Stuart, J. D., Li, Y., & Parnas, R. S. (2010). The feasibility of converting cannabis sativa L. oil into biodiesel. *Bioresource Technology*, 101(21), 8457–8460.
<http://doi.org/10.1016/j.biortech.2010.05.064>
- MacCOUN, R., & Reuter, P. (2001). Evaluating alternative cannabis regimes. *The British Journal of Psychiatry*, 178(2), 123–128. <http://doi.org/10.1192/bjp.178.2.123>

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- Macleod, J., Oakes, R., Copello, A., Crome, I., Egger, M., Hickman, M., ... Davey Smith, G. (2004). Psychological and social sequelae of cannabis and other illicit drug use by young people: A systematic review of longitudinal, general population studies. *The Lancet*, 363(9421), 1579–1588. [http://doi.org/10.1016/S0140-6736\(04\)16200-4](http://doi.org/10.1016/S0140-6736(04)16200-4)
- Marks, M., & Howell, S. (2015). *Cops , drugs and interloping academics : An ethnographic justification for harm reduction-based programmes in South Africa. Police Practice and Research*. Forthcomming.
- Miron, J. A. (2005). *The budgetary implications of marijuana prohibition*. Report funded by the Marijuana Policy Project, Washington, DC. Retrieved from <http://www.prohibitioncosts.org/mironreport/>
- Morris, R. G., TenEyck, M., Barnes, J. C., & Kovandzic, T. V. (2014). The effect of medical marijuana laws on crime: Evidence from state panel data, 1990-2006. *Plos One*, 9(3). <http://doi.org/10.1371/journal.pone.0092816>
- Natal (Colony). Indian Immigrants Commission. (1987). *Report of the Indian Immigrants Commission, 1885-1887*. (Wragg Commission). Pietermaritzburg, South Africa.
- Nutt, D. J., King, L. A., & Nichols, D. E. (2013). Effects of schedule I drug laws on neuroscience research and treatment innovation. *Nature Reviews Neuroscience*, 14(8), 577–585. <http://doi.org/10.1038/nrn3530>
- Nutt, D. J., King, L. A., & Phillips, L. D. (2010). Drug harms in the UK: A multicriteria decision analysis. *The Lancet*, 376(9752), 1558–1565. [http://doi.org/10.1016/S0140-6736\(10\)61462-6](http://doi.org/10.1016/S0140-6736(10)61462-6)
- Nutt, D. J., King, L. A., Saulsbury, W., & Blakemore, C. (2007). Development of a rational scale to assess the harm of drugs of potential misuse. *The Lancet*, 369(9566), 1047–1053. [http://doi.org/10.1016/S0140-6736\(07\)60464-4](http://doi.org/10.1016/S0140-6736(07)60464-4)
- organtica.com. (2015). Hemp adidas trainer [photograph]. Retrieved from <http://organtica.com/index.php/lifestyle-products/apparel/143-adidas>
- Ostrowski, J. (1990). The moral and practical case for drug legalization. *Hofstra Law Review*, 18(3), 607–702.
- Parry, C. D. H., & Myers, B. J. (2014). Legalising medical use of cannabis in South Africa: Is the empirical evidence sufficient to support policy shifts in this direction? *South African Medical Journal*, 104(6), 399–400. <http://doi.org/10.7196/SAMJ.8135>
- Paterson, C. (2009). *Prohibition & resistance: A socio-political exploration of the changing dynamics of the southern African cannabis trade, c.1850 – the present*. ((Masters Thesis) Rhodes University, Grahamstown, South Africa).
- Pedersen, W., & Skardhamar, T. (2010). Cannabis and crime: findings from a longitudinal study. *Addiction*, 105(1), 109–118. <http://doi.org/ADD2719> [pii] \r10.1111/j.1360-0443.2009.02719.x
- Peltzer, K., Davids, A., & Njuho, P. (2011). Alcohol use and problem drinking in South Africa: findings from a national population-based survey. *African Journal of Psychiatry*, 14(1), 30–37. <http://doi.org/10.4314/ajpsy.v14i1.65466>
- Peltzer, K., & Ramlagan, S. (2007). Cannabis use trends in South Africa. *South African Journal of Psychiatry*, 13(4), 126–131.

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- Proal, A. C., Fleming, J., Galvez-Buccollini, J. A., & DeLisi, L. E. (2014). A controlled family study of cannabis users with and without psychosis. *Schizophrenia Research*, 152(1), 283–288. <http://doi.org/10.1016/j.schres.2013.11.014>
- Quah, D., Collins, J., Atuesta Becerra, L. H., Caulkins, J. P., Csete, J., Drucker, E., ... Ziskind, J. (2014). *Ending the drug wars*. Report of the LSE Expert Group on the Economics of Drug Policy, London School of Economics. Retrieved from <http://www.lse.ac.uk/IDEAS/publications/reports/pdf/LSE-IDEAS-DRUGS-REPORT-FINAL-WEB.pdf>
- Raghupathy, S., & Hahn-Smith, S. (2011). Reliability of the high school youth risk behavior survey when administered online. *International Quarterly of Community Health Education*, 32(2), 135–148. <http://doi.org/10.2190/IQ.32.2.d>
- Rehm, J., & Fischer, B. (2015). Cannabis legalization with strict regulation, the overall superior policy option for public health. *Clinical Pharmacology & Therapeutics*, 97(6), 541–544. <http://doi.org/10.1002/cpt.93>
- Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., & Patra, J. (2009). Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet*, 373(9682), 2223–33. [http://doi.org/10.1016/S0140-6736\(09\)60746-7](http://doi.org/10.1016/S0140-6736(09)60746-7)
- Reinarman, C., Nunberg, H., Lanthier, F., & Heddleston, T. (2011). Who are medical marijuana patients? Population characteristics from nine California assessment clinics. *Journal of Psychoactive Drugs*, 43(2), 128–135. <http://doi.org/10.1080/02791072.2011.587700>
- Rothbard, M. N. (1977). *Toward a reconstruction of utility and welfare economics* (reprint). New York, NY: Center for Libertarian Studies. <http://doi.org/10.1007/BF00842706>
- Roulac, J. (1997). *Hemp horizons: The comeback of the world's most promising plant*. Madison, WI: Chelsea Green Publishing.
- Salas-Wright, C. P., Vaughn, M. G., Todric, J., Córdova, D., & Perron, B. E. (2015). Trends in the disapproval and use of marijuana among adolescents and young adults in the United States: 2002–2013. *The American Journal of Drug and Alcohol Abuse*, 41(5), 392–404. <http://doi.org/10.3109/00952990.2015.1049493>
- SAPA. (2015, February 19). Cops nip dagga problem in the bud. *IOL News*. Retrieved from <http://www.iol.co.za/news/crime-courts/cops-nip-dagga-problem-in-the-bud-1.1821011#.VQSYZY7Lcn4>
- SAPS. (2015a). *Annual report*. Pretoria, South Africa: Government Printer. Retrieved from http://www.saps.gov.za/about/stratframework/annual_report/2014_2015/SAPS_AR_2014-15_for_viewing.pdf
- SAPS. (2015b). Crime statistic of Republic of South Africa [Data file]. Retrieved from http://www.saps.gov.za/resource_centre/publications/statistics/crimestats/2015/crime_stats.php
- SAPS. (2015c). SAPS destroys several hectares of dagga crops. Retrieved from <http://www.saps.gov.za/newsroom/selnewsdetails.php?nid=4069>

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- Schneider, M., Norman, R., Parry, C., Bradshaw, D., & Plüddemann, A. (2007). *Estimating the burden of alcohol abuse in South Africa in 2000. Methodological Note*. Cape Town, RSA: Medical Research Council.
- Secades-Villa, R., Garcia-Rodríguez, O., Jin, C. J., Wang, S., & Blanco, C. (2015). Probability and predictors of the cannabis gateway effect: A national study. *International Journal of Drug Policy*, 26(2), 135–142. <http://doi.org/10.1016/j.drugpo.2014.07.011>
- Soth, J., Grasser, C., Salreno, R., & Kiefer & Partners AG. (1999). *Background paper: The impact of cotton on fresh water resources and ecosystems - a preliminary synthesis*. Zurich, Switzerland: World Wide Fund for Nature. Retrieved from <http://wwf.panda.org/?3686/The-impact-of-cotton-on-fresh-water-resources-and-ecosystems>
- South Africa. (2014). *Medical innovation bill [discussion draft]*. General Notice 100 of 2014 [PMB1 - 2014] Publication and Invitation for Public Comment, Pretoria, SA: Government Printer. Retrieved from http://www.parliament.gov.za/live/commonrepository/Processed/20140414/567327_1.pdf
- South Africa. Department of Agriculture Forestry & Fisheries. (2012). *A profile of the South African hemp market value chain*. Pretoria, South Africa: Government Printer.
- South Africa. Department of Correctional Services. (2012). Correctional services statistical information [Data file]. Retrieved from <http://www.dcs.gov.za/AboutUs/StatisticalInformation.aspx>
- Sznitman, S. R., & Bretteville-Jensen, A. L. (2015). Public opinion and medical cannabis policies: examining the role of underlying beliefs and national medical cannabis policies. *Harm Reduction Journal*, 12(1). <http://doi.org/10.1186/s12954-015-0082-x>
- Sznitman, S. R., & Zolotov, Y. (2015). Cannabis for therapeutic purposes and public health and safety: A systematic and critical review. *The International Journal on Drug Policy*, 26(1), 20–9. <http://doi.org/10.1016/j.drugpo.2014.09.005>
- Thaler, R., & Sunstein, C. (2008). *Nudge: Improving decisions about health, wealth and happiness* (2nd ed.). London, UK: Penguin Books.
- The house that hemp built: Hemporium built an eco-friendly hemp house in CT to showcase how industrial hemp can be used in construction. (2014). *World Design Capital: Cape Town*. Retrieved from <http://www.wdccapetown2014.com/projects/project/372>
- The World Bank. (2014). *World Development Indicators - South Africa [Data file]*. Washington DC. Retrieved from <http://data.worldbank.org/country/south-africa>
- Thurstone, C., Lieberman, S. A., & Schmiede, S. J. (2011). Medical marijuana diversion and associated problems in adolescent substance treatment. *Drug and Alcohol Dependence*, 118(2-3), 489–492. <http://doi.org/10.1016/j.drugalcdep.2011.03.031>
- Trautmann, F., Kilmer, B., & Thurnbull, P. (2013). *Further insights into aspects of the EU illicit drugs market*. Luxembourg City, Luxembourg: European Commission. Retrieved from http://ec.europa.eu/justice/anti-drugs/files/eu_market_full.pdf
- United Nations. (1972). *Single convention on narcotic drugs, 1961: As amended by the 1972 protocol amending the single convention on narcotic drugs*. Geneva, Switzerland: United Nations. Retrieved from https://www.unodc.org/pdf/convention_1961_en.pdf

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- United Nations. (1988). *United Nations convention against illicit traffic in narcotic drugs and psychotropic substances*. Vienna, Austria: United Nations. Retrieved from <https://treaties.un.org/doc/Publication/UNTS/Volume1582/volume-1582-I-27627-English.pdf>
- UNODC. (2002). *South Africa: Country profile on drugs and crime*. Pretoria, South Africa: UNODC Regional Office for Southern Africa.
- UNODC. (2007). *Cannabis in Africa: An overview*. Vienna, Austria: United Nations Office on Drugs and Crime. Retrieved from https://www.unodc.org/documents/data-and-analysis/Can_Afr_EN_09_11_07.pdf
- UNODC. (2009a). *A century of international drug control*. Vienna, Austria: United Nations Office on Drugs and Crime. Retrieved from https://www.unodc.org/documents/data-and-analysis/Studies/100_Years_of_Drug_Control.pdf
- UNODC. (2009b). *World drug report 2008*. Vienna, Austria: United Nations Office on Drugs and Crime. Retrieved from https://www.unodc.org/documents/wdr/WDR_2008/WDR_2008_eng_web.pdf
- UNODC. (2012). *Cannabis: A short review*. Vienna, Austria: United Nations Office on Drugs and Crime. Retrieved from https://www.unodc.org/documents/drug-prevention-and-treatment/cannabis_review.pdf
- UNODC. (2014). *World drug report 2014*. New York, NY: United Nations Office on Drugs and Crime. Retrieved from https://www.unodc.org/documents/wdr2014/World_Drug_Report_2014_web.pdf
- UNODC. (2015a). *Special session of the United Nations general assembly on the world drug problem - background*. Retrieved from <https://www.unodc.org/ungass2016/en/background.html>
- UNODC. (2015b). *World drug report 2015*. Vienna, Austria: United Nations Office on Drugs and Crime. <http://doi.org/10.1017/CBO9781107415324.004>
- van der Werf, H. M. G., & Turunen, L. (2008). The environmental impacts of the production of hemp and flax textile yarn. *Industrial Crops and Products*, 27(1), 1–10. <http://doi.org/10.1016/j.indcrop.2007.05.003>
- Van Kerken, Q. (2013). *At what cost? The futility of the war on drugs in South Africa*. Johannesburg, South Africa: Anti Drug Alliance SA.
- Van Niekerk, J. P. (2011). Time to decriminalise drugs. *South African Medical Journal*, 101(2), 79 – 80. Retrieved from <http://hmpg.co.za/index.php/samj/article/view/3428/4052>
- Van Niekerk, J. P. (2014). Medical marijuana and beyond. *South African Medical Journal*, 104(6), 387. <http://doi.org/10.7196/samj.8335>
- Wagenaar, A. C., Salois, M. J., & Komro, K. A. (2009). Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. *Addiction*, 104(2), 179–190. <http://doi.org/10.1111/j.1360-0443.2008.02438.x>
- Walsh, J., & Ramsey, G. (2015). *Uruguay's drug policy: Major innovations, major challenges*. (Report) Foreign Policy at Brookings, Washington DC. Retrieved from <http://www.brookings.edu/research/papers/2015/04/global-drug-policy>

Through the smokescreen: A socio-economic business case for cannabis legalisation in South Africa?

- Williams, G. M., Kroes, R., & Munro, I. C. (2000). Safety evaluation and risk assessment of the herbicide Roundup and Its active ingredient, glyphosate, for humans. *Regulatory Toxicology and Pharmacology*, 31(2), 117–165. <http://doi.org/10.1006/rtp.1999.1371>
- Wynn, J. (1998). *South African hemp feasibility report*. Rustenburg, South Africa: Interim Task Team on Bast Crops South African Plant Fibre Cluster.

8. APPENDIX A: FURTHER DETAIL ON INDUSTRIAL APPLICATIONS OF CANNABIS (HEMP)

As mentioned, and confirmed by Johnson (2015) and Kraenzel et al. (1998), the ARC (2014) identifies 25 000 consumer products that can be produced from hemp, with applications across multiple industries including but not limited to the following:

- **Automotive.** A 2004 study of the hemp industry found that 15% of European hemp fibre was used in the automotive industry in 2002, a substantial increase from the 1% observed in 1996 (Karus & Vogt, 2004). The study discovered that this increased demand was due to an increased push by European automotive manufacturers to use more environmentally sustainable materials in vehicle interiors, which historically were made using plastics from fossil fuel resources. Karus and Vogt (2004) propose that as production techniques incorporating more use of natural fibre with petrochemical plastics are developed, demand for hemp fibre in the automotive industry will continue on its current growth trend.

Furthermore, and perhaps commercially more profound, Li, Stuart, Li and Parnas (2010) found that industrial hemp seed has strong potential as a new crop source for biodiesel, which is both attractive due to its flow properties and competitive due to hemp seeds' high seed yield and oil content. Their study found that hemp biodiesel meets the international standards for biodiesel fuel (ASTM 6751-09) (Li, Stuart, Li, & Parnas 2010).

- **Construction material.** As part of the South African hemp pilot programme (discussed earlier) and the City of Cape Town's World Design Capital project initiatives, a house constructed almost entirely of hemp was built in Cape Town. Construction materials included hempcrete (fibre board), hemp insulation, hemp chipboard and hemp carpets, and furnishings included hemp textiles ("The house that hemp built", 2014) (see Figure 13).

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Figure 13: The house built of hemp in Noordhoek, South Africa (“The house that hemp built”, 2014)

Hempcrete, comprising hemp fibre-reinforced composite concrete blocks, is a much more sustainable building material than other conventional building materials (Eires, Nunes, Figueiro, Jalali, & Camões, 2008). But it has limitations: As De Bruijn, Jeppsson, Sandin and Nilsson (2009) point out, hempcrete products must be used in combination with an existing load-bearing structure. Nonetheless hempcrete has the additional benefits of good thermal insulation, sound insulation, air tightness, fire and moisture protection, and light weight, as a result of which it could reduce construction costs (De Bruijn et al., 2009; Eires et al., 2008).

- **Food and beverage.** Hemp seed oil has been shown to have “numerous benefits [for] health, including but not limited to greater resistance to cancer, inflammation, and blood clotting. A general increase in metabolism and lowering of overall blood cholesterol levels has also been observed” (Leizer, Ribnicky, Poulev, Dushenkov, & Rskin, 2000, p. 51). Callaway (2004) found that subjective concerns regarding the presence of psychoactive THC in hemp foods are not supported by scientific evidence.

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Figure 14: Imported hemp seeds for sale in South Africa at R103 for 200 grams
(Author's collection, 2015)

- **Cosmetics.** Akin to the benefits of hemp seed oil as a food supplement, the very high (approx. 30%) essential fatty acids content in hemp seeds (see Figure 14) makes hemp seed oil an attractive input in skin and hair care products (Callaway, 2004; Herer, 1985; Leizer et al., 2000).
- **Agriculture.** Karus and Vogt (2004, p. 11) found that:
more than 95% of hemp seeds produced in Europe are sold for animal feed, mainly as bird feed, with smaller amounts used by anglers as bait. The attractiveness of this sector strongly depends on the dollar exchange rate and its impact on the competitiveness with imports from China.

Callaway (2004) supports the case for hemp seed as a valuable animal food source in referring to multiple feeding trials which demonstrate the quality of essential fatty acids and the easily digested protein that comprises the hemp seed.

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- **Paper.** In 1916 a US Department of Agriculture (1916) report found that hemp hurds from one acre of hemp plants were able to produce over four times as much pulp (for paper) than from one acre of trees on a sustained yield basis. Karus and Vogt (2004) found that 70 to 80% of hemp fibre produced in Europe is used as specialty pulp for cigarette papers and technical applications. However, they also observe that only a very small portion of fibre used for pulping is traded in the open markets, as the majority of fibre enters integrated process chains in the form of raw material (Karus & Vogt, 2004).
- **Textiles.** Van der Werf and Turunen (2008) note that while cotton and synthetic fibre meet most of the world's textile demand, they are associated with major environmental problems. Cotton cultivation requires significant water, pesticide and fertiliser use (Chapagain, Hoekstra, Savenije, & Gautam, 2008; Soth, Grasser, Salreno, & Kiefer & Partners AG, 1999), much more so than hemp cultivation for textiles (Van der Werf & Turunen, 2008) (see Figure 15). "Synthetic fibres deplete fossil energy resources" (van der Werf & Turunen, 2008, p. 1).



Figure 15: Adidas shoes made from hemp canvas (organtica.com, 2015)

Ending the Drug Wars

Report of the LSE Expert Group on the Economics of Drug Policy



Ending the Drug Wars

Report of the LSE Expert Group on the Economics of Drug Policy, May 2014

It is time to end the ‘war on drugs’ and massively redirect resources towards effective evidence-based policies underpinned by rigorous economic analysis.

The pursuit of a militarised and enforcement-led global ‘war on drugs’ strategy has produced enormous negative outcomes and collateral damage. These include mass incarceration in the US, highly repressive policies in Asia, vast corruption and political destabilisation in Afghanistan and West Africa, immense violence in Latin America, an HIV epidemic in Russia, an acute global shortage of pain medication and the propagation of systematic human rights abuses around the world.

The strategy has failed based on its own terms. Evidence shows that drug prices have been declining while purity has been increasing. This has been despite drastic increases in global enforcement spending. Continuing to spend vast resources on punitive enforcement-led policies, generally at the expense of proven public health policies, can no longer be justified.

The United Nations has for too long tried to enforce a repressive, ‘one-size-fits-all’ approach. It must now take the lead in advocating a new cooperative international framework based on the fundamental acceptance that different policies will work for different countries and regions.

This new global drug strategy should be based on principles of public health, harm reduction, illicit market impact reduction, expanded access to essential medicines, minimisation of problematic consumption, rigorously monitored regulatory experimentation and an unwavering commitment to principles of human rights.

Signed:

Professor Kenneth Arrow, 1972 Nobel Prize in Economics.

Luis Fernando Carrera Castro, Minister of Foreign Affairs, Guatemala.

Nick Clegg, Deputy Prime Minister of the United Kingdom of Great Britain and Northern Ireland.

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Alejandro Gaviria Uribe, Minister of Health and Social Protection, Colombia.

Professor Conor Gearty, London School of Economics.

Aleksander Kwaśniewski, President of the Republic of Poland (1995 – 2005).

Professor Margot Light, LSE IDEAS.

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Professor Sir Christopher Pissarides, 2010 Nobel Prize in Economics.

Professor Danny Quah, LSE IDEAS.

Professor Dani Rodrik, Princeton University.

Professor Jeffrey Sachs, Columbia University.

Professor Thomas Schelling, 2005 Nobel Prize in Economics.

George Shultz, US Secretary of State (1982 – 1989).

Professor Vernon Smith, 2002 Nobel Prize in Economics.

Dr Javier Solana, EU High Representative for Common Foreign and Security Policy (1999 – 2009).

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* LSE IDEAS is responsible for the overall conclusions of this report. Each Contributor is responsible solely for the views expressed in his or her contribution.

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Executive Summary

John Collins, Editor

A major rethink of international drug policies is under way. The failure of the UN to achieve its goal of 'a drug free world' and the continuation of enormous collateral damage from excessively militarised and enforcement-led drug policies, has led to growing calls for an end to the 'war on drugs'. For decades the UN-centred drug control system has sought to enforce a uniform set of prohibitionist oriented policies often at the expense of other, arguably more effective policies that incorporate broad frameworks of public health and illicit market management. Now the consensus that underpinned this system is breaking apart and there is a new trajectory towards accepting global policy pluralism and that different policies will work for different countries and regions. The question, however, remains, how do states work together to improve global drug policies? This report highlights two approaches. First, drastically reallocating resources away from counterproductive and damaging policies towards proven public health policies. Second, pursuing rigorously monitored policy and regulatory experimentation.

States appear set to push forward with a new variety of responses to this issue designed to meet their various national and regional needs. If multilateralism is to remain relevant it must evolve its role from that of global enforcer to global facilitator. The UN, in particular, must recognise that its role is to assist states as they pursue best practice policies based on science and evidence, not work to counteract them. If this occurs, a new and effective international regime based on the acceptance of policy pluralism can emerge. If not, states are likely to move ahead unilaterally and the international coordinating opportunities that the UN affords will be lost.

This report begins with John Collins examining the strategic logic underpinning drug policy over the last century. He argues that the 'drug free world' ideology that pervaded the recent international strategy was misguided and counterproductive and argues that a fundamental restructuring of national and international policies and strategies is required. Next Jonathan Caulkins suggests that current policy debates underestimate prohibition's success in drastically inflating drug prices and diminishing access to illicit drugs in consumer countries. He argues that the goal of prohibition should not be to eradicate mature drug markets completely, something which is not realistic. Instead the goal should be to drive the activity underground while controlling collateral damage created by the markets. His analysis does not, however, apply to producer and transit countries where many of the collateral costs of prohibition are displaced.

Taking up this discussion, Daniel Mejia and Pascual Restrepo examine the negative impacts of prohibitionist policies on producer and transit countries. They argue that Latin American governments are increasingly rejecting prohibitionist policies due to their poor 'operationalisation'. They conclude with a call for drug policies to be evaluated on the basis of their results, not their intentions. Peter Reuter examines the evidence on the 'balloon effect hypothesis' which posits that supply interdiction or eradication in one area merely displaces it to another, 'with no more than temporary inconvenience to the participants'. He argues that this hypothesis contains at least some element of truth and that effective international cooperation and management is required to mitigate its damages.

Vanda Felbab-Brown examines the evidence surrounding the supply-side policies aggressively pursued by the US and its partners in producer and transit countries over the past few decades, finding that blanket eradication and interdiction policies have not only failed, but have often proved highly destabilising for these countries. She argues for a shift towards focused-deterrence strategies, selective targeting and sequential interdiction efforts. These should be coupled with effective economic development and population security strategies. Laura Atuesta examines the plight of Internally Displaced Populations (IDPs) created by the drug wars in Latin America. She argues

that governments need to implement legislation to recognise the existence of IDPs and work to ensure their ability to return to their home regions, as well as economic restitution for their losses. She argues that legalisation alone will not solve this problem and that it would need to be accompanied by major reinvestments of current security expenditures in health, education and transport infrastructure.

Alejandro Madrazo examines the constitutional costs of the 'war on drugs,' finding that many of the legal changes aimed at better enforcing prohibition consist of major alterations to national constitutional systems. These include the creation of 'exceptional' legal regimes. He argues that once these regimes are created they tend to broaden and serve purposes different from those originally sought and are hard to reverse. Following on from this, Ernest Drucker examines the explosive growth of mass incarceration in the US following the declaration of the 'war on drugs'. He argues that its large-scale systems of punishment now represent an important determinant of broader population health. He warns that, although drug-related mass incarceration is largely a United States phenomenon, it is rising in many developing countries facing burgeoning drug markets.

Continuing this discussion of public health outcomes and turning to a basis for the post-'war on drugs' strategy, Joanne Csete examines the clear benefits of adopting public health policies to manage drugs. She highlights that public health services for people who use drugs provide substantial cost savings and positive outcomes, yet are grossly under-resourced. She argues for governments to scale up these services and ensure that law enforcement does not impede access to them. Finally, turning to the role of regulatory experimentation in a post-'war on drugs' strategy, Mark Kleiman and Jeremy Ziskind examine the case of cannabis, 'the drug for which serious legalisation efforts are now in motion'. They argue that, although key questions remain uncertain, it is important to allow jurisdictions to pursue their current initiatives with regulatory experimentation to determine what policies work and what policies need to be avoided. They also outline regulatory principles that can form the basis for states beginning to look at cannabis regulation.

The time has now come to develop an international strategy for the twenty-first century. This will take time to emerge. However the most immediate task is ensuring a sound economic basis for policies and reallocating international resources accordingly. This report sets out a roadmap for finally ending the drug wars. ■

The Economics of a New Global Strategy

John Collins

This contribution provides an overview of the evolution of the current international drug control system. It also highlights some of the contradictory forces built into the system since early in its genesis. It examines the microeconomic contradictions inherent in the supply-centric model of control. These contradictions have created a central policy paradox within the system and thereby help explain the latter's continued failure to achieve its goals as well as its active propagation of widespread policy harms. The contribution then looks at the systemic macroeconomic problems of the globally planned licit drug market and how this relates to the provision of essential medicines. The contribution concludes by outlining the core tenets for a new strategy for international efforts.

Summary

- The current United Nations-governed global strategy of achieving a 'drug-free world' has failed. Pursuit of this unachievable goal has proved damaging to human security and socioeconomic development.
- Decades of evidence conclusively show that the supply and demand for illicit drugs are not something that can be eradicated. They can be managed, either well or badly. They are currently being managed badly.
- Multilateralism should not be geared towards bullying states into pursuing a 'one-size-fits-all' response to drugs. It should focus on facilitating and coordinating multifaceted responses based on a principle of policy pluralism.
- States should examine whether the failure of the International Narcotics Control Board (INCB) to guarantee access to essential pain medicines internationally is the result of a systemic regulatory design flaw or other factors.
- The interpretation and implementation of the conventions is often a fluid construction and a function of the politically dominant approach to policies within the UN framework at any given time. Over the period 1970-2008 the ideologically prohibitionist approach developed an unchallenged suzerainty over the drug issue at the UN. This leadership has now been broken as new approaches are openly supported.
- States should drastically re-prioritise resources away from law enforcement and interdiction, towards public health-based policies of harm reduction and treatment. The priority should be to ensure that treatment and harm reduction services are fully resourced to meet requirements.

A SHORT HISTORY OF INTERNATIONAL DRUG CONTROL

International drug control efforts, currently governed through the United Nations, can be traced to 1909.¹ The world's powers met in Shanghai to devise an international response to the vast quantities of opiates washing around the global market. Following a moralistic and supply-centric vision of this issue, states attending resolved to eradicate 'drug abuse'. This aspiration became codified in the 1912 Hague Opium Convention which set the trajectory for the next hundred years of control efforts. Although no specific tools were initially created to implement this strategy, the institutional mechanisms that evolved over the following decades became almost entirely focused on supply minimisation and police enforcement as the means to achieve it.

The approach to and conception of the problem resulted in a system that was almost entirely supply-centric. All the early political and bureaucratic battles centred on controlling supply. Bureaucrats were hired to focus on supply; delegates arrived at international meetings to discuss supply; home governments then implemented supply-focused treaties and recommendations. An international machinery emerged, initially under the banner of the League of Nations and then transferred to the United Nations, to implement this treaty framework.² As such, the system was built largely upon the assumption that by controlling supply it could control and eventually eradicate 'non-medical and non-scientific' use of drugs.

1 For an historical overview, see 'The International Drug Control System,' in *Governing the Global Drug Wars*, ed. John Collins (London: LSE IDEAS Special Report, 2012).

2 William B. McAllister, 'Reflections on a Century of International Drug Control,' in *Governing the Global Drug Wars*, ed. John Collins (London: LSE IDEAS Special Report, 2012), 13.

Devising policies for dealing with issues of demand and consumption was more problematic and generally sidestepped. This was particularly important regarding the delicate question of opium smoking and the existence of opium monopolies in Europe's Asian colonies. The question of what to do with Asian populations living with addiction and the monopolies that supplied them, which didn't conform to the strict 'medical and scientific' interpretation of 'legitimate' drug use, plagued the system for the first four decades of its existence. Delegates tried to sidestep it by finding common ground between states willing to accept international regulation of narcotics, such as Britain, and those advocating an absolutist prohibitionist approach, such as the United States. Where these two strands intersected – around limiting the production and manufacture of opiates and cocaine via the creation of a global 'system of estimates' – political progress was possible. Where the two diverged – such as on the question of ending the opium monopolies – acrimony initially ensued.

A distinction between global licit and illicit markets was eventually formalised into treaty law in 1931, but a growing illicit market quickly accompanied this provision. Efforts to generate an enforcement response to this illicit market were mixed and political momentum stalled as the US adopted an absolutist prohibitionist approach to the colonial opium monopolies. By the end of the 1930s the system had become entwined in negotiations to control the production of opium at its source. By the outbreak of World War II it had largely lost forward political momentum. The US then used its wartime leverage, particularly over its allies, to push through major policy changes around the world and by 1945 the drug issue had been transformed. Previous impediments to accord, particularly the opium monopolies, faded from view and there emerged a more coherent supply-centric paradigm. This aspired towards a unified commodity control arrangement that would regulate drugs from production all the way to consumption. The questions of what to do with existing addiction and the illicit market, however, remained unanswered.³

The international political battles in the decades following World War II centred on the distribution of the regulatory burden between states that grew drug crops and states that manufactured narcotics. Eventually a compromise oligopolistic structure was created, which delineated a group of recognised producers to grow opium poppy for the global licit market.⁴ These were traded through a set of international conduits administered by UN-affiliated technocrats, which eventually became the International Narcotics Control Board (INCB). The

‘ A global system which predominantly encourages policies that transfer the costs of prohibition onto poorer producer and transit countries, as the current system does, is an ineffective and unsustainable way to control drugs in the long term. ’

Single Convention of 1961 codified this approach – although it alienated the more hard-line US delegates who became partially estranged from the system until the early 1970s.

In the meantime, countries with previously low rates of illicit drug consumption began witnessing a rapid expansion in use. As they cast around for a method to deal with this the US-led prohibitionist bloc appeared to offer the only coherent model ready for adoption. Following the American lead, and supported by the UN treaty framework and agencies, states uniformly moved towards the criminalisation of use and doubled down on supply enforcement measures.

Thus began the trend of modern drug control characterised by a series of drug wars. In the 1970s the US took a reinvigorated lead on the issue, particularly at the UN and through INCB. This was reinforced by a domestic declaration of a 'war on drugs' under Richard Nixon and an aggressive batch of bilateral drug diplomacy. The 1971 Convention and the 1972 amendment to the Single Convention represented a strengthening of international drug control measures while states gradually ramped up their domestic control efforts. The 1988 Convention, aimed primarily at illicit trafficking, followed logically from these efforts. Ten years later, in 1998, states sought to reinvigorate international efforts by embarking on ambitious targets for demand and supply-reduction under the slogan 'a drug-free world, we can do it!'⁵

As the 2000s progressed it became clear that states would miss these targets and the international consensus around the current supply-centric and prohibitionist-oriented approach began to break apart.⁶ There is now a new willingness among certain states, particularly in Latin America, to be vocal about the inherent problems within the system and to try to extricate themselves from the global drug war quagmires.⁷ This contribution hopes to aid these debates by providing explanations for some of the fundamental policy paradoxes built into the system that render the supply-centric strategy not only unachievable, but in many cases actively damaging to human security and socio-economic development.

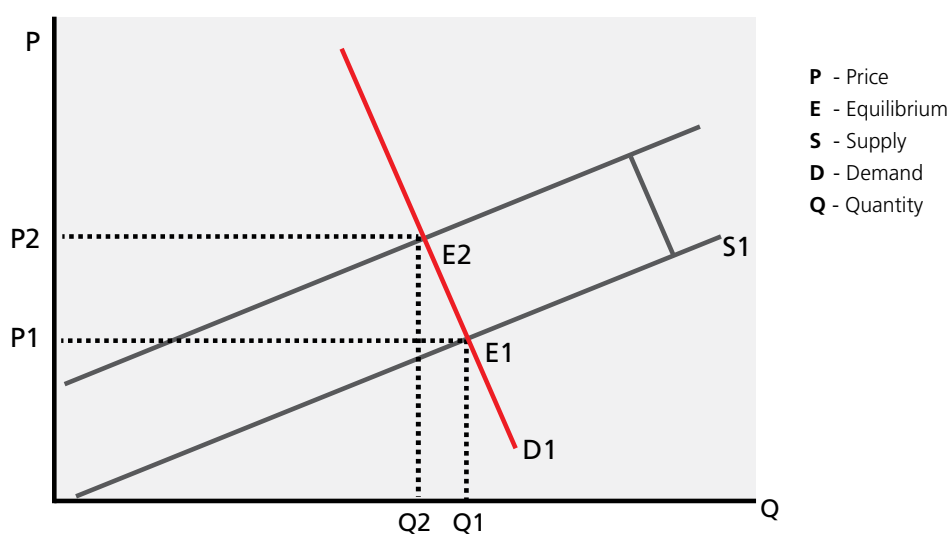
- 3 John Collins, 'Breaking the Monopoly System: American Influence on the British Decision to Prohibit Opium Smoking and End Its Asian Monopolies, 1939-1943,' Paper Presented at *Drugs and Drink in Asia : New Perspectives from History Conference*, Shanghai University, China, June 22, 2012.
- 4 For the debates around a closed list of producers see John Collins, 'Anglo-American Relations and International Drug Policy: The Diplomacy of Disunity from the 1953 Opium Conference to the 1961 Single Convention,' Paper Presented at the *Transatlantic Studies Association Annual Conference*, University College Cork, Ireland, July 12, 2012.
- 5 David R. Bewley-Taylor, 'The Contemporary International Drug Control System: A History of the UNGASS Decade,' in *Governing the Global Drug Wars*, ed. John Collins (London: LSE IDEAS Special Report, 2012), 49.
- 6 David R. Bewley-Taylor, *International Drug Control: Consensus Fractured* (Cambridge University Press, 2012).
- 7 Juan Manuel Santos, 'Re-examining the Drug Problem Through a Fresh Lens,' in *Governing the Global Drug Wars*, ed. John Collins (London: LSE IDEAS Special Report, 2012): 2–3; Alfonso Serrano, 'Guatemala president to UN: Reform global drug policy,' *Al Jazeera America*, September 26, 2013, <http://america.aljazeera.com/articles/2013/9/26/guatemalan-presidentcallsfordrugpolicyreformatungeneralassembly.html>

THE MICRO-ECONOMICS OF GLOBAL FAILURE

The pursuit of a 'drug-free world' is underpinned by the goal of eventually reducing illicit supplies to zero. One can argue whether policymakers pursue this as a genuine or merely an aspirational goal. Regardless, articulating such broad strategic goals has clear and substantial impacts on international bureaucracies when deciding priorities and allocating resources. This has resulted in a drastic overemphasis on policies aimed at suppressing the supply of illicit substances and encouraging the pursuit of highly repressive demand reduction policies. These extend a full spectrum of policy measures, from military intervention, through aerial spraying, alternative livelihoods, border enforcement and criminalisation of consumption (as a means to deprive supply of its demand). Underpinning this strategy, however, is a fundamental policy paradox. In a world where demand remains relatively constant,⁸ suppressing supply can have short-run price effects.⁹ However, in a footloose industry like illicit drugs, these price increases incentivise a new rise in supply, via shifting commodity supply chains. This then feeds back into lower prices and an eventual return to a market equilibrium similar to that which existed prior to the supply-reduction intervention.¹⁰

This effect is exacerbated for addictive substances. For example, a person addicted to heroin is far more likely to decrease outlays on other living expenses to meet marginally increased costs for heroin, as explained by the economic concept of elasticity.¹¹ Price elasticity of demand measures how much demand for a good changes in response to price changes. For a good with many substitutes (rice can be replaced by wheat) a rise in price brings a proportional decline in demand. For a good with few substitutes (e.g. a drug required to prevent the onset of withdrawal symptoms) and that is inelastic, increases in price lead to a proportionally smaller fall in demand (see Figure 1). It is also likely that the new equilibrium, although at a similar level of supply than before interdiction, may be punctuated by a higher level of violence as the least efficient and (potentially) less violent actors are cleared from the market.¹² This pattern can help explain the escalation of drug war violence over the past five decades. Market interventions by states disturb the political economy of the trade, cultivating more violent actors, in turn driving more aggressive state interventions which in turn drive more violent outcomes. This is a point highlighted by Paul Gootenberg with regard to the evolution of the cocaine trade in the Americas from an informal underground economy into the present state of acute violence.¹³

Figure 1. Impact of a Supply-Side Enforcement with a Steep Demand Curve



8 UNODC, *World Drug Report 2006* (Vienna: United Nations, 2006), http://www.unodc.org/pdf/WDR_2006/wdr2006_volume1.pdf.

9 These price effects are contingent on many factors, such as how far up the commodity chain interdiction occurs and where outcomes are measured. The general trend is for drug prices to grow exponentially as they move up the value chain towards final market consumer countries. As a result, interdiction and eradication close to production source have a minimal impact on consumer country prices. For example, eradication under the Taliban in the 2000s resulted in a ten fold increase in farm gate prices in Afghanistan. These price increases were largely absorbed by the profit margins of traffickers without significant impact on consumer country prices or demand. See Barnett R. Rubin and Jake Sherman, *Counter-Narcotics to Stabilize Afghanistan: The False Promise of Crop Eradication* (New York: NYU Center on International Cooperation, 2008), 19.

10 Vanda Felbab-Brown, in her contribution to this report, cites data that suggests a maximum of a two-year lag between successful interdiction and eradication policies and a return to previous levels of supply.

11 Peter Reuter has pointed out that elasticity varies across different drugs and is influenced by a variety of factors. See Peter Reuter, ed., *Understanding the Demand for Illegal Drugs* (Washington DC: National Academies Press, 2010), 20. As a generic example of supply interventions in this case we will assume a relatively inelastic demand for addictive drugs in a market where drug consumption is not saturating all consumers' income.

12 The escalation of violence as a result of 'undifferentiated targeting of organised crime groups' is highlighted in Vanda Felbab-Brown, 'Focused deterrence, selective targeting, drug trafficking and organised crime: Concepts and practicalities,' *Modernising Drug Law Enforcement Report II* (International Drug Policy Consortium, 2013), <http://www.brookings.edu/~media/research/files/reports/2013/03/drug%20law%20enforcement%20felbabbrown/drug%20law%20enforcement%20felbabbrown.pdf>

13 Paul Gootenberg, 'Cocaine's 'Blowback' North: A Commodity Chain Pre-History of the Mexican Drug Crisis,' in *Governing the Global Drug Wars*, ed. John Collins (London: LSE IDEAS Special Report, 2012).

‘...the system was built largely upon the assumption that by controlling supply it could control and eventually eradicate ‘non-medical and non-scientific’ use of drugs.’

This is not to say that a realistic and rational implementation of prohibitionist policies is without merit. Vastly inflating the price of goods which are deemed detrimental to macro-level public health outcomes can be viewed as highly beneficial for consumer countries through diminished accessibility.¹⁴ However, these benefits often derive from the transfer of prohibition’s externality costs to producer and transit countries.¹⁵ A global system which predominantly encourages policies that transfer the costs of prohibition onto poorer producer and transit countries, as the current system does, is an ineffective and unsustainable way to control drugs in the long term.

Further, implementing prohibitionist-oriented policies requires an appreciation of what they can reasonably be expected to do, particularly at the margins. They cannot be expected to eradicate drugs. They can be expected to raise prices to a very high level and thereby dissuade consumption in final market countries.¹⁶ However, in consumer countries with mature drug markets this policy reaches diminishing returns at a certain level.¹⁷ Additional spending has little additional effect other than creating market interventions which are unpredictable and potentially violence-inducing, or increasing societal costs in the form of incarceration and negative public health outcomes.¹⁸ Marginal spending in pursuit of these policies is therefore an ineffective and often counterproductive use of resources.

A more thorough cost-benefit analysis of the merits of prohibition relative to the costs of enforcement, which takes into account the cross-border spillovers, is required for a global cooperative framework. From this analysis a better appreciation of regulatory options and potential for experimentation and readjustment of resources can then be decided. This is not merely a case of numbers. There are intangible human rights and legal institutional costs which must also be weighed.¹⁹

THE MACROECONOMICS OF REGULATORY FAILURE

The international drug control system, through the International Narcotics Control Board (INCB), is tasked with ensuring adequate supplies for licit scientific and medical uses.²⁰ This, however, by INCB’s own admission, is something which it has failed to do.²¹ As a 2013 GDPO Situation Analysis highlights, ‘[m]ore than 5.5 billion people (83 percent of the world’s population) in over 150 countries have low to non-existent access to morphine and other controlled medicines for pain relief, palliative care or opioid dependency’.²² While INCB has sought to lay the blame with countries for overly restricting national access, the international community must examine whether this failure is not instead the result of a systemic regulatory design flaw.²³

The ‘system of estimates’ upon which the international licit market is based was created at a time when policymakers held far greater faith in centrally-planned commodity markets to ensure that supply met demand. As was remarked in 1964 of the international system:

*‘[it] pioneers new territory – that of a planned economy on a world-wide scale. It regulates a whole industry throughout the world’.*²⁴

There is now a greater understanding of the regulatory problems associated with centrally-planned markets. In particular, the absence of a price mechanism creates major information asymmetries and obscures the actual levels of supply required to meet demand. Often estimates are extrapolated from previous years’ statistics, resulting in a cumulative trend towards shortages where supply remains constant while demand is growing. This problem accurately predicts the severe shortages and large market distortions witnessed in the global pain medication market. At the international level this is rendered far more complex by the fact that a global market needs to engage in significant price differentiation practices to counteract the vast global income inequalities between nations and their populations. Further, the level of institutional capacity to physically supply ‘medical and scientific’ narcotics through legitimate channels varies drastically from country to country.

14 See Jonathan P. Caulkins’ contribution to this report.

15 See Daniel Mejia and Pascual Restrepo’s contribution to this report. For discussions of specific externalities see Laura Atuesta’s and Alejandro Madrazo’s contributions.

16 See Jonathan P. Caulkins’ contribution to this report.

17 Jonathan P. Caulkins and Peter Reuter, ‘Reorienting U.S. Drug Policy,’ *Issues in Science and Technology*, XXIII/1 (2006), pp.79-85.

18 Joanne Csete’s contribution to this report highlights some of the opportunity costs in terms of money not spent on proven and highly effective public health interventions. Ernest Drucker’s contribution highlights the costs of over-incarceration on macro population health determinants.

19 See Alejandro Madrazo’s contribution to this report and Damon Barrett, ‘Reflections on Human Rights and International Drug Control,’ in *Governing the Global Drug Wars*, ed. John Collins (London: LSE IDEAS Special Report, 2012).

20 Single Convention on Narcotic Drugs, 1961, Art. 9.4.

21 See Hamid Ghodse, ‘Preface,’ *Report of the International Narcotics Control Board on the Availability of Internationally Controlled Drugs: Ensuring Adequate Access for Medical and Scientific Purposes* (New York: United Nations, 2011), http://www.incb.org/documents/Publications/AnnualReports/AR2010/Supplement-AR10_availability_English.pdf.

22 Katherine Pettus, *Untreated Pain in the Lower and Middle-Income Countries* (Swansea: Global Drug Policy Observatory Situation Analysis, 2013), <http://www.swansea.ac.uk/media/GDPO%20Situation%20Analysis%20Essential%20Med.pdf>.

23 Ghodse, ‘Preface’.

24 Bertil A. Renborg, ‘The Grand Old Men of the League of Nations: What They Achieved. Who They Were,’ *UN Bulletin on Narcotics* (1964), http://www.unodc.org/unodc/en/data-and-analysis/bulletin/bulletin_1964-01-01_4_page002.html.

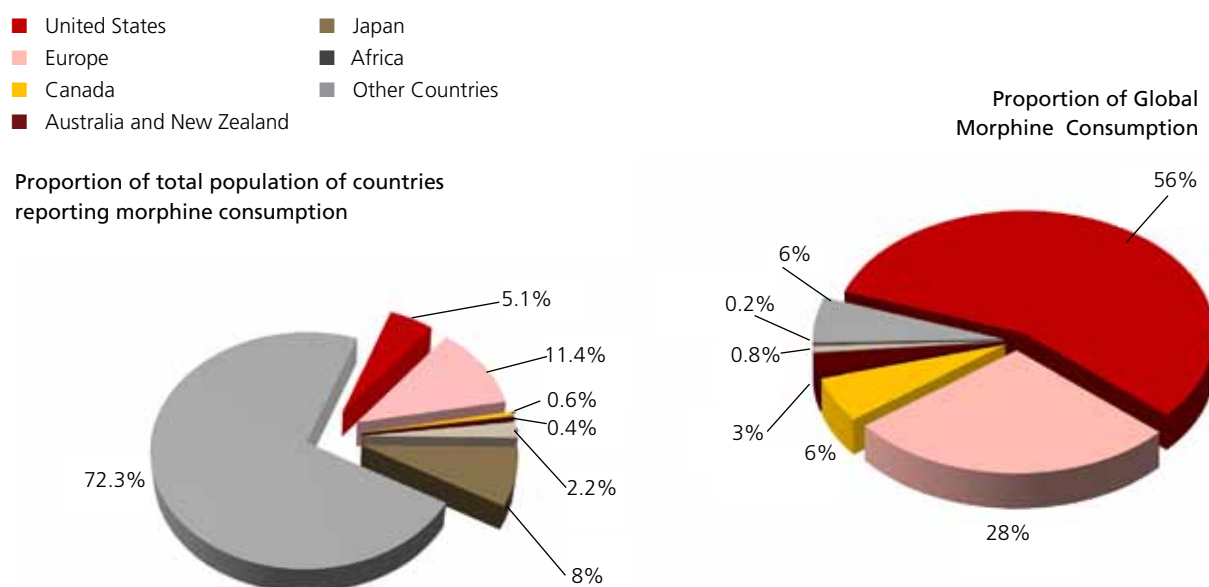
These design flaws have all been rendered more problematic by the intense politicisation of INCB's work. Soon after its creation in 1968, INCB succumbed to regulatory capture²⁵ by ideologically prohibitionist forces within the system.²⁶ It has since evolved into a proxy for states advocating an absolutist, prohibitionist-oriented approach to narcotics control, while appearing to command the legitimacy of a technocratic agency. Examples of the highly politicised work of the INCB have been highlighted elsewhere.²⁷ The 'system of estimates' should arguably have been designed to provide regulated and accessible forms of opiates globally. Poorer populations, in Asia in particular, had previously relied on traditional 'quasi-medical' uses of opiates, either by smoking or eating prepared opium. However, for ideological reasons the international goal instead became to suppress all opiate use. The indigenous traditional use of opiates was suppressed while the system of estimates had no way to provide fully legalised and 'medical' alternatives. This design flaw could initially be ignored out of a belief that medical innovations would soon render plant-based opioid medicines obsolete. As one of the chief architects of the international drug control system and lead US Delegate to the UN Commission on Narcotic Drugs (CND) Harry J. Anslinger stated at a UN meeting in 1965:

*When it has been demonstrated, as is expected within the next few years, that opium is not essential for medical purposes, the United States would give very favorable consideration to discussions leading to an international agreement which would abolish legal opium production entirely.*²⁸

The goal was therefore to stabilise and shrink supply until such innovations occurred. However, no such 'silver bullet' version of pain medication has been discovered while the goal of suppressing supplies of opioid-based medicines has remained.²⁹

It is unlikely that these information and market asymmetries, not to mention the political weaknesses of the INCB structure, can be overcome. Nevertheless, the international community can take action to reform the current system. Rather than examining micro-oriented and state-level ways to counteract the vast inequality of access to medicines internationally (see Figure 2), it is time to examine seriously whether the model begun a century ago, and consolidated under the 1961 Single Convention, remains suitable to meet the needs of the current era.

Figure 2. Global Inequality: Distribution of Morphine Consumption 2009³⁰



- 25 Regulatory capture describes an outcome where a regulatory agency becomes unduly influenced by a particular interest group. The interest group then uses the agency to advance their goals.
- 26 The INCB was established in 1968 in accordance with the 1961 Single Convention on Narcotic Drugs. It represented an amalgamation of its technocratic predecessors the Permanent Central Opium Board and the Drug Supervisory Body. Debates around the evolving conception of INCB are highlighted in David R. Bewley-Taylor, *International Drug Control Consensus Fractured* (Cambridge University Press, 2012), 266-7.
- 27 Joanne Csete, 'Overhauling Oversight: Human Rights at the INCB,' in *Governing the Global Drug Wars*, ed. John Collins (London: LSE IDEAS Special Reports 2012).
- 28 Statement by Harry Anslinger to the 20th Session of the UN CND, on the Review of the Commission's Work During its First Twenty Years, December 16, 1965, Federal Bureau of Narcotics Files, US National Archives, ACC 170-74-5, Box 124, File 1230-1 United Nations 20th Session (1965).
- 29 The idea of discovering a synthetic 'silver bullet' for pain medicine was a constant theme of drug policy discussions around the 1961 Single Convention. See William B. McAllister, *Drug Diplomacy in the Twentieth Century: An International History* (Routledge, 2000).
- 30 *Report of the International Narcotics Control Board on the Availability of Internationally Controlled Drugs: Ensuring Adequate Access for Medical and Scientific Purposes* (New York: United Nations, 2011), http://www.incb.org/documents/Publications/AnnualReports/AR2010/Supplement-AR10_availability_English.pdf.

The UN General Assembly Special Session on Drugs (UNGASS) in 2016 can and should be used as an opportunity to examine other global regulatory models.

States should also work to ensure that INCB:

1. Remains within its mandate and does not interfere with or prejudice states in their pursuit of public health interventions and domestic cannabis regulation. Excessive interference, outside facilitating CND discussion, is a symptom of politicisation of INCB, rather than a manifestation of the intent of the treaties governing the international drug control system. INCB was created, first and foremost, as a cooperative, technocratic and number-crunching body, not a policy advocacy or enforcement body. It has pursued these latter interests at the expense of its core technocratic function, to the detriment of the developing world.
2. Incorporates the basic principles of human rights, outlined by the United Nations Office on Drugs and Crime (UNODC) in its 2012 Guidelines.³¹ For any drug control strategy to be effective it must be firmly grounded in adherence to and respect for principles of human rights. INCB should not be permitted to use UN Secretariat services, while claiming to be unbound by the UN's conventions in the field of human rights.³²
3. Aggressively acts to expand access to essential pain medicines. Further it should work to expand the use of opioid substitution therapy (OST) through its mandate to provide adequate access to 'gold standard' treatment medicines such as methadone and buprenorphine.³³

The issue of access to essential pain medicines is central to economic development, global public health and basic human rights. The 'planned' global market has not worked as intended. It is time to examine a new macroeconomic regulatory approach to meet international demand. Ideally this is an issue to be addressed at the UN level. If, however, the international drug control system fails to respond, national and regional institutions should unilaterally move towards addressing this issue.³⁴

TOWARDS A REGIME OF POLICY PLURALISM

These policy paradoxes and design flaws have resulted in the failure to realise the core goals of international drug control. A deep strategic re-evaluation is therefore required. This should be accompanied by clear alterations in funding allocation and policy priorities. Further there must be a far greater emphasis on measuring the relative cost and benefits of specific policies.

The immediate task is for international policymakers to accept that a more rational and humble approach to supply-centric policies is required. If prohibition is to be pursued as a means to suppress the supply of certain drugs deemed incompatible with societal well-being, care must be taken to ensure that enforcement is resourced *only* up to the point of drastically raising marginal prices to the point where consumption is measurably reduced. After this, additional spending is wasteful and likely damaging.

Further, there is a clearly emerging academic consensus that moving towards the decriminalisation of personal consumption, along with the effective provision of health and social services, is a far more effective way to manage drugs and prevent the highly negative consequences associated with criminalisation of people who use drugs.³⁵

“...there is a clearly emerging academic consensus that moving towards the decriminalisation of personal consumption, along with the effective provision of health and social services, is a far more effective way to manage drugs and prevent the highly negative consequences associated with criminalisation of people who use drugs.”

31 UNODC, *UNODC and the Promotion and Protection of Human Rights* (Vienna: UNODC, 2012), http://www.unodc.org/documents/justice-and-prison-reform/UNODC_Human_rights_position_paper_2012.pdf

32 In 2014, after years of condemnation by human rights groups, INCB finally adhered to international human rights norms by publicly dissuading states from pursuing the death penalty for drug-related offenses. Press Release: 'INCB encourages States to consider the abolition of the death penalty for drug-related offences,' *United Nations Information Service*, March 5, 2014, http://www.incb.org/documents/Publications/PressRelease/PR2014/press_release_050314.pdf

33 See Csete, 'Overhauling Oversight'.

34 Guatemala is an example of a country currently examining the potential of bringing illicit opium cultivation under regulatory control in order to supply medicinal requirements. Phillip Smith, 'Guatemala Considers Legalizing Opium Growing for Medicinal Market,' in *Drug War Chronicle*, December 19, 2013, http://stopthedrugwar.org/chronicle/2013/dec/19/guatemala_considers_legalizing_o.

35 Caitlin Elizabeth Hughes and Alex Stevens, 'What Can We Learn From The Portuguese Decriminalization of Illicit Drugs?,' in *British Journal of Criminology* (50)6 (2010): 999-1022ma17

The failures of the war on drugs and the 'drug-free world' strategy shine a light on a more fortuitous response to the question of drugs and drug policy. An effective and rational drug policy should aim to manage drug harms via a multifaceted and evidence-based approach, *not* a one-size-fits-all, one-dimensional war strategy based on impossible targets. Managing this problem involves incorporating a broad spectrum of policies and indicators and making them work in tandem rather than in opposition to one another. An example of policies working in opposition to each other occurs where the criminalisation of users undermines their access to healthcare, justice and other social welfare services.³⁶

The downsides of prohibition can be minimised if combined with:

- Properly resourced and strongly prioritised public health interventions.
- Policies aimed towards minimising the impact of illicit markets, rather than focusing on the supplies of illicit commodities, in producer and transit countries.
- The protection of human rights and access to justice of those caught up in the drug supply chain.
- Ensuring that people who use drugs are adequately protected from law enforcement activities and have access to justice, public health and social services.
- Limiting policing and enforcement tactics to more adequately reflect the strategic goals of prohibition: not eradicating but managing global drug markets. The goal of managing drug markets is to heavily raise prices and decrease consumption as far as possible, while minimising the accompanying violence and impact on user populations.
- Recognition that the goal of a 'drug-free world' is an impossible target, underpinned by flawed assumptions and a basic incoherence between tactical means and strategic goals. Further it results in policies which fail on a basic Hippocratic standard of 'first do no harm'.

States can begin to embark on a new strategy by:

- Drastically re-prioritising resources away from law enforcement and interdiction, towards public health-based policies of harm reduction and treatment. The priority should be to ensure that treatment and harm reduction services are fully resourced to meet requirements.³⁷
- Accurately measuring and reporting total drug policy spending in national budgets and where this spending is directed.
- Scaling up harm reduction funding to a minimum of 10 percent of total drug policy spending in national budgets by 2020.
- Designing more effective ways to mitigate the harms of drug markets.³⁸
- Engaging in widespread and vigorously monitored regulatory experimentation to develop the empirical evidence base around this topic and discern which policies work and which don't. The moves towards cannabis regulation in the US (at a subnational level) and Uruguay (at the national level) are a positive step in this regard. Regulatory experimentation around new psychoactive substances (NPS) will also prove useful.

Multilateral forums should aim to:

- Disseminate and discuss best practice evidence around public health policies of harm reduction, prevention of new use and problematic use and treatment.
- Disseminate and coordinate illicit market impact reduction policies for transit and producer countries.
- Ensure access to essential medicines.
- Protect and advocate for human rights.
- Coordinate international cooperation to minimise the cross-border externalities of increasingly varying national and regional policies under a new regime based on policy pluralism.

36 Switzerland and the Czech Republic provide two good examples of well-integrated and rigorously evaluated drug control strategies for states to consider emulating. See Joanne Csete, *From the Mountaintops: What the World Can Learn from Drug Policy Change in Switzerland* (New York: Open Society Foundations, 2010), http://www.opensocietyfoundations.org/sites/default/files/from-the-mountaintops-english-20110524_0.pdf; Joanne Csete, *A Balancing Act: Policymaking on Illicit Drugs in the Czech Republic* (New York: Open Society Foundations, 2012), http://www.opensocietyfoundations.org/sites/default/files/A_Balancing_Act-03-14-2012.pdf.

37 See Joanne Csete's contribution to this report.

38 See Vanda Felbab-Brown's contribution to this report.

States should recognise that:

- Too much debate centres around the legal technicalities of the international drug control conventions.
- These conventions represent an often (purposely) deeply ambiguous and vague articulation of a set of goals and aspirations.
- The interpretation and implementation of the conventions are often a fluid construction and a function of the politically dominant viewpoint of policies within the UN framework at any given time. Over the period 1970-2008 the ideologically prohibitionist approach developed an unchallenged suzerainty over the drug issue at the UN. This leadership has now been broken as new approaches are openly supported.
- The emergence of policy pluralism within the UN is a recent and positive phenomenon.
- Although certain aspects of the conventions should be seen as representing binding commitments – namely to minimise the impact of drug commodities flowing *between* states – in others they should not. The idea of an overarching, ‘one-size-fits-all,’ binding approach for regulation *within* states was never envisaged by those who drafted the conventions. It is a construction of the recent prohibitionist era.
- This ‘one-size-fits-all’ prohibitionist approach will not work in an era of policy plurality and should not be viewed as mandated by the Conventions.
- Individual states, subject to best practice human rights and global public health standards, remain the final arbiters and executioners of treaty provisions and are best placed to determine what policies can protect and improve the ‘health and welfare’ of populations within their territories.
- Regulatory experimentation, particularly in the case of cannabis and so-called new psychoactive substances (NPS), with close scientific scrutiny feeding back into policy, should be viewed as a positive thing. It should be pursued.
- States should view the drug conventions as one part of, and subservient to, a web of commitments that encompasses various human well-being and security issues.
- Existing international human rights norms can be clearly seen as militating against the pursuit of deeply repressive and unscientific policies based on, for example, compulsory detention of addicted populations, blanket criminalisation of individual consumption and the use of the death penalty.

A time will come when a new convention will encapsulate a reformed strategic orientation towards this issue and correct the inadequacies of the current convention structure. Now does not yet appear the time. A new consensus has not clearly emerged which dissatisfied states can rally around to ensure a successful convention process. Amendments to the existing conventions, however, can and should be countenanced in areas where international cooperation is required. This is perhaps most pressing in addressing the broken regulatory framework for ensuring access to essential medicines.

CONCLUSION: CONTEMPLATING A NEW TRAJECTORY?

From 1909-1961 a highly imperfect regulatory system was created based on supply-centric tenets. This system was then used by prohibitionist forces after 1961 when they gained political ascendancy at the UN. The result was a regulatory overreach that assumed the illicit market could be tamed through enforcement and the diffusion of police measures internationally. This assumption proved to be incorrect, but the policy path determined by this view ensured the continuation of a failed approach for decades. Meanwhile, the system has enforced obligations for producer and transit countries to assume the costs of prohibitionist policies, while providing no clear obligation for consumer countries to share these costs.³⁹

Now, it is clear that political forces within the system, particularly Latin American states, are pushing for a re-evaluation for perhaps the first time in the system’s history. Furthermore, many human rights organisations are highlighting problematic aspects within the system as bodies such as INCB act without institutional checks and balances in pursuit of a failed supply-focused and prohibitionist paradigm.⁴⁰ This contribution has highlighted some of the policy paradoxes built into the current system which argue for an end to the current strategy. The UN General Assembly Special Session on Drugs in 2016 provides an excellent opportunity for states to break with the failed strategy of the past and pursue a more effective international approach to drug policy for the twenty-first century. ■

39 See Daniel Mejia and Pascual Restrepo’s contribution to this report.

40 Joanne Csete, ‘Overhauling Oversight’.

Effects of Prohibition, Enforcement and Interdiction on Drug Use

Jonathan P. Caulkins¹

The alleged ‘failure’ of the ‘war on drugs’ is a standard point of departure for discussions of drug law reform,² but reports of prohibition’s failure – like those of Mark Twain’s death – may be exaggerated. Having a realistic understanding of what prohibition does and does not accomplish in final market countries is prerequisite to informed discussion of the relative merits of alternatives. Prohibition and its attendant enforcement drive drug prices up far beyond what they would be in a legalised market, and that (as well as reduced availability) constrain use and dependence. Applying cost-utility analysis from health economics provides a framework for roughly quantifying prohibition’s benefits from reduced dependence. This contribution argues that plausible parameter values for the United States suggest those benefits may exceed prohibition’s direct costs. Inasmuch as prohibition as implemented in the United States is something of a worst case, with toughness pursued far beyond the point of diminishing returns, this likewise suggests prohibition may bring net benefits to other final market countries. For those who nonetheless want to overturn prohibition, e.g. because prohibition harms source and transshipment countries and/or is unsustainable in the long-run given globalisation’s erasing of international borders, the possibility that prohibition may not simply be a mistake implies a need to adjust rhetoric accordingly.

Summary

- The alleged failures of prohibition in consumer/final market countries may be overstated in current drug policy discourses.
- Having realistic goals for prohibition in final market countries is a prerequisite to informed discussion of the relative merits of alternatives.
- The goal of prohibition should not be to eradicate mature drug markets completely; that is not realistic. The goal should be to drive the activity underground while controlling collateral damage created by the markets.
- Higher prices and greater inconvenience can reduce use and use-related consequences, even if it remains physically possible for a determined customer to procure.
- Even granting that prohibition’s costs are enormous, it does not automatically follow that those costs outweigh potential benefits from reduced dependence, because the benefits may also be very large.
- This analysis does not apply to source or transshipment countries.

None of this gainsays prohibition’s costs or limitations. Prohibition clearly fails if it is saddled with the impossible aspiration of eliminating all drug use, but it clearly succeeds at constraining supply and use to an extent. The common drugs (cocaine, heroin, cannabis) are merely semi-refined agricultural products, yet they are extraordinarily expensive in final market countries. The only illegal drug that is used nearly as widely as are the legal drugs (alcohol, nicotine, caffeine) is the one (cannabis) whose prohibition is arguably not taken too seriously.

Prohibition is extraordinarily expensive on multiple dimensions, including budgetary costs, enrichment of criminal gangs and deprivation of liberty. So that prohibition reduces use and abuse does not imply it is good or that it could not benefit from fundamental reform. However, an honest discussion must look fairly at prohibition’s benefits as well as its costs.

Other contributions in this report deal ably with prohibition’s effects on source and transshipment countries,³ so the perspective here is that of final market countries. The focus is on the United States, both for convenience (data availability) and logic; prohibition is implemented in a particularly pigheaded way in the United States, so its performance in the US is something of a worst case.

1 The author would like to thank GiveWell and Good Ventures for supporting his work on cannabis policy. The views expressed are the author’s and should not be attributed to Carnegie Mellon, GiveWell or Good Ventures, whose officials did not review this article in advance.

2 See, for example, Global Commission on Drug Policy, ‘War on Drugs,’ 2011, <http://www.globalcommissionondrugs.org/Report>.

3 See, for example, Daniel Mejia and Pascual Restrepo’s contribution to this report.

Drugs differ, and so policies should differ across drugs accordingly. At a minimum, intelligent discussions ought to distinguish between (1) the expensive majors (cocaine/crack, heroin and methamphetamine), (2) cannabis, (3) diverted pharmaceuticals and (4) the minor drugs (LSD, PCP, GHB, etc.). In the interests of space, I address only the first two, paying particular attention to cocaine (which has historically dominated drug problems in the US) and cannabis (which offers the only historical examples of legalisation in the contemporary era).

I discuss evidence concerning prohibition's effects on those drugs' supply and price, after first discussing metrics upon which prohibition should be evaluated. I then connect price to consumption, and provide a rough quantification of possible benefits of prohibition in terms of reduced dependence.

‘ Having a realistic understanding of what prohibition does and does not accomplish in final market countries is prerequisite to informed discussion of the relative merits of alternatives. ’

WHAT WOULD COUNT AS A 'SUCCESSFUL' PROHIBITION?

Most countries allow most goods to be produced and distributed by private enterprise through markets. The markets are almost never completely free. Firms have to comply with regulations but, in general, everyone who wants to start a business can. There are exceptions, however, and selling a range of goods is prohibited, including products from endangered species, certain weapons and human organs. Likewise certain services may be prohibited, including the sale of votes and sexual favours.

The goal of prohibition is not and should not be to eradicate the corresponding markets completely; that is not realistic. Rather, the goal should be to drive the activity underground, making it less efficient or, equivalently, driving up the cost of providing the good or service. The combination of higher prices and greater inconvenience can reduce use and use-related consequences, even if it remains physically possible for a determined customer to procure the good or service in question.

Prohibitions generate three categories of cost: (1) costs of enforcement; (2) greater harms per unit of consumption that does occur; and (3) foregone benefits of consumption that does not occur.⁴ The first two are obvious; enforcement is intrusive and imprisonment is expensive to both taxpayers and those imprisoned, and consumption of street heroin is riskier than is consumption of medical-grade heroin delivered through heroin maintenance programmes.⁵ The third pertains to the idea of a 'consumer surplus'. Standard economics presumes that customers buy whatever brings them the greatest joy. If that product is not available, they will buy something else. The difference between the joy they could have felt if the banned good were available and what they actually feel consuming their second-favourite object counts as a cost of prohibition.

So if a group of friends would like to get stoned and listen to jazz, but prohibition induces them to go to the movies instead, the difference between how much they would have enjoyed getting stoned and how much they actually enjoyed going to the movies is a loss whose value should be charged to prohibition.

The benefits of prohibition are reduced 'externalities' and reduced 'internalities'. Externalities are costs one person's consumption imposes on another. For example, to the extent that alcohol prohibition reduces drunkenness, it might count fewer assaults, greater road safety and less domestic violence among its benefits.

'Internalities' are costs that one person's consumption imposes on oneself. Extreme 'Chicago School' economists generally deny the possibility of internalities, assuming perfect consumer foresight. An alternative model of human behaviour holds that people are heuristic decision-makers who muddle through life following rules of thumb that work most of the time for most products, but which can be defeated by certain products whose effects bundle immediate gratification with some non-negligible but modest probability of deep pain in the future. Cocaine may fit that description. So might Krispy Kreme doughnuts, as in the adage 'a moment on the lips, a lifetime on the hips'. Opinions differ sharply and perhaps intractably about whether a paternalistic intervention to limit someone's freedom can ever make that person better off. Parents routinely limit their teenagers' freedom, ostensibly out of love and concern for their welfare, and modern neuroscience amply demonstrates that the brain's prefrontal cortex and associated executive control does not reach maturity until around age 25. (And few who are not already polydrug abusers initiate use of a new intoxicant after age 25, so almost all drug-using careers are launched by immature brains.⁶)

4 Mark Kleiman (personal communications) argues that lost consumer liberty or option-value is a fourth category, over and above the foregone consumer surplus.

5 For a discussion of these costs see Ernest Drucker's and Joanne Csete's contributions to this report.

6 For example, 98 percent of those reporting current cannabis use in the US national household survey report initiating that use by age 25. The corresponding proportions for other drugs are cigarettes 97 percent, alcohol 98 percent, cocaine 87 percent.

Liberal democratic societies assume that people generally do a fine job of looking out for themselves, or at least a much better job than the government would do. Hence, government paternalism is usually limited to suasion (e.g. the FDA's advice on healthy eating), 'nudges' and quality standards (e.g. it is illegal to sell lawnmowers that lack a kill switch).⁷ Outright bans are less common, but do exist. For example, some countries and some US states prohibit production and purchase of larger firecrackers, mostly to prevent internalities (people harming themselves), not externalities.

Prohibition clearly fails if it is saddled with the impossible aspiration of eliminating all drug use, but it clearly succeeds at constraining supply and use to an extent.

Dependence-inducing substances pose a special challenge to the presumption that consumers consistently act in their own self-interest. Repeated administration of artificial neurotransmitters creates lasting changes in the brain. Dependence is therefore a central consideration. Even though most consumers do not become dependent, dependent users account for a disproportionate share of consumption. Likewise, intoxicants pose special challenges because many decisions to consume intoxicants are made while intoxicated, particularly when 'bingeing' is common, as with crack.

That holds even for cannabis. According to the 2011 US household survey, about 42 percent of all days of cannabis use are by people who self-report enough problems to meet DSM-IV criteria for substance abuse or dependence (not always dependence on cannabis; the 42 percent figure includes cannabis consumed by alcoholics). For heroin the proportion is likely much higher;⁸ about 83 percent of heroin in the US is consumed by people who use heroin daily or near-daily, and most of them are dependent.⁹ I will not attempt to resolve here what value, positive or negative, to attach to drug use in social welfare calculations; that is more of a philosophical debate. Rather, I will look only at prohibition's effect on consumption, and will remember that for all drugs – legal and illegal – the majority of consumption is attributable to the minority of users who consume on a daily or near-daily basis, many of whom have a clinically diagnosable problem of abuse or dependence.

EMPIRICAL EVIDENCE CONCERNING PRICE INCREASES ALONG THE SUPPLY CHAIN FOR COCAINE

The prices of illegal drugs increase enormously as they move down the supply chain; those price increases are almost entirely due to prohibition.¹⁰ I illustrate this by comparing two agricultural-based psychoactive substances, one legal (caffeine in the form of coffee) and one prohibited (cocaine), and contemplate what the price of cocaine might be if its distribution costs were comparable to those of coffee.

There is sometimes debate about whether distribution costs should be thought of in terms of percentage or cost per unit weight, so I provide comparable data for silver, a legal product whose value per unit weight approaches that of cocaine in South America. The silver data show that when a good's value to weight ratio is high, the mark-ups in percentage terms are much lower.

Their geography of production is broadly similar. Cocaine bound for the United States is produced primarily in Colombia, with Peru and Bolivia being other major producers. Colombia is the world's second-largest producer of Arabica coffee – albeit a distant second to Brazil, with Peru also in the top five. Peru has the world's largest silver reserves and, with Mexico, is either the largest or second largest producer depending on the year (Bolivia is seventh).

I focus on cocaine 'salt' (meaning powder), so the product at export is already in final form; there is very little processing between export and retail sale (just some repackaging and perhaps dilution, but diluents' value is trivial compared with that of the cocaine). I likewise consider the prices of silver bullion and rounds, not jewellery or flatware.

The bottom line is clear. The increase in price as cocaine moves down its distribution chain utterly dwarfs that of coffee or silver. Cocaine prices increase by more than \$100 per gram. Silver and coffee bean prices increase by less than \$0.10 per gram – a difference of three orders of magnitude.

Even if legalisation meant cocaine prices increased along the distribution chain by ten times that much, or \$1.00 per gram, the resulting retail prices would still be less than five percent of their current levels.

7 Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (Yale University Press, 2008); see Code of Federal Regulations, Title 16, Part 1205, <http://cfr.regstoday.com/16cfr1205.aspx>.

8 The household survey-based calculation is not informative for heroin, as most heroin is consumed by people who do not complete the household survey.

9 The author's side calculation is based on B. Kilmer, S. Everingham, J. Caulkins, G. Midgette, R. Pacula, P. Reuter, R. Burns, B. Han and R. Lundberg, *What America's users spend on illicit drugs: 2000-2010* (Washington, DC: Executive Office of the President, 2014). For cannabis in the US, daily and near-daily users account for about two-thirds of days-of-use and 80 percent of the quantity consumed.

10 UN Office on Drugs and Crime, *World Drug Report 2013* (Vienna: United Nations, 2013), http://www.unodc.org/unodc/secured/wdr/wdr2013/World_Drug_Report_2013.pdf.

Table 1. Mark-ups Along the Distribution Chain for Legal and Illegal Commodities

PRICES ALONG DISTRIBUTION CHAIN					
	COFFEE	SILVER	COCAINE	CANNABIS RESIN	HEROIN
Units	Pound	Troy Ounce	Gram	Gram	Gram
Source Country	\$3-\$6, Colombia	\$21.80, spot price	\$2.44, Colombia (87-95% pure)	\$0.75, Morocco	\$2.23, Afghanistan
In Transit (multi kg)	N/A	N/A	\$7.00, Bahamas	\$2.04, Spain	Various
Final Market Country	US	US	US prices per pure g	Netherlands	UK
Wholesale price	\$6.75-\$8.55	\$1 over spot + delivery (cash price)	\$37 EPH for 50 + g, 2007	\$2.60 multi-kg loads	\$54 Adjusted to 56% purity
Retail price, bulk	\$3.99-\$10.19 Grocery store, 3/4 pound bag	\$1.50-\$2 over spot Coin Store, 20+ rounds	\$71 Street Dealer, 5g		
Retail, single serving	\$1.25, medium cup brewed Convenience store	\$2 over spot Coin store, single round	\$175 Street Dealer, 0.25g	\$8.60	\$86 Adjusted to 56% purity
DRIVERS OF DISTRIBUTION COSTS					
Price/g.export	\$0.01	\$0.77	\$2.68	\$0.75	\$2.23
Legal	Yes	Yes	No	No	No
MARK-UPS					
Serving size (grams)	17	0.5	0.2	0.4	0.2
Piece per serving					
Export	\$0.17	\$0.38	\$0.54	\$0.30	\$0.45
Wholesale	\$0.29	\$0.40	\$7.40	\$1.04	\$10.71
Retail, bulk	\$0.35	\$0.42	\$14.20		
Retail, as sold	\$1.25	\$0.42	\$35.00	\$3.44	\$17.15
% Increase over export					
Wholesale	69%	5%	1280%	247%	2302%
Retail, bulk	108%	8%	2548%		
Retail, single serving	635%	9%	6427%	1047%	3745%

Sources: Cocaine prices within the US are from Fries et al.¹¹ Other prices for illegal drugs are from the World Drug Report, with UK heroin prices multiplied by 1.33 to adjust for dilution along the distribution chain (e.g. average purity in the UK is 56 percent vs. 42 percent in Turkey).¹² Likewise, cocaine percent increases over export factor in that US cocaine prices are given per pure gram.

¹¹ Arthur Fries, Robert W. Anthony, Andrew Cseko Jr., Carl C. Gaither and Eric Schulman, *The Price and Purity of Illicit Drugs: 1981-2007* (Institute for Defense Analysis, 2008).

¹² UN Office on Drugs and Crime, World Drug Report 2013 (Vienna: United Nations, 2013), http://www.unodc.org/unodc/secured/wdr/wdr2013/World_Drug_Report_2013.pdf.

Some who argue that prices wouldn't fall so much look at the percentage increases, e.g. between wheat and the price of breakfast cereal containing wheat.¹³ I would argue that is an incorrect comparison. Converting wheat into breakfast cereal involves significant processing, and distribution costs loom much larger, in percentage terms, for products with a low value-to-weight ratio. But even if cocaine increased by as much in absolute terms as silver (\$0.07 per gram) and also by as much as coffee in percentage terms (635 percent), then its retail price would still only be \$20 per pure gram, not \$175 per pure gram as it is today.

Table 1 also gives mark-ups for cannabis resin (moving from Morocco to the Netherlands) and heroin (from Afghanistan to the UK) to show that the broad outlines of these observations are not specific to cocaine or to the Western Hemisphere.

An amount equivalent to one 'serving' of cannabis resin, heroin and cocaine all cost about the same in the source country, roughly \$0.30 - \$0.50, so we define a 'serving' of silver as 0.5 grams so its price also falls in that range. But despite similar prices in the source countries, the retail prices are radically different. Distribution of legal commodities is cheap, so their prices increase by far less than do the three commodities whose distribution is prohibited. Traffickers demand \$10,000 or more per kilogram to move cocaine from South America to the US; FedEx will ship a kilogram of anything else for \$60. While prohibition cannot seal the borders, it succeeds in making drugs extraordinarily expensive. Legalisation might drive source country prices down sharply, and that would lead to a larger percentage increase along the distribution chain, but also to even lower final prices than are described here. Production of all three illegal drugs with current methods is highly labour-intensive. If legalisation allowed producers to own and employ labour-saving

capital equipment, production costs might fall appreciably. The differences in price increases across the three illegal commodities are instructive. Cannabis, for which the prohibition is enforced least intensively, shows by far the smallest increase.¹⁴ The price increases from export country to final market wholesale price for cocaine and heroin are similar, but the increase from wholesale to retail is much greater for cocaine in the US than for heroin in the UK, which makes sense inasmuch as the US pursues drug enforcement much more aggressively than does almost any other developed country, so the risks and other distribution costs are higher.

CANNABIS

Cannabis accounts for a modest share of the enforcement effort and other costs of prohibition. Even though it is the most widely used of the illegal drugs, fewer than 10 percent of drug law violators imprisoned in the United States were involved only with cannabis, and incarceration for cannabis offences is even less common elsewhere.¹⁵ Nevertheless, cannabis is of interest because there is much better empirical evidence concerning how prohibition affects production costs and wholesale prices, for two reasons. First, there are well-established regimes of partial legalisation. The Netherlands has *de facto* legalised retail sales of up to five grams.¹⁶ Alaska has legalised personal possession and home growing of up to 25 plants. And a number of western US states, including California, Colorado, Oregon and Washington, have legalised medical cannabis production and sale, including via bricks-and-mortar 'dispensaries,'¹⁷ with rules about medical eligibility so broad that effectively anyone can buy a medical recommendation from a 'Doctor 420'.¹⁸

13 Jeffrey Miron, 'The Effect of Drug Prohibition on Drug Prices: Evidence from the Markets for Cocaine and Heroin,' *The Review of Economics and Statistics*, 85/3 (2003): 522-530.

14 For a detailed analysis of cannabis price increases along the distribution chain from Morocco to final market countries in Europe, see Beau Kilmer and J. Burgdorf, 'Insights about cannabis production and distribution costs in the EU,' in *Further Insights Into Aspects of the Illicit EU Drugs Market*, ed. F. Trautman, B. Kilmer and P. Turnbull (Luxembourg, Publications Office of the European Union: 2013), 389-404.

15 Jonathan P. Caulkins and Eric Sevigny, 'How Many People Does the US Incarcerate for Drug Use, and Who Are They?' *Contemporary Drug Problems*, 32/3 (2005): 405-428.

16 Robert J. MacCoun, 'What Can We Learn from the Dutch Cannabis Coffee Shop System?,' *Addiction*. 106 (2011): 1899-1910.

17 See Rosalie Pacula, David Powell, Paul Heaton and Eric Sevigny, 'Assessing the Effects of Medical Marijuana Laws on Marijuana and Alcohol Use: The Devil Is in the Details,' *National Bureau of Economic Research, Working Paper 19302* (2013), <http://www.nber.org/papers/w19302>. The paper finds that dispensaries are a particularly important component of medical cannabis's effect on use.

18 O'Connell and Bou-Mater and Nunberg et al. provide data showing that most of those obtaining cannabis recommendations in California do not have serious diseases such as cancer, HIV, MS or glaucoma. T. O'Connell and C. Bou-Mater, 'Long term marijuana users seeking medical cannabis in California,' *Harm Reduction Journal*, 4/16 (2007); Helen Nunberg, Beau Kilmer, Rosalie Liccardo Pacula, James R. Burgdorf, 'An analysis of applicants presenting to a medical marijuana specialty practice in California,' *Journal of Drug Policy Analysis*, 4/1 (2011).

Second, two US states (Colorado and Washington) recently legalised large-scale commercial production and distribution of cannabis for recreational, not just medical, purposes. Licensed commercial operation has only just commenced as of this writing in early 2014, so market conditions are still years from reaching a new equilibrium, but considerable effort has gone into estimating what production costs and prices will be in the long-run, because the regulatory agencies need to estimate tax revenues and reach various administrative decisions. These sources provide a range of estimates of production costs and wholesale prices.¹⁹ The relevant analyses are summarised in Figure 1. All figures pertain to the wholesale price per pound for high-potency sinsemilla or its equivalent. The red bar on the left was the former price under prohibition (\$3,500) in the western states where prices have subsequently fallen.

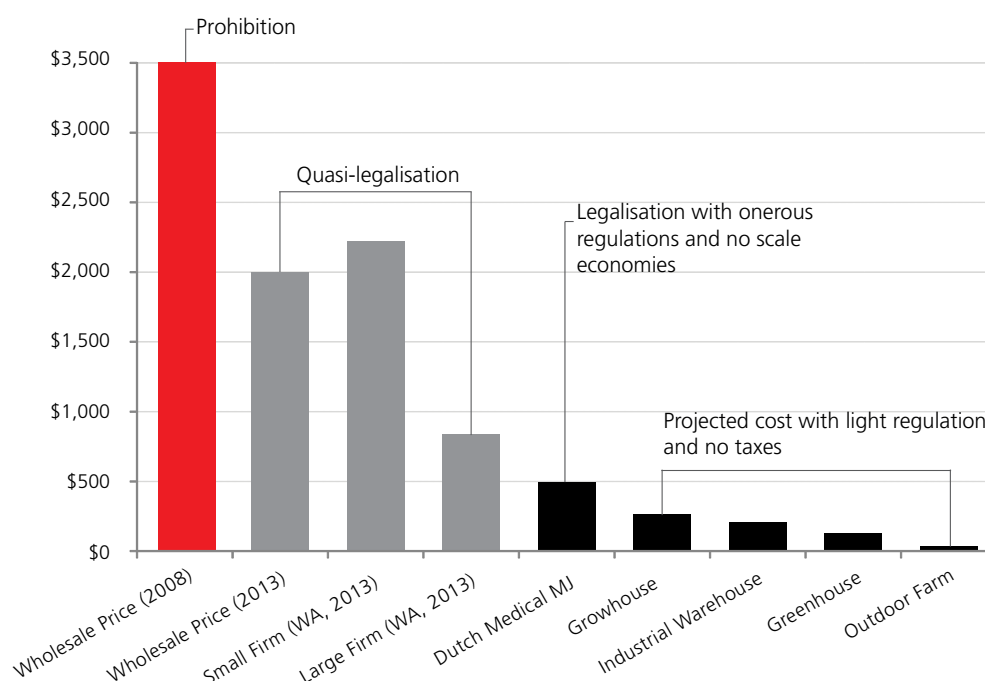
The grey bars show how wholesale prices fell as the medical industry achieved formal regulatory status under state law.²⁰ It should be noted that federal prohibition remained in place, and both producers and dispensaries were subject to occasional federal enforcement action. These grey bars therefore represent the effect of only a partial lifting of prohibition.

The second bar (\$2,000 per pound) is a typical farmgate price quoted by media sources. The third and fourth bars are production cost estimates for existing small and large firms, based on data collected for BOTEK's work advising Washington State's Liquor Control Board on its implementation of cannabis legalisation. Small and large in this context means production on 100 vs. 1,000 square metres, respectively. Washington State allows production on up to 2,800 square metres, so some further economies of scale may be realised in the future.

The black bars pertain to legalisation. The first (\$490 per pound) is for the supplier of Dutch medical cannabis. It reflects (1) low-volume production, therefore not realising economies of scale (2) of medicine, and so is subject to greater quality control and inspection costs than one would expect for recreational cannabis.²¹

The next three bars are refinements on the estimates that pertain to a situation in which a state has legalised cannabis, but growers need to remain discreet in order to avoid attracting attention from federal enforcement.²² The last bar, for outdoor farming, assumes full legalisation and production costs comparable to other crops that are transplanted, rather

Figure 1. Production Costs and Wholesale Prices for Cannabis Under Various Scenarios



- 19 Retail prices are harder to project because retailer mark-ups can vary enormously by industry, from lows of 14 percent for gasoline and new cars to 139 percent for optical goods, and it is not clear which existing industries provide the best comparators for the future cannabis retailing industry. See Jonathan Caulkins, Susan Andrzejewski and Linden Dahlkemper, 'How Much Will the 25/25/25 Tax Scheme Actually Impact the Price of Cannabis?' *Supplement: Retailer and Processor Markup BOTEK Analysis Corp.*, I-502 Project Report 430-81, 28 June 2013, http://lcb.wa.gov/publications/Marijuana/BOTEK%20reports/8a_Impact_of_tax_schemes_Appendix_A_on_Markups-Final.pdf.
- 20 The price decline was apparent in both official reports and user-contributed websites tracking prices. For a colourful description of how the supply expansion affected producers see Walter Hickey, 'The True Story of the Great Marijuana Crash of 2011,' *Business Insider*, 25 September 2013, <http://www.businessinsider.com/the-great-marijuana-crash-of-2011-2013-9>.
- 21 Beau Kilmer and J. Burgdorf, 'Insights about cannabis production and distribution costs in the EU' in *Further Insights Into Aspects of the Illicit EU Drugs Market*, ed. F. Trautman, B. Kilmer, and P. Turnbull (Luxembourg, Publications Office of the European Union: 2013), 389-404.
- 22 Beau Kilmer, Jonathan P. Caulkins, Rosalie Liccardo Pacula, Robert MacCoun and Peter Reuter, *Altered State? Assessing how marijuana legalization in California could influence marijuana consumption and public budgets* (RAND, 2010).

than grown from seed (i.e. it allows for production costs 10-20 times greater than those currently observed for industrial hemp).

We would expect national legalisation in the US to bring production costs below those currently achieved by Dutch medical growers, but how low depends on the dominant form of THC consumption. More expensive indoor growing may be necessary for standard usable cannabis that is sold loose and rolled by the user. Outdoor production may be limited to butane hash oil and other extracts (for vaporisation, direct consumption via 'dabbing' or infused in edibles and beverages) and pre-rolled cigarettes, for which appearance matters less, and 'fortifying' THC content by adding oils should be possible.

Any of these scenarios, though, involves a decline of over 90 percent in pre-tax wholesale prices relative to prohibition, and taxes large enough to make up the difference would be unprecedented in terms of value-per-unit weight, and would thus be expected to invite large-scale evasion unless the entire regime were designed around the goal of facilitating tax collection.²³

ELASTICITY OF DEMAND

The two previous sections argued that prohibition drives prices up substantially, but driving up prices is just a means to an end; the ultimate goal is to reduce use and abuse.

Economists characterise the effect of price on consumption via the 'elasticity of demand,' which measures the percent change in consumption associated with a one percent increase in price. (Elasticities are almost always negative, since price increases suppress consumption, so a 'bigger negative' number indicates a greater responsiveness of consumption to price.)

Two recent reviews are relevant: Rosalie Pacula reviews the literature specific to cannabis and Craig Gallet offers a meta-analytic survey of the literatures also concerning cocaine and heroin.²⁴ Both note complexities. Different studies do not always agree, and there are important distinctions. For example, youths tend to be more price-responsive than older users, and the long-run price response is greater than the short-run response. Also, the overall or total elasticity is

greater (in absolute value) than are participation elasticities; the latter encompass only prices' effects on prevalence. However, Pacula concludes that the total elasticity of demand for cannabis is likely to be between -0.4 and -1.25, based on which Kilmer et al. use -0.54 as the single best point estimate;²⁵ Gallett finds somewhat larger values for cocaine and heroin. There are, however, unavoidable challenges when trying to translate an elasticity of demand and a legalisation-induced price change into a projected effect on consumption. First, all historical evidence underpinning elasticity estimates comes from relatively modest price changes within a prohibition regime, and the relationship between price and consumption may be different after legalisation.²⁶ Second, legalisation can affect consumption through a half-dozen or so mechanisms besides price.²⁷ Robert MacCoun estimates these might have bumped up consumption by an additional five to 50 percent if California had legalised cannabis in 2010.²⁸ Third, legalisation-induced price declines would be large enough that assumptions about the shape of the demand curve well away from current prices can radically affect the projected effects on consumption. If one sticks to the linear demand curves drawn on chalkboards in an 'Introduction to Economics' class, then the projected effects on consumption will be much smaller than if one believes the demand curve actually curves, as with a constant-elasticity curve.²⁹

Hence, even if one somehow knew that legalisation would reduce retail prices by 75 percent for cannabis and 90 percent for cocaine, and even if one knew those drugs' elasticities over modest prices changes in the past were -0.5 and -0.75, respectively, it would almost certainly be wrong to project a price-induced increase in consumption of only $0.75 \times 0.5 = 37.5$ percent and $0.9 \times 0.75 = 67.5$ percent, respectively. Indeed, Caulkins and Kilmer et al. show that one cannot rule out the possibility that the actual increases could be very much larger.³⁰

The next section works through estimates of prohibition's benefits using arbitrary assumptions that legalisation would double the amount of cannabis use and abuse, and triple those for cocaine, heroin and methamphetamine. Those are plausible and conveniently round numbers, but they should be thought of as place-holders for quite broad uncertainty ranges.

23 Jonathan P. Caulkins and Michael A.C. Lee, 'The Drug-Policy Roulette,' *National Affairs*, 12 (2012): 35-51.

24 Rosalie L. Pacula, *Examining the Impact of Marijuana Legalization on Marijuana Consumption: Insights from the Economics Literature* (RAND, 2010) WR-770-RC; Craig A. Gallet, 'Can price get the monkey off our back? A meta-analysis of illicit drug demand,' *Health Economics* (2013).

25 Beau Kilmer, Jonathan P. Caulkins, Rosalie L. Pacula, Robert MacCoun and Peter Reuter, *Altered State? Assessing how marijuana legalization in California could influence marijuana consumption and public budgets* (RAND, 2010).

26 Caulkins and Lee, 'The Drug-Policy Roulette,' 35-51.

27 Robert J. MacCoun, 'Drugs and the Law: A Psychological Analysis of Drug Prohibition,' *Psychological Bulletin*, 113(3) (1993): 497-512.

28 Robert J. MacCoun, *Estimating the Non-Price Effects of Legalization on Consumption* (RAND, 2010).

29 Jonathan P. Caulkins, 'Do Drug Prohibition and Enforcement Work?' White paper published in the 'What Works?' series (Lexington Institute, 2000); Caulkins and Lee, 'The Drug-Policy Roulette,' 35-51; Kilmer, Caulkins, Pacula, MacCoun and Reuter, *Altered State?*.

30 Caulkins, 'Do Drug Prohibition and Enforcement Work?'; Kilmer, Caulkins, Pacula, MacCoun and Reuter, *Altered State?*.

THE BENEFIT OF PROHIBITION-INDUCED REDUCTIONS IN DEPENDENCE

Dependence

Based on responses to the 2011 household survey, about 2.6 million Americans meet DSM-IV criteria for cannabis dependence (4.1 million for abuse or dependence), with about 400,000 also dependent on some other illicit drug.³¹ The true rates may be larger, since household surveys miss some users, and denial is a hallmark of addiction. Nevertheless, if legalisation would double cannabis abuse and dependence, then prohibition should get credit for preventing something like 2.2 million instances of cannabis dependence above and beyond those who are also dependent on other illicit drugs.

The number meeting DSM-IV criteria for abuse or dependence on cocaine, heroin and methamphetamine is harder to know, since so many of them are missed by a household survey. There are, however, new estimates of the number using these substances on a daily or near-daily basis, which we will use as an imperfect proxy for dependence. Kilmer et al. estimate that there were 0.6 million, 1.0 million and 0.3 – 0.6 million daily or near-daily users of cocaine, heroin and methamphetamine, respectively.³² There is some overlap, particularly between cocaine and heroin, so the total number of individuals who are daily or near-daily users of one of these ‘hard drugs’ is about 90 percent of the individual sums.³³ Not all daily or near-daily users are dependent, but conversely some of the nearly 1 million additional people who use hard drugs roughly every other day (but not daily or

near-daily) are dependent, so there are probably something on the order of 2-2.5 million frequent users of hard drugs in the US who are dependent. If legalisation would triple rates of hard drug use and dependence, then prohibition gets credit for averting something like 4-4.5 million instances of dependence on hard drugs.

Valuation of Dependence

In the international health literature, the most common method for quantifying the loss in well-being associated with disease and other health conditions is quality-adjusted life-years (QALYs) lost. QALYs measure both survival probability and the degree of impairment when living with the illness relative to a scale on which 1.0 represents perfect health.

Several studies have estimated the QALY loss caused by dependence itself, as opposed to the various other physical ailments that are often associated with dependence. For example, Mather et al. suggest losses of 0.113 and 0.184 per year of dependence and harmful use of cannabis and benzodiazepines.³⁴ For heroin or polydrug dependence they suggest 0.27 as a ‘[I]nally derived weight, [that is] slightly larger than GBD weight [of] 0.252,’ referring to Murray and Lopez’s (1996) global burden of disease (GBD) study. Zaric et al. assumed a loss of 0.2 QALY per year spent by injection drug users not in methadone maintenance treatment and 0.1 QALY loss per year in treatment.³⁵ Pyne et al. tried to assess the QALY state of drug dependent individuals directly.³⁶ The 390 subjects with a lifetime history of drug dependence and who had current problems had

Table 1. Very Rough Quantification of the Benefits of Prohibition in the United States from Reduction in Dependence on the Drugs that are now Prohibited

	Number dependent now (millions)	Possible increase due to legalisation	QALY loss per case	Possible additional QALYs lost (millions)
Cannabis	2.2	100 percent	0.1	0.22
Hard drugs	2.25	200 percent	0.2	0.9
Total				1.12
			Value per QALY	\$100,000
			Value of dependence averted (\$B)	\$112

31 SAMHDA, ‘National Survey on Drug Use and Health,’ 2011, <http://www.icpsr.umich.edu/icpsrweb/SAMHDA/>.

32 Kilmer et al., *What America’s users spend on illicit drugs*.

33 Jonathan P. Caulkins, Susan Everingham, Beau Kilmer and Greg Midgette, ‘The whole is just the sum of its parts: Limited polydrug use among the “big three” expensive drugs in the United States,’ *Current Drug Abuse Reviews* (forthcoming).

34 Colin Mathers, Theo Vos and Chris Stevenson, *The Burden of Disease and Injury in Australia* (Australian Institute of Health and Welfare, 1999), AIHW Cat. No. PHE 17: 195.

35 G.S. Zaric, P.G. Barnett and M.L. Brandeau, ‘HIV transmission and the cost-effectiveness of methadone maintenance,’ *American Journal of Public Health*, 90 (2000): 1100–11.

36 J. M. Pyne, T.L. Patterson, R.M. Kaplan, J.C. Gillin, W.L. Koch and I. Grant, ‘Assessment of the quality of life of patients with major depression,’ *Psychiatric Services*, 48 (1997): 224–30.

average QALY scores of only 0.58 and 0.681 out of 1.0, but in a multivariate regression controlling for socio-demographic variables, the effect of lifetime dependence with current problems relative to a 'control group' of those in the study who did not have a history of dependence was 0.125. Arguably that is a conservative estimate because the control group met the diagnosis for drug abuse and need for treatment (but not dependence). On the other hand, the list of socio-demographic controls was limited, so the 0.125 figure is not a lower bound. We will use values of 0.1 for cannabis dependence and 0.2 for dependence on cocaine, heroin and methamphetamine.

A common threshold test when assessing health interventions is that programmes which save a QALY for \$50,000 or less are cost-effective, although this figure may be out of date. One would expect the threshold to increase with inflation and growth in real GDP per capita, but the \$50,000 figure dates to the mid-1980s when valuations were \$1 million dollars per life.³⁷ If \$50,000 was the right figure in 1985, today the right figure might be more like \$100,000. Furthermore, the economics literature now favours the so-called 'revealed-preference approach' which can yield substantially higher valuations on human life. Viscusi and Aldy review revealed-preference studies and conclude that estimates fall within the range of \$4 million to \$9 million per statistical life in 2000 dollars, which would suggest \$400,000 per QALY in today's dollars.³⁸ I will use \$100,000, but understand that figures half as large or two or even four times as great can be defended.

Table 1 translates these parameter values into a point estimate that prohibition may prevent enough drug dependence to warrant spending as much as \$112 billion per year, well in excess of the roughly \$50 billion per year now spent on drug control.

This quantification is *extremely* rough, but it has the virtue of being parsimonious, involving only seven parameters. Any reader with a calculator can quickly compute how the \$112 billion figure would change if one or more of the parameters were varied. Clearly one can produce benefit valuations below \$50 billion. Notably, those who reject the idea that legalisation will have any effect on dependence and/or that dependence involves any loss in quality of life would compute that prohibition offers zero benefit.

Likewise, the \$50 billion cost figure pertains to monetary spending. Some might argue that imprisonment causes a loss in quality of life. If the almost 500,000 drug law violators behind bars suffer a QALY loss of 0.5, that is 250,000 QALY lost per

year, whose monetised value of \$25 billion ought to be added to the \$50 billion in financial outlays. Likewise prohibition increases drug-related crime and violence, since the economic-compulsive and systemic crime it creates exceeds the psychopharmacological crime it averts.³⁹ Prohibition also reduces labour productivity (e.g. when a criminal record blocks someone from getting a particular job), although drug abuse does as well, so it is not immediately clear which effect is greater. Similarly, prohibition exacerbates some medical conditions (e.g. from HIV) but averts others. (The QALY calculation above considered only dependence *per se*, not the physical sequelae of substance abuse, such as heart problems or stroke caused by stimulant abuse.)

An optimist might also argue that legalisation would provide competition for alcohol and tobacco, siphoning users away from those substances, and thereby creating additional benefits. Of course a pessimist might worry that the hard drugs are complements not substitutes for alcohol, at least in the long run, and that increases in cannabis smoking might increase, not reduce, tobacco smoking.

So the purpose of this calculation is certainly *not* to argue that prohibition offers a net benefit of \$112 billion - \$50 billion = \$62 billion. For many reasons it is not possible to make such a calculation. However, this arithmetic exercise does challenge the presumption that prohibition has failed to serve the interests of the United States and, by extension, other final market countries. Even granting that prohibition's costs are enormous, it does not automatically follow that those costs outweigh potential benefits from reduced dependence, because the benefits may also be very large.

Furthermore, there is a broad consensus among researchers and increasingly among policymakers that enforcement intensity in the United States has gone beyond the point of diminishing returns. Peter Reuter and I have argued that the United States could cut sanctioning by 50 percent across the board and suffer only a very modest increase in use and dependence, even though eliminating prohibition altogether would lead to a doubling or tripling of dependence.⁴⁰ If that is correct, then such a kinder, gentler prohibition would look even better relative to legalisation than the table above suggests, and that may be a caricature of the spirit of prohibition as implemented in many final market countries in Europe and Australasia.

37 For a discussion, see W.G. Manning, E.B. Keeler and J.P. Newhouse, 'The Taxes of Sin: Do Smokers and Drinkers Pay Their Way?,' *Journal of the American Medical Association*, 261 (1989): 1604-1609.

38 W.K. Viscusi and J.E. Aldy, 'The value of a statistical life: A critical review of market estimates throughout the world,' *Journal of Risk and Uncertainty*, 27 (2003): 5-76.

39 Jonathan P. Caulkins and Mark A.R. Kleiman, 'Drugs and Crime,' in *Oxford Handbook of Crime and Criminal Justice*, ed. Michael Tonry. (Oxford University Press, 2011), 275-320.

40 Jonathan P. Caulkins and Peter Reuter, 'Reorienting U.S. Drug Policy,' *Issues in Science and Technology*, XXIII/1 (2006), 79-85.

CONCLUSION

The central point of the analysis above is that the benefits of drug prohibition in the US – in terms of reduced dependence – may well exceed prohibition's combined costs in terms of financial outlays and loss of freedom from incarceration. There is enormous uncertainty surrounding every component of the calculations, and intelligent people can disagree about what value to place on averting a year of dependence vs. a year of incarceration, but it is at least plausible that prohibition is actually succeeding from a US perspective. And if the rather extreme and inefficient version of prohibition implemented in the US has merits, the same may be true for prohibition as implemented in other final market countries. Furthermore, one cannot readily 'experiment' with legalisation; more likely than not, it is an irreversible step.⁴¹

What does this imply for the debate over drug policy reform? Even if one were persuaded by the analysis here, it does not apply to source or transshipment countries. If there were a country whose people would have no interest in using a drug, and that country were beset by violence, corruption and other ills from hosting production or international trafficking, then that country might benefit from legalisation, even if final market countries would not. That, simply put, is what some other contributions in this report argue.

There are at least three reactions to the possibility that prohibition benefits final market countries but hurts production and transshipment countries. The first is that the final market countries ought to subordinate their interests to those of source and transshipment countries; that seems far-fetched, as nations

tend to put their own interests first. The second is that the final market countries ought to compensate production and transshipment countries for the harms caused, in proportion to their share of consumption. Arguably, that is part of what has motivated some US aid to Colombia, which in recent years has stressed institution-building, not just crop eradication.

Another possibility is that the present international prohibition regime is unsustainable in the long run even if there were some such compensation; over time, footloose international trafficking may migrate to the nations least able to defend themselves, leading to failed states and *de facto*, if not *de jure* legalisation. Failed narco-states are in nobody's interests, so an alternative would be for states that are net losers under prohibition to withdraw from the international control regime, in hopes of being able to control, regulate and even tax legal production.

The country that moves first will bear unusual risks. It may quickly attract production activity from other countries. And its people would be exposed to low prices and high availability before the global society has learned how to nurture anti-use norms that can (partially) take the place of official prohibition. Nevertheless, it seems plausible that some state will become sufficiently desperate that they may take the plunge. If so, then the self-interested policy for other states, particularly distant states, may be to encourage that other country to jump first, and then learn from its tribulations. In legalisation as in software development, it may be prudent to distinguish between aspiring to be on the cutting edge vs. the bleeding edge of reform. ■

41 Caulkins and Lee, 'The Drug-Policy Roulette,' 35-51.

Why Is Strict Prohibition Collapsing? A Perspective from Producer and Transit Countries

Daniel Mejia and Pascual Restrepo

In this contribution we lay out a simple political economy theory that helps explain the current debate on prohibitionist drug policies in Latin America and their slow but sustained collapse as a strategy to confront illegal drug production and trafficking. Viewed from the perspective of producer and transit countries, prohibitionist drug policies are a transfer of the costs of the drug problem from consumer to producer and transit countries, where the latter are pushed to design and implement supply-reduction policies. The contribution shows how the low effectiveness and high costs of these policies have led the region to ask for an urgent and evidence-based debate about alternatives to strictly prohibitionist drug policies.

Summary

- Latin American governments have recently pushed back against continuing prohibitionist drug policies.
- This is due to a poor 'operationalisation' of prohibitionist drug policies that has ended up transferring a large proportion of the costs of the drug problem to producer and transit countries.
- There are three main reasons why:
 - (1) Poor effectiveness of supply-reduction efforts in reducing the flow of drugs to consumer countries.
 - (2) A high cost of implementing supply-reduction efforts (violence, corruption and institutional instability).
 - (3) A decreased willingness of producer and transit countries to mortgage their national security interests in exchange for receiving partial funding to implement supply-reduction efforts.
- Drug policy, like any policy, must be judged by results not intentions.
- Evidence is clear highlighting very high costs and ineffectiveness of many prohibitionist policies implemented under the 'war on drugs'.

Only a couple of years ago not even the most radical advocates for a change in drug policy felt that the international drug debate would evolve as quickly as it has. In an important way, the debate began to intensify four years ago, with the publication of the report of the Latin American Commission on Drugs and Democracy, headed by former Latin American presidents Fernando Henrique Cardoso, Cesar Gaviria and Ernesto Zedillo.¹

Then, about two years ago, other world leaders and international figures, such as Kofi Annan, George Schultz, Paul Volcker and Richard Branson, joined the three former Latin American presidents and published the report of The Global Commission on Drug Policy. Both reports made an urgent call for a revision of prohibitionist drug policies and advocated treating drug consumption as a public health issue, not as a criminal offence. The reports advocated including 'not just alternatives to incarceration and greater emphasis on public health approaches to drug use, but also decriminalisation and experiments in legal regulation'.²

Only a few months after the publication of the report of the Global Commission, Colombian President Juan Manuel Santos (quite courageously) encouraged the international community, other presidents in the region and especially the United States government to engage in an informed and honest discussion, based on the best available empirical and academic evidence, about the effectiveness and costs of the current global regime on drugs.³ President Santos was followed by other Latin American presidents, like Otto Pérez Molina, who introduced the issue of drug legalisation into the debate.

1 Latin American Commission on Drugs and Democracy, 'Drugs and Democracy: Towards a Paradigm Shift,' 2009, http://www.drogasedemocracia.org/Arquivos/declaracao_ingles_site.pdf.

2 See Global Commission on Drug Policy, 'War on Drugs,' 2011, <http://www.globalcommissionondrugs.org/Report>.

3 See also Juan Manuel Santos, 'Re-examining the Drug Problem Through a Fresh Lens,' in *Governing the Global Drug Wars*, ed. John Collins, (London: LSE IDEAS Special Report, 2012), 2–3.

In the Summit of the Americas held in Cartagena in 2012, the Organization of American States (OAS) received the mandate to produce a report about the Drug Problem in the Americas. This thorough report was released in May 2013, making a special emphasis in five areas: the relationship between drugs and public health; the relationship between drugs and economic and social development; security challenges as reflected in the nexus between drugs, violence and organised crime; the production and supply of drugs, pharmaceuticals and chemical precursors; and the legal and regulatory approaches to the drugs problem. All in all, the two Commissions, the statements by former and acting Latin American presidents and the OAS report reflect the frustration of many countries in the region with the ‘war on drugs’ as we know it and its high costs.

But how did all this movement start? And why in Latin America? This contribution aims at answering these two questions by providing a simple political economy theory of the war on drugs in producer and transit countries and the main reasons why the region is making an urgent call for an evidence-based debate on the costs and benefits of this war.

Before laying out the theory, it is useful to provide some definitions of prohibition and how it has been operationalised in practice. According to different sources, prohibition is ‘the action of forbidding something, especially by law’ or ‘a law or rule that stops people from doing something’. Policies to deal with the production, trafficking, sale and consumption of psychoactive substances such as cannabis, cocaine and heroin have been dominated for decades by a so-called ‘prohibitionist’ approach. That is, by policies that restrict or ban the production, trafficking, sale and consumption of these substances. More importantly, however, these policies have been operationalised using criminal policy tools such as arrest, prosecution and imprisonment. But beyond a grammatical or even operational definition of prohibition, it is worth understanding prohibitionist drug policies from an international political economy perspective.

‘...the recent Latin American experience shows that when a country is (locally) successful in the fight against drug production and trafficking – which is the exception rather than the rule – DTOs are displaced to other countries where they find more favourable environments to run their operations.’

The rest of the contribution is organised as follows. First, it lays out a simple international political economy theory of prohibition. It then explains in detail the three main reasons why, in our view, the operationalisation of this theory is collapsing as a strategy to confront the drugs problem in Latin America. Finally, it presents some concluding remarks.

A SIMPLE POLITICAL ECONOMY THEORY OF PROHIBITION

From the perspective of producer and transit countries, prohibitionist drug policies can be understood as a transfer of the costs of the ‘drugs problem’ faced by consumer countries to producer and transit countries. On the one hand, under complete legalisation, consumer countries would end up bearing most of the costs associated with drug consumption. Among others, these are the costs that the health systems in consumer countries would have to pay for treating dependent users and problematic drug consumers, the productivity losses associated with problematic drug consumption and the costs of implementing policies to reduce drug consumption (prevention, treatment and rehabilitation, among others), among others.

With full prohibition, on the other hand, consumer countries end up transferring a significant part of these costs to producer and transit countries by pushing them (through international norms such as the United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988 or the US annual certification process⁴) to implement supply-reduction efforts aimed at making the price of drugs reaching consumer countries higher and their availability lower. Examples of supply-reduction efforts that have been implemented in different countries in the region are the eradication campaigns of illicit crops; the interdiction of drug shipments; the detection and destruction of drug producing labs; and the arrest of leaders of Drug Trafficking Organisations (DTOs).

With less drug supply and higher prices, the argument follows, the use of these substances in consumer countries should decrease, as should the costs that these countries have to pay to confront their drug problem.⁵ In summary, from an international political economy point of view, the current operationalisation of prohibition is little more than the transfer of a major part of the costs of the drug problem from consumers to producer and transit nations.

In theory, at least, this operationalisation of prohibition (e.g. the pressure on producer and transit countries to implement supply-reduction policies) sounds like a reasonable option, and should not then be a surprise that major consuming countries partially fund these supply-reduction efforts through initiatives such as Plan Colombia or the Merida Initiative (or, in a different region, crop eradication programmes in Afghanistan). Ultimately, it is about some consumer countries compensating others for having transferred an important part of the costs of their drug problem.

4 The US certification process rates the anti-narcotics efforts of other countries, imposing sanctions on countries that do not meet certain standards of drug control. Sanctions range from the suspension of US foreign aid and preferential trade benefits to curtailment of air transportation.

5 For this argument see Jonathan P. Caulkins’ contribution to this report.

Recent research has shown how the increase in the size of illegal drug markets observed between 1994 and 2008 (about 200 percent) explains roughly 25 percent of the current homicide rate in Colombia. This translates into about 3,800 more homicides per year on average that are associated with illegal drug markets and the war on drugs.

Under the current prohibitionist approach to drug policy, producer and transit countries have ended up paying a very high cost in terms of violence, corruption and the loss of legitimacy of state institutions, among many others.

Consider the following thought experiment.⁶ Suppose for a moment that all cocaine consumption in the US disappears and goes to Canada. Would the US authorities be willing to confront drug trafficking networks at the cost of seeing the homicide rate in cities such as Seattle go up from its current level of about five homicides per 100,000 individuals to a level close to 150 in order to prevent cocaine shipments from reaching Vancouver? If your answer to this question is 'perhaps not,' well... this is exactly what Colombia, Mexico and other Latin American countries have been doing over the last 20 years: implementing supply-reduction policies so that drugs don't reach consumer countries at the cost of very pronounced cycles of violence and political corruption, with the consequent losses of legitimacy of state institutions.

THE THREE MAIN REASONS BEHIND THE SLOW BUT SUSTAINED COLLAPSE OF PROHIBITIONIST DRUG POLICIES

What was it that failed with the operationalisation of prohibition in Latin America if it seemed like a reasonable policy (in theory, at least)? This section argues that three main assumptions on which the theory rested have failed to be true: first, a high effectiveness of supply-reduction efforts in reducing the flow of drugs to consumer countries; second, a low cost of implementing supply-reduction efforts; and third, a sustained willingness of producer and transit countries to mortgage their national security interests in exchange for receiving partial funding to implement supply-reduction efforts.

First, the theory assumed that if sufficiently large amounts of resources were invested in supply-reduction efforts in producer and transit countries, it was possible to restrict, or at least to control, the flow of drugs to consumer countries. However, the available evidence shows that there are very few success stories in the fight against drug production and trafficking in the region. And what is even more worrying is that of the few success stories, these have just ended up transferring or displacing production and trafficking activities somewhere else.

The most emblematic case study of the 'war on drugs' in the region is Plan Colombia, a joint initiative implemented by Colombia and the US to fight against cocaine production and trafficking. Under Plan Colombia, the two countries have invested more than one percent of Colombia's GDP each year (about \$1.2 billion per year) to curtail cocaine production and trafficking and to fight against criminal organisations linked to these activities. The available evaluations of anti-drug strategies implemented under Plan Colombia show that these policies tend to be very ineffective – and costly – in reducing the cultivation of coca crops and cocaine production.

First, aerial spraying campaigns of coca crops (the most used strategy to combat cocaine production in Colombia) have been shown to have very small (or no) effects in quantities produced and prices.⁷ According to the most conservative estimates derived from a quasi-experimental evaluation of this strategy, for each additional hectare sprayed with herbicides, coca cultivation is reduced by about 0.1 to 0.15 hectares.⁸ Furthermore, spraying campaigns have been shown to generate health problems in rural populations exposed to the herbicides used in these campaigns,⁹ to damage the environment¹⁰ and to cause loss of confidence in state institutions.¹¹

6 This thought experiment is based on a conversation between the authors and Benjamin Lessing.

7 Luis C. Reyes, 'Estimating the Causal Effect of Forced Eradication on Coca Cultivation in Colombian Municipalities,' unpublished manuscript, Department of Economics, Michigan State University, 2011; Sandra Rozo, 'On the Effectiveness and Welfare Consequences of Anti-drug Eradication Programs,' unpublished manuscript, UCLA, 2013; Daniel Mejía, Pascual Restrepo and Sandra Rozo, 'On the Effectiveness of Supply Reduction Efforts in Drug Producing Countries: Evidence from Colombia,' unpublished manuscript, Universidad de los Andes, 2013; Jorge Gallego and Daniel Rico, 'Manual Eradication, Aerial Spray and Coca Prices in Colombia,' unpublished manuscript, UNODC-Colombia, 2013.

8 Mejía et al., 'On the Effectiveness of Supply Reduction Efforts'.

9 Adriana Camacho and Daniel Mejía, 'Consecuencias de la aspersión aérea en la salud: evidencia desde el caso colombiano,' in *Costos económicos y sociales del conflicto en Colombia: ¿Cómo construir un postconflicto sostenible?* ed. Ibañez et al., (Universidad de los Andes 2014).

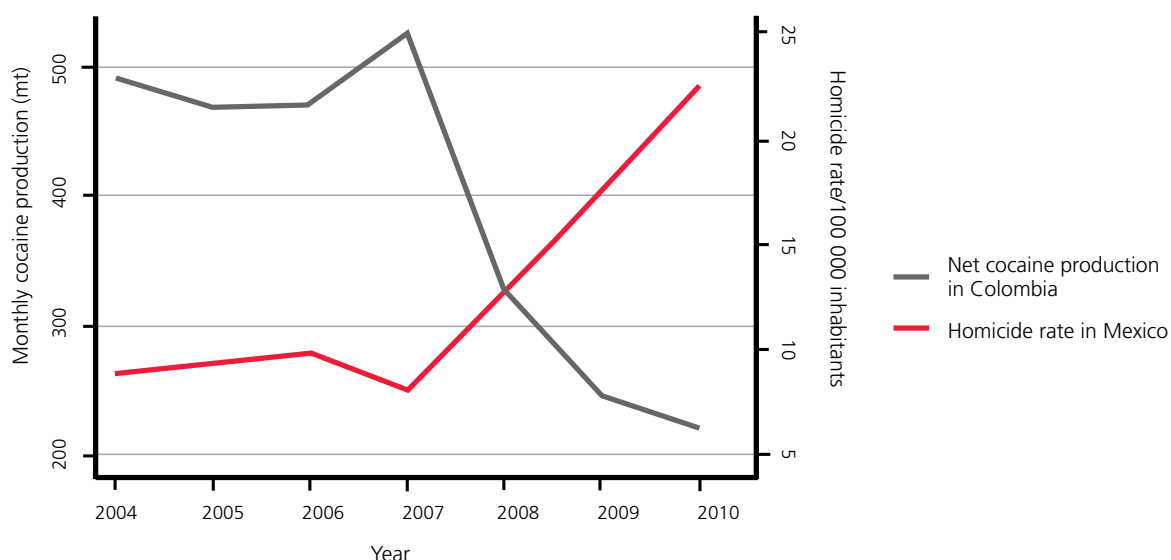
10 Rick A. Relyea, 'The Impact of Insecticides and Herbicides on Biodiversity and Productivity of Aquatic Communities,' *Ecological Society of America* (2005): 618-627; Carolina Navarrete-Frías and Connie Veillette 'Drug Crop Eradication and Alternative Development in the Andes' Congressional Research Service (2005), <http://fpc.state.gov/documents/organization/61022.pdf>; L. Dávalos, A. Bejarano and H. Correa 'Disabusing Cocaine: Pervasive Myths and Enduring Realities of a Globalized Commodity,' *International Journal of Drug Policy*, 20 (5) (2009): 381-386; L. Dávalos, A. Bejarano, M. Hall, H. Correa, A. Corthals and O. Espejo, 'Forests and Drugs: Coca-Driven Deforestation in Tropical Biodiversity Hotspots' *Environ. Sci. Technol.*, 45 (4) (2011): 1219-1227.

11 M. García, 'Cultivos ilícitos, participación política y confianza institucional,' in *Políticas antidroga en Colombia: éxitos, fracasos y extravíos* ed. A. Gaviria and D. Mejía, 2011, 357-386.

Second, interdiction efforts aimed at disrupting cocaine shipments en route to consumer markets have been shown to be more effective when compared to aerial spraying campaigns,¹² but have only ended up displacing the bases of operation of DTOs to other countries in the region instead of leading to regional decreases in the amount of drugs transacted. This was the case, for instance, after successful interdiction policies in Colombia were implemented in 2007 and cocaine production activities in this country were reduced significantly. With the shift to more interdiction and less eradication in Colombia, coca crops started to move back to Peru and Bolivia; cocaine processing facilities moved to Venezuela and Ecuador (where lower prices for some of the chemical precursors used in the production of cocaine such as gasoline and cement make this activity more lucrative); and the bases of operation of the main trafficking organisations were displaced to Mexico and Central America. All in all, the recent Latin American experience shows that when a country is (locally) successful in the fight against drug production and trafficking – which is the exception rather than the rule – DTOs are displaced to other countries where they find more favourable environments to run their operations. The displacement of drug trafficking activities to other countries after successful interdiction strategies are implemented in one country leads to cycles of violence and instability in the receiving countries. A recent example is Mexico, where drug trafficking activities and violence have sky-rocketed since 2006.

Although many political analysts have put all the blame of the recent situation in Mexico on the strategies implemented by Felipe Calderon, recent research shows that part of the increase of violence and drug trafficking activities in Mexico can be explained by successful interdiction policies implemented in Colombia starting in 2007 (Figure 1). This research finds that high-frequency shocks in the supply of cocaine created by higher cocaine seizures in Colombia increased the levels of violence in Mexico. According to this study, ‘scarcity created by more efficient cocaine interdiction policies in Colombia may account for 21.2 percent and 46 percent of the increase in homicides and drug related homicides, respectively, experienced in the north of Mexico’.¹³ In most cases, however, anti-drug policies implemented to reduce supply are unsuccessful, even at the local level. The second assumption of the theory that failed to hold relates to the costs that producer and transit countries had to pay for implementing supply-reduction efforts. The theory clearly underestimated both the direct and the collateral costs that had to be paid by countries in Latin America for implementing anti-drug strategies aimed at reducing the supply of drugs and fighting against DTOs.¹⁴ The recent case of Mexico is the most salient one. When President Felipe Calderon declared an open war against DTOs and decided to send the army to confront these organisations at the beginning of his term (December 2006), what can only be described as an ‘epidemic’ of violence was unleashed.

Figure 1. Net cocaine supply from Colombia and homicide rate in Mexico



Source: author's calculations based on data from INEGI, UNODC and the Colombian National Police.

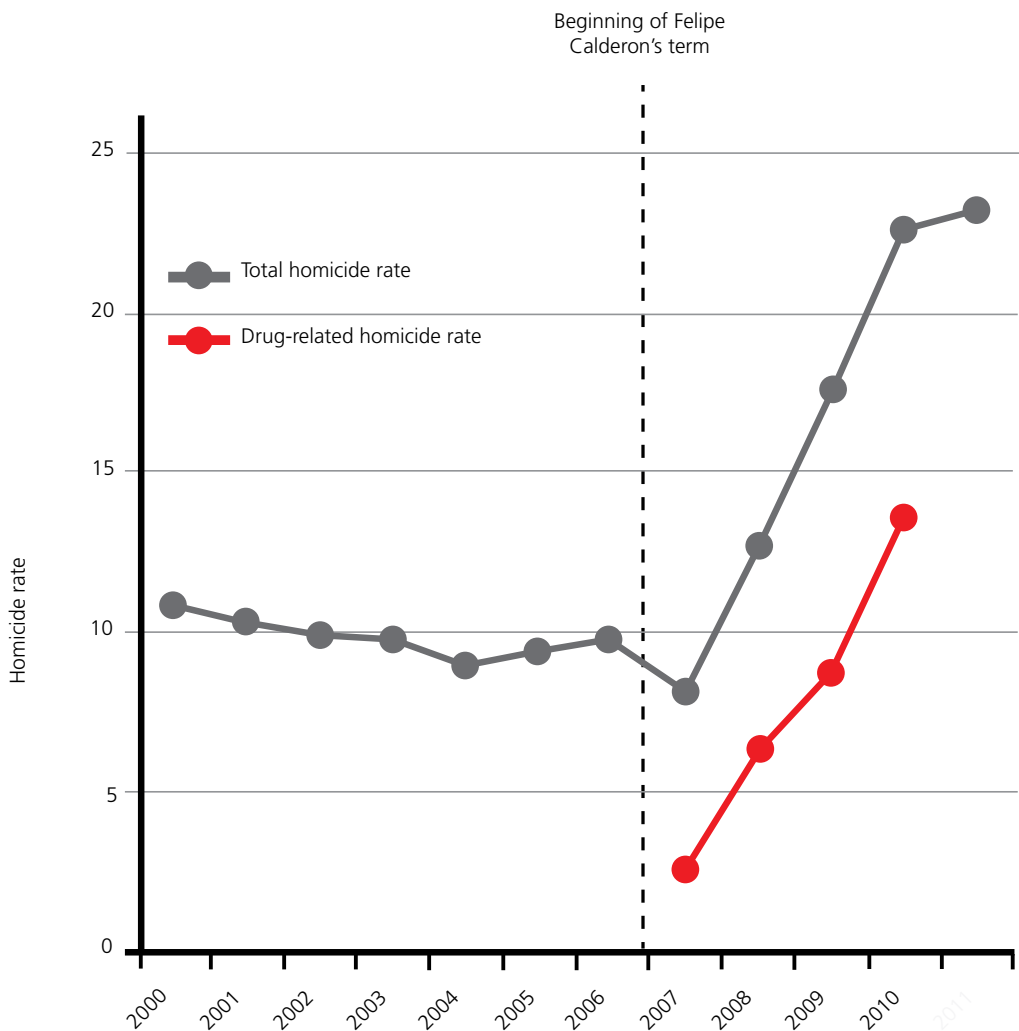
- 12 D. Mejía and P. Restrepo, 'The Economics of the War on Illegal Drug Production and Trafficking,' Documento CEDE no. 54, Universidad de los Andes, 2013.
- 13 J. Castillo, D. Mejía, and P. Restrepo, 'Scarcity without Leviathan: The Violent Effects of Cocaine Supply Shortages in the Mexican Drug War,' Center for Global Development WP # 356, February (2014).
- 14 For other examples of these collateral costs see Laura Atuesta's contribution to this report examining the creation of 'internally displaced populations' (IDPs) in Colombia and Mexico or Alejandro Madrazo's contribution on the 'constitutional costs' of the war on drugs.

The total homicide rate in Mexico increased threefold within a period of just four years, from about eight homicides per 100,000 individuals in 2006 to more than 23 in 2010 (see Figure 2). Several studies have tackled this issue, confirming that the crackdowns on drug cartels had a significant effect on the levels of violence experienced in Mexico.¹⁵

Another well-known case where both illegal drug markets and the war against them have led to pronounced cycles of violence is that of Colombia during the last 30 years. Figure 3 presents the evolution of the homicide rate in Colombia during the last three decades. The first wave of violence (during the late 1980s and the beginning of the 1990s) is clearly associated with the war against the Medellin cartel, which ended in 1993 with the killing of Pablo Escobar in a populous neighbourhood

in Medellin. In that year, the homicide rate in Colombia reached a level of 72 homicides per 100,000 inhabitants. Although this level is very high, it pales when compared with the level of the homicide rate reached in that year in Medellin: 420. The second wave of violence in Colombia occurred during the late 1990s, and is mainly explained by FARC's increasing involvement in the drug trade and the strengthening of their military capacity afterwards (Figure 3). Recent research has shown how the increase in the size of illegal drug markets observed between 1994 and 2008 (about 200 percent) explains roughly 25 percent of the current homicide rate in Colombia. This translates into about 3,800 more homicides per year on average that are associated with illegal drug markets and the war on drugs.¹⁶ Although violence is the clearest, crudest and most visible example of the high costs that producer and transit countries

Figure 2. Homicide rate in Mexico



15 Melissa Dell, 'Trafficking networks and the Mexican drug war,' unpublished manuscript, Harvard University, 2012; G. Calderón, A. Díaz-Cayeros and B. Magaloni 'The Temporal and Spatial Dynamics of Violence in Mexico,' unpublished manuscript, Stanford University, 2012.

16 D. Mejía and P. Restrepo, 'Bushes and Bullets: Illegal Cocaine Markets and Violence in Colombia,' Documento CEDE no. 53, Universidad de los Andes, November 2013.

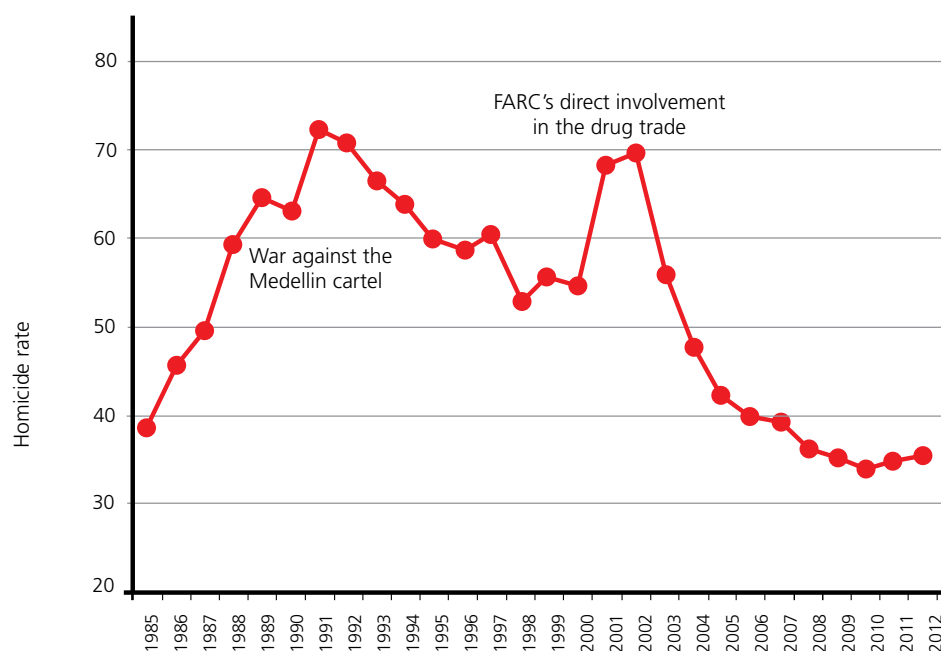
have had to pay for waging a war on illegal drugs, they are, unfortunately, not limited to it. A less visible but equally important obstacle to socioeconomic development caused by the high rents associated with drug trafficking are the levels of corruption observed in the region. Drug cartels have funded political campaigns, have penetrated (and intimidated) media outlets and have corrupted the most remote corners of society (including beauty contests and football teams, the two preferred hobbies of Latin American drug traffickers). The costs of violence, crime and corruption caused by the high rents associated with the illegal drug trade are very difficult to quantify, but for countries like Mexico, Colombia and many small countries in Central America, they undoubtedly account for a non-negligible fraction of GDP and for a few percentage points in terms of lower growth rates in these economies.

The third pillar of the theory of prohibition, which only began to fail more recently, is the assumption that producer and transit countries in the region would continue mortgaging their security interests and institutional stability in exchange for \$400-500 million per year in aid to confront illegal drug trafficking. Increasingly, countries in the region are beginning to realise that the funding they receive from governments of consumer countries to help finance supply-reduction efforts

are not sufficient to compensate the high costs they have to pay for waging this war on drug trafficking and drug cartels. In order to have full control of the policies, some countries, like Colombia, have begun a process of nationalisation of the costs of the 'war on drugs'. This will ensure these countries have full control over which policies are and are not implemented. This does not mean that all forms of aid to the countries in the region risk national and institutional security interests. However, there is no doubt that they reduce the space and independence to decide which policies are more effective and less costly for their own national interests rather than the interests of funding countries.

Such is the case, for example, of aerial spraying campaigns of illicit crops with herbicides in Colombia, where a sizeable proportion of US aid under Plan Colombia has been tied to the use of small aircraft, contractors and herbicides to carry out these campaigns. Only recently, the government of Colombia has started to realise that this form of funding for the war on drugs brings about more costs than returns, and it is starting to question the benefits of continuing these fumigation campaigns. The same realisation has occurred in Mexico, where the government has preferred, in some cases, to give up substantial aid packages in order to keep full control of the policies that are implemented and the operations that are carried out against cartel leaders.

Figure 3. Homicide rate in Colombia



Source: author's calculations based on data from the Colombian National Police.

These are three main reasons why, in our view, strictly prohibitionist policies are being subjected to increasing public scrutiny in Latin America. Several leaders (including several acting presidents) in the region have asked respectfully but urgently for an honest and informed debate about which policies work, which don't and what their costs are. The urgent call of Latin American leaders for a debate on the drug problem is a desperate plea to consumer countries to start carrying their own burdens, treating their own ills and fighting their own wars.

CONCLUSION

The recent history of countries affected by drug production and trafficking in the region has been repeated again and again: violence, corruption, overstressing the capacity of state institutions, etc. In its initial stages, drug trafficking organisations infiltrated traditional political parties. Then, the increase in drug-related violence overwhelmed the capacity of the judicial system to confront these criminal organisations, thus making the countries in the region shift to a new equilibrium characterised by high levels of crime and violence and low state capacity. Organised criminal groups waged an open war against the state and the media, and later funded the expansion of guerrilla and paramilitary groups.

The current debate on drug policy should not be based on simplistic solutions derived from preconceived ideological positions, but on analysis and research that takes into account all the available evidence about the effectiveness, efficiency and costs of alternative drug policies. Drug policy, like any other public policy, must be judged by its results, and not by its intentions, and although in theory prohibition sounds like a reasonable choice, the available evidence is clear in pointing out the very high costs and ineffectiveness of many of the policies that have been implemented so far under the so-called war on drugs. ■

The Mobility of Drug Trafficking

Peter Reuter¹

It is widely believed that pressing down on one trafficking route simply leads to a shift in drug traffic. This contribution reviews the evidence for this proposition, focusing on cocaine and heroin. Theory suggests that smugglers choose the low-cost method for moving from the source country to the final market country. However, interdiction risks are only one among many factors that determine that cost and substantial changes in interdiction intensity on one route may not induce change. A small number of episodes do suggest that the balloon effect, if not universal, can apply. In particular, the emergence of a West African route for cocaine to Europe may have been in response to a Dutch crackdown on an existing route from the Netherlands Antilles to Amsterdam's Schiphol airport. The poor quality of data on either interdiction intensity or on the distribution of drug traffic across routes makes it difficult to find counter-examples, such as crackdowns that did not induce shifts. Though the balloon effect is not perhaps as universal as claimed, it is real enough that policymakers contemplating a major crackdown need to consider effects on other nations.

Summary

- The balloon effect hypothesis advances that if authorities get tougher on producing, trafficking or dealing in one location then the targeted activity will be displaced to another location with no more than temporary inconvenience to the participants.
- The hypothesis further advances that the long-term consequences of supply interventions in terms of availability and price to users will be slight, particularly if the intervention is close to the production site.
- Surely the balloon effect contains at least a grain of truth, even if it is not the whole story. But the question is how much increased interdiction can erode the competitive advantage of existing routes, and that remains in the domain of pure speculation.
- Interdiction crackdowns by one country may well affect others. Co-ordinating decision-making internationally will be extremely difficult both institutionally and operationally but without such co-ordination, negative outcomes may continue to be displaced across borders.

The balloon effect hypothesis has become part of the conventional wisdom about the illegal drug trade. Simply put, this hypothesis advances that if authorities get tougher on producing, trafficking or dealing in one location then the targeted activity will be displaced to another location with no more than temporary inconvenience to the participants.² The long-term consequences, in terms of availability and price to users, will be slight, particularly if the intervention is close to the production site.

This contribution reviews the evidence in support of that proposition with respect to international drug trafficking. To what extent has such trafficking, as opposed to production, proven mobile in response to interdiction activities? Interdiction is broadly defined as any activity aimed at apprehending drugs or couriers. The contribution begins with a brief conceptual framework as to how smugglers choose routes. It then reviews what is known about the major routes chosen for cocaine and heroin. The third section examines a small number of instances of crackdowns on specific routes and what happened in response. The final section identifies the principal caveats and draws conclusions.

Cocaine and heroin are the principal focus of the review. They are the drugs thought to be the most valuable in terms of revenues and certainly have caused great harm. Amphetamine Type Stimulants (ATS) are also internationally trafficked and cause harm but very little is known about the trafficking itself. The review's emphasis is on effects in the trafficking countries rather than in final markets; in that sense it looks at interdiction from the point of view of the transshipment countries, not the final consumer countries that are so often the financiers and instigators of interdiction crackdowns.

¹ The author wishes to acknowledge the valuable research assistance of Rafael Alencar and Daniel Rico in preparing this paper. Financial support for this research was provided by the Open Society Foundations.

THE THEORY BEHIND THE BALLOON EFFECT

What explains the geographic configuration of international drug trafficking, in particular which countries serve as the principal transit countries? The obvious model for understanding smuggler choices, used in the few attempts to formally model drug trafficking, assumes that the smuggler's goal is to minimise the cost of smuggling the drug from the source country to the final market country.³ The difficulty is to specify the components of the cost function. The consequences of interception (weighted by the probability of occurrence) are presumably a large, perhaps dominant, component of that cost. Interception imposes a variety of costs: loss of the drugs; loss of the transportation vehicle if the drug is being carried in a specialised vessel, such as a go-fast boat or small plane; and perhaps incarceration of those bringing the drugs.⁴ The latter shows up as a cost in terms of the compensation paid to couriers for incurring the risk of incarceration and perhaps also compensation to their families while the courier is in prison.⁵ The costs may also include paying government officials for allowing shipments and couriers through.⁶

In this model, the effect of intensified interdiction in a specific transshipment country is straightforward. Costs are now higher, making other countries relatively more attractive. Depending on the difference between the costs associated with the current transshipment country and the next cheapest, the traffic will shift to the latter when the differential is eliminated. Given that the smugglers have imperfect knowledge about costs and risks associated with a particular route, the shift may be partial and lagged.⁷

So what determines the smuggling risk cost associated with any country for a given set of smugglers? First note that the risks are not unidimensional. There is the risk of smuggling from source country A (Colombia) to transshipment country B but then also the risk associated with smuggling from B to (in this simplified example) final country C (the US). Assume that Honduran colonels offer cheaper protection for cocaine importers than Costa Rican customs officials (given that the latter country lacks a military). However, if the probability of search and apprehension is higher for Honduras-US shipments than for Costa Rica-US shipments, then Costa Rica may be a preferred transshipment country, because total smuggling costs are lower.

It is this complexity that helps explain the surprising observation, documented below, that some drug shipments travel through multiple countries rather than going by the most direct route from source to consumer country.

The costs are also state-dependent. Learning which Honduran colonels can be trusted and which cannot is a valuable experience-dependent asset. Assume that the Honduran government increases the expected prison sentence for convicted traffickers or creates an elite unit that raises the risk of apprehension.⁸ Even then the investment in relations with corrupt Honduran colonels may enable established traffickers to smuggle more cheaply there than in other Central American nations. Knowing which Honduran transportistas are reliable is similarly a cost-reducing asset that may reduce willingness to seek alternative routes. Thus route choice responses to higher interdiction intensity may be lagged and incomplete.

Moreover, different types of smugglers may face different risks in a given country, dependent on such factors as extended family links and linguistic familiarity. For example, a Mexican smuggler may have cross-border family ties to Honduran officials that are unavailable to Colombian smugglers and which can largely negate a Honduran crackdown on cocaine trafficking.

Geography and Route Choices

Being close reduces the exposure time of the shipment and the pure transportation cost, though the latter is surely a small part of the total cost. Neighbouring major producer or consumer countries are plausibly important risk factors for a country becoming a transshipment country. A land border allows for use of routes which are usually harder to monitor than those by air or sea.

Consumer countries (e.g. US, Western European countries)

Mexico is perhaps the nation for which geographic destiny is strongest; it has been called a 'natural smuggling platform' for the United States, though it was less important than Canada for alcohol smuggling during Prohibition.⁹ Mexico serves as the principal entry country for cocaine, heroin, cannabis and methamphetamine imported by the United States. For cocaine its proximity to Colombia also helps. Caribbean nations serve

2 Perhaps the most prominent early articulation of the proposition is Ethan Nadelmann (1989) 'Drug Prohibition in America: Costs, Consequences and Alternatives,' *Science* 253, 1989: 949-957

3 Jonathan P. Caulkins, Gordon Crawford and Peter Reuter 'Simulation of Adaptive Response: A Model of Interdictor-Smuggler Interactions,' *Mathematical and Computer Modelling* 17 (2) 1993: 37-52; Daniel Mejia and Pascual Restrepo 'The Economics of the War on Illegal Drug Production and Trafficking,' working paper (2013), <http://crimelab.stanford.edu/clftp/uploads/183/5838.pdf>

4 Money laundering charges may arise as well if the interdiction is intelligence determined but there are not many such charges.

5 There are occasional reports of such payments. See for an earlier period J. R. Fuentes, *The Life of a Cell: Managerial Practice and Strategy in a Colombian Cocaine Distribution System in the United States* (City University of New York, 1998).

6 One could imagine a race to the bottom. Officials of different countries might compete to offer the lowest price for their services. There is, however, no evidence of anything approaching an international market for corruption services; the barriers to dissemination of information may be too substantial for a market to form.

7 This indeed was the result in Caulkins, Crawford and Reuter, 'Simulation of Adaptive Response'.

8 The D.E.A has developed special units in the enforcement agencies of Guatemala, Dominican Republic, Haiti, Honduras and Belize. The squads are part of a programme called Foreign-deployed Advisory Support Team (FAST). Charlie Savage, 'D.E.A. Squads Extend Reach of Drug War,' *New York Times*, November 6, 2011, <http://www.nytimes.com/2011/11/07/world/americas/united-states-drug-enforcement-agency-squads-extend-reach-of-drug-war.html?pagewanted=all>

9 This may have simply reflected the relatively low value of bootlegged alcohol per unit volume. Transportation costs themselves were an important component of total costs. The major US city markets for alcohol in the 1920s were much closer to the Canadian border than to Mexico.

as transit countries for cocaine, again reflecting geography. At various times Central American nations have also served as transshipment countries to Mexico; they are way stations to Mexico, with minimal direct entry to the United States.¹⁰

Western Europe, unlike the United States, has a complex set of borders. The many nations of the Western Balkans, hewn out of the artificial monolith Yugoslavia, have become, along with Albania, an important set of transshipment countries for heroin.¹¹ Proximity in this case is artificial – the major markets are far west of the Balkans but these countries border the European Union and once inside the EU, the risk of interception is significantly reduced. Morocco almost neighbours Spain, with a sea separation of less than 10 miles. While Morocco, a traditional producer of cannabis, is the major foreign source of cannabis to Western Europe, it does not appear to have an important role in the importation of cocaine or heroin.

Producer countries (e.g. Andean countries, Afghanistan)

Looking at proximity to production, Colombia itself can be seen as a transit country; from the late 1970s to the early 1990s Bolivia and Peru were the principal producers of cocaine base, but that product went to Colombia for processing into cocaine hydrochloride and then on to the US.¹² Venezuela, as Colombia's neighbour but with a government more tolerant of the cocaine trade in recent years, has become an important transshipment country.¹³

Over time, Afghanistan's neighbours have served in varying degrees as major routes for the export of heroin from the nation that has dominated world production for almost 20 years. Indeed, given that Afghanistan is land-locked and poorly connected to Western Europe by either commerce or traffic, it is almost inevitable that some of its six neighbours (i.e. China, Iran, Pakistan, Uzbekistan, Tajikistan, Turkmenistan) would be involved in transshipment.

Though the data available are indicative rather than quantitative, it appears that Iran has consistently been a major trafficking route, reflecting both its historic importance as a market for Afghan-origin heroin and its relatively good connections to European markets via Turkey. The emergence of a Central Asia route (particularly through Tajikistan) came only after the break-up of the Soviet Union and the development of a large Russian heroin market, separate but related phenomena.¹⁴ The extent to which Pakistan has served as a route to major European markets is hard to determine but there have been more reports of that connection in recent years. Seizure quantities are the standard indicator, though with well-known flaws. Pakistan's heroin seizures are regularly second amongst Afghanistan's neighbours but generally between one-tenth and one-third as large as those of Iran, which has always had the highest heroin seizure total since 2004. The Taliban ban year and the two immediately after showed a different pattern with more seized in Pakistan. The table below records seizures for the period 2001-2011.

Table 1. Heroin Seizures in Central Asian Nations, 2001-2011 ¹⁵

Heroin Seizures	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Iran	4001	3977	3327	4715	5554	10665	15899	23129	24926	27141	23096
Pakistan	6931	5870	6363	3487	2144	2819	2873	1900	2061	4236	7651
Afghanistan	n.r.	1291	815	2388	7112	4052	5038	2782	2188	9036	10235
Tajikistan	4239	3958	5600	4794	2344	2097	1549	1632	1132	985	509
Turkmenistan	131	53	76	258	172	201	325	244	419	133	39
Uzbekistan	466	256	336	591	466	537	479	1471	754	1004	622

10 There are occasional maritime shipments directly from Honduras to the US coast. See Julie Marie Bunck and Michael Ross Fowler, *Bribes, Bullets, and Intimidation: Drug Trafficking and the Law in Central America* (Penn State Press, 2012).

11 UNODC, *World Drug Report 2013* (New York: United Nations, 2013), http://www.unodc.org/unodc/secured/wdr/wdr2013/World_Drug_Report_2013.pdf.

12 Patrick Clawson and Rensselaer Lee *The Andean Cocaine Industry* (New York: St. Martin's Press, 1996).

13 UNODC, *Transnational Organized Crime in Central America and the Caribbean* (Vienna: UNODC, 2013), http://www.unodc.org/documents/data-and-analysis/Studies/TOC_Central_America_and_the_Caribbean_english.pdf

14 Letizia Paoli, Victoria A. Greenfield and Peter Reuter, *The World Heroin Market: Can Supply be Cut?* (Oxford University Press, 2009).

15 UNODC, *World Drug Report 2013*.

Proximity, indeed even being on a sensible geometric path between source and destination, is not necessary for a nation to become a transshipment country. Nigeria illustrates the issue most vividly, a nation that seems to have little potential for a role in the international drug trade but is definitely a significant player.

Nigeria is isolated from any of the principal producer or consumer countries and lacks a significant base of traditional domestic production or consumption.¹⁶ Nonetheless, Nigerian traffickers, including many in the substantial Nigerian diaspora of roughly 3 million, have come to play a substantial role in the shipping of heroin between Southeast Asia and the United States as well as to Europe. More recently these traffickers have even entered the cocaine business, although the cocaine production centres are even more remote from their home country. For example, Nigerians accounted for more than half of all those arrested for cocaine trafficking in Switzerland in 2011.¹⁷ In 2012 there were 450 Nigerians in Brazilian jails for drug trafficking. When police searched all passengers on two flights from São Paulo to Luanda, Mozambique, they found over 20 passengers, mostly Nigerians, in each flight carrying cocaine.¹⁸ Nigeria itself is an important hub as well. For example, 57 percent of those arrested for cocaine trafficking on flights from West Africa into Europe from 2004-2007 were Nigerians. There have been substantial seizures in Nigeria itself.¹⁹

The explanation for Nigerian resident and diaspora involvement surely involves a multiplicity of factors. Nigerians are highly entrepreneurial, have been misruled by corrupt governments over a long time and have large overseas populations, weak civil society, very low domestic wages and moderately good commercial links to the rest of the world. Thus, it is relatively easy to buy protection for transactions in Nigerian airports (due to corruption and a weak governmental tradition) to establish connections in both the source and the rich consuming nations (due to large overseas populations); and to use existing commercial transportation (note that the drugs travel with passengers rather than cargo since Nigerian exports, apart from oil, are modest) and smuggling labour is cheap due to low domestic wages. Moreover, Nigeria's entrepreneurial tradition produces many competent and enthusiastic smuggling organizers. Nigeria is not unique in most of these dimensions; however, its size and connections with the rest of the world distinguish it from other West African nations. Perhaps accident played a role in that country's initiation into the trade, but these other factors plausibly play a major role.

‘ Crossing more borders would seem to increase the risk of interception of the drugs. However, borders represent varying levels of risk. ’

Drugs travel in the pipelines of regular commerce and traffic. Thus some aspects of the distribution of routes between a producer and consumer region can be easily explained. Consider for example two of the major portals for cocaine coming into Western Europe. The UNODC reports that for the period 2006-2011, between 40 and 70 percent of the seizures of cocaine in Portugal come from Brazil, with another 20 percent usually coming from Lusophone Africa.²⁰ In contrast, during the same period, Brazil accounted for less than 10 percent of seizures headed for Spain; the bulk there came from Spanish-speaking Latin America. These patterns reflect the trading partnerships of the two Iberian countries.

Patterns of immigration may be particularly important for trafficking. The causal direction can be difficult to disentangle; the immigrant group in the consumer countries may make their home country an attractive transshipment site or the fact of being a transit country may increase the attractiveness of migrating to the destination country.

The large Albanian diaspora in Western Europe is a post-Cold War phenomenon.²¹ Albania is just one of many potential routes from Turkey to the richer Western markets. The diaspora, including many poorly-educated and poorer workers, may have made that country an attractive route.

Western Europe is home to an estimated 5 million Turkish citizens, many of whom are the children or grandchildren of the original immigrants.²² In the constant flow of communication and exchanges linking them to relatives and friends in their home country, heroin loads can be easily disguised. Whether the diaspora benefits from Turkey being a transit country or whether Turkey's transit role is a function of the existence of many potential traffickers in Western Europe again cannot be determined.

Immigrants in the destination country who are from the producing and trafficking countries have advantages in managing the smuggling sector, with better knowledge of potential sellers and corruption opportunities. Paoli and Reuter examined the heroin trade in Western Europe and found that it was indeed dominated by immigrants from the transit countries; on the other hand, natives dominated the trade in synthetics and other domestically-produced drugs.²³

16 Gernot Klautschnig, 'West Africa's drug trade: reasons for concern and hope,' *Addiction* 108 (11) 2013, 1871-1872.

17 UNODC, *Transnational Organized Crime in West Africa, A Threat Assessment* (Vienna: UNODC, 2013): 15, http://www.unodc.org/documents/data-and-analysis/tocta/West_Africa_TOCTA_2013_EN.pdf

18 *Ibid.*, 5.

19 *Ibid.*

20 *Ibid.*, 44.

21 Pino Arlacchi, *Addio Cosa Nostra* (Biblioteca Univerzale Rizzoli, 2004): 6-7.

22 Stiftung Zentrum für Türkeistudien, *The European Turks: Gross domestic product, working population, entrepreneurs and household data*. (Essen: Centre for Studies on Turkey, 2013).

23 Letizia Paoli and Peter Reuter 'Drug trafficking and ethnic minorities in Europe,' *European Journal of Criminology* 5 (2008): 13-37.

The drug trade also readily uses indirect paths for smuggling. Drugs seized in Germany sometimes turn out to have travelled through Scandinavia into Russia and then exited through Poland to their final market. Ruggiero and South describe

*'a joint Czech-Colombia venture to ship sugar, rice and soya to Czechoslovakia....This operation was used to smuggle cocaine, destined for Western Europe. In 1991, police say that 440 lbs. of cocaine were seized in Bohemia and at Gdansk in Poland, which would have been smuggled onward to the Netherlands and Britain.'*²⁴

Crossing more borders would seem to increase the risk of interception of the drugs. However, borders represent varying levels of risk. A plane from Bogota landing in New York is likely to be subject to an intense search. Doing the same trip via Santiago, Chile will probably generate less vigorous scrutiny even when adding together the customs inspection at both airports. Of course there are other costs associated with the intermediate stop that have to be weighed in the calculation but complex routes, perhaps many such routes, is one possible response to interdiction.

THE IMPACT OF INTERDICTION ON TRAFFICKING ROUTES

As noted above, it is not hard to explain why interdiction might shift trafficking routes. By increasing the risk of seizures along one particular route, interdiction makes alternative routes relatively more attractive. Perhaps with a lag, the traffic then moves partially or completely from its original routes. That leaves many questions – for example, how intense does interdiction have to become to have this effect? And how permanent is the shift?

We begin by illustrating some important instances of interdiction-generated shifts. The claim of causality, that a particular change in trafficking routes is a consequence of a specific interdiction event, is never tightly supported by empirical evidence; only rarely is the interdiction itself precisely enough described and data on the distribution of trafficking volumes across routes are never well-documented. High plausibility is all that can ever be offered.

Note an important information asymmetry. Because more is known, or at least publicly disseminated, about route shifts than about interdiction itself, we only rarely learn of unsuccessful interdiction intensification. Nations or alliances (particularly NATO) do not provide enough specifics of an intensified effort

at disrupting some specific route and then follow-up information, such as whether one can identify instances of the traffic *not* moving in response two or three years later. Thus, all that we can establish is that there are instances of movements in response to interdiction. *Netherlands Antilles and the West African route*

At the beginning of the last decade, authorities at Schiphol Airport in Amsterdam began to make many seizures of cocaine on passengers flying in from the Netherlands Antilles. The Netherlands Antilles was conveniently located close to the coast of Venezuela which has for at least a decade been used for exporting Colombian processed cocaine to both North America and Western Europe.²⁵ By 2001, the total number of Schiphol seizures and the quantity seized rose to levels regarded as representing a crisis; some of the arrested had to be released because of inadequate detention capacity. Moreover it was estimated that the 1300 arrested in 2001 were only about five percent of the total number of couriers.²⁶

As a consequence, the Dutch government in December 2003 imposed a policy of searching all passengers suspected of possessing cocaine coming off the plane from the Antilles. Anyone detected with less than three kilograms of cocaine was not arrested. Instead, the cocaine was seized, the courier's name was added to a list of persons not eligible for flights and/or his or her passport was confiscated for three years. This was labelled a 'substance-oriented' rather than an 'offender-oriented' approach.

The results were exactly what the Dutch authorities hoped for. The number of detected couriers in the first quarter of 2004 was 343 and actually rose in the following quarter to a peak of 483; it then fell rapidly to 40 by the third quarter of 2005. In the third quarter of 2006 it had fallen further to only 17. The authorities felt confident enough of the criminal justice system's capacity to handle these new numbers through conventional processing; the three kilogram limit was dropped to 1.5 kilograms and the sentencing regime moved back to what had conventionally been applied.

There were claims that this made little difference to the total quantity of cocaine imported into the Netherlands – and certainly into Europe – and that it simply diverted trafficking to new routes. In particular for the first time substantial quantities of cocaine were detected entering West Africa, exiting then to Western Europe. Whereas in 2003 only 1.1 tons of cocaine were seized in Africa, by 2007 that number had risen to 5.5 tons, mostly from West Africa. Figure 1 provides UNODC estimates of the quantities of cocaine trafficked to Western Europe through West Africa, 2004-2010.

The nation of Guinea-Bissau became a transshipment country.²⁷ This tiny and impoverished country has no military or police capacity to deal with smugglers; the government is easily corrupted. Smugglers started using landing strips there for large shipments.

24 Vincenzo Ruggiero and Nigel South, *Eurodrugs: Drug use, markets, and trafficking in Europe* (UCL Press, 1995): 75.

25 Bruce Bagley, *Drug Trafficking and Organised Crime in the Americas: Major Trends in the Twenty First Century*, (Woodrow Wilson Center for International Scholars, 2012), <http://www.wilsoncenter.org/sites/default/files/BB%20Final.pdf>.

26 For an excellent account of the implementation of the 100 percent search policy and its consequences see Ernestien Jensema, *Fighting Drug Trafficking With a Substance-Oriented Approach: A Matter of Substance* (Transnational Institute, 2010).

27 UNODC, *Cocaine Trafficking in West Africa: A threat to stability and development (with special reference to Guinea Bissau)* (Vienna: 2007), http://www.unodc.org/documents/data-and-analysis/west_africa_cocaine_report_2007-12_en.pdf.

In 2007 there was one seizure of three quarters of a ton and it is believed that an even larger quantity from that shipment made it out of the country.²⁸

Ghana, a larger nation than Guinea-Bissau but one also with fragile institutions, saw a sudden influx of cocaine traffickers; in 2005 Accra accounted for more seized cocaine at London's Heathrow than did any other city.²⁹ Until about 2010 there were regular reports of multi-kilo seizures of the drug either in Ghana itself or at airports after flights from Ghana.

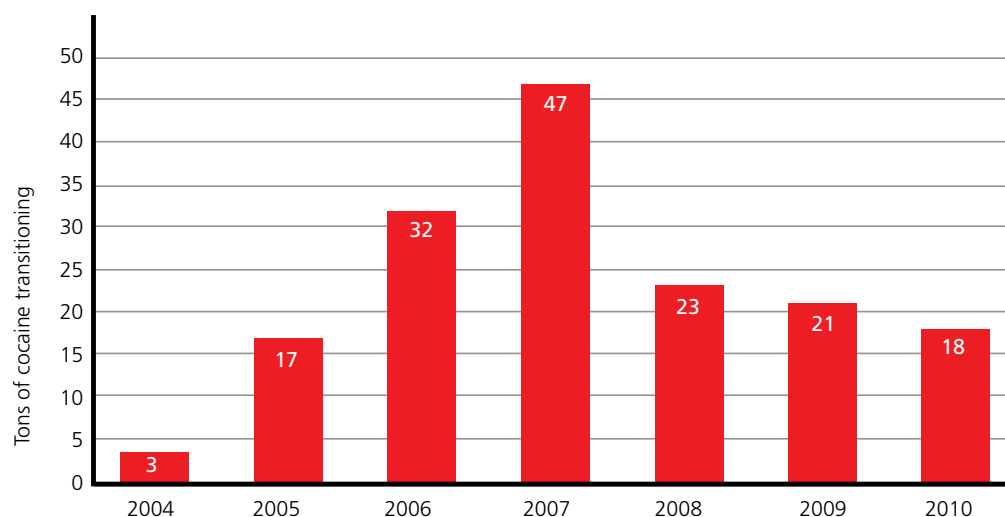
Was the opening of the West African route a response to the closing of the Netherlands Antilles smuggling channel? The timing is roughly right. Venezuela was once again identified as the principal source of the cocaine for the African route as it had been for the Antilles. That is about all one can offer in the absence of interviews with traffickers. *Mexico and its Central American neighbours*

For 25 years, from about 1985 to 2010, Mexico was the principal transshipment country for Colombian cocaine entering the United States. The Caribbean, which served as the principal transshipment region in the early 1980s when the cocaine trade first became important, accounted for 75 percent of US cocaine seizures in 1982; five years later it was less than half that.

In recent years, some cocaine has entered directly from Colombia, via both planes³⁰ and small boats, but the US government consistently claimed that 90 percent entered via Mexico.³¹ Until about 2007 it was thought that the countries between Colombia and Mexico (the seven nations of Central America) served as transshipment countries only in the passive sense that the drug passed through their territory; no transactions were thought to take place there.³²

At the end of 2006 the newly-elected Mexican president Felipe Calderón launched an intense campaign against his nation's major Drug Trafficking Organisations (DTO). This resulted in major conflict within the cocaine-smuggling sector; violence reached extraordinary levels, with over 60,000 drug-related homicides in the six years of the Calderón presidency.

Figure 1. Tons of Pure Cocaine Transiting West Africa on their way to Europe.



Source: UNODC estimates.

28 K. Sullivan, 'Route of Evil: How a Tiny West African Nation Became a Key Smuggling for Colombian Cocaine and the Price it is Paying' *Washington Post*, 25 May 2008, A1.

29 European Commission, 'A report on Global Illicit Drugs Markets 1998-2007, 2009, 50, http://ec.europa.eu/justice/anti-drugs/files/report-drug-markets-short_en.pdf.

30 The film *Maria, Full of Grace* provides a heart-rending and persuasive portrayal of the work conditions of those who carry the drugs by swallowing condoms stuffed with the powder.

31 For example, US Office of National Drug Control Policy, *National Drug Control Strategy*, 2011, <http://www.whitehouse.gov/sites/default/files/ondcp/ndcs2011.pdf> shows that 95 percent of flows in 2010 were across the Mexico border.

32 Kazakhstan serves the same role for Central Asian heroin traveling to Russia. None of Tajikistan, Kyrgyzstan or Uzbekistan have borders with Russia, so heroin trafficked through those countries have to pass through Kazakhstan or (less frequently) Turkmenistan to reach Russia. There are no claims that Kazakhstan-resident individuals or organisations play an important role in the trade.

By 2007 there were signs that the northern triangle of Central America (El Salvador, Guatemala and Honduras) had become an area of much greater drug smuggling activity. Seizures became substantial for the first time (see Table 2) and there was a very large increase in homicides, many of which were thought to be drug-related. It is now claimed that Guatemalan gangs were actively involved in smuggling itself, paid by either Colombian or Mexican DTOs in cocaine rather than cash. Oddly enough, the largest seizures have been farther south, particularly in Panama, but there is some question as to whether these are double counting of Colombian seizures.

The suggestion here is that the intensification of enforcement in Mexico has led to a shift of some trafficking activities to countries lying between Colombia and Mexico. There does indeed seem to be more such activity.³³ What is unclear though is what exactly has shifted from Mexico, since there are almost no direct deliveries to the United States from Central America. It may simply be that the Mexican government crackdown makes it sensible to hold inventory further south, where government protection is more cheaply bought, a reminder that smuggling is

not a single event but a combination of activities. Alternatively, it may be that what has shifted across Mexico's southern border is safe operating space for the principals.

For the purposes of this contribution, this may be a counter-example to the balloon effect hypothesis. Mexico has cracked down but the result has been a relatively minor displacement of certain activities rather than a large-scale shift of routes.

Interdiction around Afghanistan

As already noted, there have been shifts in the routes from Afghanistan, now 15 years into its dominance as the world's leading producer of opium and heroin, and to the major wealthy markets in the West. Seizure data, presented earlier, show such shifts. Unfortunately, there are no data about interdiction programmes that would permit testing of the balloon effect hypothesis. Iran always notes the intensity of its efforts to deter trafficking and to suppress its domestic heroin market, but there are no figures on how the intensity of interdiction has varied over time. The same is true for the countries of Central Asia.

Table 2. Cocaine Seizures in Central American nations, 2001-2011³⁴

Cocaine Seizures	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belize	3854	7	56	735	244	90	32	16	0	2600	0
Costa Rica	1748	2955	4291	4590	7049	22909	32435	16167	20875	11265	8952
El Salvador	31	2075	2044	2710	38	107	4075	1347	442	150	0
Guatemala	4107	2934	9200	4481	5085	287	711	2214	6936	1458	3960
Honduras	717	79	5649	3934	472	2714	0	6468	0	0	13904
Nicaragua	2717	2208	1110	3703	6951	9720	13	19500	9800	17500	0
Panama	2660	2587	9487	7068	18314	36000	60000	51000	52443	52429	34132

³³ An excellent source for this is the website *Insight Organized Crime in the Americas*, <http://www.insightcrime.org>.

³⁴ The years with zero entries should be taken to be years of missing data.

CONCLUSION

The balloon effect can be seen as a simplifying metaphor; after all interdiction is just one contributing factor to the observed shifts of trafficking.³⁵ To test the balloon effect hypothesis properly requires a kind of data that is never likely to be available: estimates of the intensity of interdiction along specific routes and the flow of drugs along those same routes over a period of time. Even the most basic data, drug flows along routes, are hard to obtain. For instance 'US drug officials claim that 70 percent of cocaine consumed in Europe was shipped through West Africa in 2007, while the United Nations Office on Drugs and Crime (UNODC) estimate that 25 percent of Europe's cocaine transits through the sub-region'.³⁶ There is simply no systematic methodology for making such estimates.³⁷ We rely on impressions, weakly reinforced by seizure data. It is probably asymmetric, with false positives less likely than false negatives but with a delay in knowledge about the shift in routes, particularly in countries around Afghanistan.

Surely the balloon effect contains at least a grain of truth, even if it is not the whole story. Smugglers, like other profit-making enterprises, have incentives to respond to changes in costs. The trope of a globalised world is true for illegal drugs as it is for legal trade. But the question is how much increased interdiction can erode the competitive advantage of existing routes, and that remains in the domain of pure speculation.

What should decision-makers do in light of this uncertainty about the mobility of trafficking? One response of interdiction agencies is to cheer what appears to be good news. If the balloon effect is punctured, then the justification for intense interdiction is strengthened; it is not merely moving traffic around but has some prospect of actually reducing total world consumption. However, that flies in the face of the macro-evidence against interdiction's effectiveness.

Fluctuations in the share of cocaine seized in recent years has not been reflected in estimated global consumption. The quantitative basis for clear statements is weak; seizure estimates are hampered by lack of purity data, while consumption estimates are notoriously fragile in the few countries where they exist. Nonetheless, it has been consistently difficult to find any connection between interdiction success and final market outcomes; Pollack and Reuter provide a brief review of the available evidence.³⁸

An alternative response is to note that there are some instances in which the balloon effect does indeed occur. The Dutch decision to crack down in the Netherlands Antilles has cost West African development dearly. Globalisation is not just a phenomenon to be observed; it is a fundamental aspect of decision-making. Interdiction crackdowns by one country may well affect others. Co-ordinating this element of decision-making internationally will be extremely difficult both institutionally and operationally but without such co-ordination, this kind of immiserating effect will no doubt occur again. ■

35 Cornelius Friesendorf, 'Squeezing the balloon? United States Air Interdiction and the Restructuring of the South American Drug Industry in the 1990s,' *Crime, Law and Social Change* 44 (2005): 45-78.

36 Gernot Klautschnig, (2012) 'Africa and the war on drugs fighting a historical analysis,' 2012, <http://africanarguments.org/2012/10/18/africa-and-the-war-on-drugs-fighting-a-historical-analysis-of-the-west-african-trade-%E2%80%93-by-gernot-klautschnig/>

37 Beau Kilmer, Jonathan P. Caulkins, Brittany Bond and Peter Reuter *Reducing Drug Trafficking Revenues and Violence in Mexico: Would Legalizing Marijuana in California Help?* (RAND Occasional Paper, 2010) http://www.rand.org/pubs/occasional_papers/2010/RAND_OP325.pdf

38 Harold Pollack and Peter Reuter, 'Does tougher enforcement make drugs more expensive,' *Addiction* (forthcoming).

Improving Supply-Side Policies: Smarter Eradication, Interdiction and Alternative Livelihoods – and the Possibility of Licensing

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Summary

- The past three decades of US counternarcotics efforts abroad have strongly emphasised eradication of crops, interdiction and dismantling of drug trafficking organisations (DTOs).
- Policies were aimed at reducing US drug consumption and weakening militant groups. The cumulative evidence has proven these basic assumptions wrong.
- Successful cases of eradication and interdiction have at most succeeded in generating a two-year lag before production and supply recovered.
- In poor countries eradication strengthens the political capital of the belligerents.
- This is not to say that eradication should never be used. Rather, eradication needs to be well-crafted, used judiciously and, crucially, properly sequenced with other measures.
- Just like eradication, alternative livelihoods can only shift production from one area to another (the ‘balloon effect’). But, when designed as broader development efforts, they make enforcing the law, including eradication, politically and socially acceptable, preventing dangerous instability.
- Focused-deterrence strategies, selective targeting and sequential interdiction efforts are often more promising law enforcement alternatives than flow-suppression or zero-tolerance approaches.
- States should move law enforcement forces away from random non-strategic strikes and blanket ‘zero-tolerance’ approaches against lowest-level offenders, and toward strategic selectivity to give each counter-crime operation enhanced impact.
- Governments and international organisations need to thoroughly consider to which locales the illicit economy will shift if suppression efforts in a particular locale are effective and whether such a shift is desirable.

THE GLOBAL COUNTERNARCOTICS MOOD: THE EMERGING DISSENSUS

Over the past three decades, US counternarcotics efforts abroad have strongly emphasised eradication of illicit crops, interdiction of drug flows and dismantling of drug trafficking organisations (DTOs). At the core of these policies lay the assumption that such drug suppression policies not only accomplished the key US objective of reducing US drug consumption by reducing the volume of drug flows to the United States, but also fostered other crucial US goals of weakening, if not outright defeating, terrorist and militant groups involved in the highly lucrative drug trade. Yet the cumulative evidence of the outcomes of these policies over the past three decades has proven these basic assumptions of US counternarcotics policies wrong. Premature forced eradication, unfocused interdiction and nonstrategic break-up of DTOs – policies often exported and force-fed to supply-side and transshipment countries – came with a host of negative side-effects. These include: extensive human rights violations; further political, economic and social marginalisation of illicit crop farmers; destabilisation of local governments; alienation of local populations; strengthening of bonds between militant groups and local populations; and increases in violence perpetrated by DTOs and other criminal groups.

Frustration and strong dissatisfaction with US-supported policies have stimulated increasing debates in Latin America about how to redesign policies toward the drug trade, including various forms of decriminalisation and legalisation of at least some narcotics, such as cannabis.

Such calls for reform have not been echoed in other parts of the world, however. Russia in particular has been at the forefront of calls for toughening policies. China has also embraced existing policies and many countries in Asia and the Middle East continue to defend their harsh punishments of users as well as local dealers.

Among many drug policy reformers, there is an emerging consensus that decriminalisation, public health, treatment and harm reduction-based policies and even legalising some drugs (such as cannabis in Uruguay) are more appropriate than punitive policies for controlling consumption.

There is, however, no equivalent consensus among reformers on how to restructure supply-side policies and how to mitigate the multiple threats that the drug trade poses, including threats to public safety from violent drug trafficking organisations and to national security from the nexus of militancy and drug trafficking.

Many proponents of legalisation argue that legalisation by itself will eliminate violence, criminality and the militancy nexus. This contribution does not support that contention. Instead, it argues that even in markets of legal commodities, law enforcement plays a key role. Thus, rather than jettisoning eradication, interdiction and alternative livelihoods efforts altogether, there is a great and urgent need to make them smarter.

THE FAILURES OF ERADICATION AND HOW TO IMPROVE IT

A key premise of counternarcotics strategies that emphasise the eradication of drug crops is that the reduction in supply will reduce consumption by increasing street prices. Yet although eradication efforts have been extensive and occasionally have succeeded (for example China in the 1950s and 1960s and Vietnam in the 1990s and 2000s), they have failed to dramatically increase overall prices, including in key consumption markets.

In the US, consumption of cocaine has been declining steadily mainly because hardcore users have been aging. At the same time, consumption of methamphetamines and of synthetic and prescription drugs has increased. Cocaine consumption has meanwhile been on the rise in Western Europe. Iran and Pakistan remain extensive markets for heroin and other opiates. Russia and Brazil have an illicit drug consumption problem that rivals the West and continues to expand.¹ In localities where traditional drug production and traffic have been suppressed, such as in Burma or Laos, people have not abandoned use. Instead, they frequently switch to home-cooked synthetic drugs that often cause even more health damage than traditional alkaloid-based substances.²

Indeed, despite determined eradication efforts over the past thirty years, drug prices in the West have been for the most part falling. In the United States, retail heroin prices fell from \$1896 per gram at 11 percent purity in 1981 to \$408 per gram at 28 percent in 2011, with the lowest price of \$378 at 34 percent purity in 2008.³ Cocaine prices fell from \$669.18 per two grams at 40 percent in 1981 to \$177.26 at 42 percent purity level in 2011, with the lowest recorded price of \$132.89 at 64 percent purity in 2007.⁴ US heroin prices are thus 21 percent in nominal terms of what they were in the early 1980s, and cocaine prices are at 26.5 percent.

A counterargument could be raised that in the absence of such intense supply-side suppression measures, prices would be far lower and availability far greater, with accompanying expansion in consumption.⁵ Such a counterargument reveals the inherent difficulties of drawing inferences without analytic control comparisons of alternative policies. Imagine the following scenario: a sick patient has been taking a pill as treatment, but is not getting better.

Does that justifiably imply that the pill is not effective treatment? Possibly. But there are several other possibilities:

- (1) The dosage needs to be higher, for example more intense eradication campaigns.
- (2) The pill is at least partly effective, and without it, the patient would be much sicker.
- (3) Not only is the pill ineffective, but is in fact counterproductive – like the eradication programmes detailed below which have complicated efforts to suppress militancy and terrorism.
- (4) The treatment is effective in attacking the disease (analogous to wiping out the poppy crops in a particular locale), but is killing the patient at the same time – worsening human rights and complicating counterinsurgency and counterterrorism efforts.

Indeed, counternarcotics suppression efforts have consistently failed in their second key promise: to diminish militants' and terrorists' physical capabilities by bankrupting them. Suppression efforts raise the price of illicit commodities – thus, in the cases of only partial suppression of production, frequently resulting in little change in the belligerents' income. Given fairly stable or increasing international demand, full and permanent suppression of supply is extraordinarily hard to achieve. The extent of the belligerents' financial losses from suppression of illicit economies depends on the adaptability of the belligerents, traffickers and peasants. Adaptation methods are frequently plentiful, especially in the case of illicit drugs. Belligerents can store drugs, which are essentially nonperishable. Belligerents can put some money away. Farmers can replant after eradication and offset losses from areas eradicated. Farmers, traffickers and belligerents can shift production to areas where the crops are not being eradicated and where detection is difficult. Traffickers can switch their trafficking, their means of transportation or take various other evasion adaptations.

Successes of law-enforcement and counter-narcotics supply-side policies frequently last only briefly. Without reductions in global demand, they inevitably give way to supply recovery in the same locale, or elsewhere (the so-called 'balloon effect'⁶). Coca and

1 United Nations Office on Drugs and Crime, *2006 World Drug Report*, http://www.unodc.org/pdf/WDR_2006/wdr2006_volume1.pdf.

2 See, for example, Tom Kramer, Martin Jelsma and Tom Blickman, *Withdrawal Symptoms in the Golden Triangle: A Drugs Market in Disarray* (Amsterdam: Transnational Institute, January 2009).

3 Office of National Drug Control Policy, *National Drug Control Strategy: Data Supplement 2013*, http://www.whitehouse.gov/sites/default/files/ondcp/policy-and-research/2013_data_supplement_final2.pdf: 76.

4 Ibid., 75. Note that in US databases, and this report, cocaine prices are given per two grams while heroin prices are given per gram.

5 See, for example, Jonathan P. Caulkins' contribution to this report.

6 See Peter Reuter's contribution to this report.

opium cultivation and processing are archetypal footloose industries: they require little capital, few labour skills and the necessary technologies are simple and well-known. Source country suppression policies – eradication and interdiction – have at most succeeded in generating a two-year lag before production and supply recovered.⁷

There is not one single case over the past five decades where eradication policies succeeded in bankrupting or defeating belligerents. Even in Colombia, eradication hampered governmental efforts to defeat the FARC.⁸ Indeed, suppression of narcotics crops has proved outright counterproductive to defeating militants, obtaining actionable intelligence on terrorists and ending violent conflict. This is because belligerents often obtain not only financial resources, but also political capital from their involvement in the illicit economies such as the drug trade. The increases in the belligerents' political capital are especially pronounced if they are involved in labour-intensive illicit economies, such as sponsoring illicit crop cultivation in poor regions where legal job opportunities are lacking. There, local populations, over whose allegiance terrorists, militants and governments compete, are fully dependent on cultivation of drug crops for basic economic survival, human security and any social advancement.

Belligerents who use their sponsorship of illicit economies and the income they derive from them to provide otherwise-lacking public goods and socio-economic benefits, such as schools, clinics and roads – and who protect the population against abusive traffickers and particularly against government eradication efforts – obtain the strongest political capital. The population bonds with them, often providing them with material benefits, such as food and shelter, and critically denying intelligence on the belligerents to the government and counterinsurgent forces. In poor countries or regions, eradication of illicit crops thus critically strengthens the political capital of the belligerents.

On the other hand, during periods and in places where interdiction has been undertaken without eradication, and especially during periods and in locales where laissez-faire

toward narcotics crop cultivation or non-prosecution of illicit crop farmers have been the policy, the belligerents' political capital has declined and the population has been more inclined to cooperate with and provide intelligence to the governing authorities, strengthening counterinsurgency and anti-militant efforts.⁹

Conditions necessary for eradication to be effective in reducing cultivation in specific areas:

1) First and foremost, *if a government's goal is to suppress production in the entire country, then it needs to have control over the entire country.* It must have detailed knowledge of where production is shifting as a result of eradication and be able to counter this trend. It must also have a continuing presence on the ground to prevent replanting. It cannot face an armed opposition able to exploit the popular anger against eradication.

In addition to firm government control throughout the country, either one of the two following conditions needs to be present:

2) *The government has the will and capacity to be very harsh to the population – ignoring their economic plight that is worsened by eradication; cracking down on protests and rebellions against eradication; and removing any opposition leaders who embrace the counter-eradication cause and could effectively mobilise against the government.* And the government has to be prepared to carry out such repression on a repeated basis for years to come. Needless to say, such a policy is inconsistent with democracy and human rights – and *not recommended by this author.*

3) *Alternative economic livelihoods are in place – not simply promised to take place in the future, but already generating legal economic alternatives.* Like eradication, alternative livelihoods will not eliminate the world's production of illicit crops or the world's illicit economies. However, like eradication, they can be effective in reducing or even eliminating the illicit production in particular regions or countries – if they are well-designed, integrated into overall poverty reduction strategies and enjoy broader auspicious economic growth contexts. Often, however, they are not designed and implemented effectively and produce disappointing results. How to improve their effectiveness is discussed below.

The harsh repression model has so often been successful only on a temporary basis, and has mostly broken down within a few years. Poppy cultivation in Afghanistan picked up within one year after the Taliban's 2000 prohibition. Despite a combination of repression and localised alternative development programmes in Bolivia, production increased there since 2000.¹⁰ Mao's eradication of opium poppy cultivation in China in the 1950s and 1960s has been the most effective and lasting eradication campaign ever; but it involved levels of brutality that would be, appropriately so, intolerable in most countries.

“ All of the above are not to say that eradication should never be used as a counternarcotics policy tool. Rather, eradication needs to be well-crafted, used judiciously and, crucially, properly sequenced with other measures. ”

7 Kevin Jack Riley, *Snow Job?* (New Brunswick: Transaction Publishers, 1996), 93.

8 For the case of Colombia as well as Afghanistan, Peru, Burma and Thailand, see Vanda Felbab-Brown, *Shooting Up: Counterinsurgency and the War on Drugs* (Washington, DC: Brookings, 2010).

9 Ibid., 'Chapter 3: Peru,' 35-68.

10 See, for example, Francisco Thoumi, *Illegal Drugs, Economy, and Society in the Andes* (Baltimore: John Hopkins University Press, 2003); Kathryn Ledebur, 'Bolivia: Clear Consequences,' in *Drugs and Democracy in Latin America*, eds. Coletta A. Youngers and Eileen Rosin, (Boulder: Lynne Rienner, 2005), 143-182.

All of the above are not to say that eradication should never be used as a counternarcotics policy tool. Rather, eradication needs to be well-crafted, used judiciously and, crucially, properly sequenced with other measures.

Using eradication to prevent the cultivation of illicit crops in national parks, for example, might be highly appropriate. Such a policy, however, will only be effective if suppression measures are less intense outside of national parks.

Similarly, once alternative livelihoods efforts have generated the necessary and sufficient resources for illicit crop farmers to switch to sustainable licit livelihoods, eradication may well be an important tool to catalyse such an economic switch. Such smart eradication will be socially viable and will strengthen the rule of law. But premature eradication – in the context of insurgency and without alternative livelihoods in place – will be counterproductive with respect to improving the security situation in the country and also ineffective with respect to suppressing the illicit crops.

In sum, governments should not rely on suppression of illicit economies to defeat or even substantially weaken belligerents. Most likely, belligerents will find a host of adaptations to escape from the resource-limitation trap, making the focus on limiting the belligerents' resources a highly risky strategy for the government. If a government seeks to achieve a preponderance of military power, it needs to do so through strengthening its own military resources. In the case of labour-intensive illicit economies in poor countries, governments should postpone suppression efforts toward the illicit economy, which target the wider population, until and after belligerents have been defeated or have negotiated an end to the conflict. Premature suppression efforts, such as eradication, will alienate the population and severely curtail intelligence flows from the population. It will lose hearts and minds and severely hamper the military effort against the belligerents. Nor will eradication be effective in the context of violence because traffickers and producers will find a way to adapt in the context of limited state presence. Interdiction at borders and destruction of labs do not target the population directly.

Consequently, it does not alienate the population to the same extent as eradication and is thus more easily compatible with the counterinsurgency and counterterrorism effort.

Military forces – whether domestic or international – should focus on directly defeating the belligerents and protecting the population. They do have an important role to play in counternarcotics policy and in suppressing other illicit economies, namely to provide security. Without such security, efforts to suppress illicit economies will not be effective. But they should not engage in eradication themselves.

If belligerents have not yet penetrated an illicit economy in a country – for example, narcotics cultivation in a particular region – governments should make every effort to prevent the belligerents from penetrating the economy, such as by establishing a cordon sanitaire around the region.

If the belligerents themselves undertake suppression of a labour-intensive illicit economy the government should immediately step in and provide economic relief to the population. It should also intensify the military effort against the belligerents at that time as they will be extremely vulnerable politically and not have a robust population support base. Most likely, belligerents will themselves undertake eradication only when they first encounter the illicit economy – which could be a highly auspicious moment for the government to undertake a robust offensive against the belligerents. But such an opportunity could also arise as a result of a change in leadership, intensified ideological fervour, or the need to appease some outside patron.

Efforts to limit the belligerents' resources should focus on mechanisms, such as those targeted against money laundering, that do not directly harm the wider population. Such measures cannot remain localised but need to be strengthened on the global level. It is important to recognise, however, that anti-laundering measures are no panacea and will remain of limited effectiveness.

If the government itself undertakes suppression efforts toward a labour-intensive illicit economy — efforts which target the wider population – it should at least complement such a dangerous policy by providing immediate relief to the population by way of humanitarian aid and alternative livelihoods programmes. Alternative livelihoods programmes will not have a chance to really take off until conflict has ended and security has been established; but the government needs to demonstrate to the population right away that it is not indifferent to its plight.

Even after the conflict has ended, eradication of illicit crops should only be undertaken once the population has access to alternative livelihoods that address the entire scope of structural drivers of illicit crop cultivation. That may well entail delaying eradication for several years while alternative livelihoods efforts are being implemented; eradication should only be undertaken when the household is receiving sufficient legal income. However, a well-sequenced eradication may well be undertaken in areas where households are not economically dependent on drug crop cultivation. The so-called *uno-cato* policy that President Evo Morales adopted in Bolivia, permitting households to cultivate a small area of land with coca, provides many lessons.¹¹

A failure to actually provide such comprehensive alternative development – only promising it for the future and undertaking eradication prematurely – will result in social instability, critically destabilising the government immediately after conflict. In that case, the government will only be able to maintain eradication by resorting to very harsh measures toward the population and will have to maintain such repression for many years.

11 For a review of how Bolivia's *uno-cato* policy and the broader strategy of 'yes to coca, no to cocaine' has evolved and the many difficulties it has run into, see Coletta Youngers, 'Shifts in Cultivation, Usage Put Bolivia's Coca Policy at the Crossroads,' *World Politics Review*, December 5, 2013, 1-3.

‘...the absolutist goal of a complete suppression of drug trafficking (or organised crime overall) will mostly be unachievable, and will be particularly problematic in the context of acute state weakness where underdeveloped and weak state institutions are the norm.’

THE FAILURES OF ALTERNATIVE LIVELIHOODS EFFORTS AND WAYS TO IMPROVE THEM

Even if smart alternative livelihoods efforts were undertaken globally, they would not eliminate the global drug trade. Some people with plentiful legal economic options would be tempted to make a high income from breaking the law. Just like eradication, alternative livelihoods can only shift production from one area to another. But alternative livelihoods efforts when designed as broader development efforts make enforcing the law, including eradication, politically and socially acceptable, preventing dangerous instability. However, in order to accomplish these goals, they need to be properly sequenced and well-designed.

In their current design, alternative livelihoods programmes have been no more successful than eradication on a country-wide scale (although they have been relatively more successful at local levels). This is partially because alternative livelihood programmes have been neither sufficiently long-lasting nor well-funded and well-managed. Thailand provides the most significant example of success. There, three decades of multi-faceted, comprehensive, well-funded and well-managed rural development since the 1970s – *significantly* accompanied by very impressive and crucial economic growth and industrialisation that generated extensive new employment opportunities outside of drug areas led to the elimination of poppy cultivation.¹² Thus cultivation fell from 17,920 hectares at its peak in 1965-1966 to 209 hectares in 2012.¹³

It is important to point out that even at its peak, cultivation was about a tenth of the size of the problem in Afghanistan today or (in the case of coca) in Latin America. Moreover, Thailand continues to have flourishing traffic in synthetic drugs as well as in opiates from other countries.¹⁴

For alternative livelihoods programmes to be effective in reducing illicit crop cultivation in a lasting way, good security needs to be established in the rural regions. In other words, military conflict needs to be ended.¹⁵

Moreover, alternative livelihoods programmes cannot be construed as only crop substitution. Price profitability is only one factor. Even in rich Western countries, cultivation of illicit cannabis is more profitable than the many legal jobs, yet the vast majority of the population chooses to obtain legal employment. The key for alternative livelihoods should not be to match the prices of the illicit commodity – a losing game – but rather to create such economic conditions that allow the population to have a decent livelihood without having to resort to the illicit economy.

Other drivers of illicit economies, such as insecurity and a lack of access to necessary productive resources, value-added chains and markets are frequently far more important determinants of the decision to participate in illicit economies. Thus, farmers, such as those in the Shinwar and Achin regions of Afghanistan or the Shan hill areas of Burma, continue to cultivate illicit crops even though legal crops, such as vegetables, fetch greater prices and would bring a greater profit.¹⁶ Risk-minimisation in a high-risk environment is often more important than profit-maximisation. A mixture of many other factors also matters: security, rule of law, assured property rights and moral considerations, as well as other economic structural drivers.¹⁷

For alternative livelihoods to have any chance to take off and be sustained, they must address all the structural drivers of illicit economies. They must encompass the generation of sufficient employment opportunities (such as through the promotion of high-value, labour-intensive crops), infrastructure building, distribution of new technologies (including fertilizers and better seeds), marketing help and the development of value-added chains, facilitation of local microcredit, establishment of access to land without the need to participate in the illicit economy and development of off-farm income opportunities, to name a few.

12 For a good overview, see Ronald D. Renard, *Opium Reduction in Thailand, 1970-2000: A Thirty-Year Journey* (Bangkok: UNDCP Silkworm Books, 2001).

13 Ibid., 36 and UNODC, *Southeast Asia: Opium Survey 2012*, December 2008, 5.

14 Pierre-Arnaud Chouvy, 'Drugs and War Destabilize Thai-Myanmar Border Region,' *Jane's Intelligence Review*, April 1, 2002; and Pierre-Arnaud Chouvy, *Opium: Uncovering the Politics of Poppy* (Cambridge: Harvard University Press, 2010).

15 For a discussion of how, in the context of insecurity and ongoing military conflict, alternative livelihoods efforts will be of limited effectiveness and can be even counterproductive, see Paul Fishstein and Andrew Wilder, *Winning Hearts and Minds? Examining the Relationship between Aid and Security in Afghanistan* (Tufts University, Feinstein International Center, January 2012); and Vanda Felbab-Brown, *Aspiration and Ambivalence: Strategies and Realities of Counterinsurgency and State-building in Afghanistan* (Washington, DC: Brookings Institution Press, 2013).

16 David Mansfield, 'The Economic Superiority of Illicit Drug Production: Myth and Reality—Opium Poppy Cultivation in Afghanistan,' paper prepared for the International Conference on Alternative Development in Drug Control and Cooperation, Feldafing (Munich), January 7–12, 2002.

17 David Mansfield and Adam Pain, 'Alternative Livelihoods: Substance or Slogan?' AREU Briefing Paper, October 2005, <http://areu.org.af/UpdateDownloadHits.aspx?EditionId=187&Pdf=524E-Substance or Slogan BP.pdf>.

Alternative livelihoods efforts will be ineffective if they are conceived as discreet handouts and isolated interventions, as is indeed often the case in both rural settings, where the goal is to suppress drug cultivation, and in urban environments where socio-economic policies are meant to reduce drug trafficking and other criminality.¹⁸ Alternative livelihoods really mean comprehensive rural and overall economic and social development. As such, the programmes require a lot of time, the politically difficult willingness to concentrate resources and lasting security in the area where they are undertaken.

Focused-deterrence strategies, selective targeting and sequential interdiction efforts should often be considered as more promising law enforcement alternatives than flow-suppression measures or zero-tolerance approaches.

THE FAILURES OF INTERDICTION AND HOW TO MAKE INTERDICTION MORE EFFECTIVE

Over the past several decades, interdiction policies have been predominantly designed to stop or minimise the volume of illicit flows. Occasionally, but rarely, they have succeeded in disrupting trafficking and rerouting it from particular regions, or in reshaping the structures of criminal markets. Interdiction efforts were, for example, successful in destroying the so-called 'French connection' and disrupting heroin smuggling from Asia through Turkey in the 1970s (attributable to successful interdiction plus the licensing of Turkish opium cultivation for medical purposes). But the outcome of disrupting the 'French connection' also included the emergence of substantial heroin production elsewhere—namely Mexico. During the 1990s, the United States was highly effective in disrupting the drug trade through the Caribbean, pushing trafficking into Central America and Mexico. With US assistance, Colombia ultimately prevailed against the Medellín and Cali cartels and broke up large cartels into smaller, less threatening ones – but those successes also empowered the Mexican drug trafficking groups.

Indeed, interdiction measures preoccupied with the suppression of flows or otherwise mis-designed have often turned out to produce a set of undesirable effects. In Mexico, premature and nonselective frontal assault by the state on Mexico's drug

trafficking groups during the administration of President Felipe Calderon broke up the groups, but also provoked extremely violent turf wars among and within the crime groups over territory and access to corruption channels. In Afghanistan, interdiction efforts of the mid-2000s that focused on the least powerful small traders led to a vertical integration of the illegal and gave rise to powerful and well-connected drug capos and enabled the Taliban to reintegrate itself into Afghanistan's drug trade. Similarly, zero-tolerance approaches to drugs and crime, popular around the world since the late 1980s, have often proven problematic. They have frequently failed to suppress criminality while increasing human rights violations and police abuses. And the absolutist goal of a complete suppression of drug trafficking (or organised crime overall) will mostly be unachievable, and will be particularly problematic in the context of acute state weakness where underdeveloped and weak state institutions are the norm. Yet well-crafted interdiction efforts remain a crucial policy tool – but not because they will significantly reduce the income of belligerents or significantly limit supply. Rather, they are an important tool because they allow the state to prevent criminal groups from cooperating with militant actors. They also allow the state to prevent criminal groups from accumulating extensive coercive and corruptive power which threatens the security, rule of law and political integrity of the country. They further help the state in minimising the violence associated with criminal markets.

Smart interdiction policies for achieving the above goals include the following measures:

(1) *Governments should avoid unnecessarily strengthening the bond between the criminal traffickers and the belligerents by treating the two as a unified actor and should explore ways to pit the two kinds of actors against each other.* Far from being comrades in arms, they have naturally conflicting interests, and governments should avoid helping them to align their interests. One way may be to temporarily let up on the group that represents a smaller threat to the state and to exploit that group for intelligence acquisition.

But it is also important to be conscious of the possibility that such efforts may set up perverse incentives to corrupt the state. Selectively targeting only traffickers linked to belligerents, for example, will send a signal that the best way to be a trafficker is to be a part of the government. That may well be beneficial in the short run with respect to counterinsurgency objectives, but it may generate long-term problems of corruption. Thus planning needs to be taken as to how to reclaim state dominance and limit corruption once the security threat from the belligerents has subsided.

(2) *Interdiction efforts need to be designed carefully with the objective of limiting the coercive and corruption power of crime groups.* The goal of interdiction should thus be to have the illicit economy populated by many small traders, rather than a few vertically integrated groups. Although the former will likely require an intensification of intelligence resources

18 Vanda Felbab-Brown, 'Bringing the State to the Slum: Confronting Organized Crime and Urban Violence in Latin America,' *Brookings Latin America Initiative Paper Series*, December 2011, http://www.brookings.edu/~media/research/files/papers/2011/12/05%20latin%20america%20slums%20felbabbrown/1205_latin_america_slums_felbabbrown.pdf.

devoted to keeping track of the many small actors, such an outcome will benefit public safety because small traders will not have the power to systematically corrupt or threaten the state.

Focused-deterrence strategies, selective targeting and sequential interdiction efforts should often be considered as more promising law enforcement alternatives than flow-suppression measures or zero-tolerance approaches. These former approaches seek to minimise the most pernicious behaviour of criminal groups, such as violence or engagement with terrorist groups, and help law enforcement institutions overcome resource deficiencies.¹⁹

Defining 'the most harmful' behaviour can vary. The broad concept is to move law enforcement forces away from random non-strategic strikes and blanket 'zero-tolerance' approaches against lowest-level offenders, and toward strategic selectivity to give each counter-crime operation enhanced impact. The decision whether to focus selective interdiction on high-value targets or the middle layer of criminal groups is importantly related to whether incapacitation or deterrence strategies are privileged.²⁰

Meanwhile, before the state takes on extensive and powerful crime networks, it needs to have the law enforcement and intelligence resources ready to prevent and suppress violence resulting from turf wars over illicit markets.

(3) *The state and international partners sponsoring interdiction and suppression measures in source countries keenly need to watch the watchdogs.* Organisations and individuals tasked with eradication and interdiction are ideally placed to become the top traffickers in a country because they have access to intelligence and can manipulate suppression efforts to augment their power and target political or ethnic rivals. In many source countries subjected to intense suppression efforts, the top law enforcement officials became the top traffickers. Consequently, relentless internal monitoring is critical.

(4) *Governments and international organisations also need to thoroughly consider to which locales the illicit economy will shift if suppression efforts in a particular locale are effective and whether such a shift is desirable.* Suppression will only shift production elsewhere – for example, where a major terrorist group operates. Such a group consequently would receive a

major windfall, both in terms of military capabilities and political capital. The mere fact of relocation will be highly disruptive to the new recipient region with respect to public safety, national security and political, judicial and law-enforcement institutions. Moreover, governments and international organisations need to consider what illicit economy will replace the existing one and whether it is potentially even more pernicious.

THE PROMISE OF LICENSING AND LEGALISATION AND WHY THEY ARE NOT A PANACEA

Source-country policies toward illicit economies can also encompass licensing of the illicit economy for legal purposes. For example, the licensing of opium poppy cultivation for medical opiates (morphine, codeine and thebaine) in Turkey eliminated the illegal cultivation of poppy there. The fact that some form of licensing is feasible and effective in one context does not mean it would be equally effective in other contexts. Turkey had a strong state that had firm control over the territory concerned. Furthermore, Turkey was able to utilise a particular technology, the so-called poppy straw method, that makes diversion of morphine into the illicit trade very difficult. India's licensing system for the cultivation of opium poppy for medical opiates proved considerably less effective in preventing diversion of opium into illicit uses, as India never adopted the poppy-straw method.²¹ Although both India and Turkey have a guaranteed market in the United States under the so-called 80/20 rule, both are being displaced from the licit market by new industrial suppliers of medical opiates, such as Australia. Trying to apply such a licensing scheme, say to Afghanistan today, would face a host of legal, political, economic and efficacy obstacles, foremost among them the lack of security and state presence, but also the lack of a guaranteed market and stiff international competition.²²

In addition to opiates, licensing of limited production can and has also been adopted in the case of the illicit logging of tropical forests, mining or wildlife trafficking. In some cases, such as in the case of farming of crocodileans, licensing turned out to be a highly effective policy, saving many species from extinction.

In many other cases, however, licensing of wildlife trade, logging and mining merely turned out to be a white-wash of consumer consciousness, masking undesirable practices, complicating law enforcement and increasing demand.²³

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- 19 For details on focused-deterrence strategies and selective targeting, see David Kennedy, Daniel Tompkins and Gayle Garmise, 'Pulling Levers: Getting Deterrence Right,' *National Institute of Justice Journal* (236), 1998, 2-8; Mark Kleiman, *When Brute Force Fails: How to Have Less Crime and Less Punishment* (Princeton: Princeton University Press, 2009); Vanda Felbab-Brown, 'Targeted Deterrence, Selective Targeting, Drug Trafficking and Organized Crime: Concepts and Practicalities,' IDPC-IISS-Chatham House, *Modernizing Drug Law Enforcement*, Report No. 2, February 2013.
- 20 Vanda Felbab-Brown, 'Despite Its Siren Song, High-Value Targeting Doesn't Fit All: Matching Interdiction Patterns to Specific Narcoterrorism and Organized-Crime Contexts,' The Brookings Institution, October 1, 2013.
- 21 For analysis of licensing efficacy in India and Turkey, see David Mansfield, 'An Analysis of Licit Opium Poppy Cultivation: India and Turkey,' author's copy.
- 22 For a detailed analysis, see Vanda Felbab-Brown, 'Opium Licensing in Afghanistan: Its Desirability and Feasibility,' *Foreign Policy Studies Policy Paper*, No. 1, Brookings Institution Press, August 2007, <http://www3.brookings.edu/fp/research/felbab-brown200708.pdf>.
- 23 See Vanda Felbab-Brown, 'The Disappearing Act: Species Conservation and the Illicit Trade in Wildlife in Asia,' *Brookings Foreign Policy Working Paper No. 6*, Brookings Institution, June 2011, http://www.brookings.edu/papers/2011/06_illegal_wildlife_trade_felbabbrown.aspx; Vanda Felbab-Brown, 'Not as Easy as Falling off a Log: The Illegal Timber Trade in the Asia-Pacific Region and Possible Mitigation Strategies,' Brookings Foreign Policy Working Paper No. 5, Brookings Institution, March 2011.

Smartening the design of supply-side policies – eradication, interdiction, alternative livelihoods – and carefully monitoring and adjusting the design of licensing and legalisation measures will go a long way to improving the effectiveness of policies toward the drug trade and minimising their often intense negative side-effects.

Proponents of legalisation as a mechanism to reduce organised crime often make two arguments: that legalisation will severely deprive organised crime groups of resources; and that legalisation will also free law enforcement agencies to concentrate on other types of crime, such as murders, kidnappings and extortion. A country may have good reasons to want to legalise the use and even the production of some addictive substances and ride out the consequences of possible greater use. Such reasons could include providing better health care to users, reducing the number of users in prison and perhaps even generating greater revenues and giving jobs to the poor.

Yet without robust state presence and effective law enforcement, there can be little assurance that organised crime groups would be excluded from the legal drug trade. In fact, they may have numerous advantages over legal companies and manage to hold onto the trade, including through violent means.

Further organised crime groups may intensify their violent power struggles over remaining illegal economies, such as the smuggling of other illegal commodities or migrants, prostitution, extortion and kidnapping.

Nor does legalisation imply that law enforcement would be liberated to focus on other issues or become less corrupt: the state would have to devote substantial resources to regulating, monitoring and enforcing the legal economy, with the legal economy potentially serving as a mechanism to launder illegally produced drugs.

Additionally, a grey market in drugs would likely emerge: the higher the tax on the legal drug economy imposed to deter use and generate revenue, the greater the pressures for a grey market to emerge. Organised crime groups could set up their own fields with smaller taxation, snatch the market and the profits and the state would be back to combating them and eradicating their fields. Such grey markets exist alongside a host of legal economies, from cigarettes to stolen cars.

Thus there is no guarantee either that marginalised groups, such as farmers of illicit crops, would retain their jobs in a legal drug economy: The legal drug cultivation would likely shift to other more developed areas of agricultural production which are inaccessible to the marginalised groups to begin with, being the result of exclusionary political-economic institutional arrangements. Indeed, redesigning political and economic institutions to achieve greater equity of access and accountability to the overall population, and hence dismantling state institutional capture by powerful economic and political elites, are often the necessary prerequisites to make licensing and alternative livelihoods work.

CONCEPTUALISING COUNTERNARCOTICS POLICIES AS STATE-BUILDING EFFORTS

Without capable and accountable police that are responsive to the needs of the people – from tackling street crime to suppressing organised crime – and that are backed-up by an efficient, accessible and transparent justice system, neither legal nor illegal economies will be well-managed by the state. Smartening the design of supply-side policies – eradication, interdiction, alternative livelihoods – and carefully monitoring and adjusting the design of licensing and legalisation measures will go a long way to improving the effectiveness of policies toward the drug trade and minimising their often intense negative side-effects. Reducing the violence associated with drug trafficking should be a priority for law enforcement agencies. Governments that effectively reduce the violence surrounding illicit economies often may not be able to *rid* their countries of organised crime; they can, however, lessen its grip on society, thereby giving citizens greater confidence in government, encouraging citizen cooperation with law enforcement and aiding the transformation of a national security threat into a public safety problem. That can well be accomplished – and many countries have succeeded in doing so – in the absence of legalisation. Counternarcotics policies as well as other anti-crime measures should therefore be conceived as a multifaceted state-building effort that seeks to strengthen the bonds between the state and marginalised communities dependent on or vulnerable to participation in illicit economies for reasons of economic survival and physical security. Efforts need to focus on ensuring that peoples and communities will obey laws – by increasing the likelihood that illegal behaviour and corruption will be punished via effective law enforcement, but also by creating a social, economic and political environment in which the laws are consistent with the needs of the people so that the laws can be seen as legitimate and hence be internalised. ■

Addressing the Costs of Prohibition: Internally Displaced Populations in Colombia and Mexico

Laura H. Atuesta Becerra

The creation of internally displaced populations (IDPs) is one of the indirect costs of the drug prohibition policies implemented in Colombia and Mexico during the 2000s. Although in Colombia the problem has been quantified and recognised, and the government has changed the legislation in order to provide the IDPs with humanitarian assistance, in Mexico policies are inexistent, there is no registry for quantifying them and the government has not recognised its responsibility for the problem. Currently, the discussions about the failure of the ‘war on drugs’ are taking place at various national and international levels. Experts have argued that new drug policies should be focused more on addiction treatments, consumption prevention and health programs. However, some important questions should be kept in mind while discussing these new policies. What would happen to peasants in Colombia who abandoned their land and to civilians in Mexico who moved to safer places because their lives were threatened? Would these drug policies focused on health issues, consumption and treatments cover the humanitarian assistance these IDPs need? Would the cartels stop their extortion practices just because currently illicit drugs were legalised and their main source of income taken away? Would rebel groups in Colombia do the same? This article uses a simulation analysis of the legalisation of drugs in Colombia and a migration analysis in Mexico to answer some of these questions.

Summary

- The creation of internally displaced populations (IDPs) is one of the indirect costs of the drug prohibition policies implemented in Colombia and Mexico during the 2000s.
- There is a need for national governments to recognise and work to ameliorate the problems associated with the creation of IDPs.
- This article concludes that the legalisation or regularisation of illegal drugs would not by itself ameliorate the IDP problem.
- If the legalisation of drugs ends the armed conflict in producer and transit countries, the welfare of households is improved only when the government reinvests the security expenditures in other productive sectors such as health, education and transportation.

Colombia and Mexico face challenges in order to solve the humanitarian crisis created by IDPs' living conditions. Although Colombia has approved the Victims' Law to protect IDPs, its implementation has been difficult and the rebel groups keep resisting the return of victims to their hometowns. In Mexico, the situation is exacerbated because of the inexistence of academic research that quantifies the size of the IDP, the lack of public policies to address the situation and the increasing insecurity for the civilian population in areas with high levels of drug-related violence.

This contribution concludes that the legalisation or regularisation of illegal drugs would not by itself ameliorate the IDP problem. In Colombia, the creation of new rebel groups after the demilitarisation of the paramilitary groups are enough evidence to suggest that, even if illegal drugs were legalised, and the rebels' main source of income were taken away, they would find new financial sources through extortion or other illegal activities. Results from a computable general equilibrium (CGE) model¹ using data from Colombia suggest that the economic welfare of households would be improved only if the government reassigned the military budget to other

1 CGE models are a type of economic analysis that use real world data to estimate the economic impacts resulting from changes in policy, technology or other factors.

Between 2000 and 2010, Colombia had the second-largest IDPs (after Sudan) with a proportion of displaced over the total population of 7.8 percent.

economic activities. The legalisation of drugs, without such reinvestments, would only produce 'some' return migration from urban to rural areas and a very small revival or regeneration of the countryside. Further, if new rebel groups were subsequently created, the government would be unlikely to reduce its military spending to reinvest it into other economic activities.

In the case of Mexico, the country needs first to recognise and quantify the IDPs in order to design public policies to address their needs. Congress approved the Victims' Law in January 2013, which includes the creation of a Victims' National System and restitution for the victims of up to 500 days' worth of minimum wages, depending on the damage they suffered.² However, the Law does not have any budget assigned for its implementation and it has not found an equilibrium between the local support offered to the victims by some of the states and the federal jurisdiction.³ The results of an internal migration economic model that includes as a determinant the drug-related violence differential between origin and destination suggest that violence is a determinant of migration. Further, they suggest that the relationship is stronger when the place of origin is a high-violence state. These results suggest that people fled from violence in Mexico, even if economic opportunities were not better at their destination point.

Given the role played by the drug cartels in provoking this migration in Mexico, one could ask if these migrants would be willing to return to their hometowns if illegal drugs became legal or regularised. Using the experience of Colombia and the evidence of the creation of new rebel groups there, this return-migration scenario does not seem likely. The drug cartels in Mexico are already extorting migrants from Central America passing through on their way to the US. Further, the fact that they already control territory, mostly in the northern states, makes it probable that current clashes with the military forces would continue. This situation of violence and extortion would

generate a *pull effect* for migrants who would consider returning to their places of origin. If return migration is difficult, it becomes evident that we need more immediate and integrated approaches to this issue while discussions on the future of drug policies take place. Meanwhile, although much of the current discourse about reversing the damage caused by the 'war on drugs' centres on issues of consumption and treatment, it must be recognised that these changes will have limited impacts in countries such as Mexico and Colombia which suffer systemic illicit drug-related violence, homicides and IDPs.

This contribution continues as follows. The second section below briefly describes the forced displacement situation in Mexico and Colombia. Following this the contribution will examine a Colombian CGE model and a welfare analysis under a potential scenario of drugs being legalised. Next it will look at the migration model and its estimates for Mexico including the drug-related violence differential as a determinant of the migration decision. This contribution concludes with an analysis of the costs associated with the IDP and examines new approaches for the future of drug policies in the Americas.

INTERNALLY-FORCED DISPLACEMENT AS AN INDIRECT COST OF PROHIBITION

Between 2000 and 2010, Colombia had the second-largest IDPs (after Sudan) with a proportion of displaced over the total population of 7.8 percent.⁴ Forced displacement is associated with the internal armed political conflict. During the 1990s the conflict was intensified by the strengthening of the guerrillas and the paramilitaries being financed by the illegal drug business. Colombia is considered one of the countries in the region with the most advanced legislation to protect IDPs. These efforts started in 1997 with the creation of the National System for Attending the Displaced Population and were strengthened in 1999 with the creation of the Displaced Population Registry (RUPD). In 2005, with the approval of the Justice and Peace Law, the government established the right for victims to seek truth, justice and reparations. Later on, in 2007, the Constitutional Court recognised land restitution as a fundamental right for IDPs. This was based on the principle of ensuring victims could attain the same situation he or she had before the displacement.⁵ Finally, in 2011, Congress approved the Victims' Law with the purpose of providing reparation to the victims through land restitution.

Mexico, on the other hand, has had three waves of displacement:⁶ (1) during the Mexican Revolution (with no data available); (2) during the uprising of the Zapatista movement in Chiapas (with around 35,000 people displaced);⁷ and (3) during the current 'war

2 'Decreto por el que se expide la Ley General de Víctimas,' Diario Oficial de la Federación, January 9, 2013, http://dof.gob.mx/nota_detalle.php?codigo=5284359&fecha=09/01/2013

3 'La Comisión de Víctimas queda fuera del presupuesto 2014,' Animal Político, 2013, <http://www.animalpolitico.com/2013/11/la-comision-de-victimas-queda-fuera-del-presupuesto-2014/#axzz2mzouOxoO>.

4 Ana M. Ibañez, *El desplazamiento forzoso en Colombia: un camino sin retorno hacia la pobreza* (Universidad de los Andes, 2009).

5 'Protección de tierras y patrimonio de población desplazada: Síntesis de la experiencia del Proyecto Protección de Tierras y Patrimonio de la Población Desplazada,' Acción Social, 2010, http://restituciondetierras.gov.co/media/descargas/publicaciones/resumen_ejecutivo.pdf

6 Luis Benavides and Sandra Patargo, 'México ante la crisis humanitaria de los desplazados internos,' *Foreign affairs: Latinoamérica*, 12/4 (2012): 77-88.

7 Although some already returned to their places of origin, it is estimated by the local government that, as of May 2012, 25,000 people remained displaced in Chiapas (IDMC, 2012).

on organised crime' in which thousands of households have fled from the violence generated by clashes between the drug cartels and the military forces, mainly in the northern states.⁸ The numbers are unclear: while IDMC reported that 160,000 people have been displaced since 2007,⁹ a private consultant firm reported that the number of IDPs is more than 1.5 million people.¹⁰ In contrast to the efforts made by Colombia to recognise the existence of IDPs, the Mexican government has not yet recognised the problem, despite the approval of the Victims' Law in early 2013.

‘ The latest Human Rights Watch report on displacement in Colombia documented 21 cases where individual IDPs have lost their lives since 2008, 80 cases where they have received serious threats and 30 cases where they have been displaced again. ’

Since Mexico does not have an official registry to provide assistance to IDPs, no one really knows the number of displaced households, or the causes of their displacement. The most informative survey was conducted by the Universidad Autónoma de Ciudad Juárez in 2010, reporting that 220,000 people have abandoned Ciudad Juárez since 2007 as a result of violence. From this figure, half have remained in the country as IDPs and the rest have migrated to the US.¹¹

Several organisations in Colombia have provided assistance to this vulnerable group. One of the most recognised is CODHES (Consultant firm for Human Rights and Displacement), an NGO that promotes the protection of human rights of IDPs and refugees. On the other hand, the Universidad de los Andes, in collaboration with the Conferencia Episcopal, conducted

a survey in 2004 of 2,342 displaced households located in 48 municipalities in 21 departments.¹² This survey has been used in several academic studies with the purpose of estimating the costs of displacement.

The implementation of the Victims' Law in Colombia has been extremely difficult. The insecurity faced by IDPs and their leaders is still one of the main problems, not only for the implementation of the Law but for ensuring the return of the victims to their places of origin. The latest Human Rights Watch report¹³ on displacement in Colombia documented 21 cases where individual IDPs have lost their lives since 2008, 80 cases where they have received serious threats and 30 cases where they have been displaced again. From December 2005, more than 500 IDPs who claimed their land have received threats, and more than 360 IDPs and leaders are considered at 'extreme risk'. The Attorney General's Office is investigating more than 56 homicides committed in activities related to land restitution since 2000.¹⁴ The safe return of IDPs often cannot be guaranteed because of the existence of new rebel groups conducting illegal activities in the abandoned land (mainly the production of illegal crops and illegal mining).¹⁵

Colombia still has a long way to go. The implementation of the Victims' Law has been complicated and the insecure conditions have jeopardised land restitution. Mexico, on the other hand, has not yet even officially recognised these victims of the 'war on drugs'. Comparing both situations, can we use the Colombian experience to forecast what could happen in Mexico? Is it possible that drug cartels could jeopardise return migration, even if they stop receiving funding from narco-trafficking? Drug cartels in Mexico are already involved in other criminal activities such as human trafficking, extortion and kidnappings. Further, controlling territories is crucial for conducting these activities. Return migration for IDPs will therefore be problematic, with or without either narco-trafficking or changes in drug policy. The next two sections of this contribution describe two quantitative studies, one in Colombia and the other in Mexico, to understand the costs of the current drug policy on household welfare and population movements. Understanding these costs is crucial to analyse the potential impact of changing drug policies on households.

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- 8 Baja California, Chihuahua, Coahuila, Durango, Guerrero, Michoacán, Nuevo León, San Luis Potosí, Sinaloa, Sonora, Tamaulipas and Veracruz.
 - 9 'Global Overview 2012: People internally displaced by conflict and violence, Norwegian Refugee Council,' Internal Displacement Monitoring Centre, 2012, <http://www.internal-displacement.org/publications/global-overview-2012>.
 - 10 *Parametría* estimates are approximations based on a household survey, on which 2 percent of households reported having fled their homes due to violence related to the war on organised crime.
 - 11 'MEXICO: Displacement due to criminal and communal violence. A profile of the internal displaced situation,' Internal Displacement Monitoring Centre, 2013, [http://www.internal-displacement.org/8025708F004BE3B1/\(httpInfoFiles\)/59056C1DECFC954BC1257953004FDF2/\\$file/Mexico+-+November+2011.pdf](http://www.internal-displacement.org/8025708F004BE3B1/(httpInfoFiles)/59056C1DECFC954BC1257953004FDF2/$file/Mexico+-+November+2011.pdf)
 - 12 Ana Ibáñez and Andrea Velásquez, *El proceso de identificación de víctimas de los conflictos civiles: una evaluación para la población desplazada en Colombia* (Universidad de los Andes, CEDE, 2006).
 - 13 *El riesgo de volver a casa: Violencia y amenazas contra desplazados que reclaman restitución de sus tierras en Colombia* (Human Rights Watch, September 2013).
 - 14 'Actos de violencia amenazan el éxito de la Ley de Víctimas: HRW,' *El Tiempo*, September 2013, http://www.eltiempo.com/politica/ARTICULO-WEB-NEW_NOTA_INTERIOR-13067095.html.
 - 15 'Nuevo caso de amenaza contra líderes de restitución de tierras,' *Noticias Caracol*, May 2013, <http://www.noticiascaracol.com/nacion/video-293532-nuevo-caso-de-amenaza-contra-lideres-de-restitucion-de-tierras>. 'Alerta en Colombia: Águilas Negras amenazan nuevamente a la Liga de Mujeres Desplazadas,' *Red Latinoamericana y del Caribe para la Democracia*, November 2012, <http://www.redlad.org/alerta-en-colombia-%C3%A1guilas-negras-amenazan-nuevamente-la-liga-de-mujeres-desplazadas>.

AN ECONOMIC WELFARE ANALYSIS OF THE LEGALISATION OF DRUGS IN COLOMBIA

Results from a CGE model used to simulate the Colombian economy after legalisation of illegal drugs suggest that government reinvestments of military expenses are crucial in determining changes in household welfare. Without these reinvestments, the benefits of legalisation are not significant, and the economic welfare of rural and urban households is only slightly improved.

For the simulations, the analysis uses data from 2006 with 10 legal sectors and one illegal sector on the production side, and a disaggregated demand by income deciles and by geographic location (urban and rural). Because of legalisation, the government receives more money from taxes, rural households receive most of the gains of the drug market and money laundering is reduced to zero. In terms of security, the military aid received from the US to finance the 'war on drugs' is reduced, and the government has the option to distribute military expenses in other productive sectors if the armed conflict is terminated.

The results of the simulation suggest that the economic welfare of rural and urban households is slightly improved with legalisation. However, the results change significantly depending on whether there is continuity of the armed conflict and whether there is reinvestment of military expenses. With the perpetuation of the armed conflict (through the creation of new rebel groups or the generation of new illegal activities), the economy continues in an 'economy of war' situation. The increasing drug production in rural areas, the higher taxes received by the government and the linkages between the security sector and other productive sectors are reflected in a welfare increase for all income deciles. However, this economic

model does not consider the losses on welfare generated by the indirect costs of the conflict such as homicides, extortion, threats and the impossibility of the displaced households to return to their hometowns.

Under the other scenario, if the legalisation of drugs ends the armed conflict, the welfare of households is improved only when the government reinvests the security expenditures in other productive sectors such as health, education and transportation. With this reinvestment, welfare increases, with the gains being higher for the lowest deciles both in rural and in urban areas.

INTERNAL MIGRATION IN MEXICO: ARE POPULATION MOVEMENTS DETERMINED BY DRUG-RELATED VIOLENCE?

The results of an econometric model of migration in Mexico suggest that wage differentials are an important determinant of migration. However, when migrants are coming from a state with high levels of drug-related violence, the violence differential is also significant in explaining migration decisions. Some studies of forced migration due to internal conflicts have been conducted in other countries. These have shown that political violence was a dominant motivation for explaining international migration,¹⁶ but only when some critical level of violence is reached.¹⁷ This suggests a non-linear effect between violence and migration: moderate levels of violence reduce the likelihood of movement, while high levels increase it.¹⁸ Using data from the 2010 Mexican Census to identify migrants (if they lived in a different state in 2005), wages in different locations are estimated by comparing the pool of migrants to the residents of each state. Then, using an econometric model of migration, we calculate how relevant the violence and the wage differentials are for explaining migration. For the violence differentials, we use the rate of alleged homicides related to organised crime from 2006-2010 as a proxy.¹⁹

The results show that migrants coming from states with high levels of violence have potential wages lower than migrants coming from states with low levels of violence. On average, if a migrant from a high-violence state decides to migrate to a low-violence state, his or her wage would be 3.65 percent lower than the wage of a migrant from a low-violence state deciding to migrate to another low-violence state. Moreover, migrants coming from violent states are willing to lose money in order to gain 'safety,' and migrants moving to violent states from non-violent states are demanding significant economic gains in order to compensate for their 'safety' losses.

‘ In contrast to the efforts made by Colombia to recognise the existence of IDPs, the Mexican government has not yet recognised the problem, despite the approval of the Victims’ Law in early 2013. ’

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- 16 William Stanley, 'Economic migrants or refugees from violence? A time-series analysis of Salvadoran migration to the United States,' *Latin American Research Review*, 22/1 (1987): 132-154.
- 17 Andrew Morrison and Rachel May, 'Escape from terror: Violence and migration in post-revolutionary Guatemala,' *Latin American Research Review*, 29/2 (1994): 111-132.
- 18 Pratikshya Bohra-Mishra and Douglas Massey, 'Individual decisions to migrate during civil conflict,' *Demography*, 48/2 (2011): 401-424.
- 19 The data was collected by the Consejo de Seguridad Nacional, and obtained from the El Universal webpage, 'El detalle mes a mes de los homicidios del narco,' January 2013, (<http://www.eluniversal.com.mx/notas/736970.html>).

Migration from high-violence states does not behave like traditional economic migration. These migrants are willing to earn lower wages just to flee from violence. In most cases, their wage differential between current wages and the wages they would have earned had they remained in the same state as in 2005 is zero or negative. Educational attainment, a determinant factor for explaining migration, is not useful in determining migration from and to high-violence states: while more educated migrants from low-violence states are more willing to migrate to low-violence states, more educated migrants from high-violence states are *not* willing to migrate to high-violence states.

Without knowing the reason for migration or the conditions in which this migration took place, it is not possible to identify which ones are IDPs and which ones are economic migrants. However, if these people migrate because of security reasons, one could expect that they would want to come back, but this return migration is not guaranteed if the security conditions are not improved in their hometowns.

The results of this statistical analysis are in line with the anecdotal evidence already existent in Mexico. People living in high-violence states fled from violence looking for safety, and some of them migrate without any economic opportunity in the state of destination. Animal Político,²⁰ in collaboration with Insight Crime, prepared three case studies about forced displacement in Sinaloa, Tijuana and Ciudad Juárez, reporting the existence of the phenomenon by interviewing several families that leave their homes looking for safety. In the three cases, the rises in crime and homicide rates were accompanied by an increase of IDPs; however, when governmental authorities were asked about the topic, they denied its existence, or simply said that there was not enough evidence on displacement to recognise it as a problem.

‘...if the legalisation of drugs ends the armed conflict, the welfare of households is improved only when the government reinvests the security expenditures in other productive sectors such as health, education and transportation.’

CONCLUSION

The blog *Foco Económico* posted an analysis of the costs of prohibitionist drug policies.²¹ According to the article, one of the reasons prohibition did not work is that the collateral costs and the indirect costs of the ‘war on drugs’ were too expensive for producer and transit countries. The increasing drug-related violence, in both Colombia and Mexico, was accompanied by thousands of families who left everything behind to migrate to safer places.

There are two main costs associated with IDPs. The first is the humanitarian crisis generated by the poor living conditions they face in their destinations. In Colombia, they have arrived in the big cities and have become homeless, begging for money at traffic intersections. In Mexico, they generally do not receive humanitarian assistance from the government, and when they do, it is under deplorable conditions. According to testimonies of displaced families from Ciudad Juárez,²² they were placed in warehouses (often without air conditioning) by the city government in Mexico City, where they had to stay 24 hours per day for several months while fighting for every inch of space.

The second cost is associated with ensuring their return to their hometowns. Given the humanitarian crisis created by their poor living conditions as IDPs, the main solution, both for them and for the government, would be to provide a safe return. However, as discussed above, even if legislation guarantees this return, in practice the situation is more problematic. The creation of new rebel groups, the perpetuation of violence and the absence of state presence are just a few of the many obstacles to ensuring security for the returning IDPs.

In the final assessment, prohibition did not work. It generated enormous costs both in producer and transit countries. The main question is therefore: what are we going to do about these costs and with policies going forward? The new debates on alternative drug policies are focused on addiction treatments, consumption prevention, regularisation of the drug market and in some cases, ‘legalisation’ is on the agenda. However, for countries such as Mexico and Colombia, it is too soon to think about these alternative policies. The drug policy based on prohibition and the ‘war on drugs’ left these countries with serious problems that we cannot ignore just by approving a drastic change in drug policies. It was because of prohibition that the guerrillas, paramilitaries and drug cartels were able to finance their criminal activities. However, it is naïve to expect that if prohibition is ended and the earnings of the illicit drug market are reduced, these organisations are going to become legal, conditions are going to be safer and IDPs are going to return to their hometowns. Colombia has been an important case study in this regard. Although the paramilitaries were demilitarised and the Victims’ Law was approved, new rebel groups have been created that conduct new illegal activities and leaders of IDPs risk being killed if they decide to go back and participate in the land restitution project.

20 ‘Desplazados del narco en México,’ Animal Político, September 2013, <http://www.animalpolitico.com/2013/09/nota-especial-desplazados-del-narco-en-mexico/#axzz2hEaz23tQ>.

21 Daniel Mejía, ‘Qué falló con la prohibición?,’ *Foco Económico*, October 2013, 2013, <http://focoeconomico.org/2013/10/08/que-fallo-con-la-prohibicion/>.

22 Ibid., Animal Político.

Drug policies in Mexico and Colombia should go through a transition period in which the security component is also present. The costs of prohibition were too extensive and they generated long-term consequences that we cannot ignore. In the short and medium term, drug policies should advance solutions to reverse these consequences. Thinking about drug legalisation, addiction treatment and consumption prevention as the only new alternatives for the current drug policies would leave Mexico and Colombia with a security problem that sooner or later would be translated into other repressive, prohibited and 'war on *something*' policies.

Colombia and Mexico have a big challenge ahead. Asking 'what next?' and proposing a single solution is impossible and unrealistic. Drug policies in the Americas have been a trial-and-error exercise, and it would be a mistake to presume that legalisation by itself would solve all problems. The political, social and economic implications of the 'war on drugs' are so broad that it is not possible to reverse them in just a few years. This contribution refers only to the IDP phenomenon and the welfare losses caused by prohibition, but the drug-related violence is too embedded in Latin American societies and political systems for it to be ignored. In the end, it is worth analysing the beginning of the problem to understand different actors' motivations. Why do youths decide to be members of drug cartels and rebel groups? What has been the role of the government in these decisions? Which policies have been effective and which ones have been counterproductive in fighting organised crime? What has been the experience of countries facing similar situations? What is next would still be a trial-and-error process, but the more information we have, the better our chances of minimising error. ■

The Constitutional Costs of the 'War on Drugs'

Alejandro Madrazo Lajous¹

The war on drugs has had many and diverse consequences internationally. Increased violations of human rights, violence, corruption, direct economic costs, economic divestment from certain regions affected by violence, mass displacement of population,² increased risk and harm of consumption, massive budget allocations to security forces, etc. have all been documented as costs that need to be included when assessing the results of the war on drugs. To these we must add one more type of cost: the impact the drug war has had on the constitutional commitments of countries. Constitutional texts, interpretations and practices have been transformed in order to, in theory, better tackle drugs. Many of these changes undermine long-standing commitments to specific constitutional principles, values and rights. These are not problems of unconstitutional behaviour on the part of authorities, but rather an alteration in what is deemed constitutional so as to accommodate the policies and practices deployed by authorities in order to better enforce prohibition. This contribution will make this phenomenon visible and offer an initial analytical framework through which to explore it. It offers three preliminary case studies drawn from the three key countries engaged in the war on drugs in the Americas: Mexico, Colombia and the US.

Summary

- To the list of costs of the war on drugs we must add the impact the drug war has had on the constitutional commitments of countries.
- Many of the legal changes aiming to better enforce prohibition consist of major alterations to the constitutional system. Such alterations, when they run counter to previously held normative and political commitments, should be understood as the 'constitutional costs' of the 'war on drugs'.
- Creating an 'exceptional' regime of diminished fundamental rights goes against the logic of fundamental rights: that they be universal.
- Once regimes of exception are admitted, they tend to broaden and serve purposes different from those originally sought.
- The structural design of constitutional government should not be adjusted in function of specific, purportedly transitory policies.
- The blurring of previously clear distinctions of government agencies' roles makes citizens more vulnerable to arbitrariness and authorities less accountable for their actions.

The current prohibitionist drug policy has several and different costs, among which are violence, discrimination and human rights violations. Yet the war on drugs carries with it another important type of cost: constitutional costs. By this, I refer to changes in legal systems (texts, interpretations and/or practices) of countries engaged in the war on drugs, which run counter to previously held substantive normative commitments (that is, constitutional commitments) of the polity. The usual stated purpose of adopting such changes is to adapt the legal and institutional framework so as to better enforce drug prohibition and pursue crime. This type of statement, however, is seldom accompanied by an attempt to flesh out the impact of such changes on preexisting constitutional commitments. This contribution seeks to evaluate precisely that impact. Many of the legal changes adopted so as to better enforce prohibition consist of major alterations to the constitutional system as a whole. Such alterations, when they run counter to previously held normative and political commitments which are not explicitly renounced, should be understood as the 'constitutional costs' of the war on drugs.

My aim is to offer, through an overview of the Mexican case, a preliminary analytic framework that simultaneously allows us to visualise the constitutional costs of the war on drugs and begin to devise the analytical tools with which to understand these phenomena. This text builds on a previous effort to identify and categorise the constitutional costs of Mexico's recent efforts to enforce prohibition (2005-2012) and then turns to other countries – namely Colombia and the US – so as to test the usefulness of an analytic framework developed around the Mexican experience and as an initial attempt to explore whether this is, in fact, a phenomenon that crosses borders and which manifests itself in similar ways across borders.

1 This text is based on an ongoing project called 'The Constitutional Costs of the War on Drugs'. The first version was presented at the ISSDP Conference, Bogota, 2013.

2 See Laura Atuesta's contribution to this report.

By 'constitutional costs' of the 'war on drugs,' I mean the permanent curtailment, abandonment, impingement, carving out from or any other affectation to long-held values – principles, rights or institutions – that inform our systems of government and which is justified not in and of itself, but rather as a means to achieve a very specific objective: to better enforce the prohibition of illicit drugs and/or confront criminal organisations involved in drug trafficking. Such costs have political as well as legal effects, for constitutions are not only legal but also political documents which reflect the values on which a political community is founded.

The constitutional costs are generated in different ways. First, many of the legal changes adopted *change* the constitution by becoming a part of it (i.e. formal constitutional amendments) – they cannot technically be charged with impinging or violating the constitution. The difference between the rights, principles, values or institutions as they were *prior* to a 'war on drugs' amendment and the way they come out of the amendment process is the constitutional cost of a constitutional amendment. Second, other constitutional costs need not take this approach: legal changes, with no constitutional amendment that explicitly accommodates them, can impinge upon the constitutional commitments. Finally, interpretations of legal texts – whether constitutional or otherwise – without formal amendment can also be considered a change that can represent a constitutional cost.

I propose we consider at least three types of constitutional costs, a classification that stems from studying the case of Mexico in recent years:

- (1) The curtailment of fundamental rights;
- (2) The restructuring of our forms of government; and
- (3) The undermining of legal security, by conflating legal concepts and state functions.

Most likely, these categories will be either insufficient or inadequate for studying other countries. Nevertheless, this contribution makes a first attempt at trying them out in countries other than Mexico, which was used as the initial case study.

Fundamental rights are, in theory, the core value commitments of the political community which governments are bound to respect or even guarantee or foster.³ They are universally attributed. So, curtailment of fundamental rights can mean one of two things: (i) the restriction of fundamental rights across the board, or (ii) the carving out of a regime of reduced rights for certain people. I want to focus on the phenomenon of carving out 'special' regimes of *reduced* rights. A recurrent argument that exceptional powers be granted to authorities so they can effectively pursue the 'war on drugs' has had important corrosive effects on the system of fundamental rights, but that was not the stated objective of the war on drugs. The exceptions can be temporary or can affect

A recurrent argument that exceptional powers be granted to authorities so they can effectively pursue the war on drugs has had important corrosive effects on the system of fundamental rights....

only one group – e.g. drug dealers, drug users, organised crime – but in and of itself creating an 'exceptional' regime of diminished fundamental rights cuts against the logic of fundamental rights: that they be universal. Furthermore, there is a risk that, as exceptions are admitted, they can broaden.

Restructuring government can be defined as substantive adjustments to arrangements under which the powers and responsibilities are distributed between branches and/or levels of government. The reconfiguration of federalist relationships, for instance, is one such adjustment. The delegation of legislative or judicial functions to the executive could be another. What matters is the way in which power distribution between various authorities is altered. That powers and responsibilities be redistributed in order to effectively enforce a specific policy should grab our attention. That is, it is counterintuitive, when thinking about the structural design of constitutional government that it should be adjusted in function of specific policies, which are contingent on the circumstances and the specific objectives which they aim to address. This, however, seems like a phenomenon that is easily expected or at least accepted in the context of the war on drugs.

The *conflation of state functions* can be defined as the blurring of distinctions between legal definitions or of powers and functions which results in diminished clarity and legal security for citizens when facing state action. This can be understood as an *indirect* constitutional cost, as opposed to the *direct* changes to the constitutional system that diminished rights or undermined principles such as those described in the previous two sections. This type of constitutional cost is indirect because in blurring distinctions or conflating state functions, legal uncertainty is fostered. Thus the principle of legality – a central constitutional commitment by which repressive state action should have clear and explicit legal grounding – is undermined. The distinction itself is not necessarily a constitutional value, but its blurring affects a core constitutional commitment: legal security. The blurring of previously clear (or comparatively clear) distinctions makes citizens more vulnerable to arbitrariness and authorities less accountable for their actions.

3 Victor Abramovich and Christian Courtis, *Los derechos sociales como derechos exigibles*, (Trotta: 2004).

MEXICO

Mexico adopted a prohibitionist regime long ago, but it was in the early years of this century, particularly during the presidency of Felipe Calderón (2006-2012), that a 'war on drugs' was pursued as a government priority. In these years, starting in 2005, but especially during the Calderon administration, a series of major constitutional and legal changes have been adopted in the context of – and motivated by – the war on drugs. Between 2005 and 2012, seventeen amendments to various legal texts, including the Constitution, were made.⁴ Most are related to the punitive activities of the state: either to the criminal justice system or to the functioning of the security apparatus. Some measures included in these amendments represent constitutional costs that can be grouped into the three main types proposed above:

(1) The *curtailment of fundamental rights* through the carving out of a regime of exception. In 2008 Mexico bifurcated its criminal procedure: it amended the constitutional text so as to include notions such as the presumption of innocence, oral and public trials, victims' rights and an adversarial structure to criminal trials, to make it more transparent and adversarial.⁵ At the same time, an exceptional regime of reduced rights and extraordinary police powers was imbedded in the constitution for 'organised crime' delinquency (of which drug crimes are the main cohort by far). In addition, it defined organised crime loosely ('three or more people who organise to commit crimes in a permanent or repeated manner as specified in law'⁶). All measures adopted under the exceptional regime of reduced rights are, of course, constitutionally banned under the 'ordinary' criminal justice process. This exceptional regime included: the possibility of being held incommunicado and without formal charges for up to 80 days if it is deemed instrumental to *any* 'organised crime' investigation (*arraigo*); a doubling of the time period allowed for police detention prior to presentation before judicial authority (from two days to four days); incommunicado while in prison (legal counsel excepted); incarceration in 'special' prisons separate from the general population; a blank authorisation to apply 'special' and unspecified 'security measures' within prisons; and the possibility of being charged anonymously.

The case of the *arraigo* is particularly illustrative of the 'constitutional costs' Mexico is willing to pay to continue a war on drugs. The *arraigo* – theoretically a form of house arrest, but in practice detention at an undisclosed location – was deemed unconstitutional by the Supreme Court in 2005, but the 2008 amendment overrode the impediment of constitutional incompatibility by inserting the policy of *arraigo* directly in the text of the constitution. The use of *arraigo* expanded enormously

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during Mexico's recent 'war on drugs' – from 42 *arraigos* in 2006, to over 1600 by 2011 – without a direct substantive effect on organised crime convictions.⁷

Limits and exceptions to other rights, such as privacy of communications and property rights, have also been carved out in recent years. For instance, a 2012 law allowed for prosecutors to demand from mobile phone providers, without a court order, the geographic location in real time of users.⁸

(2) The *restructuring of forms of government* refers specifically to the curbing of federalism and state powers. In recent years, the relationships between national, state and city governments in Mexico have been rearranged as security measures have been adopted in order to face 'the threat of narco-trafficking'. Mexico's *Ley de Narcomenudeo* illustrates this phenomenon of government restructuring.⁹ Approved in 2009, it was the first occasion in over a century and a half in which the federal government formally intervened in state criminal policy. Since the toppling of the Santa Anna dictatorship in 1855 and the definitive establishment of Mexico as a federal (as opposed to centralist) republic with the 1857 Constitution, states had maintained complete autonomy regarding their internal criminal law (except for the limits established through federal constitutional rights).

In 2005, the Constitution was amended empowering the federal Congress to dictate 'the manner in which federal entities may participate in the persecution of crimes in concurrent matters'. Concurrent matters are those in which the Constitution

4 Alejandro Madrazo, 'The Constitutional Costs of the War on Drugs'.

5 'Decreto que reforma, adiciona y deroga diversas disposiciones de la Constitución,' *Diario Oficial de la Federación (DOF)*, June 18, 2008.

6 Constitución Política de los Estados Unidos Mexicanos (art. 16).

7 Alejandro Madrazo and Angela Guerrero, 'Más caro el caldo que las albóndigas' in *Nexos*, December 2012; Catalina Pérez Correa and Elena Azaola, *Resultados de la Primera Encuesta realizada en los Centros Federales de Readaptación Social*, (México: CIDE, 2012).

8 'Decreto por el que se reforman, adicionan y derogan diversas disposiciones del Código Federal de Procedimientos Penales, el Código Penal Federal, la Ley Federal de Telecomunicaciones, de la Ley que Establece las Condiciones Mínimas Sobre Readaptación Social de los Sentenciados y de la Ley General del Sistema Nacional de Seguridad Pública,' *Diario Oficial de la Federación (DOF)*, April 17, 2012; Alejandro Madrazo, 'The Constitutional Costs of the War on Drugs,' forthcoming.

9 'Decreto por el que se expide la Ley de la Policía Federal,' *Diario Oficial de la Federación (DOF)*, June 2009.

establishes the concurrent jurisdiction of the federation and the states, one of which is health, and drug crimes are formally categorised as ‘crimes against health’. Thus drug crimes were, until 2009, exclusively the jurisdiction of the federal government. With the *Ley de Narcomenudeo* they also became a matter of state jurisdiction. The thrust of the reform established that possession and petty-dealing – up to a specified amount – were to fall under state authority and, beyond that, under federal jurisdiction, effectively forcing the hand of state governments to join the Calderón Administration’s ‘war on drugs’. This was consistent with one of President Calderón’s key programmatic objectives: to bring state and local governments on board with the ‘war on drugs’ which he claimed was being fought single-handedly by the federal government.¹⁰

State criminal law as a matter to be decided by state governments was, until 2005, a long-standing constitutional arrangement and one of the most important powers reserved for the states in Mexico’s federal system. So, an exception to that principle was carved out in the context of the ‘war on drugs’.

(3) *The undermining of legal security by conflating legal concepts and state functions.* Historically in Mexico, there has been a sharp formal distinction between three different spheres: (i) national security, (ii) public security and (iii) criminal investigation and prosecution. Each of these concepts referred to a distinct area that a state organ was charged with: national security was the realm of the armed forces; public security the realm of police bodies; and criminal investigation and prosecution the realm of the (federal and state) Attorney General’s Office. Starting in 2005, again in a purported effort to better vest authorities with the legal tools to enforce drug prohibition and fight organised crime (always emphasising narco-trafficking as the quintessential form of organised crime), with the novel National Security Law, these distinctions rapidly collapsed.¹¹

The result of these conflations – between national security, public security and criminal investigation – has been a confusing situation in which it is unclear what each of the bodies involved – Army, Navy, Federal Police and Attorney General’s Office – does and what each is responsible for (e.g. who can detain, investigate, question and charge whom). This translates into a context of enormous legal uncertainty for the civilian population. When everyone can do anything and nobody is responsible for actually getting things done, the result is deepened insecurity and uncertainty for everyone except empowered authorities.

COLOMBIA: EXCEPTIONAL CRIMINAL JUSTICE¹²

The constitutional costs of the war on drugs in Colombia follow somewhat similar lines, but over a more prolonged period of time and in a more complex political scenario. Manuel Iturralde explains how, during the second half of the twentieth century, Colombia suffered from both the presence of illegal armed groups (guerrillas and paramilitaries) and organised crime (drug cartels).¹³ In response, the Colombian government took measures to facilitate the use of state force. The central thrust of these measures has been the creation of exceptional regimes outside the ordinary criminal justice system. In the case of Colombia, in contrast with Mexico, we need to keep in mind that a political conflict – a long-standing civil war – predates the war on drugs and is the context in which drug policy is deployed and understood. Nevertheless, the war on drugs is a core component of the conflict and one of the central purposes of many of the legal reforms with which we are concerned.

The exceptional criminal justice regime has been perpetuated over three decades and has changed through this period. From the 1950s to the 1980s, social protest was criminalised and repressed through an overt regime of exception controlled by military courts. This repression contributed to the rise of leftist guerrillas and armed conflict in the 1960s. In the 1980s, with the involvement of guerrillas and paramilitaries in drug trafficking as part of their funding sources, government efforts focused on the war on drugs. In 1984 drug crimes came under military jurisdiction.¹⁴ Thus, government deemed the problem of drugs both a criminal matter and a national security matter, conflating functions between criminal and military jurisdictions.

Features of this regime of exception which processes drug crimes include: increased sentences and reduced benefits; investigation, arrest and house searches of civilians without judicial authorisation; restrictions to *habeas corpus* for drug cases; detention and complete isolation without charges for up to seven days; expedition of extradition to the US; and wiretapping authorised by military justice.

¹⁰ Plan Nacional de Desarrollo 2007.

¹¹ ‘Decreto por el que se expide la Ley de Seguridad Nacional,’ Diario Oficial de la Federación (DOF), January 3, 2005.

¹² The information in this section is based on Manuel Iturralde, *Castigo, liberalismo autoritario y justicia penal de excepción*, (Columbia: Universidad de los Andes, 2010).

¹³ Ibid.

¹⁴ Ibid.

The exceptional criminal justice regime remained under military control until 1987 when it was carved out as a new special jurisdiction. By 1990, most of the exceptions were systematised and recognised as permanent with the publication of the *Statute for the Defense of Justice*.¹⁵ Paradoxically, during the late 1980s and early 1990s, legal and constitutional amendments (including a new constitution in 1991) sought to strengthen democratic institutions and the rule of law. Nevertheless, Colombian governments continued to use the exceptional criminal justice regime to combat the guerrillas, paramilitaries and drug trafficking. During the 1990s, exceptional criminal justice was expanded and became permanent as a branch of ordinary criminal justice and remains in force to this day.

Features of this regime of exception which processes drug crimes include: increased sentences and reduced benefits; investigation, arrest and house searches of civilians without judicial authorisation; restrictions to *habeas corpus* for drug cases; detention and complete isolation without charges for up to seven days; expedition of extradition to the US; and wiretapping authorised by military justice.¹⁶ The development and content of the exceptional criminal justice system has been cumulative and has varied depending on the government in power and the stage of the conflict. In general, however, many measures included in these exceptional regimes consistently represent constitutional costs of some form. Most of the measures that constitute the regime of exception can be classified, extrapolating the categories drawn from the Mexican case, into a specific type of constitutional cost: the curtailment of fundamental rights. However, it must be kept in mind that much of this has occurred in a context of conflation of functions between military and civil jurisdictions and so the indirect constitutional cost of engendering legal uncertainty is also a useful category in this case. Furthermore, the exceptions tend to identify specific groups, such as paramilitaries, drug cartels and guerrillas. Under these regimes, however, the repressive action of the State can be directed against a larger number of crimes, situations and people.

‘ In 1984 drug crimes came under military jurisdiction.

Thus, government deemed the problem of drugs both a criminal matter and a national security matter, conflating functions between criminal and military jurisdictions. ’

THE UNITED STATES¹⁷

The war on drugs in the US has also engendered constitutional costs. Michelle Alexander has famously studied its costs in terms of antidiscrimination law. Her central claim is that the war on drugs has provided a complex mechanism for reinstating a legal regime of discrimination, which disproportionately affects the African American communities in the US. If this is true, the war on drugs is a vehicle that undermines one of the most valued commitments of the American constitutionalism of the twentieth century: anti-discrimination, famously crystallised in *Brown vs. Board of Education* as the foundational case of modern American constitutional law. If so, then the war on drugs as a whole is a major constitutional cost for the United States.

Even if we do not share Alexander's interpretation of prohibition, her research documents many measures – both through statutory changes and judicial rulings – that should be deemed constitutional costs of the war on drugs. In 1988 the US Congress established the Anti-Drug Abuse Act, by all accounts an extraordinarily and intentionally punitive piece legislation. It included new ‘civil penalties’ for drug offenders extending beyond traditional criminal punishments. For instance, it authorised public housing authorities to evict any person who allows any drug-related criminal activity to take place on or near public housing; it eliminated federal benefits (for example, student loans) for those sentenced for a drug offence; it expanded the use of the death penalty for serious drug-related offences and created new mandatory minimum sentences for drug offences. According to Alexander the legislation marked a legal watershed. As she wrote: ‘Remarkably, the penalty would apply to first-time offenders. The severity of this punishment was unprecedented in the federal system. Until 1988, one year of imprisonment had been the maximum for possession of any amount of any drug’.¹⁸ Such measures carve out a *civil* regime of reduced rights for certain people – drug offenders – through the criminal justice system.

The Supreme Court should, in theory, protect against such curtailment of rights. But some precedents suggest otherwise. In 1996, for instance, in *Whren vs. US*, the US Supreme Court ruled that the use of traffic violations by the police as a means to take arrests for drug offences did not violate equal protection. In *McCleskey vs. Kemp*,¹⁹ they ruled that racial bias in sentencing, even if shown through credible statistical evidence, could not be challenged under the 14th Amendment in the absence of clear evidence of conscious, discriminatory intent. In May 1996, in *Armstrong vs. US*,²⁰ the Supreme Court reversed its previous decision about the recognition that racially selective enforcement violates equal protection of the law.²¹ Finally, in 1995, in *Purkett vs. Elm*, the Court supported the exclusion of black jurors, another

15 Decreto 2790 of 1990

16 Ley 365 of 1997; Ley 884 of 2001; Decreto 182 of 1998; Decreto 1859 of 1989; Decreto 1860 of 1989, later repealed by the Constitution of 1991; Decreto 2103 of 1990.

17 The information of this section was based on Michelle Alexander, *The New Jim Crow: Mass Incarceration in the Age of Colorblindness* (USA: The New Press, 2010).

18 Ibid., 53.

19 *McCleskey v. Kemp*, 481 US 279 (1987)

20 517 US 456, 116 S. Ct. 1480, 134 L. Ed. 2d 687, 1996 US

21 *Yick Wo v. Hopkins*, 118 U.S. 356 (1886)

case that seems to go against fundamental rights. In *Florida vs. Harris*, the Supreme Court ruled that an alert by a dog trained to detect drugs could be deemed probable cause to carry out a warrantless search in private property, regardless of the accuracy of the dog's performance in the past, thus reducing the standards for state intrusion in the private sphere in the case of drug searches.²²

‘ Many countries and societies have undertaken profound restructuring of some of their key normative and political commitments so as to wage a more effective war on drugs. ’

CONCLUSION

The costs of the prohibition of drugs – or, in its more bellicose version, the ‘war on drugs’ – are many and significant. The war on drugs consistently demands great sacrifices from societies around the world. Among them we need to take into consideration what fundamental changes political communities should be willing to undergo. Further, the sacrifices we as *political communities* accept must be tallied among the other many costs of the war on drugs. So, to the list costs, we need to add a new category: the constitutional costs of the war on drugs.

Many countries and societies have undertaken profound restructuring of some of their key normative and political commitments so as to wage a more effective war on drugs. In order to face the purported threat drugs and drug trafficking represent to our societies, our leaders and governments have time and again requested and obtained broader powers and/or the evisceration of constitutional barriers to state power.

In the Mexican case these changes affected important aspects of the Mexican legal system: fundamental rights (related to the creation of a special criminal system), distribution of functions (the curbing of federalism and state powers through the modification of concurrent matters) and legal uncertainty (the conflation of functions) based on this analysis of the Mexican experience, we can identify three categories of constitutional costs: (a) the curtailment of fundamental rights by either (i) the restriction of fundamental rights across the board, or (ii) the carving out of a regime of reduced rights for certain people); (b) the restructuring of forms of government; and (c) the undermining of legal security.

In the Colombian case, we see that for several decades, subsequent governments have established exceptional criminal process regimes in order to support the war on drugs.

The contents of these have changed over time, but in all cases it is possible to find a common thread in the curtailment of fundamental rights for drug offenders. In Colombia, the exceptional criminal justice system is not temporary or exceptional, but has coexisted for five decades with ordinary criminal justice.

Consequently, in the Mexican and Colombian cases, the constitutional costs appear as statutes, constitutional amendments or both. The case of the United States is somewhat different. We can find legislative changes, but the affectation of constitutional commitments manifests itself most importantly in judicial opinions. Some measures of the war on drugs imply the curtailment of fundamental rights. These are apparently neutral, but in fact have deep discriminatory implications, as Michelle Alexander has famously argued.

When we sacrifice the core values we hold collectively and renounce core commitments previously held by a political community, we must be sure that it is for good reason. So far, these constitutional costs are most often not understood as such but as extraordinary and exceptional measures we must adopt to achieve our objective. But these measures are fundamentally reshaping political communities and if we continue to accept them without understanding them as costs in terms of the way we exist as communities, we will soon find that we no longer recognise our polities. ■

22 Andrew Claycroft, *Something Smells Rotten in the State of Florida: Harris, Jardines And the Inequitable Landscape of Canine Sniff Jurisprudencie*, final paper presented for *Drug Policy in the Americas: a Critical Appraisal*, at Georgetown Law Center, 2013.

Mass Incarceration as a Global Policy Dilemma: Limiting Disaster and Evaluating Alternatives

Ernest Drucker

Summary

- Modify drug laws to end long mandatory sentences – something that's already beginning in the US.
- Declare a blanket amnesty for drug users serving long terms that no longer apply to their original offences.
- Identify and release populations that pose little or no risk to public safety. These include non-violent drug offenders and older prisoners serving out long mandatory sentences.
- End the long, restrictive parole arrangements that often re-incarcerate drug users for administrative and drug violations.
- Replace punitive parole programmes with community-based support services not linked to corrections.
- Expand voluntary access to evidence-based drug treatment services, uncoupled from court mandates.
- Convert prison-based drug programmes to residential schools and mental health facilities, staffed with well-trained medical and mental health personnel.
- Revise international treaties to develop a single convention for the control of all psychoactive drugs, both licit and illicit.
- Publicly monitor progress using sentinel metrics of drug use and drug policies such as overdose and drug treatment outcomes. These should assist with re-examining the entire spectrum of public health and clinical responses to changing patterns of drug abuse.

With over 9 million in prisons worldwide (25 percent of these in the US), large-scale systems of punishment now represent an important determinant of population health. This has particular relevance for the harms of drug use and the many new challenges facing global drug policies. The measures used to punish individuals involved in drug use include hard labour, severe mental and physical conditions, long periods of punitive isolation, bodily mutilation and execution. These all have profound effects on the trajectory of individual drug use, the social construction of addiction and the human rights of drug users. As penal systems expand their roles, so too do their public health impacts on drug use in society – including collateral effects upon families and communities of those imprisoned.

Any public health analysis of drug use and its relationship to criminal justice policies has to take account of both individual and population effects. These include the patterns of morbidity and mortality (i.e. suicide and homicide). They also include the course and outcomes of addiction treatment methods along with their relationship to individual health and psychopathology. Each of these impacts the lives of former prisoners and their families – including prospects for successful marriage, family life and employment. Aggressive drug criminalisation also has intergenerational impacts upon the children of incarcerated parents – affecting mortality, risks for drug use and health problems resulting in decreased life expectancy and elevated infant mortality rates.

Some limited international comparative data are available on the public health impact of drug policies. However, it is the American experience with mass incarceration that most clearly highlights the 'dose relationship' of punitive drug policies to many of these phenomena. While the US is atypical in its scope and severity, it is still instructive as a case study given that it is the nation with the world's largest number of prisoners and highest rate of imprisonment. And while mass incarceration of drug

users is not seen in most other developed democratic nations, it is on the rise in many developing countries facing burgeoning drug markets such as those in Sub-Saharan Africa. The case of America demonstrates how high rates of imprisonment can become socially ‘toxic’ – damaging population health, deforming vital family, community and societal structures and compromising human rights on a massive scale.

**LESSONS IN DISASTER:
MASS INCARCERATION AND
GLOBAL PUBLIC HEALTH**

The two main premises of this section are (1) that drug use may be usefully understood as a public health issue; and (2) that any public health analysis of drug use must therefore now include serious consideration of criminal justice systems and drug-related incarceration (as well as the dangers of drug use *per se*) as major determinants of population health. In addition to the value of employing a public health lens to examine drug use and addiction, these tools are especially relevant to understanding the breadth and depth of the serious and negative consequences of criminal justice policies based on global drug prohibition. Measuring the intended and unintended outcomes of drugs and drug policies, we must examine immediate and long-term health and social consequences of incarceration. This requires common public health metrics and methods. The US system

(admittedly an extreme case) can provide the initial data set by which we can demonstrate the value of applying public health and epidemiological principles to incarceration.

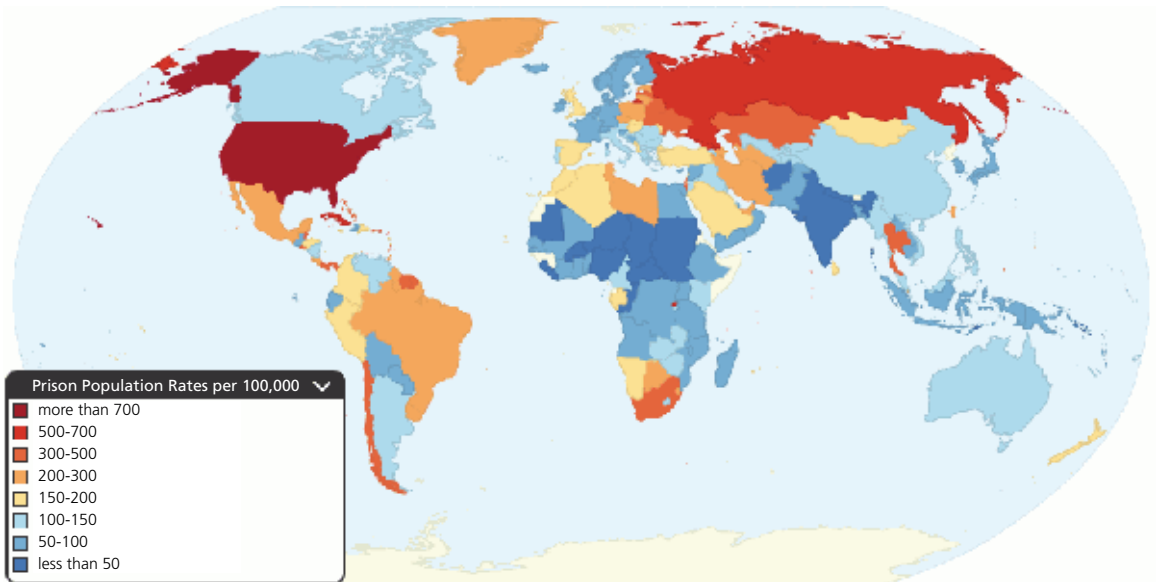
As state systems of punishment expand, they become a determinant of macro population health outcomes. Therefore, we are drawn first to *mass or hyper-incarceration* and its health and ‘dosage effects’ upon populations in terms of health and social outcomes.¹

The prevalence of imprisonment at national levels ranges by a full order of magnitude from less than 50 to over 700 per 100,000 population. Drug offences are estimated at 40 percent of the 9 million individuals incarcerated globally. Such wide variations in the magnitude and methods of punishment for drug use between societies enable a closer examination of their specific consequences and population impacts.

The Prisons’ Revolving Door: Re-entry and Recidivism

Most of those who are incarcerated are ‘incapacitated’ by removal from society (considered by criminologists as one of the ways imprisonment increases ‘public safety’), but only temporarily. Most eventually return to their communities – usually worse for the experience.³ Recidivism (readmission to prison), due to new offences or (more commonly) due to administrative parole violations (e.g. relapse into drug use), can be viewed as a failure of the rehabilitation potential of arrest and imprisonment. An analysis of US recidivism patterns of 40,000 offenders released from state prisons in 1994 discovered that 56.2 percent resumed their pre-incarceration

Figure 1. Global Rates of Imprisonment ²



1 Ernest Drucker, *A Plague of Prisons: The Epidemiology of Mass Incarceration in America* (The New Press, 2013).
2 Map of World Prison Population Rates per 100,000 of the national population. Charts Bin 2013 <http://chartsbin.com/view/eqq>.
3 Jeremy Travis, *But They All Come Back: Facing the Challenges of Prisoner Reentry* (Urban Institute Press, 2005).

Figure 2. Lifetime Imprisonment Rates for US Birth Cohorts by Race and Age.⁴

Risk of imprisonment by age 30-34: Men born 1945-49, 1970-74		
Percent	Born 1945-49	Born 1970-74
White men	1.2	2.8
All non-college	1.8	5.1
High school dropouts	4.2	14.8
High school only	0.7	4.0
Some college	0.7	0.9
Black men	9.0	22.8
All non-college	12.1	30.9
High school dropouts	14.7	62.5
High school only	10.2	20.3

Percent	1945-49	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79
White men							
High school dropouts	4.2	7.2	8.0	8.0	10.5	14.8	15.3
High school only	0.7	2.0	2.1	2.5	4.0	3.8	4.1
All non-college	1.8	2.9	3.2	3.7	5.1	5.1	6.3
Some college	0.7	0.7	0.6	0.8	0.7	0.9	1.2
All men	1.2	1.9	2.0	2.2	2.8	2.8	3.3
Black men							
High school dropouts	14.7	19.6	27.6	41.6	57.0	62.5	69.0
High school only	10.2	11.3	9.4	12.4	16.8	20.3	18.0
All non-college	12.1	14.1	14.7	19.9	26.7	30.9	35.7
Some college	4.9	3.5	4.3	5.5	6.8	8.5	7.6
All men	9.0	10.6	11.5	15.2	20.3	22.8	20.7

Source: Bruce Western and Christopher Wildeman, 'The Black Family and Mass Incarceration,' *Annals of the American Academy of Political and Social Science* 621, no.1 (2009): 231.

4 http://muse.jhu.edu/journals/future_of_children/v020/20.2.wildeman_tab01.html

offending trajectories after release, with no apparent effect of imprisonment on future risk of re-incarceration.⁵ Another meta-analysis concluded that the absolute impact of incarceration is, 'at best, marginal and at worst, iatrogenic' in predicting recidivism.⁶ Complementing these patterns, other studies have found that shorter sentences or early release pose no added risk – with equal or decreased rates of arrest for new crimes after release.

Incarceration as population exposure

We can now view the consequences of involvement with the criminal justice system as we would the long-term effects of a toxic exposure – in this instance to punishment. The US data for lifetime risks of imprisonment (Figure 2) clearly show the wide disparities in this exposure by race and its powerful association with educational attainment – a marker for future economic and social outcomes (such as marriage) and for life expectancy itself.

The graphic representation of these same data (Figure 3) illustrates the exposure history of the entire US population to imprisonment – showing its tripling over successive birth cohorts between 1940 and 1980.

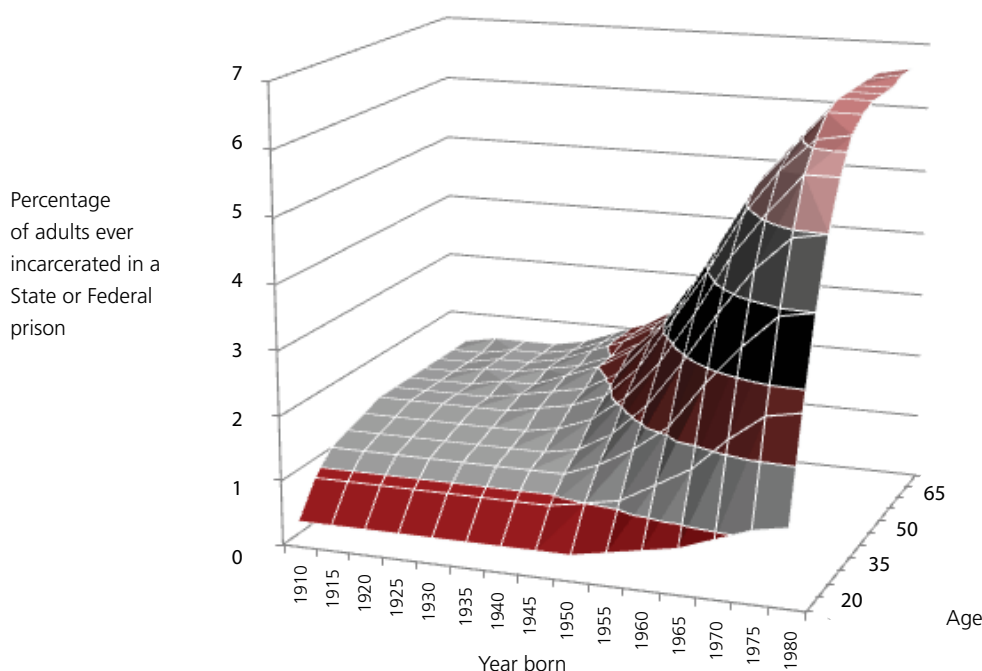
Drugs, Addiction and Their Treatment in Prisons

Significant problems with drug use and alcoholism are ubiquitous in US prison populations.⁷ US studies estimate that 60 to 83 percent of the nation's correctional population has used drugs at some point in their lives, twice the estimated drug use of the total US population (40 percent). Drug offenders accounted for 21 percent of the US state prison population in 1998 (up from six percent in 1980), 59 percent of the federal prison population in 1998 (up from 25 percent in 1980) and 26 percent of all jail inmates, mirroring the steady increase in arrests for drug offences over this period.

Women in US prisons are more likely than males to be involved in problematic drug use (62 percent versus 56 percent in the month before their offence) and more likely to have committed their offence under the influence of drugs or while engaging in petty theft or prostitution to get cash for drugs.

While the US has generally opposed substitution treatment in prison for those addicted to opiates, there is clear data on the benefits of such treatment globally.⁸ Further, a programme recently instituted in Baltimore provided methadone maintenance for prisoners who were soon to be transferred to community-based methadone programmes at release. These

Figure 3. Percentage of Adults Ever Incarcerated in State or Federal Prison, by year of birth and age⁹



- 5 T. Loughran, E. P. Mulvey, C. A. Schubert, J. Fagan, S. H. Losoya and A. R. Piquero, 'Estimating a Dose-Response Relationship between Length of Stay and Future Recidivism in Serious Juvenile Offenders,' *Criminology* 47(3) (2009): 699-740. See also *Pathways to Desistance*, <http://www.pathwaysstudy.pitt.edu/publications.html>.
- 6 F. T. Cullen, C. L. Jonson and D. S. Nagin, 'Prisons Do Not Reduce Recidivism: The High Cost of Ignoring Science,' *The Prison Journal* 91(3) (2011).
- 7 Christopher J. Mumola and Jennifer C. Karberg, 'Drug Use and Dependence, State and Federal Prisoners, 2004,' *US DOJ, Bureau of Justice Statistics*, (Washington, DC, 2006).
- 8 E. Drucker, R. G. Newman, E. Nadelmann, A. Wodak et al., 'Harm Reduction: New Drug Policies and Practices,' in *Substance Abuse: A Comprehensive Textbook*, Fifth Edition, ed. Pedro Ruiz and Eric Strain, (Williams and Wilkins, New York, 2011).
- 9 T. P. Bonczar and A. J. Beck, 'Lifetime likelihood of going to state or federal prison,' *US DOJ, Bureau of Justice Statistics* (Washington, DC, 1997).

prisoners had significantly better outcomes than a control population provided only counselling and passive referral after discharge. Results included more time spent in treatment during the twelve-month post-release period and far fewer positive urine tests for heroin and cocaine.¹⁰

However, because of hostility toward the use of methadone in correctional settings in the US (it is also barred in almost all drug courts), such programmes are rare. Accordingly, the first thing many released prisoners do on getting out is seek relief by injecting heroin – often with lethal results. Over 25 percent of drug fatalities due to overdose are now thought to stem from this phenomenon. Multiple studies have confirmed that overdose deaths among people who used heroin prior to incarceration are increased tenfold in the two weeks after release from prison, as compared to the usual overdose rate.¹¹

Meanwhile, the failure to address addictions in the criminal justice system is the single most significant reason for re-arrest and recidivism once released.¹²

Internationally many other countries now also have large proportions of drug users in prison, but many now also offer a wide range of treatments (including methadone) to incarcerated drug users.¹³ Many also have employed harm-reduction strategies to reduce HIV and Hepatitis C (HCV) transmission in prisons (e.g. methadone substitution treatment and access to clean injecting equipment) and now also seek to avoid imprisonment for those with addictions.¹⁴

There is now growing evidence that mass incarceration is contributing to the continued high incidence of HIV in the US, particularly among racial minorities.

Most US prisons have been resistant to this approach. While there are many very dedicated peer drug counsellors in prisons, their efforts to rebuild self-esteem and equip inmates to deal with dependency and the high risk of relapse are often thwarted by anti-therapeutic environments dominated by punishment. There is little incentive to offer effective drug treatment in modern American prisons and most adopt a moralistic tone, depicting addiction as evidence of personal weakness. The treatment of drug addiction in US prisons has become an extension of the moral crusades of America's 'war on drugs' – where legitimate questions of how best to minimise the harm from drugs are subordinated to the goals of zero tolerance – even for therapeutic drugs that soften the pains of withdrawal.

This result has been seen in the United Kingdom, Canada and Australia, which all have drug problems similar to that in the United States but incarceration rates of drug users that are only about one quarter of US rates. Opiate overdoses are thought to be due to the loss of tolerance associated with the greatly reduced use of opiates in prison. In the United States, the most significant reason for this can be found in the failure to treat opiate dependency adequately in prisons, for example, through methadone or buprenorphine substitution, which are known to be the most effective methods available to treat opiate addiction.¹⁵ When there is drug treatment (consisting mostly of prisoners talking in groups), it is usually modelled after the drug-free therapeutic communities that philosophically dominate American drug treatment – generally to the exclusion of approaches that employ medications such as methadone or buprenorphine.

The high rate of drug incarcerations ensures that drug problems will be very common in prison populations worldwide. In the US, state correctional officials estimate that between 70 and 85 percent of inmates need some level of substance abuse treatment. But sustained, professional, supervised drug and alcohol treatment is currently available in fewer than half of federal, state and local adult detention facilities. Juvenile correctional facilities are also staffed to serve only a fraction of those who need treatment services. In approximately 7,600 correctional facilities surveyed, 172,851 inmates were in drug treatment programmes in 1997, less

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- 10 M. S. Gordon, T. W. Kinlock, R. P. Schwartz and K. E. O'Grady, 'A randomized clinical trial of methadone maintenance for prisoners: findings at 6 months post-release,' *Addiction* 103(8) (2008): 1333–1342.
 - 11 I. A. Binswanger, M. F. Stern and J. G. Elmore, 'Mortality after Release from Prison,' *New England Journal of Medicine* 356 (2007).
 - 12 E. Drucker, 'Prisons: From Punishment to Public Health,' in *Oxford Textbook of Public Health*, Sixth Edition, ed. R. Detels, M. Gulliford, Q. A. Karim and C. C. Tan, (OUP, 2014).
 - 13 United Nations Office on Drugs and Crime, 'Drug Treatment and Rehabilitation in Prison Settings,' (Vienna: UNODC, 2013), http://www.unodc.org/docs/treatment/111_PRISON.pdf.
 - 14 Kate Dolan, Wayne Hall and Alex Wodak, 'Methadone Maintenance Reduces Injecting in Prison,' letter to the editor, *BMJ* 312(7039) (1996): 1162; Kate Dolan, Scott Rutter and Alex D. Wodak, 'Prison-based syringe exchange programmes: a review of international research and development,' *Addiction* 98 (2) (2003): 153–158.
 - 15 Drucker et al., 'Harm Reduction'.

than 11 percent of the inmate population and less than 20 percent of those with addiction histories.¹⁶ While some state prison systems expanded drug treatment programmes in the 1990s, these have now been cut severely in most systems – for example, a 40 percent reduction in California in 2009 alone.¹⁷

The injection of heroin within correctional facilities persists worldwide despite vigorous attempts to deter. Although drug injecting inside these facilities is generally far less frequent than in the community, adverse consequences (including HIV infection) are well-documented.¹⁸ While the use of methadone or buprenorphine maintenance for addiction treatment is prohibited in US state and federal prisons, a small number of local jails do offer brief detoxification programmes using these medications. In the past decade, some jail facilities have begun to offer methadone maintenance treatment as well.

A large-scale methadone maintenance treatment programme, serving two thousand patients per year, was established in New York City's Riker's Island Correctional Facility in the 1970s – operated by the Montefiore health service – the first jail programme to offer this treatment in the United States. This programme paved the way for several small pilot methadone programmes in prisons and jails in Maryland, Puerto Rico and New Mexico. But all face formidable struggles to maintain their modest gains in the face of widespread correctional hostility to this approach, despite the powerful evidence of its benefits elsewhere in the world.¹⁹

By contrast, as of January 2008, methadone maintenance has been implemented in prisons in at least 29 other countries or territories, with the proportion of prisoners in care ranging from less than one percent to over 14 percent. In Canada, prisoners have access to methadone maintenance throughout their incarceration and many heroin users are started on

methadone during federal incarceration. Further, in Eastern Europe and Central Asia, some prisons now offer methadone maintenance or a short course of methadone-to-detoxification in some pretrial detention facilities.²⁰

AIDS and Incarceration

Due to its powerful linkages to injection drug use and sex work, the global HIV epidemic now directly implicates national criminal justice policies and imprisonment. Policies which involve large-scale arrests and the disproportionate incarceration of impoverished marginal populations drive HIV before them.²¹ Case incidence patterns are shifting rapidly as HIV enters new human populations and selects new channels of transmission.

While sexual transmission remains the principal mode of transmission worldwide, injecting drug use continues to spread to new regions (most recently Sub-Saharan Africa) and remains a major vector of infection.²² These factors are allied to increased imprisonment of these populations, particularly in those nations addressing burgeoning drug markets with harsh punitive criminal justice responses. Once again the US is an unhappy poster child for this modern plague and in 2008, the US Center for Disease Control (CDC) estimated that approximately 56,300 Americans are newly infected with HIV annually.²³

There is now growing evidence that mass incarceration is contributing to the continued high incidence of HIV in the US, particularly among racial minorities. While constituting 12 percent of the US population, African Americans account for 45 percent of all new HIV diagnoses and have an incidence rate eight times that of whites.

For African American women, the magnitude is even more pronounced – their HIV rates are nearly 23 times the rate for white women. Discovering the causes of such dramatic disparities is crucial for efforts to control the epidemic. Research on HIV risk is now examining the social conditions and structure of this group's community networks, especially within African American populations. These data suggest a strong correlation between high incarceration rates and high HIV prevalence within many African American subpopulations and their communities.²⁴ Further, the US association of incarceration and the HIV epidemic is now very strong: between 17 and 25 percent of all people in the United States who are estimated to be infected with HIV disease will pass through a correctional facility each year, roughly 190,000 to 250,000 of the country's estimated total of 1 million HIV-positive individuals.²⁵

Policy Implications

Maintenance programmes have proven efficacy in treating drug addiction – particularly opiate dependency – but are not widely available in US prisons and remain under-resourced and underutilised in prison environments worldwide. Governments should drastically scale up their implementation and ensure supportive cultural and organisational changes are fostered.

16 Mumola and Karberg, 'Drug Use and Dependence'.

17 Michael Rothfeld, 'State to Eliminate 40% of Funding Designed to Turn Prisoners' Lives Around,' *Los Angeles Times*, October 17, 2009, <http://articles.latimes.com/2009/oct/17/local/me-rehab17>.

18 Drucker et al., 'Harm Reduction'.

19 Ibid.

20 Ibid.

21 P. Spiegel 'HIV/AIDS among Conflict-affected and Displaced Populations: Dispelling Myths and Taking Action,' *Disasters* 28(3) (2004): 322–339.

22 B. M. Mathers, L. Degenhardt, H. Ali et al., 'HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage,' *The Lancet*, 375(9719) (2010): 1014–1028.

23 H. Irene Hall et al., 'Estimation of HIV Incidence in the United States,' *JAMA* 300(5) (2008): 520–29.

24 Thomas A. Peterman, Catherine A. Lindsey and Richard M. Selik, 'This Place Is Killing Me: A Comparison of Counties Where the Incidence Rates of AIDS Increased the Most and the Least,' *Journal of Infectious Diseases* 191 (2005): 123–26.

25 Anne C. Spaulding, Ryan M. Seals, Matthew J. Page, Amanda K. Brzozowski, William Rhodes and Theodore M. Hammett, 'HIV/AIDS Among Inmates of and Releasees from US Correctional Facilities, 2006: Declining Share of Epidemic but Persistent Public Health Opportunity,' *PLoS ONE* 4(11) (2009): e7558.

The cost of care of HIV-infected inmates is a major issue in nations with high rates of HIV. Thus New York State (with over 53,000 prisoners in 2010) has about 1,700 HIV-infected inmates receiving medical care using antiretroviral drugs, at an annual cost of more than \$25 million. But best estimates are that these 1,700 are only about one-third of those infected; most do not know they are infected and there is no routine testing. There is great need for testing programmes to identify infection and initiate treatment as early as possible – both for the individual's benefit and for reducing transmission risk in the broader communities.

HIV rates among African Americans in New York state prisons are estimated at five to seven percent among men and seven to nine percent among women, and the risk appears to carry over to their sexual partners in their home communities.²⁶ Recent evidence also suggests that cyclical patterns of release and re-incarceration may foster instability in sexual and social networks. In conjunction with unstable housing, untreated drug addiction and recurrent imprisonment, a 'churn' in social networks occurs. These destabilising effects act within the social networks established in the prison feeder communities of many cities to produce increases in risk for HIV transmission both by sex and by drug use. This pattern of serial disruption spreads risk across these communities, with 'risk networks' extending to sexual partners of ex-prisoners, who may form a

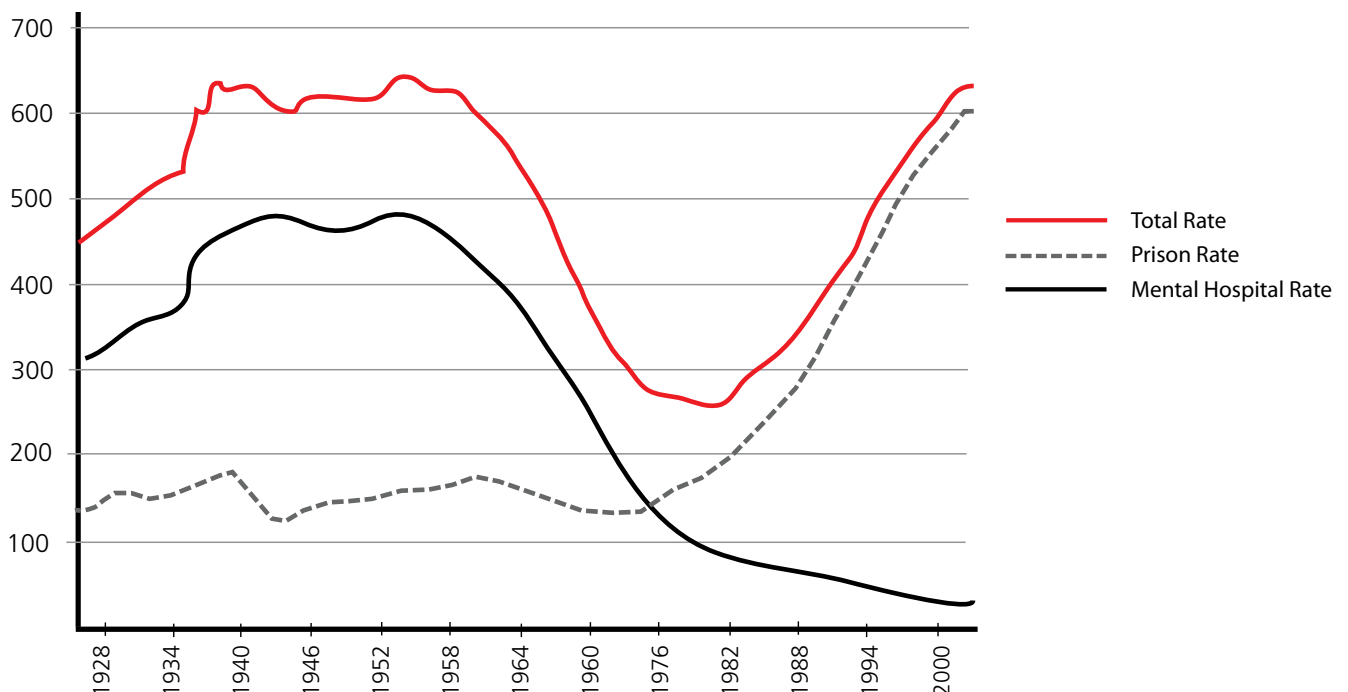
bridge to the surrounding population. This connection between the widespread incarceration of African American males and high rates of HIV in many urban communities dramatically demonstrates an important long-term community health impact of the criminal justice system.

MENTAL HEALTH

Mental health problems represent another source of the mounting toll of lifelong disabilities that incarceration imposes. In the US, 400,000 to 600,000 prison inmates (15–20 percent of all prisoners) have a major acute or chronic psychiatric disorder. In addition to failing to treat many pre-existing mental health problems, incarceration itself, and especially new practices of isolation and solitary confinement, often create new mental health issues that handicap individuals long past the end of their prison sentences.²⁸

Following the US 'deinstitutionalisation' from psychiatric hospitals for the chronically mentally ill (from the 1950s through the 1970s), the criminal justice system became the default response for these former hospital patients – most dramatically among the poor and homeless (see Figure 4). Chicago political scientist Bernard Harcourt notes that a growing number of individuals 'who used to be tracked for mental health treatment are now

Figure 4. Institutionalisation in the United States (per 100,000 adults)²⁷



26 Adaora A. Adimora and Victor J. Schoenbach, 'Social Context, Sexual Networks, and Racial Disparities in Rates of Sexually Transmitted Infections,' *Journal of Infectious Diseases* 191 (2005): 115-22.

27 Source: Harcourt <http://www.law.uchicago.edu/files/files/institutionalized-final.pdf>

28 Atul Gawande, 'Hellhole,' *New Yorker*, March 30, 2009; Jeffrey L. Metzner and Jamie Fellner, 'Solitary Confinement and Mental Illness in U.S. Prisons: A Challenge for Medical Ethics,' *Journal of the American Academy of Psychiatry and the Law* 38(1) (2010).

getting a one-way ticket to jail.²⁹ A US Justice Department study released in September 2006, found that 56 percent of those in state prisons (and a higher proportion of those in local jails) reported mental health problems within the past year.³⁰ Harcourt writes that, 'over the past 40 years, the United States dismantled a colossal mental health complex and rebuilt – bed by bed – an enormous prison'.³¹ However there is a growing movement in the US and elsewhere to establish mental health courts to deflect these cases (often with dual diagnosis of substance abuse) to alternatives to prisons, with some positive results now being seen.³² But this system is also very limited due to severe shortages of properly trained and supervised mental health personnel and inadequate budgets.

MINIMISING THE PROBLEMS OF INCARCERATION

A number of trends in US mass incarceration are important to consider in any prescriptive approach to policy in other countries and serve as a guide to those prison and incarceration policies for drugs offences that can be extrapolated across borders so other countries don't make the same mistakes.

Punitive Isolation and Solitary Confinement

The United States, with only five percent of the world's population (and 25 percent of its prisoners) now has over half of all the world's prisoners who are in long-term solitary confinement. More than 25,000 inmates are permanently in isolation in US 'supermax' prisons (short for 'super-maximum security'), where they may spend years locked in small, often windowless cells with solid steel doors, let out for showers and solitary exercise in a small, enclosed space once or twice each week. A report by Human Rights Watch found that supermax prisoners have almost no access to educational or recreational activities and are usually handcuffed, shackled and escorted by two or three correctional officers every time they leave their cells.³³ Supermax prisons were ostensibly designed to house the most violent or dangerous inmates – 'the worst of the worst'.

In the US the trend toward more long-term solitary confinement is inseparable from the explosive growth of mass incarceration. In 2009, Harvard surgeon Atul Gawande published a startling article about the use of solitary confinement in American prisons, noting that in the US '[t]he wide-scale use of isolation is, almost exclusively, a phenomenon of the past twenty years'.³⁴ Indeed, sustained isolation has now become institutionalised as a cornerstone of America's criminal justice system and its requirement for extreme sanctions to handle the huge population of prisoners.

Women and Prisons

Women's healthcare needs, always more prominent than those of young males, are also typically inadequately addressed in prisons. In addition to facing all the routine gynaecological, reproductive and nutritional issues of all women, the overwhelming majority of women in prisons are survivors of violence and trauma.³⁵ Further, more than 60 percent of incarcerated women are parents, who must deal with separation from their children and families, along with depression, anxiety and low self-esteem. Not surprisingly, incarcerated women suffer from serious mental illnesses at much higher rates than male inmates.

In the US over the last 25 years the number of women and girls caught in the criminal justice system has risen dramatically – with more than 200,000 women behind bars and more than 1 million on probation and parole. The percentage of women behind bars increased by 757 percent between 1977 and 2004, twice the increase of the incarcerated male population during the same period. The number of women in prison – along with the number of women giving birth in prison – continues to rise each year. Few get the services they need. Notably, despite the persistence of racial disparities, white women are the now among the US groups with the fastest growth rate in US prison systems. The increased incarceration of women for drug offences has, in some states, also served as a proxy for efforts to ban abortions.³⁶

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- 29 Bernard E. Harcourt, 'Cruel and Unusual Punishment,' in *Encyclopedia of the American Constitution*, Supplement II, ed. Leonard Levy, Kenneth Karst and Adam Winkler (New York: Macmillan, 2000); Bernard E. Harcourt, 'The Mentally Ill, Behind Bars,' *New York Times*, January 15, 2007, http://www.nytimes.com/2007/01/15/opinion/15harcourt.html?_r=0.
 - 30 D. J. James and L.E. Glaze, 'Mental Health Problems of Prison and Jail Inmates,' US DOJ, *Bureau of Justice Statistics* (Washington, DC, 2006), <http://www.bjs.gov/content/pub/pdf/mhppji.pdf>.
 - 31 Harcourt, 'The Mentally Ill, Behind Bars'.
 - 32 V.A. Hiday, H. W. Wales and B. Ray, 'Effectiveness of a Short-Term Mental Health Court: Criminal Recidivism One Year Postexit,' *Law and Human Behavior* (2013).
 - 33 *Supermax Prisons: An Overview* (Human Rights Watch Report, 2000), <http://www.hrw.org/reports/2000/supermax/Sprmx002.htm>.
 - 34 Gawande, 'Hellhole'.
 - 35 Diane C. Hatton and Anastasia A. Fisher, eds. *Women Prisoners and Health Justice: Perspectives, Issues, and Advocacy for an International Hidden Population* (Oxford: Radcliffe, 2009); Pamela M. Diamond et al., 'The Prevalence of Mental Illness in Prison,' *Administration and Policy in Mental Health and Mental Health Services Research* 29 (1) (2001).
 - 36 Lynn M. Paltrow, 'Roe v Wade and the New Jane Crow: Reproductive Rights in the Age of Mass Incarceration,' *American Journal of Public Health* 103(1) (2013): 17-21.

The use of privately contracted security corporations is growing worldwide.³⁷ The UK was Europe's first country to establish prisons run by the private sector (Wolds Prison opened in 1992) under the government's Private Finance Initiative contracts.³⁸ There are now 14 prisons in England and Wales operated under contract by private companies with a total combined capacity of about 13,500 prisoners or approximately 15 percent of the entire prison population. There are also two privately run prisons in Scotland and nine contracts to run private prisons are currently under consideration in England and Wales.

The US led the movement to employ private firms to operate state prisons and, with the world's largest prison system, now leads in the proportion of its facilities contracted to private firms. While 50 percent of the US state prison systems (with a total of 1.2 million inmates) currently use no privately-operated prison services, the 25 states that do now rely on private services for over 25 percent of their operations are located mainly in Southern and Western states. As of December 2000, there were 153 private correctional facilities operating in the US with a capacity of over 119,000.³⁹ Prison privatisation is an aggressively entrepreneurial business – working to increase its market and buying entire prisons from cash-strapped states in exchange for 20-year management contracts and a guaranteed occupancy rate of 90 percent. Critics argue that the contractual obligations of states to fill the prisons to 90 percent occupancy are poor public policy and end up costing taxpayers more than state-run prisons would.⁴⁰

CONCLUSION

The rapid rise in incarceration in the US and several other countries from the 1970s through the 2000s has often been driven by the incarceration of drug users. As discussed above, these policies have had very broad effects. They have impacted those imprisoned but also their families and communities. The expansive reach of 'mass incarceration' and its collateral effects has been accompanied in many cities by increased contact between citizens and law enforcement, increases in the time and financial impositions on individuals awaiting trial, a decline in the quality of correctional health care and a reduction in available services for formerly incarcerated individuals. These complex and inter-related patterns show the ways in which imprisonment, human rights and public health are now intimately related. With their growing concentration of vulnerable populations and their relationship to drug markets, immigration, human trafficking, border security and global pandemics associated with sex and drugs (HIV), the international public health significance of criminal justice systems and prisons grows apace.

This examination of prisons through the lens of public health has documented the long- and short-term implications of criminal justice involvement, particularly incarceration, for public safety as well as their economic, social and health effects on society.⁴¹ With this new public health basis of concern, there is renewed professional interest in the possibilities for families, schools and neighborhood institutions to divert individuals from criminal offending, recidivism and the continued risks of jail and prison. The fiscal burdens of incarceration in the US and elsewhere have also animated new efforts to develop and strengthen community-based sanctions as alternatives to custodial ones. These challenges, their individual and collective effects and their concentration within the most vulnerable racial and ethnic minority communities in many nations have motivated an intense re-examination of the 'carceral continuum,' now viewed across the multiple domains of public health, health care and social services.⁴² Most recently, there is renewed interest in sweeping reform of drug criminalisation and ending the continued criminalisation of drug users – including developing programmes of general amnesties for prisoners of the drug wars.⁴³ ■

37 <http://www.justice.gov.uk/publications/corporate-reports>

38 Alan Travis, 'Nine prisons put up for tender in mass privatisation programme,' *The Guardian*, July 13, 2011, <http://www.theguardian.com/society/2011/jul/13/nine-prisons-tender-privatisation-programme>.

39 American Civil Liberties Union Report : *Banking on Bondage: Private Prisons and Mass Incarceration*, November 2, 2011, <https://www.aclu.org/prisoners-rights/banking-bondage-private-prisons-and-mass-incarceration>

40 Chris Kirkham 'With States Facing Shortfalls, Private Corporation Offers Cash For Prisons,' *Huffington Post*, February 14, 2012, http://www.huffingtonpost.com/2012/02/14/private-prisons-buying-state-prisons_n_1272143.html; 2012 Solicitation letter from CCA <http://big.assets.huffingtonpost.com/ccaletter.pdf>

41 Ernest Drucker, 'Prisons: From Punishment to Public Health' in *Oxford Textbook of Public Health*, 6th Edition, 2014.

42 C. Shedd, 'Countering the carceral continuum. The legacy of mass incarceration,' *Criminology and Public Policy - Special Issue on Mass Incarceration* 10 (3) (2011): 865–871.

43 E. Drucker and M. Trace, 'An Amnesty for Prisoners of the War on Drugs,' *Huffington Post*, September 22, 2013, http://www.huffingtonpost.com/ernest-drucker/an-amnesty-for-prisoners-_b_3957493.html.

Costs and Benefits of Drug-Related Health Services

Joanne Csete

Health services for people who use drugs are important on many levels. In addition to the clinical benefits to the individual and the benefit to the community of reducing drug-related harms such as HIV and drug-related crime, they represent an alternative to arrest and detention for some offenses and thus are a possible starting point for developing less repressive drug policies. In spite of a significant body of evidence that drug-related health services are a very good investment for society, they remain woefully underfunded and unavailable.

Summary

- Governments should ensure that health services for people who use drugs (at adequate scale) are a priority for public resource allocation. These services currently have a very low availability relative to need.
- Governments should develop standards and monitoring systems to ensure good-quality health services for people who use drugs in both public and private sector facilities. Further, they should not impede those services.
- Governments should ensure that police do not interfere with health service provision. They should, for example, not use numbers of arrests of drug users as a basis for police compensation or performance review. Police, prosecutors and judges should be trained on the importance of basic health services for people who use drugs.
- Governments may find it useful to invest in benefit-cost studies of these services and should inform the public and legislators in user-friendly ways of their benefits.
- In multilateral bodies, health services for people who use drugs are in dire need of member state champions. United Nations agencies, especially WHO and UNAIDS, have commissioned research and made statements in support of most of these services, but international debates remain dominated by positions based on fear and ideology rather than evidence.

The policy approach to drug control in most countries features heavy spending on policing, interdiction of drugs, judicial processes and incarceration. In the United States, for example, it is estimated that about \$50 billion a year from state and federal budgets goes to drug control, of which the majority is devoted to law enforcement and interdiction.¹ One estimate of drug-related law enforcement expenses globally puts the figure at about \$100 billion per year.² Drug-related health and social services are nonetheless often underfunded and inadequate to meet the need. Treatment for drug dependence, for example, is frequently inaccessible or unaffordable to people who need it, and this service may not exist without (often grudging) public sector support. Millions of people who need them are without services to protect themselves from injection-related harms, such as provision of sterile injecting equipment and medicines, such as methadone, that stabilise cravings and do not require injection.³

Good-quality treatment for drug dependence and drug-related harm reduction services have been widely studied and can be life-saving for those fortunate enough to have access to them. The clinical evidence for effectiveness of these measures, particularly with respect to outcomes such as averting HIV or hepatitis C transmission, is very strong. The purpose of this contribution is to review the evidence that they also have a larger economic and social value – that is, to assess their costs and benefits in a broad sense, including with respect to social outcomes such as crime reduction.

- 1 See US Office of National Drug Control Policy, 'The National Drug Control Budget FY 2103 Funding Highlights' and Drug Policy Alliance, 'The Federal Drug Control Budget: New Rhetoric, Same Failed Drug War,' 2013, http://www.drugpolicy.org/sites/default/files/DPA_Fact%20Sheet_Federal%20Drug%20War%20Budget.pdf
- 2 Count the Costs, 'The war on drugs: Wasting billions and undermining economies,' <http://www.countthecosts.org/sites/default/files/Economics-briefing.pdf>.
- 3 Bradley Mathers, Louisa Degenhardt, Hammad Ali, Lucas Wiessing et al., 'HIV prevention, treatment and care services for people who inject drugs: a systematic review of global, regional and national coverage,' *Lancet* 375 (2010): 1014-1028.

BASIC IDEAS: COST OF DRUG USE AND PROMISE OF TREATMENT

Not all drug use is problematic, and thus not all drug use requires a health service response. The most recent annual report of the UN Office on Drugs and Crime (UNODC) uses the rough estimate that globally 167 to 315 million persons aged 15-64 used illicit substances.⁴ The large range of the estimate reflects the paucity of countries with population-based surveys that would allow more precise estimates and the fact that people who use drugs are highly criminalised in many places and thus may be hidden from surveys. UNODC defines 'problem drug use' to include people who inject drugs and people who are diagnosed with drug dependence or other drug-related disorders. It estimated that in 2011 there were 16 to 29 million persons whose drug use was problematic, less than 10 percent of the total of people who use drugs.⁵ Thus, part of the challenge of drug-related health services is to target those most in need of services and ensure that the services are effective and readily accessible. (A corresponding challenge of economic importance is to ensure that people who use drugs but do not have problematic use are not obliged or otherwise directed into services that they do not need.)

Treatment for drug addiction takes many forms – residential and non-residential, assisted by medications such as methadone or not, '12-step' programmes and other group support approaches, behavioural and cognitive therapies, and many others. It is plain from clinical experience, as noted by the World Health Organization (WHO) and UNODC, that while all of these have some record of success for some people, none is effective 100 percent of the time.⁶ It is common for people with drug dependence, if they have varied services available to them, to attempt several forms of therapy before finding the one that succeeds for them, whether 'success' is judged as complete abstinence or less problematic drug use. There is also evidence from many settings to suggest, not surprisingly, that drug treatment combined with support in the form of stable housing, food assistance and support to family members has the greatest chance of success.⁷ Based on evidence to date, it is safe to say that drug treatment (combined or not with some form of social support) can reduce problematic drug consumption and thus the costs associated with it, and we take that as a point of departure in this contribution.

Cost-benefit analysis – comparison of the cost of an intervention or programme to a monetary estimate of its benefit – is an essential tool for evaluation of health interventions. (The technique of cost-benefit analysis produces results usually expressed as benefit-cost ratios – that is, an estimate of the benefits derived divided by the cost incurred. Positive net benefits are indicated by benefit-cost

ratios greater than one.) It is important to assess costs and benefits of treatment of drug dependence, not least because many of the people needing this intervention are reliant on publicly supported treatment, thereby making it particularly susceptible to political controversy.⁸ While many studies demonstrate the clinical benefit to the individual of various forms of treatment for drug dependence, consideration of social and economic costs has generated a smaller literature. Indeed, the multifaceted nature of the costs of drug dependence and benefits of reducing it pose considerable methodological challenges, a full treatment of which is beyond the scope of this contribution. For our purposes, it is useful to note that WHO, recognising these challenges, has established guidelines suggesting that quantifying the economic impact of drug use on society should include assigning monetary value to the following costs:

WHO: 'Tangible' elements of economic impact of problematic drug use

- Health, social and welfare services (i.e. reduced drug dependence should result in a lower burden of health and social services related to drug dependence).
- Productivity loss in the workplace and the home.
- Drug-related crime, law enforcement and criminal justice.
- Road accidents.
- Cleaning up the environment (e.g. of unsafely discarded injection equipment).
- Research and prevention activities.⁹

These are the categories of 'tangible' cost; loss of life, pain and suffering are noted by WHO as intangible costs. WHO's guidelines then seek to consider the various measurement challenges, necessary simplifying assumptions and other elements of putting cost figures on the tangible items in an effort to enable national governments to make estimates that will be comparable to some degree.

For some of these items, methodological debates will possibly never be completely settled. Quantifying crime-related costs, for example, includes obvious criminal justice activities, including incarceration (though drug-related activities may not always be distinguished); costs of drug-related crime to individuals, including material loss and loss of time and productivity; and the 'esoteric and ephemeral' costs to the legitimate economy of the human resources represented by people who are involved with drug trafficking or other drug-related crimes.¹⁰ It is recognised that for many of these elements, there will not be good data

4 UN Office on Drugs and Crime, *World Drug Report 2013* (Vienna: United Nations, 2013), appended fact sheet, http://www.unodc.org/doc/wdr/Fact_Sheet_Ch1_2013.pdf

5 Ibid.

6 WHO and UNODC, 'Principles of drug dependence treatment: discussion paper.' (Vienna: United Nations, 2008), <https://www.unodc.org/documents/drug-treatment/UNODC-WHO-Principles-of-Drug-Dependence-Treatment-March08.pdf>.

7 Ibid.

8 Susan L. Ettner, David Huang, Elizabeth Evans, Danielle Rose Ash et al., 'Cost-benefit in the California Treatment Outcome Project: does substance abuse treatment 'pay for itself?,' *Health Research and Educational Trust* 41 (2005):193-194.

9 Eric Single et al., *International guidelines for estimating the costs of substance abuse*, 2nd ed. (Geneva: World Health Organization, 2004).

10 Single et al., 59-62.

in even the best-organised jurisdictions, and simplifying assumptions will be necessary. In addition, WHO experts note that many drug-related crimes, particularly assaults and thefts, are habitually under-reported by victims and thus not captured in official data.¹¹ Ideally, moreover, these factors should be studied over a long period, which is rarely possible in practice.

METHODS

This contribution benefits from a number of careful reviews of cost-benefit and cost-effectiveness studies of health services for people who use drugs, particularly of treatment for drug dependence, which were complemented with an updated search of cost-benefit and cost-effectiveness studies of drug-related health services.¹²

COSTS AND BENEFITS OF TREATMENT OF DRUG DEPENDENCE

An important review of 11 cost-benefit analyses published before 2003, all of them conducted in the United States, included only published peer-reviewed studies that attempted cost-benefit analyses of one or more of these factors: crime, health services utilisation, employment earnings and expenditure on illicit drugs and alcohol.¹³ The authors note, in sum:

- The average total net benefit accruing from all categories of cost reductions estimated over the 12-month period was \$42,905. The average benefit-cost ratio for studies in which it was calculated was 8.9, ranging from 1.33 to 23.33.
- The greatest economic benefit was in reduced criminal activity, over half of the total.
- The economic benefit of savings on health services averted was about 15 percent of the total, and of increased employment earnings was about 13 percent. The authors note that the latter, measured only as actual in-pocket earnings, probably underestimates the importance of having any kind of stable employment as a determinant of long-term 'success'.¹⁴

Since that review, there have been a number of interesting attempts to estimate social costs and benefits of treatment. Using data from 43 treatment facilities in the state of California supplemented by surveys, Ettner and colleagues used WHO guidelines to assess the benefits of treatment with respect to medical care, criminal activity, earnings of people treated and welfare programme (government transfer) payments.¹⁵ Their finding was that treatment cost an average \$1,583 per person but benefited society at the level of \$11,487, a 7:1 ratio.¹⁶ As in the earlier review, the authors estimate that the greatest savings – 65 percent – were in lower crime-related costs, with 29 percent attributable to increased earnings and six percent due to reduced medical costs. They suggest that the actual benefit-cost ratio is probably closer to 9:1 because of the use of arrests as a proxy for crime, given that many crimes do not ever result in an arrest.¹⁷

A study that focused narrowly on costs related only to robbery looked at several forms of treatment for drug dependence in the United States.¹⁸ Across all forms of treatment, being in treatment was associated with a reduction in robbery incidence of at least 0.4 robberies per patient per year. The authors conclude: 'Given reasonable valuations associated with averting, at the margin, a single armed robbery, this one component of benefit may be large enough to offset the economic costs' of drug treatment.¹⁹ They further note that while residential treatment is generally considerably more expensive than outpatient care, the greater benefit of residential programmes in averting crime may 'more than offset' the added cost.²⁰ Policymakers and service providers alike may tend to favour support for drug treatment programmes that admit older, more educated patients with no criminal record and no psychiatric disorders, but the results of this study suggest that much greater social benefits would derive from expanding treatment access for those patients with a propensity to commit crimes.²¹

11 Ibid., 60-61.

12 Kathryn E. McCollister and Michael T. French. 'The relative contribution of outcome domains in the total economic benefit of addiction interventions: a review of first findings,' *Addiction* 98 (2003): 1647-1659; Louisa Degenhardt, Bradley Mathers, Peter Vickerman, Tim Rhodes et al. 'Prevention of HIV infection for people who inject drugs: why individual, structural and combination approaches are needed,' *Lancet* DOI:10.1016/S0140-6736(10)60742-8; Daniel Wolfe, M. Patrizia Carrieri and Donald Shepard, 'Treatment and care for injecting drug users with HIV infection: a review of barriers and ways forward,' *Lancet* DOI:10.1016/S0140-6736(10)60832-X; Center for Health Program Development and Management, 'Review of cost-benefit and cost-effectiveness literature for methadone or buprenorphine as a treatment for opiate addiction,' Baltimore, 9 May, 2007.

13 McCollister and French, op. cit.

14 Ibid., 1655.

15 Ettner et al., 196.

16 Ibid., 205.

17 Ibid., 204, 206.

18 Anirban Basu, A. David Paltiel and Harold A. Pollack, 'Social costs of robbery and the cost-effectiveness of substance abuse treatment,' *Health Economics* (2008): 927-946.

19 Ibid., 939.

20 Ibid., 939-940.

21 Ibid., 940.

Opioid Substitution Therapy (OST)

In part because of its link to HIV prevention and its long clinical track record, one of the most widely studied forms of treatment for drug dependence is medication-assisted therapy for opiate addiction, also called opioid maintenance treatment or opioid substitution treatment (OST hereinafter). Opium-derived medicines, especially methadone and buprenorphine, can be administered daily by mouth – thus obviating injection – and can stabilise cravings of people with opiate dependence. As UN agencies have noted, this therapy can enable people to hold jobs and eliminate the need to commit crimes to obtain illicit opiates, as well as reducing heroin use, heroin overdose, overdose mortality and reducing other injection-related harms.²² UN agencies have promoted OST as a central element of HIV prevention where illicit opiate use is significant because OST ‘can decrease the high cost of opioid dependence to individuals, their families and society at large by reducing heroin use, associated deaths, HIV risk behaviours and criminal activity’.²³ They also note that it may be optimal for some patients to continue OST indefinitely,²⁴ a response to the misinformed but still widely held view that methadone therapy should always be of limited duration as a bridge to abstinence from all opiates.²⁵

OST is limited and stigmatised in many countries and banned outright in a few (notably the Russian Federation).²⁶ In spite of OST’s track record of successful treatment of heroin addiction that dates from the late 1960s, some practitioners and policymakers deride it as substituting one addiction for another. The potential for diversion of methadone and buprenorphine to illicit markets also means that their medical use must be carefully controlled and the costs of that control figured into assessments. In many countries, including the US, the administration of methadone must be directly observed – that is, patients must come to a health facility every day and take their medicine in front of a health professional – an enormous inconvenience to the patient and a practice with considerable other costs. Buprenorphine, particularly in a formulation in which it is combined with the opioid antagonist naloxone, is considered to have a lower potential for diversion to illicit use, and in many places it is possible to receive take-home doses rather than requiring daily direct observation.

‘...for every one dollar invested in NSPs (2000-2009), \$27 is returned in cost savings. This return increases considerably over a longer time horizon.’

Because drug injection is associated with high risk of transmission of HIV, a very expensive disease to treat, some cost-benefit studies of OST count benefits mainly in savings from HIV cases averted. In spite of hard-won victories in lowering the cost of HIV treatment, HIV remains quite expensive to treat.²⁷ In addition, HIV transmission through injection with contaminated equipment is much more efficient than sexual transmission; even a very small number of injections poses a high risk.²⁸ Given the high cost of HIV treatment, as some experts have noted, OST expansion carries a benefit so substantial as to be self-justifying ‘regardless of what assumptions are made about the effect of opiate dependence or methadone prescription on the quality of life’.²⁹ Reviewing the research on OST in 2004, WHO, UNAIDS and UNODC summarised it as follows:

According to several conservative estimates, every dollar invested in opioid dependence treatment programmes may yield a return of between \$4 and \$7 in reduced drug-related crime, criminal justice costs and theft alone. When savings related to health care are included, total savings can exceed costs by a ratio of 12:1.³⁰

Most studies of the cost and benefit of OST have been undertaken in countries of the global North. Recently, however, a number of studies from Asia have made cost-benefit calculations of OST, though generally only of benefits related to averting cases of HIV. A 2012 study in Dehong (Yunnan), China estimated that against a per-patient cost of OST of \$9.10-16.70 per month over the 30-month period followed, methadone programmes averted HIV cases of which the cost would have been a net \$4600 per

22 World Health Organization, UN Office on Drugs and Crime and UNAIDS (UN Joint Programme on HIV/AIDS), ‘WHO/UNODC/UNAIDS position paper: Substitution maintenance therapy in the management of opioid dependence and HIV/AIDS prevention,’ Geneva, 2004, <http://www.unodc.org/documents/hiv-aids/Position%20Paper%20sub.%20maint.%20therapy.pdf>

23 Ibid., 1.

24 Ibid.

25 See, for example, Charles Winick, ‘A mandatory short-term methadone-to-abstinence program in New York City,’ *Mount Sinai Journal of Medicine* 68(2001): 41-45; the Manhattan and Brooklyn drug treatment courts in New York City as of 2013 require participants to use methadone only as a short-term bridge to abstinence.

26 Mathers et al., op.cit.

27 HIV treatment costs vary considerably based on the percentage of patients who may have developed resistance or intolerable side effects to generic first-line medicines, as well as whether countries have access to generic forms of some medicines. The cost of a WHO-recommended first-line regimen was about \$112 per patient per year in 2012. Second-line regimens cost on average about \$450 per person per year in 2012, but much more in the US and other high-income countries. The cost of third-line treatments was \$13,225 per person per year in Georgia, \$7,782 in Paraguay, \$8,468 in Armenia, and \$4,760 in Thailand. See World Health Organization, ‘Global update on HIV treatment 2013: results, impacts and opportunities,’ Geneva, United Nations, 99-100, http://apps.who.int/iris/bitstream/10665/85326/1/9789241505734_eng.pdf.

28 One review of the research indicates that HIV risk from one episode of vaginal (male-female) sex is as low as 0.05 percent (or 1 in 2000) while injection with contaminated equipment carries a risk of about 0.7 percent or 0.8 percent. Government of Canada, Public Health Agency, ‘HIV transmission risk: a summary of evidence,’ Ottawa, 2013, <http://www.phac-aspc.gc.ca/aids-sida/publication/hivtr-rtvih-eng.php>.

29 Paul G. Barnett and Sally S. Hui, ‘The cost-effectiveness of methadone maintenance,’ *Mount Sinai Journal of Medicine* 67 (2000): 371.

30 World Health Organization, Joint UN Programme on HIV/AIDS (UNAIDS) and UN Office on Drugs and Crime. ‘Position Paper: Substitution Maintenance Therapy in the Management of Opioid Dependence and HIV Prevention,’ Geneva, United Nations, 2004.

case to treat.³¹ A similar study over a five-year period estimated that OST programmes in the Xinjiang, China averted over 5600 HIV infections that would have incurred a cost to the health system of over \$4.4 million in the same period.³² These studies obviously rely on assumptions about risks of HIV transmission faced by people who inject drugs, mostly extrapolations from previous periods. They notably did not calculate the costs of sexual transmission of HIV to people who do not inject drugs and so probably underestimate the benefits accrued.

A special category of treatment of drug dependence is the legal administration of medicinal heroin available in a few countries, generally only for small numbers of people with long-standing addictions who, for various reasons, have not benefited from other therapies. A review of evaluations of heroin-assisted treatment in Switzerland, Germany, the Netherlands, Spain, Canada and the UK concluded that these programmes have generally demonstrated considerable benefits through the reduction of criminal activities among these patients, decline in use of illicitly obtained drugs and decline in risky injection.³³ One study of the Swiss experience indicated that the incidence of the crimes of burglary, muggings and drug trafficking declined between 50 to 90 percent among people in the prescription heroin programme, depending on the crime, but did not attempt to assign costs to this reduction.³⁴ It is not expected that this intervention would ever be offered on a mass scale, but it illustrates the principle of achieving significant benefits by reaching those associated with the most problematic use.

OTHER SERVICES FOR PEOPLE WHO USE DRUGS

Needle and Syringe Programmes (NSPs)

Programmes that furnish clean injection equipment to people who inject drugs are proven to be extremely effective with respect to prevention of HIV. The review commissioned by WHO of the extensive research on this subject shows, in fact, that these programmes, most often established as needle exchanges (whereby used injection equipment can be exchanged for sterile equipment), are among the most effective and cost-effective programmes in the HIV prevention arsenal.³⁵ These programmes should not be expected to have the range of potential social benefits that are associated with treatment of drug dependence since they do not necessarily reduce drug use or addiction, though

they may present important opportunities for referral to treatment services and other social support – an element that has not been extensively evaluated economically in the published literature.

A 2010 review of cost studies – mostly cost-effectiveness rather than cost-benefit – concluded that if averting HIV cases could be demonstrated, as they were convincingly in a number of studies, the benefit-cost ratio of these programmes should be expected to be very high because the programmes tend to cost

As of 2012, there were about 500 overdose episodes that occurred among people using Insite but no deaths, whereas the neighbourhood of Insite was previously known for frequent overdose-related incidents and deaths on the street.

little, and HIV care is expensive.³⁶ A widely cited study by the government of Australia drew the following conclusion about these programmes across the country:

For every one dollar invested in NSPs, more than four dollars were returned (additional to the investment) in healthcare cost-savings in the short term (10 years) if only direct costs are included; greater returns are expected over longer time horizons....If patient/client costs and productivity gains and losses are included in the analysis, then...for every one dollar invested in NSPs (2000-2009), \$27 is returned in cost savings. This return increases considerably over a longer time horizon.³⁷

As noted above, NSP programmes reach people who are actively injecting and who are more likely than non-injectors to have drug-related health problems, and NSP staff can provide a link to other health services and counselling. A 2010 review in *The Lancet* concluded that if the desired outcome is HIV control, the greatest cost-effectiveness and benefit-cost will be achieved by high coverage of both these interventions in combination with high coverage of HIV treatment, even though the last element

- 31 Yan Xing, Jiangping Sun, Weihua Cao, Liming Lee et al., 'Economic evaluation of methadone maintenance treatment in HIV/AIDS control among injection drug users in Dehong, China,' *AIDS Care* 24 (2012): 756-762.
- 32 Mingjian J. Ni, Li Ping Fu, Xue Ling Chen et al., 'Net financial benefits of averting HIV infections among people who inject drugs in Urumqi, Xinjiang, People's Republic of China (2005-2010),' *BMC Public Health* 2012, 12:572, <http://www.biomedcentral.com/1471-2458/12/572>.
- 33 Benedikt Fischer, Eugenia Oviedo-Joekes, Peter Blanken, Christian Haasen et al., 'Heroin-assisted treatment (HAT) a decade later: a brief update on science and politics,' *Journal of Urban Health* 84 (2007): 552-562.
- 34 Martin Killias, Marcel F. Aebi and Denis Ribeaud, 'Key findings concerning the effects of heroin prescription on crime,' in *Heroin-assisted treatment: work in progress* eds. Margret Rihs-Middel, Robert Hämmig and Nina Jacobshagen (Bern: Verlag Hans Huber, 2005).
- 35 Alex Wodak and Annie Cooney, 'Effectiveness of sterile needle and syringe programming in reducing HIV/AIDS among injection drug users – Evidence for Action Technical Paper,' Geneva, World Health Organization, 2004, <http://whqlibdoc.who.int/publications/2004/9241591641.pdf>
- 36 Degenhardt et al., 35-36.
- 37 Government of Australia, National Centre in HIV Epidemiology and Clinical Research 'Return on investment 2: evaluating the cost-effectiveness of needle and syringe programs in Australia,' 2009, [http://www.health.gov.au/internet/main/publishing.nsf/Content/C562D0E860733E9FCA257648000215C5/\\$File/retexe.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/C562D0E860733E9FCA257648000215C5/$File/retexe.pdf).
- 38 Degenhardt et al., 30.

is very costly in most places.³⁸ The authors bemoan the low availability of all these services for many people who use drugs, which is linked to the stigma they face and their fear of using services that may result in their drug use being brought to the attention of the police.³⁹

Needle and syringe programmes may yield particularly high returns in prison settings. Countries including Germany, Switzerland, Spain, Moldova, Belarus, Luxembourg, Romania and Kyrgyzstan have programmes that furnish clean injection equipment in prison,⁴⁰ an intervention that requires the politically courageous recognition that in spite of even the best efforts to stop it, drug injection occurs in prisons. All of those programmes studied have had dramatic results in reducing transmission of HIV and in some cases hepatitis C, though benefit-cost ratios have not been calculated.⁴¹ Since treating HIV among prisoners is the responsibility of the state and could be a long-term responsibility, the cost savings from HIV and hepatitis cases averted are likely to be considerable. OST is offered in prison in some countries, where it has an excellent track record (directly observed administration is facilitated by the prison environment), but many countries that offer OST in the broader community still do not offer it in prisons.⁴²

Supervised Injection Facilities

Some countries committed to comprehensive HIV services for people who use drugs also authorise so-called supervised or safe injection facilities, places where people can inject illicit drugs with clean equipment in the presence of health professionals. These facilities exist in many western European countries – Germany, the Netherlands and Switzerland were pioneers – as well as Canada and Australia.⁴³ The facility in Vancouver, Canada, called Insite, has been extensively studied by public health and social science researchers. As of 2012, there were about 500 overdose episodes that occurred among people using Insite but no deaths,⁴⁴ whereas the neighbourhood of Insite was previously known for frequent overdose-related incidents

and deaths on the street. In addition, a 2011 study found that not only was overdose mortality averted in the facility itself, but in a 500-metre radius of Insite, overdose episodes dropped by 35 percent in the first years of the facility's operation, compared to a nine percent decline in the rest of the city.⁴⁵ In benefit-cost terms, a 2010 study that made conservative assumptions about overdose mortality, other overdose complications and HIV cases averted estimated a benefit-cost ratio for Insite of about 5:1 or in monetary terms about \$6 million a year.⁴⁶

Drug Treatment Courts

A number of countries, particularly the US and Canada, have invested in specialised drug courts or drug treatment courts in which some alleged offenders can be diverted to court-supervised treatment programmes as an alternative to incarceration. Drug courts in the US have been extensively evaluated, mostly on the criterion of criminal recidivism. The US model of courts raises a number of questions, including the due process issue of requiring people to plead guilty to whatever charge is before them as a condition of being diverted to treatment, the question of whether treatment should ever be coercive in any sense, and the fact that many courts refuse OST as a treatment option in spite of great need for it.⁴⁷ An extensive drug court evaluation supported by the US Department of Justice included a cost-benefit calculation that assigned monetary values to components of a broad definition of benefits, including social and economic productivity of drug court participants, welfare programme savings, and criminal justice and health service savings and compared them to drug court costs, which are generally well documented.⁴⁸ Their sophisticated analysis, involving many well-specified assumptions, concluded that drug courts in the US carry a benefit-cost ratio of 1.92:1.⁴⁹ At this writing, the US is promoting drug courts heavily as part of its international drug control programmes.

Drug treatment courts have potentially large economic benefits in theory from incarceration costs averted, but not if their rules

39 Ibid.

40 See Rick Lines, Ralf Jürgens, Glenn Betteridge et al., 'Prison needle exchange: lessons from a comprehensive review of international evidence and experience,' (Toronto: Canadian HIV/AIDS Legal Network, 2006), <http://www.aidslaw.ca/publications/interfaces/downloadFile.php?ref=1173>; and Ingo Ilya Michels and Heino Stöver, 'Harm reduction – from a conceptual framework to practical experience: the example of Germany', *Substance Use and Misuse* 47 (2012): 910-922.

41 Lines et al., *ibid.*

42 Kate Dolan, Ben Kite, Emma Black et al., 'HIV in prison in low-income and middle-income countries,' *Lancet Infectious Diseases* 7 (2007): 32-41.

43 Harm Reduction International, *Global state of harm reduction 2012: toward an integrated response*, London, 2012, http://www.ihra.net/files/2012/07/24/GlobalState2012_Web.pdf.

44 Vancouver Coastal Health, 'Supervised Injection Site – User Statistics,' http://supervisedinjection.vch.ca/research/supporting_research/user_statistics

45 Brandon D.L. Marshall, M-J Milloy, Evan Wood, Julio Montaner and Thomas Kerr, 'Reduction in overdose mortality after the opening of North America's first medically supervised safer injection facility: a retrospective population-based study,' *Lancet* 377 (2011): 1429-1437.

46 Martin A. Andresen and Neil Boyd, 'A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility,' *International Journal of Drug Policy* 21 (2010): 70-76.

47 Ryan S. King and Jill Pasquarella, 'Drug courts: a review of the evidence,' (Washington, DC: The Sentencing Project, 2009), http://www.sentencingproject.org/doc/dp_drugcourts.pdf; and Drug Policy Alliance, 'Drug courts are not the answer: toward a health-centered approach to drug use,' New York, 2011, http://www.drugpolicy.org/sites/default/files/Drug%20Courts%20Are%20Not%20the%20Answer_Final2.pdf.

48 P. Mitchell Downey and John K. Roman, 'Chapter 9 – Cost-benefit analyses,' in Shelli B. Rossman, John K. Roman, Janine M. Zweig et al., eds. *The multi-site adult drug court evaluation: the impact of drug courts*. (Washington, DC: Urban Institute, 2011), 228-250.

are so onerous or their protection of due process so flawed as to make them unattractive to a significant percentage of those who might benefit from them. In places where opiate addiction is a public health problem, drug courts should follow the recommendation of the board of the US National Association of Drug Court Professionals and allow OST as a treatment alternative likely to be essential for many participants.⁵⁰

CONCLUSION

In spite of methodological challenges, a significant body of evidence shows that health services for people who use drugs have significant social and economic benefits, including reduction of crime and increasing the ability of people who have lived with addiction to be economically productive. This evidence has figured insufficiently in policy and resource allocation decision-making on drugs, apparently frequently overshadowed by political factors. These services should be a high priority for fiscally-minded governments, which should especially ensure that they are not undermined, for example, by policing that targets health or needle exchange facilities to find drug users to fill arrest quotas, or by undue 'not in my backyard' neighbourhood opposition to the placement of drug treatment clinics. Moreover, drug-related health services derive the greatest benefits when they target marginalised people with a propensity to commit crime, in spite of the obvious political challenges posed by directing funding toward these individuals. ■

49 Ibid., 247.

50 National Association of Drug Court Professionals: *Resolution of the Board of Directors on the availability of medically assisted treatment (M.A.T.) for addiction in drug courts*, 17 July 2011, <http://www.nadcp.org/sites/default/files/nadcp/NADCP%20Board%20Statement%20on%20MAT.pdf>

Lawful Access to Cannabis: Gains, Losses and Design Criteria

Mark A.R. Kleiman¹ and Jeremy Ziskind

Much of the current argument about whether to legalise various currently illicit drugs is conducted at a high level of abstraction (morality and health vs. liberty and public safety). The details of post-prohibition policies are barely mentioned and concrete outcomes are either ignored or baldly asserted without any careful marshalling of fact and analysis. But it is possible to try to predict and evaluate – albeit imperfectly – the likely consequences of proposed policy changes and to use those predictions to choose systems of legal availability that would result in better, rather than worse, combinations of gain and loss from the change.

The analysis below focuses on cannabis, the drug for which serious legalisation efforts are now in motion. The difficulty of that analysis will provide some indication of how much more difficult it would be to evaluate the question for ‘drugs’ more generally. Cannabis is the most widely used illicit drug, so its legalisation would influence the largest number – in some countries an absolute majority – of all users of illicit drugs, and eliminate a large number of arrests. But since other drugs dominate drug-related violence and incarceration, many of the costs of the ‘war on drugs’ would remain in place after cannabis legalisation:

Summary

- *Adopt policies that learn.* Policymakers should try out ideas, measure their outcomes and make mid-course corrections accordingly. One extreme version would be to incorporate a ‘sunset’ clause into the initial regulation, requiring a legislative or popular re-authorisation of legal availability after a trial period.
- *Beware commercialisation.* The commercial interest in promoting heavy use will prove difficult to control through taxes and regulations. Not-for-profit-only production and sale on the one hand, and state monopoly on the other, are options to consider before rushing headlong into a replication for cannabis of something resembling the existing alcohol industry.
- *Consider incremental approaches.* Not all initial policies are equally easy to change. In particular, the greater the financial (and therefore political) power of a commercial, for-profit cannabis industry, the harder it will be to make policy adjustments that might reduce the revenues of that industry. Thus, pioneering jurisdictions may want to consider incremental approaches that begin – and might end – with non-profit regimes.
- *Let the experiments run.* The places that legalise cannabis first will provide – at some risk to their own populations – an external benefit to the rest of the world in the form of knowledge, however the experiments turn out. Federal authorities in the United States and other places where states or provinces try to innovate and the guardians of the international treaty regimes would be well advised to keep their hands off as long as the pioneering jurisdictions take adequate measures to prevent ‘exports’.²
- *Prevent price decreases.* Any consumer concerned about cannabis prices is probably using too much.
- *Plan for prevention and treatment.* Abuse will almost certainly go up under legal availability, but prevention and treatment efforts can help to limit the size of that increase and the suffering it creates.
- *Consider user-set quotas and other ‘nudge’ options.* If substance abuse is a ‘disorder of choice,’³ then managing the choice architecture might be one mechanism for preventing and managing that disorder.

1 Mark Kleiman would like to thank GiveWell and Good Ventures for supporting his work on cannabis policy. The views expressed are the author’s and should not be attributed to UCLA, GiveWell or Good Ventures, whose officials did not review this article in advance.

2 James M. Cole, ‘Guidance Regarding Marijuana Enforcement,’ US Department of Justice, Office of the Deputy Attorney General, 29 August 2013, <http://www.justice.gov/iso/opa/resources/3052013829132756857467.pdf>.

3 Gene M. Heyman, *Addiction: A Disorder of Choice* (Harvard University Press, 2010).

a point often omitted by proponents of legalisation as they skip directly from mass incarceration and illicit-market violence as problems to the legalisation of cannabis as a solution. The claims of advocates might be more convincing if they were more restrained.

At the opposite pole from bare assertion either of moral claims (e.g. that drug-taking is inherently wrong, or alternatively that any drug prohibition violates basic human rights) or of factual predictions (about drug abuse or incarceration) lies the project of formal cost-benefit analysis, which aims to weigh all of the gains and losses from a proposed policy change on the same scale: the valuations of the individual gainers and losers, measured by their (hypothetical) willingness to pay to enjoy the gains or avoid the losses. It is possible to imagine doing an elaborate cost-benefit analysis of legalising cannabis,⁴ but doing so in practice would require one to predict the extent of changes in variables that cannot even be accurately measured in the present, and to perform implausible feats of relative valuation (e.g. comparing person-years of incarceration with person-years of cannabis dependency).

The size of the gains from legalisation, and in particular the reduction in the extent of illicit activity and of enforcement effort, would be greater in high-consumption countries such as the United States than it would in the lower-consumption conditions characteristic of most other advanced economies.

Key uncertainties include:

- The demand-side responses to price changes after legalisation, more convenient access, the removal of legal sanctions and the diminution of social stigma.
- The size and direction of changes in abuse risk (the probability of proceeding from casual to problem use).
- Changes in product choice (to more or less risky forms of the drug).
- Effects on the abuse of alcohol and other drugs.

This last set of effects is both important and unknown. In particular, whether alcohol is a substitute for, or instead a complement to, cannabis remains to be ascertained, and the answer might not be the same for all populations and may differ in terms of short-run and long-run effects.

Since the alcohol problem in all countries is much bigger than the cannabis problem, indirect effects on alcohol could overwhelm the direct effects, converting the results of cannabis legalisation from a net gain to a net loss or *vice versa*.

Thus reasonable ranges of difference over valuations and predictions will probably span the break-even point. Moreover, the outcomes of legalisation depend very sharply on details of policy that are usually not specified in the debate.

Thus it seems hard to justify any dogmatic statement that cannabis legalisation would, or would not, be beneficial on balance, without reference to a specific locale and a specific set of post-prohibition policies.

If legalisation is to be tried – as now in Colorado, Washington State and Uruguay, very likely soon in other US states and quite possibly within the next decade in the US on a national level – it ought to be tried in an experimental spirit. Given the huge range of potential gains and losses, and of policy options, the probability of finding the perfect combination right from the start must surely be near zero. Thus the best initial policy will not be the one that comes closest to some calculated optimum, but instead the one easiest to adjust in light of experience, which among other things means building in evaluation and policy feedback mechanisms. The pioneers of cannabis legalisation are all too likely to experience in practice the validity of von Moltke's maxim that no battle plan survives first contact with the enemy.

That is not, of course, a reason not to analyse and to plan, but some of that analysis and planning should involve building in to the process the capacity to improvise in the face of the predictable appearance of unpredicted phenomena.

CATEGORIES OF GAIN AND LOSS

One way to start the analysis would be by cataloguing the categories of personal and social gain and loss that might arise from legalisation. The following list – far from exhaustive – suggests the range of possible considerations.

Potential Gains:

- Reduce the size and revenue of illicit trade, the associated violence and disorder and the harm done by arrests and incarceration.
- Increase somewhat the range of licit economic opportunity and generate public revenue.
- Either reduce public expenditure on law enforcement or free enforcement resources for other uses.
- Reduce the risks of cannabis consumption by replacing untested, unlabelled and unregulated product with tested, labelled and regulated product.
- More speculatively, it might encourage consumption using less health-damaging means (e.g. vaporisation rather than smoking) or new cultural practices, such as cannabis use short of intoxication.
- All consumers would face lower prices and a wider choice of products, generating increased consumers' surpluses among all whose consumption is well-informed and not the result of substance-abuse disorder, and even among some unwise or dependent consumers.

4 Stephen Pudney, Mark Bryan and Emilia DelBono, 'Licensing and Regulation of the Cannabis Market in England and Wales: Towards a Cost/Benefit Analysis,' Beckley Foundation, 14 September, 2013.

Potential Losses:

- Increased consumption for those consumers whose consumption is, on balance and at the margin, damaging rather than beneficial to themselves. That might be especially true of dependent users (including those not now dependent who might become so under conditions of legal access) and of minors. But as the examples of tobacco, alcohol, gambling and food all illustrate, fashion and present-orientation can lead even non-dependent adults to make self-harming decisions.
- Losses to those whose welfare is interdependent (materially or emotionally) with self-harming users who are their kin or friends and to those harmed by accidents, crimes or derelictions of duty caused by cannabis intoxication or dependency. There would be analogous gains related to users whose lives or social performance improves from using licit cannabis or who avoid legal penalties for using or selling it due to the repeal of prohibitory laws.

There might also be, as noted, either gains or losses from decreased or increased self-harming or socially harmful use of alcohol and other drugs.

POLICY DETAILS

The actual outcomes of any scheme of legal access would depend strongly on details rarely mentioned in the abstract pro-and-con discussion of whether to legalise. The risk of a large increase in damaging forms of consumption would be greater at a lower price; the need for enforcement against illicit production and sale, or tax evasion by licensed producers and sellers, would be higher.

Another central decision is whether to allow private for-profit enterprises to produce and sell cannabis, or instead to restrict licit activity to:

- (1) Production for personal use and free distribution only.
- (2) Production and sale by not-for-profit enterprises such as consumer-owned cooperatives like the Spanish 'cannabis clubs'
- (3) Some variety of state monopoly, perhaps of retail sales only, leaving production to private enterprise.

If the private enterprise model is chosen, an additional choice must be made about whether to limit market concentration to ensure the existence of a variety of competing firms (thus perhaps limiting the marketing and political power of the industry as a whole and – again perhaps – increasing the rate of product innovation and the range of products easily available) or instead to allow the likely development of oligopolistic competition, as in the markets for cigarettes and beer. A potential advantage of legalisation would be the provision of consumer information superior to that available on the illicit market. The corresponding disadvantage might be the application of powerful marketing techniques to making excessive consumption seem desirable and fashionable.

Cannabis is a more complex product than beer, with at least two and perhaps dozens of significantly psychoactive chemicals and, to date, only limited scientific knowledge about their actions and interactions. Requiring accurate label information about chemical content seems a sensible approach, but not all consumers will be able to make good use of a collection of chemical names and percentages. Industry participants could be given the responsibility of providing sound consumer information, including due warnings about the risks of habituation, at the point of sale or via websites, or that responsibility could be assigned to NGOs or public agencies, perhaps financed by cannabis taxation. It seems at least arguable that cannabis sales personnel should have extensive training both about the pharmacology of the drug and about offering good advice to consumers, making their role closer to that of a pharmacist or nutritionist than of a mere sales clerk or bartender.

By the same token, decisions would have to be made and executed about whether and how to limit marketing efforts. To some eyes at least, the alcohol industry provides a warning by example of what could go wrong. In the United States, the doctrine of 'commercial free speech' might gravely impair the capacity of the state to allow private enterprise but restrain promotion.

Again as with alcohol, rules would have to be set and (imperfectly) enforced about public intoxication, workplace intoxication, operating a motor vehicle under the influence and provision to or use by minors.

A central fact about cannabis – as about alcohol and many other activities that form a persistent bad habit in a significant minority of their participants – is that the problem minority consumes the dominant share of the product. (A generalisation often cited as 'Pareto's Law' holds that 20 percent of the participants in an activity account for 80 percent of the activity.) As a result, a commercial industry, or a revenue-oriented state monopoly, would depend for much if not most of its sales on behaviour that is self-harming. In the case of cannabis in the United States, something like four-fifths of total product currently goes to consumers of more than a gram of high-potency cannabis per day; about half of those daily users, according to their own self-report, meet clinical criteria for abuse or dependency. That would create a commercial incentive directly contrary to the public interest, and potentially great political pressure to do away with any restriction that promises to be efficacious in reducing the frequency of drug misuse. Under contemporary conditions in advanced Western countries, it is difficult to make any commodity available to adults without increasing access to minors, since every adult is a potential point of 'leakage' across the age barrier. Teenagers are not merely an important current market segment; in the eyes of companies trying to increase their 'brand equity,' they are the future. Within legal constraints, the alcohol and tobacco industries do their utmost to compete for teenage market share, even where that consumption is illegal. There is no reason to think that formal bans on marketing to minors would have more than a trivial impact on the efforts of participants in a legal cannabis industry to penetrate the youthful demographic.

TAXATION AND REVENUE

Cannabis, even under illegal conditions, is a highly cost-effective intoxicant. At prevailing prices in the United States, a drinker who has not built up a tolerance for alcohol might need about \$5 worth of store-purchased mass-market beer to become drunk; a similarly fresh smoker could become intoxicated on perhaps \$2 worth of cannabis, or even less. Medical dispensaries in Colorado already offer ‘weekly special’ strains of sinsemilla cannabis at \$5 per gram (with volume discounts), where a gram represents more than two standard ‘joints’ (cannabis cigarettes), each more than adequate to intoxicate a non-tolerant user. Vaporisation seems likely to lower the effective cost substantially, both because concentrates trade at discount to herbal cannabis on an intoxicant-equivalency basis and because the vaporisation process loses fewer of the active chemicals to combustion or as sidestream smoke.

Thus there seems to be no strong argument for letting prices fall much from existing levels; even a user of modest means will reach the point where his or her cannabis use is self-harming before reaching the point where it becomes a budget problem. But since production costs under legal conditions would be negligible (Jonathan P. Caulkins and his colleagues have estimated costs in the pennies-per-joint range⁵) maintaining current prices would require very heavy taxation, whether measured in terms of the tax share of the final price (more than 95 percent) or in terms of tax-per-unit-weight (roughly \$300 per ounce). Collecting such taxes would pose a daunting challenge; in New York City, where a pack (roughly one ounce) of cigarettes bears a tax burden of approximately \$8, full tax has not been paid on more than one-third of all cigarettes consumed.⁶

This suggests that taxation be a specific excise (perhaps per unit of THC) rather than on an *ad valorem* (percentage-of-market-price) basis. Taxation levels might also be varied with product composition to encourage the sale of less hazardous (e.g. lower-THC, higher-CBD) forms of the drug. Alternatively, annual production quotas could be set to restrict production to achieve some desired price level, and producers could be required to bid at auction for quota rights. A properly-designed auction ought to be able to capture for the state almost all of the producers’ surplus in the commodity cannabis market.

With taxes (or quota prices) high enough to maintain illicit prices, cannabis could be a significant, though not a major, source of public revenue, on about the same scale (low double digits of billions of dollars per year in the United States) as alcohol and tobacco. How to keep even a state monopoly from encouraging problem use to hit revenue targets – as American state lotteries notoriously do – would remain a problem.

CULTURE AND CANNABIS CONSUMPTION

Though a very large share of all alcohol – in the United States, approximately 50 percent – is consumed as part of intoxication events (‘drinking binges’), the vast majority of drinking occasions do not involve the user becoming intoxicated. The opposite seems to be true now for cannabis, where ‘getting high’ is the socially understood purpose of using the drug. But it is possible – and might be easier with clearly labelled products and more controllable means of administration, such as vaporisation rather than smoking – to have the cannabis equivalent of a single alcoholic drink, and it is conceivable that, under legality, norms of using cannabis not to intoxication might establish themselves at least in some social circles. Doubtless some policies would be more favourable than others to such a development, but too little is yet known to allow more than mere speculation about what might, or might not, work in that regard.

ENFORCEMENT

In the long run, a legal market should require less enforcement attention than an illegal market. But regulations and taxes do not enforce themselves, and an untaxed and unregulated illegal market has some natural advantages over a taxed and regulated legal market, especially when the legal market is new and competitive pressures and technological advances have not yet driven prices down. Just as the first step in making rabbit stew is catching a rabbit, the first step in running a controlled market is to draw customers in from the uncontrolled markets. That will require mounting sufficient enforcement efforts to shift the balance of competitive advantage toward licit activity.

PREVENTION AND TREATMENT

Drug consumption has risks, including the risk of progressing to problem use. ‘Just-say-no’ prevention efforts have limited efficacy.⁷ But the natural effect of legal availability, bringing lower prices and decreased non-price barriers to use, is to increase consumption, including problem consumption. Therefore a legalisation scheme ought, ideally, to include a comprehensive information and persuasion strategy, aimed at potential as well as current users, and designed to minimise the number of people who find themselves in the grip of a substance abuse disorder. There are lessons to be learned from both the successes and the failures of current efforts to prevent alcohol and tobacco misuse.

For those who do find themselves with harmful patterns of drug use that prove resistant to efforts at self-management, services directed at ameliorating the harm they do to themselves and others, and if possible to restoring normal volitional control. It would be wrong to expect that expanded drug treatment services would be capable of preventing a rise in the number

5 Jonathan P. Caulkins, ‘Estimated Cost of Production for Legalized Cannabis,’ RAND Corporation, July 2010; Beau Kilmer, Jonathan P. Caulkins, Rosalie Liccardo Pacula, Robert J. MacCoun and Peter H. Reuter, ‘Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets,’ RAND Corporation, 2010; Jonathan P. Caulkins and Peter Reuter, ‘What Can We Learn from Drug Prices?,’ *Journal of Drug Issues* 28 (1998): 593–612.

6 Paul McGee, ‘Fact Sheet: NYS Cigarette Tax Evasion,’ American Cancer Society (accessed Nov. 11, 2013)

of persons currently suffering from cannabis abuse disorder, but the need for those services will increase. Designing ways to meet that need – to identify problem users, persuade them to seek help, and ensure an adequate supply of services and a means of paying for them – ought to enter into the legalisation planning process.

USER-SET QUOTAS: A ‘NUDGE’ STRATEGY

Problem drug-taking can be thought of as a problem of impaired volition, in which the easy and natural thing for the user to do is not the most beneficial thing to do – even as the consumer would understand it if approaching the question thoughtfully. (Someone once said that if the pain of the hangover came before the pleasure of the intoxication, heavy drinking would be a virtue rather than a vice.) If that is the case, then one way to deal with addiction would be to change the ‘choice architecture’ – the decision problem presented to the consumer – in ways more conducive to choices consistent with the consumer’s goals and values and less dominated by impulse.⁸ In one of his ‘self-command’ essays, Thomas Schelling tells the story of a firm alarmed by spreading waistlines among its executives, who seemed to have a hard time restraining their caloric intake in the company dining room.⁹ The elegant – and, apparently, effective – solution was to have everyone order lunch at 9:30 in the morning, when the executives were not hungry and when the decision to order the brownie sundae did not result in having a brownie sundae immediately. Once it got to be lunchtime, when the temptation to overeat was stronger and more immediate, the option was no longer available: everyone was stuck with whatever he or she ordered at 9:30. Now of course no one was being fooled; the executives knew perfectly well that at 1 pm they would desire more, and different, food than they ordered at 9:30. But, at 9:30, that forgone future – rather than current satisfaction – seemed like a perfectly reasonable sacrifice for a smaller shirt or dress size.

That suggests a policy intervention for cannabis (or alcohol or gambling): a system of user-set personal quotas. Under such an approach, any adult might purchase cannabis from a set of competing outlets offering a variety of products at a variety of prices, just as in any normal market, and do so without any externally-imposed limit on quantity. But every user would be required to register, with the registration information treated as personal health information and thus strongly privacy-protected. (Given the somewhat complex and risky nature of cannabis-taking as an activity, it might be reasonable to require every new user to go over some educational material and pass a simple test, like a driver’s license exam, but that is a different issue.)

At registration – which could take place in any retail establishment or at a state office – the new user would be asked to establish a personal monthly or weekly purchase quota, perhaps denominated in multiples of some standard dosing unit: for example, 40 mg of THC, roughly the content of the average joint. A request for a very large quota might call for some counselling (or even lead to suspicion that the consumer intended to purchase for resale to minors or other unlicensed buyers), but the consumer’s final decision would stand, whatever it turned out to be.

But that choice, once made, would then be binding; every purchase would have to be centrally tracked against the consumer’s personal limit, just as every credit card transaction is tracked against the cardholder’s credit limit. Once the weekly or monthly quota had been reached, no retail outlet would be allowed to sell any more cannabis to that consumer in that time period. The consumer would have the right to modify his or her quota, but while a request for a decrease would take immediate effect, a request for an increase would not become effective until after some delay, perhaps two weeks.

That system would not interfere with anyone who really *wanted* to be chronically intoxicated. But it would allow someone who really wanted to be an occasional user from slipping insensibly into a bad habit, and someone who really wanted to cut back to protect that desire from his or her own transient impulses. At minimum, it would make every cannabis user aware of his or her consumption pattern.

Of course, the limit would not really bind any sufficiently determined user, even in the short term: it would always be possible, with some amount of effort, to find a friend, or even a stranger, willing to share supplies or to make a ‘straw’ purchase. But just having that barrier in place might prevent some fraction of the substance abuse disorder that would otherwise result from free access to cannabis.

It seems likely that most users would set moderate quotas for themselves and never run into those limits, and that a smaller number would either start with a very high quota or start with a moderate quota, hit the limit a few times, increase the limit, start hitting the limit again, increase the limit again, and find themselves with bad cannabis habits. But – and this is the empirically open claim – it is also possible that a substantial number would set a limit, hit it repeatedly, and *never increase it*, and that a non-trivial number would voluntarily cut back their personal quotas or take themselves off the rolls entirely. That surely would not eliminate cannabis abuse and dependency, but it would give the potential problem user a fighting chance to overcome the joint forces of his or her own weakness of will and the cleverness of the cannabis

7 Jonathan P. Caulkins, Susan S. Everingham, C. Peter Rydell, James Chiesa and Shawn Bushway, *An Ounce of Prevention, a Pound of Uncertainty. The Cost of School-Based Drug Prevention Programs*, RAND, 1999.

8 Richard Thaler and Cass Sunstein, *Nudge: Improving Decisions and Health, Wealth, and Happiness* (Yale University Press: 2008).

9 Thomas Schelling, ‘Self-Command in Practice, in Policy, and in a Theory of Rational Choice,’ *The American Economic Review*, Vol. 74, No. 2, May 1984, 1-11.

industry marketing experts who would be doing their utmost to turn him into a 'good' – that is, addicted – customer. Imperfect self-command is not a disease; it is part of the human condition. Virtually all of us need, at some times and with respect to some behaviours, what Herbert Kleber has called 'prosthetic support for weak will'. 'Nudging' in the form of self-set but externally enforced quotas is one possible way to help deal with the self-command problem when the problem is quantitative and involves a well-defined salable product. It would not solve the problem, which is after all not soluble. But it might diminish its extent without the well-known side-effects of dealing with cannabis (and perhaps other habit-forming drugs) by making sale and use illegal.

CONCLUSION

The debate over how to legalise cannabis tends to assume that for-profit commercial enterprise is the default option. Legalising cannabis on the alcohol model may, however, be the second-worst option (behind only continued prohibition); commercialisation creates an industry with a strong incentive to promote heavy use and appeal to minors through aggressive marketing. No system of legal availability is likely to entirely prevent an increase in problem use. But pioneering jurisdictions should consider alternative approaches including non-profit regimes and state monopoly. Both sides of the legalisation debate should acknowledge that the question is complex and the range of uncertainties wide. Such modesty, alas, is in short supply. ■

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TECHNICAL REPORT

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The Impact of Marijuana Policies on Youth: Clinical, Research, and Legal Update

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This technical report updates the 2004 American Academy of Pediatrics technical report on the legalization of marijuana. Current epidemiology of marijuana use is presented, as are definitions and biology of marijuana compounds, side effects of marijuana use, and effects of use on adolescent brain development. Issues concerning medical marijuana specifically are also addressed. Concerning legalization of marijuana, 4 different approaches in the United States are discussed: legalization of marijuana solely for medical purposes, decriminalization of recreational use of marijuana, legalization of recreational use of marijuana, and criminal prosecution of recreational (and medical) use of marijuana. These approaches are compared, and the latest available data are presented to aid in forming public policy. The effects on youth of criminal penalties for marijuana use and possession are also addressed, as are the effects or potential effects of the other 3 policy approaches on adolescent marijuana use. Recommendations are included in the accompanying policy statement.

abstract

FREE

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www.pediatrics.org/cgi/doi/10.1542/peds.2014-4147

DOI: 10.1542/peds.2014-4147

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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EPIDEMIOLOGY OF MARIJUANA USE AMONG YOUTH

Three major US national databases track substance use over time, including use of marijuana: Monitoring the Future (MTF),¹ sponsored by the University of Michigan and the National Institute of Drug Abuse; the Youth Risk Behavior Survey (YRBS),² sponsored by the Centers for Disease Control and Prevention; and the National Survey on Drug Use and Health (NSDUH),³ sponsored by the Substance Abuse and Mental Health Services Administration. Although each database uses different methods, all track and analyze substance use trends. MTF annually surveys approximately 50 000 middle and high school students (12th graders since 1975, and 8th and 10th graders since 1991). Data from MTF 2014 revealed that 6.5% of 8th graders, 16.6% of 10th graders, and 21.2% of 12th graders used marijuana at least once in the past 30 days ("current use"). Current use rates peaked in 1996 for 8th graders at 11.3% and in 1997 for 10th and

12th graders at 20.5% and 23.7%, respectively. Current use rates decreased for all grades from 2013 to 2014, although not in a statistically significant manner. All rates remain lower than the peak rates in the 1990s. Daily use rates for 8th, 10th, and 12th graders in 2014 were 1.0% of 8th graders, 3.4% of 10th graders, and 5.8% of 12th graders; previous peak rates were 1.3% (2002), 3.9% (2002), and 6.6% (2011) for 8th, 10th, and 12th graders, respectively. Daily use rates decreased for all grades in 2014, with the decrease in 10th graders' use statistically significant. Rates of current marijuana use in the YRBS 2011 data were not significantly changed in 2013: 23.1% and 23.4%, respectively. In addition, the Partnership Attitude Tracking Study, sponsored by the MetLife Foundation and the Partnership at DrugFree.org, found in their most recent survey, in 2012, that in a school-based sample of teenagers in grades 9 through 12, 8% reported smoking marijuana heavily (at least 20 times) in the past month. Although this rate decreased from 9% in 2011, there has been a significant increase from 5% in 2008.⁴ NSDUH 2012 data revealed current use rates were 8.2% in 2002, 6.7% in 2006 and 2007, 7.3% in 2009, and 7.9% in 2011 for 12- through 17-year-olds. Marijuana current use rates increased for 18- through 25-year-olds each year from 2008 through 2011, from 16.5%, 18.1%, 18.5%, and 19.0%, respectively; 2012 rates remained at 19.0%. Approximately 100 million adult Americans have ever used marijuana, with a current use rate of 17.4 million.⁵

As noted, MTF and NSDUH are national databases. State-specific data are available for many states through their use of the YRBS or equivalent. Using this YRBS data, it is possible now to compare use rates for states with medical marijuana laws to national levels. Since legislation allowing medical marijuana took effect across a number of states, there

have been no significant increases or decreases in youth use rates, with the exceptions of Alaska and New Mexico (see Appendix). Whereas Alaska has reported a significant decrease (8.5%) in current youth use rates since legislation took effect in 1998, New Mexico has reported a significant increase between 2011 and 2013 in 12th graders only. Additionally, 2 recently published studies have similarly found no significant differences in current use rates after legislation⁶ or only differences in 2 states (Montana decreased, Delaware increased) that can be explained equally by chance.⁷

A number of factors may affect youth use rates in the future, including perceived harm of marijuana use, pertinent norms endorsed by youth, and parenting behaviors related to youth marijuana use. Youth rates may also be influenced by specific components of marijuana policies (eg, locations and numbers of medical marijuana dispensaries in a given locale, regulations of their operation, and how legalization of marijuana for nonmedical purposes is operationalized).

DEFINITIONS

Cannabinoids

Cannabinoids are biologically active molecules that bind to receptors in the human body. Humans produce endocannabinoids, including anandamide and 2-arachidonoylglycerol, which bind the receptors known as CB1 and CB2. Both naturally occurring and synthetic cannabinoid molecules can bind these human endocannabinoid receptors and have biologic activity. Currently, cannabinoid biology is poorly understood. Research has identified areas of therapeutic potential for these molecules, including analgesia in chronic neuropathic pain, appetite stimulation in debilitating disease, and spasticity in multiple sclerosis. However, adverse effects can also

occur, ranging from benign (eg, tachycardia and palpitations) to serious (eg, mood, anxiety, and thought disorders). There are 2 cannabinoid pharmaceutical products approved by the US Food and Drug Administration. Controlled studies suggest that pharmaceutical preparations that combine cannabinoids with varying affinities for the CB1 and CB2 receptors appear to be able to deliver therapeutic effects while protecting against adverse effects.

Marijuana

Marijuana refers to the dried leaves and flowers of the cannabis plant, which contains a large number of biologically active cannabinoids. There are numerous species and subspecies of cannabis. Leaves of the plant are smoked, vaporized, or cooked to extract cannabinoids, which can then be ingested for their pleasurable psychoactive effects. Cannabinoids from marijuana may also produce therapeutic benefits, which has led to the use of marijuana as a medication. However, marijuana is a complex mixture of cannabinoids (more than 200 have been identified) and other molecules, and the risk-benefit ratio of this mixture has not been well defined. Over the past several decades, selective breeding of marijuana species has resulted in higher concentrations of cannabinoids in the plant, resulting in a more potent psychotropic effect and possible increased risk of adverse effects. Any product that requires smoking to release the desired effects cannot be recommended by physicians, because smoke contains tar and other harmful chemicals. Alternative methods of administration of cannabis without combustion have been developed.

Tetrahydrocannabinol

Tetrahydrocannabinol (THC) is the primary psychoactive cannabinoid in the marijuana plant. The amount of THC in a given plant varies widely,

depending on the species and subspecies of marijuana used in breeding the plant.

Hemp

A low-THC strain of *Cannabis sativa*, hemp, is not used for psychoactive effects. Rather, hemp is used to make a variety of consumer products, including paper, textiles, clothing, health food, and biofuel. Commercially available hemp products (eg, hemp milk) are devoid of cannabinoids. Hemp is legally grown in a number of countries, including Spain, China, Japan, Korea, France, and Ireland.

MARIJUANA BIOLOGY

There are various species of marijuana, but the 2 most common species used for “medical marijuana” are *Cannabis sativa* and *Cannabis indica*.

Psychotropically, *Cannabis sativa* typically causes increased alertness and an energetic sense, whereas *Cannabis indica* is reported to cause more of a sense of relaxation and, in some cases, lethargy. However, both species have been hybridized repeatedly, and a typical plant will have varying amounts of both sativa and indica.⁸ Regardless of the species, the main known active ingredients responsible for the desired medicinal effects are THC; cannabidiol (CBD), a nonpsychoactive cannabinoid; and arachidonoyl ethanolamide (anandamide), an endogenous ligand that is involved in binding THC and CBD to endocannabinoid receptors.⁸ These and other cannabinoids form a complex mix that bind to CB1 and CB2 with varying affinity. These active compounds bind to the body's endocannabinoid receptors, which are found throughout the body. There are 2 major endocannabinoid receptors: CB1, found in the brain and nervous system, and CB2, found in the immune system.⁸

Side Effects of Marijuana Use

The most consistent physical side effects are an increase in heart rate and systolic blood pressure. Other

side effects include conjunctival injection, dry mouth, orthostatic hypotension, increased appetite, increased thirst, drowsiness, insomnia, anxiety symptoms, panic attacks, short-term memory loss, hallucinations, and ataxia.⁹ There is no specific antidote for marijuana intoxication, but in cases of severe anxiety symptoms or a panic attack, treatment with a benzodiazepine may help,⁹ and supportive treatment is used for oversedation.¹⁰ Ischemic stroke in young people has also been reported.¹¹ No fatalities have ever been reported as solely attributable to a marijuana overdose; however, ingestion of marijuana by children can result in a variety of symptoms, including drowsiness, ataxia, nystagmus, hypothermia, and hypotonia. Respiratory depression or coma has rarely been reported.¹² Since the legalization of medical marijuana in Colorado, a number of reports of children with toxic ingestions have occurred.¹⁰ Treatment with activated charcoal to prevent absorption of the marijuana may be helpful in specific severe situations if there is no concern about level of consciousness and if treatment is initiated well within 2 hours of onset of the ingestion. As with any other prescribed medication for adults, children should not have access to medical marijuana, with the exception of unique circumstances discussed later.

Impact of Marijuana Use on Adolescent Brain Development

New research on adolescent brain development has found that brain maturation, particularly that of the prefrontal cortex, proceeds into the mid-20s. This maturation includes substantial changes in specialization and efficiency, which occur through myelination and synaptic pruning. Synaptic pruning or refining consists of a reduction in gray matter, primarily in the prefrontal and temporal cortex areas and in subcortical structures through the

elimination of neural connections.^{13–15} Increased myelination also occurs, which allows increased neural connectivity and efficiency and better integrity of white matter fiber tracts.^{16,17} The prefrontal lobes are the last areas of the adolescent brain to undergo these neuromaturational changes, which, when complete, allow more efficient communication between the higher-order areas of the brain and the lower-order sensorimotor areas.^{18,19}

It has been postulated that the developing adolescent brain is particularly at risk for the development of substance use disorders, although a number of factors are involved, including genetic predisposition, environment, and mental health disorders. The earlier the adolescent initiates substance use, the more likely a substance use disorder, such as dependence or addiction, is to occur.^{20–25} Now, with newer techniques to study brain structure and function, data are emerging to suggest that the use of marijuana may alter the developing brain, paralleling what has been found in studies on adolescent neurocognitive functioning. For example, studies have shown that adolescents who report regular marijuana use perform more poorly on tests of working memory, visual scanning, cognitive flexibility, and learning.²⁶ Furthermore, the number of episodes of lifetime marijuana use reported by subjects correlated with overall lower cognitive functioning.²⁷

Recently, studies evaluating brain structure have found effects of marijuana use on hippocampal, prefrontal cortex, and white matter volume. Specifically, heavy marijuana users have been found to have greater gray matter volume, particularly in the left hippocampal area, suggesting an interference with synaptic pruning.^{28–30} Furthermore, heavy marijuana use was also correlated with poorer verbal and attention performance.³¹ Functional

MRI studies examining neural activity in abstinent marijuana users have found abnormalities in activation during cognitive tasks, which are postulated to be correlated with marijuana-related changes seen in cognition and attention, such as deficits in spatial working memory, verbal encoding, and inhibition.³¹

Additionally, use of substances may alter the developing brain itself in ways that are not yet fully understood but are different from usual brain development, and additional studies using multimodal neuroimaging approaches are needed.³² It is also not clear whether there are critical periods during adolescence when there is heightened vulnerability to substances and whether these changes can be reversed with abstinence or reduced use.³² However, the documented effects on cognition and the emerging data that correlate these effects with detrimental effects on brain structure and function^{33,34} should serve as cautionary evidence to discourage recreational marijuana use in adolescents.

CANNABINOID THERAPEUTICS

Pharmaceutical Cannabinoids

Two legal synthetic forms of cannabinoids are available in the United States and approved by the Food and Drug Administration (FDA); a third is available in the United Kingdom and Canada. The first, dronabinol (Marinol), is a schedule III oral medication approved by the FDA for the treatment of AIDS-related wasting and chemotherapy-induced nausea and vomiting.³⁵ Dronabinol is a capsule that must be taken whole orally, which may prove problematic in the face of nausea or vomiting. Additionally, the onset of symptom relief with dronabinol is significantly longer than that of smoked or vaporized marijuana. The second, nabilone (Cesamet), is an oral capsule with properties similar to dronabinol but is a schedule II medication because of a possibly higher abuse

potential. Nabilone is also prescribed for spasticity secondary to spinal cord injury.³⁶

A third cannabinoid pharmaceutical is known as Sativex, a fast-acting nonsynthetic oral-mucosal spray.³⁷ Sativex is currently approved in Canada and the United Kingdom for symptomatic relief of neuropathic pain in multiple sclerosis. In Canada, it is also approved as an adjunctive analgesic treatment in patients with cancer pain. Sativex is undergoing late-stage clinical testing in Europe and the United States for similar indications. Sativex contains equal amounts of THC and CBD. Sativex is rapidly absorbed and easy to titrate, which may make it a more effective and easy-to-use medication than dronabinol. Onset of desired effects typically occurs within minutes.

Medical Marijuana

As of December 2014, medical marijuana (cannabis) was legal under state law for adults 21 years and older in 23 states and the District of Columbia (for the list of medical marijuana states and related updates, see the AAP Web site www.aap.org/marijuana). Cannabis is illegal by federal law and is a schedule I drug under the federal Controlled Substances Act (no legitimate medical use). California was the first state to legalize medical marijuana in 1996. Efforts are under way in a number of additional states to legalize the use of medical marijuana. Specifics of the medical marijuana laws vary by state,³⁸ but all allow adults to use marijuana for medical purposes, usually for certain specified conditions, if recommended by a physician, although general categories also often include "pain." Minors are able to obtain medical marijuana with parents' written permission (and, in some cases, other restrictions) in most states that have legalized medical marijuana.

Marijuana Delivery

Medical marijuana dispensaries provide marijuana in forms that can

be either smoked through combustion or vaporization or ingested to produce the desired medical effects. Smoking or vaporizing marijuana results in rapid onset (minutes) of desired effects, whereas ingestion results in a more gradual and delayed onset (half hour to several hours). Vaporization is considered less harmful to the lungs, because the marijuana is slowly heated to its vaporization point, releasing THC and water vapor, rather than being burned to its combustion point to release THC (as well as tar and other potentially harmful products in smoke). The dose of THC is the same whether the marijuana is vaporized or burned.^{39–41} It should be noted that use of a water pipe to smoke marijuana does not eliminate any of the harmful products in the smoke.

Medical Marijuana and Potential Impact on Adolescent Use of Recreational Marijuana

One concern of parents and pediatricians is whether the legalization of medical marijuana results in increased use of recreational marijuana by adolescents. This concern is multipronged: that legitimizing marijuana as a medication may lead adolescents to believe that marijuana is a safe drug, whether prescribed or not; that access to marijuana will be more widespread; and that there will be efforts to target youth through marketing not only for medical marijuana but also for decriminalized and possibly legal use as well. As an example, the abuse of prescription drugs such as pain relievers, sedatives, tranquilizers, and stimulants for nonmedical purposes is increasing among adolescents and young adults, given increased prescribing practices with these substances.⁴²

When all high school data are combined for each state in which medical marijuana is legalized and for which data for current use before and

after medical marijuana legalization are available (14 states to date),^{6,7} no state with legalized medical marijuana has shown a statistically significant increase in adolescent recreational marijuana use except Delaware; 2 states (Alaska and Montana) have shown statistically significant decreases. One recent study found that states with medical marijuana laws, on average, reported higher rates of marijuana use in 12- to 17-year-olds over the time period of 2002 to 2008 (8.68%; 95% confidence interval [CI], 7.95–9.42), compared with the average rate reported by 12- to 17-year-olds in all states without such laws—(6.94%; 95% CI, 6.60–7.28).⁴² States with legalized medical marijuana also reported lower rates of perception of riskiness of marijuana than states without. However, this study was not able to determine the changes within each individual state with legalized medical marijuana before the passage of the laws compared with after passage of the laws; in fact, in 8 states that passed medical marijuana laws within the time period studied (since 2004), these states already had a baseline rate that was higher than in states without legalized medical marijuana, but no data were provided comparing marijuana use rates for teenagers in those states before and after passage of medical marijuana laws.⁴³ To date, data have shown that state-specific legalization of medical marijuana has not led to an increase in recreational use of marijuana by adolescents. This relationship is complex, and research and epidemiologic surveillance must continue.

Adolescent Use of Medical Marijuana

There are numerous reports in the popular media by parents regarding the successful use of medical marijuana by adolescents for the treatment of a variety of health conditions, including attention-deficit/hyperactivity disorder, anxiety, depression, and

autism, as well as anorexia, chronic pain, and postchemotherapy nausea and vomiting. There are no data concerning rates of adolescent use of medical marijuana obtained through licensed dispensaries. There are also no published studies on the use of marijuana in the pediatric or adolescent patient populations, with the exception of 1 study evaluating the source of marijuana used by adolescents receiving care in a substance abuse treatment facility. This study found that diverted “medical marijuana” had been used by 74% of the adolescents in the treatment facility.⁴⁴

The American College of Physicians issued a position paper in 2008 emphasizing the importance of sound scientific study to evaluate the role of marijuana in modern medical therapy.⁴⁵ Although directly addressing the adult population, the position paper stressed that marijuana was neither devoid of potentially harmful effects nor universally effective.

In 2010, the California Society for Addiction Medicine issued a statement on the medical aspects of marijuana legalization,⁴⁶ which addressed the following 7 points:

1. Effective restrictions created to minimize access to marijuana for anyone younger than 21 years
2. Treatment of adolescent marijuana abusers, rather than punishment, made universally available
3. Revenue streams for treatment funded by fees and taxes from marijuana sales
4. Warning labels placed on smokable products
5. Regulation of marketing (advertising), distribution, and sales implemented
6. Evaluation components to document the impact of legalization
7. Technical difficulties documenting driving under the influence to be addressed and clarified

Based on consideration of these points, the California Society for Addiction Medicine concluded that “medical marijuana” is a flawed concept for the following 3 reasons: administering any medication via drawing hot smoke into the lungs is inherently unhealthy; although use of vaporizers, sprays, and tinctures solves problems inherent in smoking, treatment of illness without standardized dose or content of the medication remains a safety issue; and if the public wants to legalize marijuana, there is no reason to force physicians to be gatekeepers in a manner that enables liberal access to marijuana but generally fails to uphold accepted standards of practice for recommending a potentially addicting medication or drug.

Research Findings on Pharmaceutical Cannabinoids and Medical Marijuana

Cannabinoids in all forms and marijuana have been used for a wide variety of pathologic states and diseases, including chronic pain, nausea, anorexia, cancer, autoimmune and rheumatic diseases, inflammatory bowel disease, attention-deficit/hyperactivity disorder, multiple sclerosis and spasticity, depression, anxiety, and posttraumatic stress disorder. There are no FDA safety or efficacy data about marijuana for medical use. The FDA has approved synthetic THC (dronabinol) and nabilone for chemotherapy-induced nausea and vomiting as well as anorexia associated with AIDS, as previously discussed. Two recent articles have reviewed, respectively, current and emerging research on the physiologic mechanisms of cannabinoids and their applications in managing chronic pain, muscle spasticity, cachexia, and other debilitating problems as well as the efficacy of marijuana for treatment of chemotherapy-induced nausea and vomiting.^{47,48} Research has demonstrated that cannabinoids are useful in treating anorexia associated

with cancer, nausea and vomiting associated with chemotherapy, chronic pain, and multiple sclerosis.^{49–52} A recently published study also demonstrated that current marijuana use was associated with lower levels of fasting insulin, lower homeostasis model assessment-estimated insulin resistance, and smaller waist circumference.⁵³ Two recently published review articles on medical marijuana for digestive disorders and select neurologic disorders generally noted small numbers of studies and mixed results.^{54,55} There are no published studies on the use of cannabinoids or marijuana to treat health conditions in children or adolescents.

Summary

Cannabinoids may be helpful in adults for certain medical conditions. However, for pediatricians the recommendation of medical marijuana is problematic for the following reasons: It is not regulated by the FDA, its purity and THC content are not consistently verified, and because there are only small case studies available, the risk–benefit relationship cannot be determined. Available data have shown that legalization of medical marijuana has not led to a significant increase in the current use of recreational marijuana by adolescents. Pediatricians may legally recommend the use of medical marijuana in some states, although there are no consistent data supporting the effectiveness of its use in pediatric medical conditions. It is also recognized that in certain unique situations, such as with a serious disease not amenable to usual treatment, or a terminal illness, a pediatrician may recommend marijuana for compassionate medical purposes, on a case-by-case basis, using anecdotal information. Thus, without peer-reviewed studies providing scientific evidence favorable for the use of medical marijuana in pediatric populations, recommending its use would have to be based on an

individual provider's experience, weighing the needs and potential risks for an individual patient.

LEGALIZATION OF MARIJUANA: US AND INTERNATIONAL EXPERIENCES

In contrast with marijuana decriminalization (ie, no criminal penalties and either no or reduced civil penalties for possession or personal use), *legalization* refers to permitting the growing, sale, and possession of marijuana. Decriminalization and legalization of marijuana have been the focus of global debate and controversy for several decades and continue to be an active concern, particularly as they pertain to the adolescent population. It is still illegal to possess and consume, cultivate, and sell cannabis in almost all countries throughout the world, although a number of countries have adopted actual or de facto policies of decriminalization of possession. In many cases, the reluctance of nations globally to change the illegal status of drug-related activities results in part from international commitments and treaties, which oblige them to adhere to drug prohibition policies.⁵⁶

The 3 nations that can provide the most information and insight into experiences with and consequences of liberal marijuana laws are Uruguay, Portugal, and the Netherlands. In 2013, Uruguay became the first country in the world to legalize the cultivation, sale, and use of marijuana for both recreational and medicinal purposes, in response in part to the large illegal and crime-associated drug trafficking occurring in that country.⁵⁷ At this point, it is too early to determine the effect of such a law on the use of marijuana and the anticipated decrease in drug-associated violent crime in Uruguay and its neighboring countries, but there is keen interest in how this law will play out.

In 2000, Portugal officially abolished all criminal penalties for the personal

use and possession of all illicit drugs, including marijuana, cocaine, heroin, and amphetamines.⁵⁸ Although falling short of outright legalization, this country has opted to pursue a public health approach to the problem of substance use, moving those using drugs from the criminal justice system to the public health and medical system. For example, in exchange for jail time, any person caught using or possessing drugs is required to appear before a provincial “dissuasion committee” made up of an attorney and 2 health professionals, including a social worker. The committee's task is to determine whether the person's use is limited to recreational use or meets criteria for addiction. Each committee can take an individualized approach to each case and has the ability to determine which sanctions to apply, such as warnings, fines, license suspension, or, in the case of drug addiction, the requirement for drug treatment. In the latter case, the person is offered drug treatment as an alternative to a fine or suspension of his or her driver's license; failure to comply with treatment can result in referral to criminal court.⁵⁹ Studies suggest that it has been difficult for jurisdictions to enforce the requirement for treatment and to enlist the assistance of local physicians in using these committees for their patients with substance use disorders.⁵⁸ However, proponents of this legislation have cited several statistics demonstrating that in the first 5 years after passage of this legislation, reduced levels of drug use by teenagers, decreased rates of HIV infection through injection drug use, and a doubling in the rates of people seeking treatment for substance use disorders were observed.⁶⁰

The Netherlands has also taken a liberal view toward criminal prosecution of cannabis users, although it is still officially illegal to possess, use, sell, and cultivate marijuana in that country. As signatory to a number of

international anti-drug use treaties, the Netherlands is obliged to maintain the illegality of the use and possession as well as trafficking and manufacture of all illicit substances (prohibition), including all those related to the cannabis plant. However, through the Opium Act of 1976, the Netherlands attempted to make a clearer distinction in their view between drugs such as cocaine, heroin, lysergic acid diethylamide, ecstasy, and mushrooms, which were felt to have an unacceptable public health risk, and hashish and marijuana, which were thought to entail less overall risk.⁶¹ Thus, strict criminal penalties are maintained for possessing, dealing in, and selling for large-scale drug trade in these drugs. In contrast, the sale of marijuana in “coffeehouses” throughout the country is tolerated, as long as they adhere to a number of restrictions. For example, they cannot advertise, be located near international borders, sell amounts greater than 5 g to any person, sell any illicit substances other than marijuana, and sell to anyone younger than 18 years old.⁶² The public smoking of marijuana is also discouraged, although it is not viewed or treated as a criminal offense.

Of note, the rate of marijuana use did increase among adolescents after the passage of these acts but was not thought to be sufficient to repeal or change the laws regarding youth access.⁶³ Recently, however, because of increases in what has been determined to be international “drug tourism,” the Dutch government refined the laws such that “coffeehouses” are run more as private clubs, and only Dutch citizens are allowed to purchase marijuana through them.⁶⁴ In 2012, a judge upheld a government plan to ban foreign tourists from buying marijuana by introducing a “weed pass” available only to Dutch citizens and permanent residents. Worried that tourism will take a hit, Amsterdam’s mayor, Eberhard van

der Laan, worked out a compromise with the national government, which relies on municipalities and local police to enforce its drug policies.⁶⁵ The Dutch government has recently decided to reclassify high-strength cannabis (>15% THC containing) into the same category as cocaine or heroin, meaning that the “coffeehouses” will not be able to sell this product, and only the lower-strength cannabis will be available.⁶⁶

DECRIMINALIZATION OF MARIJUANA: US AND INTERNATIONAL EXPERIENCES

Decriminalization of marijuana typically is defined as the reduction of criminal offenses for the possession of small amounts of the marijuana plant to a misdemeanor, infraction, or civil penalty (eg, similar to a parking or speeding ticket) rather than a felony charge. In addition to Portugal and the Netherlands, a number of other countries have opted to decriminalize the use and possession of marijuana for individual use, although the specific policies vary widely across nations. For example, several South American countries (ie, Venezuela, Argentina, Columbia, and Peru) have tolerated the use and possession of “small amounts” (<1 g) of marijuana (not the sale or trafficking) or have effectively abolished requirements for jail time or fines for possession.⁶⁷ In some cases, countries require mandatory drug treatment and rehabilitation for any use (eg, Venezuela, Argentina, and Brazil).^{67,68} In Brazil, Bolivia, Ecuador, and Paraguay, recreational use is illegal.^{67,68} Chile specifically allows private growing and possession for recreational use or medical conditions but specifically prohibits group use, buying, and trafficking.⁶⁹

Canada, along with several European countries, likewise tolerates the use or possession of small amounts of marijuana by individuals and has also legalized medical marijuana use.⁷⁰ The definition of “a small amount”

varies between 3 and 30 g depending on the country. Furthermore, in some cases use is designated as a misdemeanor without prison terms (eg, Hungary).⁷⁰ Czechoslovakia recently passed laws decriminalizing the use of all drugs, in much the same way as Portugal did in 2000.⁷¹ Most Asian nations still do not make a distinction between use or possession of small amounts and the selling of or trafficking in larger quantities—all of which can carry stiff penalties including fines or significant prison sentences. In rare cases (eg, China and Saudi Arabia), executions have taken place.^{72,73}

Since 1937, the US federal government’s approach has remained that of prohibition, meaning that its laws and its participation in international treaties have upheld the illegal status of use, possession, cultivation, and sale of marijuana. These laws also provide the basis for efforts to deter individual use, as well as interdiction efforts aimed at large-scale selling, smuggling, and trafficking of all illicit drugs.⁷⁴ Despite the fact that there are no significant plans of the current US administration to change this position, 18 states currently (2014) have laws that have decriminalized the individual use and possession of marijuana,⁷⁵ and 4 states and the District of Columbia, have legalized nonmedical use, marketing, and sales of marijuana for adults.

In 2009, the Justice Department announced that the federal government would not prosecute medical marijuana providers and consumers who were in compliance with state laws. Subsequently, in 2013 the Justice Department also announced that it would not interfere with the legalization laws in Washington State and Colorado. Eighteen states have decriminalized the use and possession of small amounts (usually ≤1 ounce, although amounts vary by state) of marijuana for personal use; see www.aap.org/

marijuana for the list of states and latest updates. The specifics of the laws vary across states, as does the degree to which these laws are enforced at the local level. Although arrests still occur, penalties are minor and range from first offenses resulting in no penalty to fines that may increase with subsequent offenses, and, in some cases, requirement for treatment or rehabilitation. In other cases, offenses have been reduced to civil violations, resulting in fines or requirements for educational programs.⁷⁵ The key aspect from the standpoint of decriminalization is that although these offenses are considered “criminal,” the level of offense has been reduced to a misdemeanor or an infraction rather than a felony charge, which carries higher immediate criminal consequences, such as prison time. Felonies also carry significant long-term collateral consequences, such as the inability to obtain student loans, stigma related to employment, and the inability to vote.

ARGUMENTS FOR AND AGAINST LEGALIZATION OR DECRIMINALIZATION OF MARIJUANA

Legalization

Because Uruguay is the only country that has officially legalized the sale and possession of marijuana, there are no available studies evaluating the effect of this action on use by adolescents and young adults. In response to the ongoing debate about this issue, however, arguments have been put forth both for and against legalization. Proponents of legalization sometimes claim that marijuana is a benign substance, with low rates of dependence and physical or behavioral effects, and that legalization would reduce illegal trade and the crime associated with it by instituting regulations.⁷⁶

Furthermore, proponents argue that these regulations would provide significant and needed monetary resources, through taxation, and

would reduce the use of resources for interdiction.⁷⁶ In terms of effects on adolescents, proponents of legalization also argue that the requirement for selling only through licensed stores, as with tobacco and alcohol, with penalties for those selling to minors, would limit the amount of marijuana available to youth.⁷⁶

Proponents of legalization also cite reports from the United Nations Office on Drugs and Crime that have concluded that efforts to control the large-scale production and trafficking of illegal drugs not only have been futile but have not taken into account the human and economic toll that incarceration for drug-related crimes has had on individuals, families, and societies.⁷⁷ And because the primary approach to resolving illicit drug problems has emphasized law enforcement, it has been difficult for the public health community to respond appropriately to the medical problems of dependence and addiction and their role in drug-related offenses, such as intoxicated driving by minors.⁷⁷

Opponents of legalization cite a number of concerns specifically about youth and young adults. For example, there is significant concern that the legalization of marijuana will open the floodgates of marketing, with much of that being subtle marketing toward youth, even though any such legalization laws would be expected to apply only to adults older than either 18 or 21 years. The experience with the alcohol and tobacco industries, which use subtle and creative messaging directed at youth, has been cited as one of the reasons that alcohol and tobacco are used at such high rates by adolescents and young adults, and it is feared that similar marketing strategies would contribute to increased rates of use and dependence by adolescents.⁷⁸ More importantly, opponents argue that despite earlier reports claiming that

marijuana has fewer long-term effects than either tobacco or alcohol, there are newer data on the medical and psychological effects of cannabis on adolescents, particularly younger teens. Research continues to accumulate on its potential negative effects on brain development and cognitive effects on short-term memory and learning.^{79,80} Physical effects on coordination and reaction time raise serious concerns about the contribution of marijuana intoxication to motor vehicle injuries and deaths.^{81,82} Medical consequences include respiratory effects⁸³ and the long-term effects of exposure to carcinogenic components of marijuana smoke, with a recent study from New Zealand finding elevated rates of lung cancer in adults with histories of long-term marijuana smoking.⁸⁴ Studies have also shown connections between chronic marijuana use and mental health disorders such as anxiety and schizophrenia.⁸⁵

Ultimately, marijuana’s health and behavioral risks when used by either youth or adults may be irrelevant in terms of the criteria with which marijuana policy should be evaluated. Rather, the most salient criterion for evaluating these policies should be the determination of which policy (criminalization, decriminalization, or legalization) is most effective in minimizing harm.⁸⁶ One main argument against legalization but in support of decriminalization is that illicit substance use, including marijuana use, should be considered a public health problem, not something that should be given the “green light,” as would be the case if widespread legalization of marijuana and other substances occurred. This is an acknowledgment of the seriousness of issues related to substance use disorders for individuals and society, recognizing that problems related to use and small-scale possession, in contrast to those associated with large-scale production and trafficking, are best

dealt with in the public health and medical system, not the criminal justice system. This argument represents the commonly observed tension between a public health system's role in prevention, rehabilitation, and treatment compared with the criminal justice system's primary role of removing criminals from society (incarceration) and punishing them.

The amount of resources used by the criminal justice system to arrest, process, adjudicate through courts, and imprison people for minor drug-related charges (separate from more severe crimes, such as selling and trafficking) are significant, and many have cited potential cost savings as a reason for changing policies on individual use and possession.

Decriminalization

Specific arguments for decriminalization are similar to those for legalization but also focus on the costs (both human and monetary) that are involved in the enforcement of criminal laws for what are considered either minor infractions or offenses that indicate a person's need for drug treatment. Data are abundant on the costs involved in the arrest, detention, court proceedings, and the imprisonment of youth and adults who have committed the offense of possessing small amounts of marijuana, which in 2006 cost state and local governments \$10.3 billion.⁸⁷ What is often not discussed are the long-term effects that adjudication or imprisonment for a marijuana offense can have for an individual and the subsequent effect that this can have on an individual's family and on society.⁸⁸

POSSIBLE EFFECTS OF LEGALIZATION AND DECRIMINALIZATION OF MARIJUANA ON ADOLESCENTS

US Experience With Decriminalization

Since a number of states have decriminalized marijuana, there has been close scrutiny to determine

whether this change would result in higher use rates among adolescents, in particular. Several studies have compared the rates in the initial 11 states that decriminalized marijuana in the 1970s before and after criminal laws were changed. None of these studies have supported the concern that rates would increase sharply in states with decriminalization. In fact, these studies, published in the early 1980s, found that the overall national declines in rates of use of alcohol and illicit substances, including marijuana, seen since the 1970s were similar in states with and without decriminalization laws.^{89–91} Single,⁸⁹ one of the authors of these initial studies, provided an update of this issue in 1989 and found that although states with penalties for possession limited to fines experienced increased rates of marijuana use, these increases were similar to or lower than those observed in states that retained stiff penalties. They also concluded that states with decriminalization laws experienced significant savings in criminal justice costs and resources.

International Experiences With Decriminalization

In calling for a more humane approach to the problems of drug use and to address the concerns of opponents who believe that decriminalization will result in widespread increases in marijuana and other illicit substance use, people have also looked to the international experience of drug policy reform. In the case of Portugal, it has been demonstrated that in the 5 to 10 years since their laws were passed decriminalizing all drug use and possession, twice as many people have sought treatment for addiction than did so before the decriminalization of all illicit drugs in 2001. And although marijuana use rates were not higher than in countries that have stiff penalties, such as Norway and the United States, it is important to note that

reported rates of use among youth in Portugal did increase during that time.⁹² Since 2001, Portugal has also experienced decreased rates of HIV infection from injection drug use, although rates of heroin use and some drug-related crimes have increased in some locales throughout the country.⁵⁸

Although it is difficult to make cross-national comparisons, given differences in culture, legal statutes, and methods of data collection, in the Netherlands there has been an overall decline in the rates of current use since the 1970s, paralleling what has been observed across the European Union. Specifically, the current use rate among Dutch youth ages 15 to 24 is currently around 11%; this is higher than the 8.4% average use rate of other European Union nations, perhaps because of the liberal approach to marijuana selling and use in the Netherlands.⁹³ Both of these rates are significantly lower than rates reported in the United States.⁴²

COMPARISONS BETWEEN MARIJUANA, ALCOHOL, AND TOBACCO

One argument in support of marijuana legalization is that alcohol and tobacco cause more harm to society, in terms of financial and health costs, than marijuana.⁹⁴ This argument is based on their belief that tight controls on the use, possession, and sale of what some consider a benign substance, such as marijuana, are inconsistent with policies that permit the legal use of substances such as alcohol and tobacco, which cause far more harm to individuals and society. Few would argue that the use of tobacco and underage or excessive use of alcohol are not harmful. However, the harmful effects of marijuana are rarely included in discussions about legalization of recreational and medical marijuana use, despite the emerging and convincing data on the neurodevelopmental consequences of marijuana and its potential for

addiction. Proponents of legalization also claim that legalization would facilitate tighter control of its use through regulation, such as requiring a license for selling, restricting sale to those 21 years of age or older, and taxation, similar to what is done for alcohol and tobacco.⁹⁴ However, the lax enforcement of such laws for alcohol and tobacco and the push of advertisers to market these products to adolescents, despite legal sanctions, both suggest that it will be difficult to enforce similar limits of legal sale and advertising of marijuana to youth.⁷⁸ Rather than legalizing marijuana, given data supporting a causal relationship between tobacco advertising and promotional activities, and subsequent initiation and use of tobacco by youth, it has been suggested that tighter regulations and stricter enforcement of laws regulating advertisement and sales of tobacco and alcohol to minors are needed.⁹⁵

The high current use rates of underage alcohol and tobacco among 12- to 17-year-olds (12.9% and 8.6%, respectively),⁴² despite state laws barring the sale of alcohol to those younger than 21 years and tobacco usually to those younger than 18 years, support this concern. An additional concern is that over the past decade, adolescents' perception of the risks of heavy drinking, tobacco use, and marijuana use have declined, with significantly fewer youth now reporting that there is "great risk" associated with routine or heavy use of these substances.¹ Researchers cite these changes in perception of risk as contributors to this reversal of rates among youth. These perceptions have changed despite the emergence of societal norms opposing tobacco use in public and media coverage about excessive alcohol use and driving.⁹⁶

SOCIETY AND SOCIAL JUSTICE

The majority of arrests for marijuana possession occur among adolescents

and young adults; these arrests disproportionately affect young men and boys, particularly young black men and boys. Ongoing criminal prosecution for marijuana possession has led to serious and often permanent legal problems for these youth. Since 1991, marijuana arrests have nearly doubled,⁸⁷ but levels of marijuana use have not declined to a similar extent.¹ In 2009, there were 858 408 arrests for marijuana, of which 755 399 were for possession (88% of the total). Fifty-two percent of all marijuana possession arrests were in adolescents and young adults: Male adolescents ages 15 to 19 years accounted for 28% of all possession arrests, and young men ages 20 to 24 years accounted for another 24%. Thus approximately 392 807 adolescents and young adults were arrested for marijuana possession in 2009.⁹⁷ Although black people account for 13% of the population and only 15% of current marijuana users, since 2007 they have also consistently accounted for between 31% and 34% of marijuana possession arrests, reflecting the disparities in enforcement of prevailing laws across racial and ethnic groups throughout the United States.⁹⁷⁻⁹⁹ Although no national data are available about the amount of marijuana that adolescents have in their possession at the time of arrest, the Federal Bureau of Investigation Uniform Crime Reports database revealed that, for example, in Massachusetts before decriminalization, 90% of arrests were for 1 ounce or less, and in Connecticut, 75% of arrests in those older than 18 years were for a half ounce or less.^{100,101} After decriminalization of marijuana possession went into effect in Massachusetts in 2008, the number of minors arrested for marijuana possession dropped by 89%–90%—to 189 in 2009 and 170 in 2010.

Data are not available on the percentages of youth who are arrested for marijuana possession

who then have their charges dismissed, are charged with misdemeanors and petty offenses, have some kind of felony drug conviction, or are imprisoned. These numbers vary from state to state. Many people are held at least for some time in jail before they are charged with a crime. This can be a very traumatic and dangerous experience and could result in lost jobs and derailed education. Being released from jail can also be dangerous, because many jails release nonminors in the middle of the night, often without their possessions.^{102,103} Currently, criminal prosecution for marijuana possession by teenagers and young adults adversely affects almost 400 000 youth a year in the United States.⁸⁷ Imprisonment represents direct removal of a person from needed roles in society: adults away from jobs, parents from young children, and adolescents from school and their families. Furthermore, these people are placed in environments where they are likely to have close contact with people who have committed serious violent offenses or are repeat offenders.

Advocates of decriminalization cite the importance, particularly for youth, of ensuring that criminal offenses are limited to misdemeanors or petty offenses or noncriminal civil violations. These reduced violations do not carry the requirement for short-term prison time or probation or the longer-term stigma of a felony drug conviction, which may result in the inability to obtain student loans or attend school, ineligibility for certain housing, and difficulties with future employment.¹⁰⁴ For example, students applying to college may be denied federal financial aid because of a drug conviction, including marijuana possession (part of the Higher Education Act Aid Elimination Penalty passed by Congress in 1998). Penalties for marijuana possession of 1 ounce or less range widely from state to state, with maximum

penalties ranging from a fine of only \$100 to \$5000 and 5 years in prison. Possession of greater than 1 ounce of marijuana usually results in larger maximum fines and jail time. As with any other law, penalties for marijuana possession should not be targeted at or applied disproportionately to minority populations.

Detention facilities are also ill-equipped to deal with issues that may relate to an inmate's substance use disorder, and many adolescents do not receive any treatment.¹⁰⁵ Few treatment programs are available as an alternative to incarceration. Treatment and diversion programs for drug use are not a usual focus of the criminal justice system, although some jurisdictions require drug education or community service for minors convicted of drug possession. Juvenile drug courts have also been used for drug education and treatment of minors convicted of drug possession.¹⁰⁵

The main argument against decriminalization is that it will lead to increased rates of marijuana use and illicit substances in general, which in turn would lead to increases in criminal activity related to sales and distribution. It has also been argued that adolescents are frequent buyers of small amounts of marijuana, which leads to higher numbers of local drug dealers and more frequent interactions with them. Nearly 16% of 12- to 17-year-olds who bought marijuana did so from someone they had just met or did not know.¹⁰⁶ Anecdotally, some illicit drug dealers promote and sell numerous drugs simultaneously, such as cocaine and methamphetamine. Thus, adolescent buyers using the black market are potentially exposed to and encouraged to buy and try other psychoactive substances. Opponents also argue that it sends the "wrong message" to young people when the penalties for use are reduced to minor infractions that may carry little incentive to change behaviors.

Driving while intoxicated by marijuana may need a different policy approach. Cannabis is the most prevalent illicit drug detected in fatally injured drivers and motor vehicle crash victims.¹⁰⁷ However, currently there are no accepted lower levels of blood concentration for carboxy-THC, the active metabolite measured in serum, or standards regarding serum thresholds indicating intoxication.⁸¹ Because carboxy-THC is lipid soluble, a positive serum level can be detected several weeks after abstinence in the chronic user.⁸¹ Individual drivers can vary widely in their sensitivity for THC-induced impairment, as evinced by weak correlations between THC in serum and magnitude of performance impairment.⁸¹ Plasma of drivers showing substantial impairment contained both high and low THC concentrations, and different drivers with high plasma concentrations showed substantial impairment, no impairment, and even some improvement.^{108,109} Other THC metabolites are being investigated to help distinguish between acute and more chronic or heavy use.¹¹⁰ Although blood alcohol content can be accurately measured and correlated with behavioral impairment, this may not be the case with cannabis, in part because alcohol is water soluble, whereas cannabis is stored in the fat and is metabolized differently, making a direct correlation with behavior difficult to measure.¹⁰⁹ Because marijuana use does cause impaired driving, pediatricians should explicitly counsel adolescents to never drive under the influence of marijuana.

SUMMARY

Marijuana use in pediatric populations remains an ongoing concern, and marijuana use by adolescents has known medical, psychological, and cognitive side effects. Marijuana alters brain development, with detrimental effects on brain structure and function, in

ways that are incompletely understood. Furthermore, marijuana smoke contains tar and other harmful chemicals, so it cannot be recommended by physicians. At this time, there is no published research to suggest benefit of marijuana use by children and adolescents. In the context of limited but clear evidence showing harm or potential harm from marijuana use by adolescents, formal recommendations for "medical marijuana" use by adolescents are contrary to current evidence. Exceptions may be those that pertain to emerging anecdotal information concerning the medical potential of cannabinoid medications, which may be an option for children who have life-limiting or severely debilitating conditions and for whom current therapies are inadequate. Criminal prosecution for marijuana possession adversely affects hundreds of thousands of youth yearly in the United States, particularly minority youth. Current evidence does not support a focus on punishment for youth who use marijuana. Rather, drug education and treatment programs should be encouraged to better help youth who are experimenting with or dependent on marijuana. Decriminalization of recreational use of marijuana by adults has also not led to an increase in youth use rates of recreational marijuana. Thus, decriminalizing simple possession of marijuana for both minors and young adults may be a reasonable alternative to outright criminal prosecution, as long as it is coupled with drug education and treatment programs. The impact of outright legalization of adult recreational use of marijuana on youth use is unknown, and it cannot be recommended.

At this time, evaluative data on the impact of recently enacted laws regulating and taxing marijuana for adults in Washington State and Colorado may inform the issue of how youth are affected. At a minimum, marijuana should be regulated

closely, similar to what has been attempted for tobacco products and alcohol, in terms of restrictions on marketing and sale to those younger than 21 years old, continued penalties for the wholesale distribution of marijuana, clean indoor air acts to protect against passive marijuana smoke, and bans on marijuana use on college campuses, schools, and child care centers. However, the AAP recognizes that despite ongoing regulation of the tobacco and alcohol industries, youth remain common targets and ultimately consumers of these products. Thus, more effective regulation of the medical marijuana and legal marijuana industries is crucial to truly protect children and adolescents from potential harm.

APPENDIX. STATISTICAL SIGNIFICANCE OF THE INCREASE OR DECREASE OF CURRENT TEEN USE OF MARIJUANA BEFORE AND AFTER PASSAGE OF A MEDICAL MARIJUANA LAW

The Youth Risk Behavior Survey (YRBS) provides an online tool to access the statistical significance of changes in the variable data they collect. Below is specific information detailing the *P* value of the increase or decrease in current marijuana use rates for 12th graders in the years immediately preceding passage of a state medical marijuana law compared with the most recent year for which there are data. To access the full information with tables on the YRBS Web site, visit <http://nccd.cdc.gov/YouthOnline/App/QuestionsOrLocations.aspx?CategoryId=C3>.

This application allows only running the statistical significance for states in which YRBS collected data, which is not applicable to California, Oregon, and Washington.

Alaska

In 1995, 30.9% of 12th graders in Alaska reported being current marijuana users (having used in the past month) on the YRBS. In 1998, the voters of Alaska passed their medical

marijuana law. In 2011, only 22.2% of 12th graders in Alaska reported being current marijuana users on the YRBS. The difference in use rates—8.7 percentage points—is statistically significant, with *P* = .03. In 2013, 22.4% of 12th graders were current users, a nonsignificant increase from 2011.

Maine

In 1997, 33.1% of 12th graders in Maine reported being current marijuana users (having used in the past month) on the YRBS. In 1999, the voters of Maine passed their medical marijuana law. In 2011, 27.3% of 12th graders in Maine reported being current marijuana users on the YRBS. The difference in use rates—5.8 percentage points—is not statistically significant, with *P* = .12. In 2013, 29.5% of 12th graders were current users, a nonsignificant increase from 2011.

Hawaii

In 1999, 27.2% of 12th graders in Hawaii reported being current marijuana users (having used in the past month) on the YRBS. In 2000, Hawaii passed its medical marijuana law via the legislature. In 2011, 25.4% of 12th graders in Hawaii reported being current marijuana users on the YRBS. The difference in use rates—1.8 percentage points—is not statistically significant, with *P* = .67. In 2013, 22.9% of 12th graders were current users, a nonsignificant decrease from 2011.

Nevada

In 1999, 27.5% of 12th graders in Nevada reported being current marijuana users (having used in the past month) on the YRBS. In 2001, Nevada passed its medical marijuana law via the legislature. In 2009, only 22.7% of 12th graders in Nevada reported being current marijuana users on the YRBS. The difference in use rates—4.8 percentage points—is not statistically significant, *P* = .34. In 2013, 21.5% of 12th graders were current users, a nonsignificant decrease from 2009.

Montana

In 2003, 29.1% of 12th graders in Montana reported being current marijuana users (having used in the past month) on the YRBS. In 2004, the voters of Montana passed their medical marijuana law. In 2011, 27.2% of 12th graders in Montana reported being current marijuana users on the YRBS. The difference in use rates—1.9 percentage points—is not statistically significant, with *P* = .63. In 2013, 24.0% of 12th graders were current users, a nonsignificant decrease from 2011.

Vermont

In 2003, 37.2% of 12th graders in Vermont reported being current marijuana users (having used in the past month) on the YRBS. In 2004, Vermont passed its medical marijuana law via the legislature. In 2011, 31.5% of 12th graders in Vermont reported being current marijuana users on the YRBS. The difference in use rates—5.7 percentage points—is not statistically significant, with *P* = .07. In 2013, 32.8% of 12th graders were current users, a nonsignificant increase from 2011.

Rhode Island

In 2005, 34.3% of 12th graders in Rhode Island reported being current marijuana users (having used in the past month) on the YRBS. In 2006, Rhode Island passed its medical marijuana law via the legislature. In 2011, 34.0% of 12th graders in Rhode Island reported being current marijuana users on the YRBS. The difference in use rates—0.3 percentage points—is not statistically significant, with *P* = .93. In 2013, 37.0% of 12th graders were current users, a nonsignificant increase from 2011.

New Mexico

In 2007, 25.4% of 12th graders in New Mexico reported being current marijuana users (having used in the past month) on the YRBS. In mid-

2007, New Mexico passed its medical marijuana law via the legislature. In 2011, 26.8% of 12th graders in New Mexico reported being current marijuana users on the YRBS. The difference in use rates—1.4 percentage points—is not statistically significant, with $P = .66$. In 2013, 32.7% of 12th graders were current users, a significant increase from 2011.

Michigan

In 2007, 19.0% of 12th graders in Michigan reported being current marijuana users (having used in the past month) on the YRBS. In 2008, Michigan voters passed their medical marijuana law. In 2011, 21.1% of 12th graders in Michigan reported being current marijuana users on the YRBS. The difference in use rates—2.1 percentage points—is not statistically significant, with $P = .57$. In 2013, 24.7% of 12th graders were current users, a nonsignificant increase from 2011.

Arizona

In 2009, 28.2% of 12th graders in Arizona reported being current marijuana users (having used in the past month) on the YRBS. In 2010, Arizona voters passed their medical marijuana law. In 2011, 27.1% of 12th graders in Arizona reported being current marijuana users on the YRBS. The difference in use rates—1.1 percentage points—is not statistically significant, with $P = .74$. In 2013, 25.4% of 12th graders were current users, a nonsignificant decrease from 2011.

New Jersey

In 2009, 31.0% of 12th graders in New Jersey reported being current marijuana users (having used in the past month), on the YRBS. In 2010, New Jersey voters passed their medical marijuana law. In 2011, 33.4% of 12th graders in New Jersey reported being current marijuana users on the YRBS. The difference in use rates—2.4 percentage points—is not statistically significant, with $P = .74$. In 2013, 29.7% of 12th graders

were current users, a nonsignificant decrease from 2011.

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*The views expressed are those of the author and do not necessarily reflect the policy or position of the Department of the Army, Department of Defense, or the US Government.

RESOURCES

American Academy of Pediatrics:
www.aap.org/marijuana
National Institute on Drug Abuse:
www.drugabuse.gov
Office of National Drug Control Policy:
www.whitehouse.gov/ondcp

Smart Approaches to Marijuana:
<http://learnaboutsam.com>
Substance Abuse and Mental Health Services Administration:
www.samhsa.gov
US Department of Health & Human Services, Office of Adolescent Health:
www.hhs.gov/ash/oah/resources-and-publications/publications/substance-abuse.html

REFERENCES

- Johnston LD, O'Malley PM, Miech RA, Bachman JG, Schulenberg JE. *Monitoring the Future National Survey on Drug Use 1975–2013. 2013 Overview: Key Findings on Adolescent Drug Use*. Ann Arbor, MI: University of Michigan, Institute for Social Research; 2014. Available at: www.monitoringthefuture.org/pubs/monographs/mtf-overview2013.pdf. Accessed December 14, 2014
- Eaton DK, Kann L, Kinchen S, et al; Centers for Disease Control and Prevention (CDC). Youth risk behavior surveillance – United States, 2011. *MMWR Surveill Summ*. 2012;61(4): 1–162. Available at: www.cdc.gov/mmwr/pdf/ss/ss6304.pdf. Accessed December 14, 2014
- National Survey on Drug Use and Health. Population data: NSDUH. Available at: www.samhsa.gov/data/population-data-nsduh/reports. Accessed December 14, 2014
- MetLife Foundation. 2012 Partnership Attitude Tracking Study: Parents and Teens. Full Report. New York, NY: MetLife Foundation; 2012. Available at: www.drugfree.org/wp-content/uploads/2013/04/PATS-2012-FULL-REPORT2.pdf. Accessed December 14, 2014
- Substance Abuse and Mental Health Services Administration. National Survey on Drug Use and Health: summary of NSDUH. Available at: <http://oas.samhsa.gov/NSDUH/2k10NSDUH/2k10Results.htm#1.1>. Accessed June 3, 2014
- Choo EK, Benz M, Zaller N, Warren O, Rising KL, McConnell KJ. The impact of state medical marijuana legislation on adolescent marijuana use. *J Adolesc Health*. 2014;55(2):160–166. doi:10.1016/j.jadohealth.2014.02.018
- Lynne-Landsman SD, Livingston MD, Wagenaar AC. Effects of state medical marijuana laws on adolescent

- marijuana use. *Am J Public Health*. 2013;103(8):1500–1506
8. Holland J, ed. *The Pot Book. A Complete Guide to Cannabis: Its Role in Medicine, Politics, Science, and Culture*. South Paris, ME: Park Street Press; 2010
9. Wang T, Collet JP, Shapiro S, Ware MA. Adverse effects of medical cannabinoids: a systematic review. *CMAJ*. 2008;178(13):1669–1678
10. Wolff V, Lauer V, Rouyer O, et al. Cannabis use, ischemic stroke, and multifocal intracranial vasoconstriction: a prospective study in 48 consecutive young patients. *Stroke*. 2011;42(6):1778–1780
11. Appelboom A, Oades PJ. Coma due to cannabis toxicity in an infant. *Eur J Emerg Med*. 2006;13(3):177–179
12. Wang GS, Roosevelt G, Heard K. Pediatric marijuana exposures in a medical marijuana state. *JAMA Pediatr*. 2013;167(7):630–633
13. Yakovlev PI, Lecours AR. The myelogenetic cycles of regional maturation of the brain. In: Minkowski A, ed. *Regional Development of the Brain in Early Life*. Boston, MA: Blackwell Scientific; 1967:3–70
14. Sowell ER, Thompson PM, Leonard CM, Welcome SE, Kan E, Toga AW. Longitudinal mapping of cortical thickness and brain growth in normal children. *J Neurosci*. 2004;24(38):8223–8231
15. Giedd JN. Structural magnetic resonance imaging of the adolescent brain. *Ann N Y Acad Sci*. 2004;1021:77–85
16. Sowell ER, Thompson PM, Holmes CJ, Jernigan TL, Toga AW. In vivo evidence for post-adolescent brain maturation in frontal and striatal regions. *Nat Neurosci*. 1999;2(10):859–861
17. Hüppi PS, Dubois J. Diffusion tensor imaging of brain development. *Semin Fetal Neonatal Med*. 2006;11(6):489–497
18. Gogtay N, Giedd JN, Lusk L, et al. Dynamic mapping of human cortical development during childhood through early adulthood. *Proc Natl Acad Sci USA*. 2004;101(21):8174–8179
19. Luna B, Sweeney JA. The emergence of collaborative brain function: FMRI studies of the development of response inhibition. *Ann N Y Acad Sci*. 2004;1021:296–309
20. Schepis TS, Adinoff B, Rao U. Neurobiological processes in adolescent addictive disorders. *Am J Addict*. 2008;17(1):6–23
21. Casey BJ, Getz S, Galvan A. The adolescent brain. *Dev Rev*. 2008;28(1):62–77
22. Winters KC, Lee CY. Likelihood of developing an alcohol and cannabis use disorder during youth: association with recent use and age. *Drug Alcohol Depend*. 2008;92(1–3):239–247
23. Casey BJ, Jones RM. Neurobiology of the adolescent brain and behavior: implications for substance use disorders. *J Am Acad Child Adolesc Psychiatry*. 2010;49(12):1189–1201, quiz 1285
24. Perkonig A, Goodwin RD, Fiedler A, et al. The natural course of cannabis use, abuse and dependence during the first decades of life. *Addiction*. 2008;103(3):439–449, discussion 450–451
25. von Sydow K, Lieb R, Pfister H, Höfler M, Sonntag H, Wittchen HU. The natural course of cannabis use, abuse and dependence over four years: a longitudinal community study of adolescents and young adults. *Drug Alcohol Depend*. 2001;64(3):347–361
26. Medina KL, Hanson KL, Schweinsburg AD, Cohen-Zion M, Nagel BJ, Tapert SF. Neuropsychological functioning in adolescent marijuana users: subtle deficits detectable after a month of abstinence. *J Int Neuropsychol Soc*. 2007;13(5):807–820
27. Gonzalez R, Swanson JM. Long-term effects of adolescent-onset and persistent use of cannabis. *Proc Natl Acad Sci USA*. 2012;109(40):15970–15971
28. Medina KL, Schweinsburg AD, Cohen-Zion M, Nagel BJ, Tapert SF. Effects of alcohol and combined marijuana and alcohol use during adolescence on hippocampal volume and asymmetry. *Neurotoxicol Teratol*. 2007;29(1):141–152
29. Nagel BJ, Schweinsburg AD, Phan V, Tapert SF. Reduced hippocampal volume among adolescents with alcohol use disorders without psychiatric comorbidity. *Psychiatry Res*. 2005;139(3):181–190
30. Medina KL, McQueeney T, Nagel BJ, Hanson KL, Schweinsburg AD, Tapert SF. Prefrontal cortex volumes in adolescents with alcohol use disorders: unique gender effects. *Alcohol Clin Exp Res*. 2008;32(3):386–394
31. Schweinsburg AD, Nagel BJ, Schweinsburg BC, Park A, Theilmann RJ, Tapert SF. Abstinence adolescent marijuana users show altered fMRI response during spatial working memory. *Psychiatry Res*. 2008;163(1):40–51
32. Squeglia LM, Jacobus J, Tapert SF. The influence of substance use on adolescent brain development. *Clin EEG Neurosci*. 2009;40(1):31–38
33. Silins E, Horwood LJ, Patton GC, et al. Young adult sequelae of adolescent cannabis use: an integrative analysis. *Lancet Psychiatry*. 2014;1(4):286–293
34. Volkow ND, Baler RD, Compton WM, Weiss SRB. Adverse health effects of marijuana use. *N Engl J Med*. 2014;370(23):2219–2227
35. Navari RM. Antiemetic control: toward a new standard of care for emetogenic chemotherapy. *Expert Opin Pharmacother*. 2009;10(4):629–644
36. Pooyania S, Ethans K, Szturm T, Casey A, Perry D. A randomized, double-blinded, crossover pilot study assessing the effect of nabilone on spasticity in persons with spinal cord injury. *Arch Phys Med Rehabil*. 2010;91(5):703–707
37. Sastre-Garriga J, Vila C, Clissold S, Montalban X. THC and CBD oromucosal spray (Sativex®) in the management of spasticity associated with multiple sclerosis. *Expert Rev Neurother*. 2011;11(5):627–637
38. Marijuana Policy Project. *The Twenty Three States and One Federal District With Effective Medical Marijuana Laws*. Washington, DC: Marijuana Policy Project; April 2014. Available at: www.mpp.org/assets/pdfs/library/MMJLawsSummary.pdf. Accessed December 14, 2014
39. Hazekamp A, Ruhaak R, Zuurman L, van Gerven J, Verpoorte R. Evaluation of a vaporizing device (Volcano) for the pulmonary administration of tetrahydrocannabinol. *J Pharm Sci*. 2006;95(6):1308–1317
40. Abrams DI, Vizoso HP, Shade SB, Jay C, Kelly ME, Benowitz NL. Vaporization as a smokeless cannabis delivery system:

- a pilot study. *Clin Pharmacol Ther*. 2007; 82(5):572–578
41. Fishedick J, Van Der Kooy F, Verpoorte R. Cannabinoid receptor 1 binding activity and quantitative analysis of *Cannabis sativa* L. smoke and vapor. *Chem Pharm Bull (Tokyo)*. 2010;58(2):201–207
 42. US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: summary of national findings. Available at: www.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/NationalFindings/NSDUHresults2012.htm#lot. Accessed December 14, 2014
 43. Wall MM, Poh E, Cerdá M, Keyes KM, Galea S, Hasin DS. Adolescent marijuana use from 2002 to 2008: higher in states with medical marijuana laws, cause still unclear. *Ann Epidemiol*. 2011;21(9):714–716
 44. Salomonsen-Sautel S, Sakai JT, Thurstone C, Corley R, Hopfer C. Medical marijuana use among adolescents in substance abuse treatment. *J Am Acad Child Adolesc Psychiatry*. 2012;51(7):694–702
 45. American College of Physicians. *Supporting Research Into the Therapeutic Role of Marijuana: Position Paper*. Philadelphia, PA: American College of Physicians; 2008. Available at: www.acponline.org/advocacy/where_we_stand/other_issues/medmarijuana.pdf. Accessed December 14, 2014
 46. California Society of Addiction Medicine. *CSAM Statement on the Medical Aspects of Marijuana Legalization*. San Francisco, CA: California Society of Addiction Medicine; 2010. Available at: www.csam-asam.org/pdf/misc/Legalization.pdf. Accessed December 14, 2014
 47. Aggarwal SK, Carter GT, Sullivan MD, ZumBrunnen C, Morrill R, Mayer JD. Medicinal use of cannabis in the United States: historical perspectives, current trends, and future directions. *J Opioid Manag*. 2009;5(3):153–168
 48. Cotter J. Efficacy of crude marijuana and synthetic delta-9-tetrahydrocannabinol as treatment for chemotherapy-induced nausea and vomiting: a systematic literature review. *Oncol Nurs Forum*. 2009;36(3):345–352
 49. Scotter EL, Aboud ME, Glass M. The endocannabinoid system as a target for the treatment of neurodegenerative disease. *Br J Pharmacol*. 2010;160(3):480–498
 50. Rahn EJ, Hohmann AG. Cannabinoids as pharmacotherapies for neuropathic pain: from the bench to the bedside. *Neurotherapeutics*. 2009;6(4):713–737
 51. Lynch ME, Campbell F. Cannabinoids for treatment of chronic non-cancer pain; a systematic review of randomized trials. *Br J Clin Pharmacol*. 2011;72(5):735–744. doi:10.1111/j.1365-2125.2011.03970
 52. Peat S. Using cannabinoids in pain and palliative care. *Int J Palliat Nurs*. 2010;16(10):481–485
 53. Penner EA, Buettner H, Mittleman MA. The impact of marijuana use on glucose, insulin, and insulin resistance among US adults. *Am J Med*. 2013;126(7):583–589
 54. Gerich ME, Isfort RW, Brimhall B, Siegel CA. Medical marijuana for digestive disorders: high time to prescribe? [published online ahead of print September 9, 2014]. *Am J Gastroenterol*. doi:10.1038/ajg.2014.245
 55. Koppel BS, Brust JCM, Fife T, et al. Systematic review: efficacy and safety of medical marijuana in selected neurologic disorders. Report of the Guideline Development Subcommittee of the American Academy of Neurology. *Neurology*. 2014;82(17):1556–1563
 56. Haase HJ, Eyle NE, Schimpf JR. *The International Drug Control Treaties: How Important Are They to US Drug Reform?* New York, NY: New York City Bar Association, Committee on Drugs and the Law, Special Subcommittee on International Drug Law and Policy; 2012. Available at: <http://www2.nycbar.org/pdf/InternationalDrugControlTreatiesArticle.pdf>. Accessed December 14, 2014
 57. Castaldi M, Llambias F. Uruguay becomes first country to legalize marijuana trade. Reuters. December 10, 2013. Available at: www.reuters.com/article/2013/12/11/us-uruguay-marijuana-vote-idUSBRE9BA01520131211. Accessed December 14, 2014
 58. Domoslawski A. *Drug Policy in Portugal: The Benefits of Decriminalizing Drug Use*. Warsaw, Poland: Open Society Foundations; 2011. Available at: www.opensocietyfoundations.org/reports/drug-policy-portugal-benefits-decriminalizing-drug-use. Accessed December 14, 2014
 59. Greenwald G. *Drug Decriminalization in Portugal: Lessons for Creating Fair and Successful Drug Policies*. Washington, DC: Cato Institute; 2009
 60. Vastag B. 5 years after: Portugal's drug decriminalization policy shows positive results. *Scientific American*. April 7, 2009. Available at: www.scientificamerican.com/article/portugal-drug-decriminalization/. Accessed December 14, 2014
 61. van der Gouw D, Ehrlich E, van Laar MW. *Drug Policies in the Netherlands*. Utrecht, the Netherlands: Trimbos Instituut; March 2005. Available at: www.trimbos.org/projects/research-monitoring-and-policies/drug-policy-in-the-netherlands. Accessed December 14, 2014
 62. Trimbos Instituut. *Drug Situation 2006, The Netherlands by the Reitox National Focal Point: Report to the EMCDDA*. Utrecht, the Netherlands: Trimbos Instituut; 2007:18. Available at: www.trimbos.org/~media/English%20site/AF1130%20The%20Netherlands%20Drug%20Situation%202011_web.ashx. Accessed December 14, 2014
 63. MacCoun R, Reuter P. Interpreting Dutch cannabis policy: reasoning by analogy in the legalization debate. *Science*. 1997;278(5335):47–52
 64. Martin A. Amsterdam will ban tourists from pot coffee shops. *The Wire*. May 27, 2011. Available at: www.theatlanticwire.com/global/2011/05/amsterdam-ban-pot-sales-tourists/38248. Accessed December 14, 2014
 65. Waterfield B. Tourists exempted from ban on smoking cannabis in Amsterdam. *The Telegraph*. December 12, 2012. Available at: www.telegraph.co.uk/news/worldnews/europe/netherlands/9740463/Tourists-exempted-from-ban-on-smoking-cannabis-in-Amsterdam.html. Accessed December 14, 2014
 66. Holligan A. Dutch to re-classify high-strength cannabis. *BBC News Europe*. October 7, 2011. Available at: www.bbc.com/news/world-europe-15225270. Accessed December 14, 2014
 67. Shaffer Library of Drug Policy. Drug laws in South America. Available at: www.druglibrary.org/Schaffer/library/

- southam1.htm. Accessed December 14, 2014
68. Transnational Institute. Drug law reform in Latin America. Brazil. Available at: www.druglawreform.info/en/country-information/brazil/item/201-brazil. Accessed December 14, 2014
69. Quilodran F. Chile Supreme Court OKs medical marijuana company. *Associated Press*. October 7, 2011. Available at: www.boston.com/business/articles/2011/10/07/chile_supreme_court_oks_medical_marijuana_company/. Accessed December 14, 2014
70. Connors W. Canada's new marijuana laws set stage for growth. *Wall Street Journal Market Watch*. April 17, 2014. Available at: www.marketwatch.com/story/canadas-new-marijuana-laws-set-stage-for-growth-2014-04-17?pagenumber=2. Accessed December 14, 2014
71. Carney S. Czech govt allows 5 cannabis plants for personal use from 2010. *Wall Street Journal*. December 8, 2009. Available at: <http://blogs.wsj.com/emergingEurope/2009/12/08/czech-govt-allows-5-cannabis-plants-for-personal-use-from-2010/>. Accessed December 14, 2014
72. StoptheDrugWar.org. China celebrates UN anti-drug day with 59 executions. Available at: <http://stopthedrugwar.org/chronicle/192/chinakillings.shtml>. Accessed December 14, 2014
73. Media Awareness Project. Saudi Arabia: Pakistani and Iraqi beheaded in Saudi Arabia. Available at: www.mapinc.org/drugnews/v05.n006.a08.html. Accessed December 14, 2014
74. US Department of Justice, Drug Enforcement Administration, Office of Diversion Control. *Controlled Substances Security Manual*. Available at: www.deadiversion.usdoj.gov/pubs/manuals/sec/app_law.htm. Accessed December 14, 2014
75. National Organization for the Reform of Marijuana Laws. States that have decriminalized. Available at: <http://norml.org/aboutmarijuana/item/states-that-have-decriminalized>. Accessed December 14, 2014
76. *Effective Arguments for Advocates of Taxing and Regulating Marijuana*. Washington, DC: Marijuana Policy Project; May 29, 2014. Available at: www.mpp.org/assets/pdfs/library/Effective-Arguments-for-T-R.pdf. Accessed December 14, 2014
77. United Nations Office on Drugs and Crime. Data and analysis. Available at: www.unodc.org/unodc/en/data-and-analysis/index.html?ref=menuaside. Accessed December 14, 2014
78. Campaign for Tobacco Free Kids. Tobacco company marketing to kids. Available at: www.tobaccofreekids.org/research/factsheets/pdf/0008.pdf. Accessed December 14, 2014
79. Schweinsburg AD, Brown SA, Tapert SF. The influence of marijuana use on neurocognitive functioning in adolescents. *Curr Drug Abuse Rev*. 2008;1(1):99–111
80. Pope HG Jr, Gruber AJ, Hudson JI, Huestis MA, Yurgelun-Todd D. Neuropsychological performance in long-term cannabis users. *Arch Gen Psychiatry*. 2001;58(10):909–915
81. Ramaekers JG, Berghaus G, van Laar MW, Drummer OH. Dose related risk of motor vehicle crashes after cannabis use: an update. In: Verster JC, Pandi-Perumal SR, Ramaekers JG, de Gier JJ, eds. *Drugs, Driving, and Traffic Safety*. Geneva, Switzerland: World Health Organization; 2009:477–499
82. Neavyn MJ, Blohm E, Babu KM, Bird SB. Medical marijuana and driving: a review. *J Med Toxicol*. 2014;10(3):269–279 doi:10.1007/s13181-014-0393-4
83. Joshi M, Joshi A, Bartter T. Marijuana and lung diseases. *Curr Opin Pulm Med*. 2014;20(2):173–179
84. Aldington S, Harwood M, Cox B, et al; Cannabis and Respiratory Disease Research Group. Cannabis use and risk of lung cancer: a case-control study. *Eur Respir J*. 2008;31(2):280–286
85. Moore TH, Zammit S, Lingford-Hughes A, et al. Cannabis use and risk of psychotic or affective mental health outcomes: a systematic review. *Lancet*. 2007;370(9584):319–328
86. Hall W. The adverse health effects of cannabis use: what are they, and what are their implications for policy? *Int J Drug Policy*. 2009;20(6):458–466
87. Gettman J. Marijuana arrests in the United States: 1991–2009. Executive summary. *Bulletin of Cannabis Reform*. November 2009;7. Available at: www.drugscience.org/bcr/. Accessed December 14, 2014
88. Johnston LD, Bachman JG, O'Malley PM. *Marijuana Decriminalization: The Impact on Youth, 1975–1980*. Occasional Paper 13. Ann Arbor, MI: University of Michigan, Institute for Social Research; 1981
89. Single EW. The impact of marijuana decriminalization. In: Israel Y, Glaser FB, Kalant H, Popham RE, Schmidt W, Smart RG, eds. *Research Advances in Alcohol and Drug Problems*. Vol 6. New York, NY: Plenum; 1981:405–424
90. Maloff DR. A review of the effects of the decriminalization of marijuana. *Contemp Drug Probl*. 1981;10(3):307–322
91. Single EW. The impact of marijuana decriminalization: an update. *J Public Health Policy*. 1989;10(4):456–466
92. Greenwald G. *Drug Decriminalization in Portugal: Lessons for Creating Fair and Successful Drug Policies*. Washington, DC: Cato Institute; 2009
93. European Monitoring Centre for Drugs and Drug Addiction. Cannabis. Prevalence and patterns of use. Available at: www.emcdda.europa.eu/online/annual-report/2010/cannabis/3. Accessed December 14, 2014
94. Marijuana Policy Project. *Top Ten Reasons to End Marijuana Prohibition by Taxing and Regulation Marijuana*. Available at: www.mpp.org/assets/pdfs/library/Top-Ten-Reasons.pdf. Accessed December 16, 2014
95. Biener L, Siegel M. Tobacco marketing and adolescent smoking: more support for a causal inference. *Am J Public Health*. 2000;90(3):407–411
96. Perkins HW, Linkenbach JW, Lewis MA, Neighbors C. Effectiveness of social norms media marketing in reducing drinking and driving: a statewide campaign. *Addict Behav*. 2010;35(10):866–874
97. The Marijuana Policy Almanac: marijuana arrests in the United States. *Bulletin of Cannabis Reform*. Available at: www.drugscience.org/States/US/US_home.htm. Accessed December 14, 2014
98. US Census Bureau. State & county quickfacts. 2014. Available at: <http://www.census.gov/quickfacts/>

- quickfacts.census.gov/qfd/states/00000.html. Accessed December 14, 2014
99. Substance Abuse and Mental Health Services Administration. Table 1.24A: marijuana use in lifetime, past year, past month among persons aged 12 or older, by demographic characteristics. 2012. Available at: www.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/DetTabs/NSDUH-DetTabsSect1peTabs1to46-2012.htm#Tab1.24A. Accessed December 14, 2014
100. Federal Bureau of Investigation. Uniform crime reports. Accessed by e-mail communication, June 27, 2014
101. State of Connecticut, Office of Fiscal Analysis. An Act Concerning the Penalty for Certain Nonviolent Drug Offenses [sSB-1014]. Available at: www.cga.ct.gov/2011/FN/2011SB-01014-R01-FN.htm. Accessed December 14, 2014
102. Cacik A. Shedding light on late-night jail releases. *Mission & State*. February 7, 2014. Available at: www.missionandstate.org/blog/shedding-light-late-night-jail-releases/. Accessed December 14, 2014
103. Grissom B. Out of jail and onto the street, alone, in the wee hours. *The Texas Tribune*. August 27, 2011. Available at: www.nytimes.com/2011/08/28/us/28tttrelease.html?pagewanted=all&r=0. Accessed December 14, 2014
104. US Department of Justice, Drug Enforcement Administration, Demand Reduction Program. *Get Smart About Drugs: A Drug Enforcement Agency Resource for Parents*. Available at: <https://www.ncpc.org/resources/files/pdf/celebrate-safe-communities/GSAD-PALM-CARD-JUNE-2011.pdf>. Accessed December 14, 2014
105. National Drug Court Institute, National Council of Juvenile and Family Court Judges. *Juvenile Drug Courts: Strategies in Practice Monograph*. Washington, DC: US Department of Justice, Office of Justice Programs, Bureau of Justice Assistance; 2003. Available at: www.ncjrs.gov/pdffiles1/bja/197866.pdf. Accessed December 14, 2014
106. National Survey on Drug Use and Health. How youths obtain marijuana. *The NSDUH Report*. March 12, 2004. Available at: www.samhsa.gov/data/2k4/MJsource/MJsource.pdf. Accessed December 14, 2014
107. US Department of Transportation, National Highway Traffic Safety Administration. *State of Knowledge of Drug-Impaired Driving: Final Report*. Publication no. DOT HS 809-642. Washington, DC: National Highway Traffic Safety Administration; 2003. Available at: www.nhtsa.gov/people/injury/research/StateofKnowledgeDrugs/StateofKnowledgeDrugs/. Accessed December 14, 2014
108. US Department of Transportation, National Highway Traffic Safety Administration. *Marijuana and Actual Driving Performance: Final Report*. Publication no. 808-078. Washington, DC: National Highway Traffic Safety Administration; 1993. Available at: <http://ntl.bts.gov/lib/25000/25800/25867/DOT-HS-808-078.pdf>. Accessed December 14, 2014
109. Elliot M, Smith A; Marijuana DUI Workgroup. *Recommendation to the Drug Policy Task Force and Colorado Commission on Criminal and Juvenile Justice*. Denver, CO: Medical Marijuana Industry Group; 2011
110. Desrosiers NA, Lee D, Concheiro-Guisan M, Scheidweiler KB, Gorelick DA, Huestis MA. Urinary cannabinoid disposition in occasional and frequent smokers: is THC-glucuronide in sequential urine samples a marker of recent use in frequent smokers? *Clin Chem*. 2014; 60(2):361–372

The Impact of Marijuana Policies on Youth: Clinical, Research, and Legal Update

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Pediatrics 2015;135;e769; originally published online January 26, 2015;

DOI: 10.1542/peds.2014-4147

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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

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ORIGINAL ARTICLE

Trends in the disapproval and use of marijuana among adolescents and young adults in the United States: 2002–2013

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Abstract

Background: Despite policy changes related to the use and distribution of marijuana in cities and states across the country, few studies have examined changes in disapproval and use of marijuana among American youth. **Objectives:** To examine trends in disapproval and use of marijuana among adolescents and young adults in the United States. **Method:** We employed nationally representative data spanning the period of 2002–2013. Analyses were based on self-reported measurements from 105,903 younger adolescents (aged 12–14); 110,949 older adolescents (aged 15–17); and 221,976 young adults (aged 18–25). **Results:** Between 2002 and 2013 the proportion of adolescents aged 12–14 reporting “strong disapproval” of marijuana use initiation increased significantly from 74.4–78.9%. Concurrently, a significant decrease in past 12-month marijuana use (OR=0.98, 95% CI=0.97–0.99) was observed among younger adolescents. No significant trend was observed for marijuana use disapproval among adolescents aged 15–17 between 2002 and 2013. Yet a significant (OR=0.99, 95% CI=0.98–0.99) decrease in the past 12-month marijuana use was observed (2002=26.2%, 2013=21.9%) among this group. Among young adults (aged 18–25), a substantial decrease – from 40.5% in 2002 to 22.6% in 2013 – was observed in the proportion reporting “strong disapproval” of marijuana use initiation; however, increases in the past 12-month use were relatively small among young adults ($\Delta=2.21$) but statistically significant (OR=1.02, 95% CI=1.01–1.02). **Conclusions:** Changes are underway in the perception and use of marijuana among American youth. However, changes differ in important ways among youth from distinct developmental subgroups.

Keywords

Adolescent, marijuana, trend, young adult

History

Received 3 December 2014
Revised 19 March 2015
Accepted 25 March 2015
Published online 7 July 2015

Introduction

Recent policy changes related to the decriminalization, medicalization, and legalization of marijuana use in cities and states across the country suggests that important shifts are underway in the United States. A 2013 Gallup poll found, for the first time on record, that a majority of Americans believe that the use of marijuana should be legal (1). Similarly, a Pew Research Center (2) poll in 2013 found that, while half of American adults viewed marijuana use as “morally wrong” in 2006, the majority of American adults now view marijuana use as either “morally acceptable” (12%) or a “non-moral issue” (50%). Simply, the attitudes of American adults appear to be changing in respect to how they perceive the use and distribution of the most commonly used illicit substance in the United States (3).

Despite the observed changes among American adults, less is understood in terms of the changes in the perception and use of marijuana among American youth. An understanding of the changes in marijuana use disapproval – as well as concurrent patterns of use – among youth is important for a number of reasons. First, it has been well-established that substance use disapproval and other critical drug use attitudes serve as protective factors for adolescent and young adult drug use (4–9). Additionally, evidence also points to a bi-directional link between drug use and protective anti-drug attitudes (10–13). That is, findings from recent studies suggests that, not only does marijuana use disapproval predict marijuana use, but the use of marijuana may have implications for how young people feel about use of other drugs as well. Given the importance of these interrelated factors, an accurate understanding of the prevalence of youth marijuana disapproval and use is essential to inform public policy and prevention efforts.

Two of the leading sources of data on the subject of the perception and use of marijuana among American youth are

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Monitoring the Future (MTF) (14,15) and the National Survey on Drug use and Health (NSDUH) (16). Both studies annually collect nationally representative data and gather information on youth disapproval of marijuana use initiation as well as past year and lifetime marijuana use. Extant studies conducted with MTF and NSDUH data have made notable contributions to our understanding of these topics, but face important shortcomings as well. For instance, recent MTF reports have provided information about trends in disapproval of marijuana use initiation (14,15); however, the aforementioned reports combine various gradations of disapproval (i.e. “disapprove” and “strongly disapprove”) into a singular measure, thereby limiting our capacity to fully assess the complexity of changes in youth perceptions of marijuana use. Similarly, while the recent NSDUH reports provide critical information about trends in youth perceptions of the risk of marijuana use (16,17), prior reports have not systematically examined trend data related to disapproval of marijuana use. Moreover, the NSDUH reports examining trends in adolescent marijuana use have relied on analyses conducted with all adolescents aged 12–17, thereby obviating the assessment of developmental differences between younger (i.e. aged 12–14) and older (i.e. aged 15–17) adolescents. Given evidence that substantial variation exists in respect to drug use initiation during the period of adolescence, the importance of such a nuanced, developmental approach cannot be overstated (18).

In light of recent trends among adults and policy changes regarding the legal status of marijuana, several important questions have emerged. In particular, there is a need for a fine-grained, developmental assessment of the changes in the disapproval and use of marijuana among American youth. We know that important neurological changes of relevance to the perception and initiation of drug use take place during adolescence and young adulthood (19). As such, we ask: Are changes in public policy and public opinion equally impacting the views and behaviors younger adolescents, older adolescents, and young adults? Additionally, we have witnessed incremental changes in the perception of the moral acceptability of marijuana use among the nation’s adults (2). It seems reasonable that incremental changes – beyond either approval or disapproval of marijuana use – might also be observed among the nation’s youth. As such, we ask: Are changes underway with regard to the various gradations of youth disapproval (i.e. “somewhat” and “strongly disapprove”) of marijuana use in the United States? More precisely, are both forms of disapproval increasing or decreasing, or do we see divergent results with respect to the more tepid and unequivocal forms of disapproval?

A systematic exploration of the aforementioned questions promises to address an important gap in the youth drug abuse research and, potentially, inform the ongoing development of public policy and prevention efforts related to marijuana use among the nation’s youth.

The present study

The present study employs trend data from a population-based study (i.e. NSDUH) that gathered data from more than 440,000 American adolescents and young adults between 2002 and 2013 (16). The NSDUH is well-suited for this study

given its far-reaching scope and representativeness as well as its assessment of marijuana disapproval and use. Specifically, we examine trends in disapproval and past year and lifetime use of marijuana among adolescents and young adults in the United States over the last 12 years. We examine recent trends in the gradation of marijuana use disapproval among the nation’s youth as well. In all, evidence suggests that the views of American adults have changed tremendously in recent years with respect to the use and distribution of marijuana; in light of these changes, our aim is to examine the trends in the disapproval and use of marijuana among American youth.

Method

Sample and procedures

This study examined public-use data collected between 2002 and 2013 as part of the NSDUH. The NSDUH provides population estimates of drug use and health-related behaviors in the US general population. The NSDUH study utilized multistage area probability sampling methods to select a representative sample of the US civilian, non-institutionalized population aged 12 years or older for participation. Participants included household residents; civilians residing on military bases; and residents of shelters and group homes. The design and methods are summarized briefly here; however, detailed descriptions of NSDUH procedures are available elsewhere (16). The current study restricted analyses to adolescents (aged 12–17; $n=216,852$) and young adults (aged 18–25; $n=221,976$) so as to provide an in-depth analysis of trends among young people in the United States.

Measures

Marijuana use disapproval

Adolescents and young adults were queried about their views on marijuana use initiation by means of two similarly-phrased questions. Adolescents were asked: “How do you feel about *someone your age* trying marijuana or hashish once or twice?” and young adults were asked “How do you feel about *adults* trying marijuana or hashish once or twice?” Response options include: “neither approve nor disapprove”, “somewhat disapprove”, and “strongly disapprove”.

Marijuana use

We examined both lifetime and past 12-month marijuana use. Lifetime marijuana use (0=no, 1=yes) was assessed by asking participants, “Have you ever, even once, used marijuana or hashish?” Those who responded affirmatively were also asked about when they last used marijuana; individuals reporting use within the previous 12 months were coded as 1 and all other individuals (those reporting no past 12 month or lifetime use) were coded as 0.

Sociodemographic factors

The following sociodemographic variables were used: age (continuous), gender (0=female, 1= male), race/ethnicity (1 = non-Hispanic white, 2 = African-American, 3 = Native

American/Alaska native, 4 = Asian/Pacific Islander, 5 = multiracial, 6 = Hispanic), and total annual family income (1 = less than \$20,000; 2 = \$20,000–49,999; 3 = \$50,000–74,999; and 4 = \$75,000 or more). Additionally, adolescent participants were asked about the presence of their father in the household (0 = no, 1 = yes).

Statistical analyses

The statistical analyses were carried out in several stages. First, we summarized the sociodemographic and marijuana use-related characteristics of the sample across developmental subgroups (i.e. younger adolescents [aged 12–14], older adolescents [aged 15–17], and young adults [aged 18–25]). Second, in order to assess the importance of distinguishing between gradations of marijuana use disapproval, we examined the association between varying degrees disapproval and past 12-month marijuana use across the developmental subgroups. Finally, we examined trend data for marijuana use disapproval and lifetime/past 12-month use across the developmental subgroups between 2002 and 2013. Consistent with the approach outlined by the Centers for Disease Control and Prevention (20) and utilized in highly-cited epidemiological trend studies (21), logistic regression analyses were conducted to examine the significance of trend changes. Specifically, the survey year was included – along with age, gender, race/ethnicity, family income, father in household – as a continuous independent variable in logistic regression models predicting marijuana-related outcomes (i.e. disapproval, lifetime and past 12-month use). Prevalence

estimates and regression analyses were computed using Stata 13.1 SE (StataCorp 2013) (22) survey data functions. This system implements a Taylor series linearization to adjust standard errors of estimates for complex survey sampling design effects including clustered multistage data.

Results

Sociodemographic and marijuana use-related characteristics

Table 1 displays the sociodemographic and marijuana use-related characteristics of the sample across developmental subgroups. The distribution of gender and race/ethnicity was highly consistent across all three groups; however, compared to the two adolescent subgroups, a larger proportion of young adults were found to reside in households earning less than \$20,000 per year. Noteworthy differences were also identified in respect to marijuana use-related characteristics. Specifically, large differences were observed in the proportion of younger adolescents (10.08%), older adolescents (27.87%), and young adults (57.52%) reporting that they “neither approve nor disapprove” of marijuana use initiation. A similar pattern of differences was observed with regard to the decrease in the proportion of youth reporting that they “strongly disapprove” of marijuana use. The proportion of youth who reported they “somewhat disapprove” followed a distinct pattern as the proportion was lowest among younger adolescents (11.79%), increased among older adolescents (19.77%), and dropped among young adults (13.97%). With regard to marijuana use, the prevalence of past 12-month and

Table 1. Sociodemographic and marijuana use-related characteristics of adolescents and young adults in the United States: 2002–2013.

	Younger adolescents (ages 12–14) (n = 105,903) % (95% CI)	Older adolescents (ages 15–17) (n = 110,949) % (95% CI)	Young adults (ages 18–25) (n = 221,976) % (95% CI)
Sociodemographic characteristics			
Gender			
Female	48.89 (48.5–49.3)	48.94 (48.5–49.3)	49.73 (49.4–50.0)
Male	51.11 (50.7–51.5)	51.06 (50.7–51.5)	50.27 (50.0–50.5)
Race/Ethnicity			
White	58.21 (57.8–58.6)	59.74 (59.3–60.1)	60.19 (59.9–60.5)
African American	14.81 (14.5–15.1)	14.77 (14.5–15.0)	13.86 (13.7–14.0)
Native American/Alaska Native	0.64 (0.59–0.69)	0.59 (.54–.65)	0.62 (0.59–0.66)
Asian/Pacific Islander	4.49 (4.3–4.7)	4.72 (4.5–4.9)	5.18 (5.0–5.3)
Multiracial	2.19 (2.1–2.3)	1.91 (1.8–2.0)	1.47 (1.4–1.5)
Hispanic	19.66 (19.3–20.0)	18.26 (17.9–18.6)	18.67 (18.4–18.9)
Household income			
<\$20,000	17.91 (17.6–18.2)	16.83 (16.5–17.1)	31.94 (31.7–32.2)
\$20,000–34,999	32.29 (31.9–32.7)	31.98 (31.6–32.3)	34.98 (34.7–35.2)
\$35,000–69,999	18.00 (17.7–18.3)	18.23 (17.9–18.5)	13.80 (13.6–14.0)
>\$70,000	31.79 (31.4–32.2)	32.96 (32.6–33.3)	19.29 (19.1–19.5)
Father in household			
No	25.25 (24.9–25.6)	27.00 (26.7–27.3)	–
Yes	74.75 (74.4–75.1)	73.00 (72.6–73.3)	–
Marijuana use-related characteristics			
Feel about someone trying marijuana/hashish			
“Neither approve nor disapprove”	10.08 (9.8–10.3)	27.87 (27.5–28.2)	57.52 (57.2–57.8)
“Somewhat disapprove”	11.79 (11.5–12.1)	19.77 (19.4–20.1)	13.97 (13.8–14.2)
“Strongly disapprove”	78.13 (77.8–78.5)	52.36 (51.9–52.8)	28.50 (28.2–28.8)
Past 12 month use			
No	95.21 (95.0–95.4)	77.33 (77.0–77.7)	70.41 (70.1–70.7)
Yes	4.79 (4.6–5.0)	22.67 (22.3–23.0)	29.59 (29.3–29.8)
Lifetime use			
No	93.96 (93.8–94.1)	71.03 (70.7–71.4)	47.59 (47.3–47.9)
Yes	6.04 (5.8–6.2)	28.97 (28.6–29.3)	52.41 (52.1–52.7)

Table 2. Association between marijuana disapproval and use among adolescents and young adults in the United States: 2002–2013.

	Used marijuana in past 12 months				Odds ratios	
	No		Yes		OR	(95% CI)
	%	95% CI	%	95% CI		
Younger adolescents (ages 12–14)						
“Neither approve nor disapprove”	74.37	(73.2–75.5)	25.63	(24.5–26.8)	1.00	
“Somewhat disapprove”	90.38	(89.6–91.1)	9.62	(8.9–10.4)	0.31	(0.28–0.35)
“Strongly disapprove”	98.69	(98.6–98.8)	1.31	(1.2–1.4)	0.05	(0.04–0.05)
Older adolescents (ages 15–17)						
“Neither approve nor disapprove”	47.26	(46.5–48.0)	52.74	(52.0–53.5)	1.00	
“Somewhat disapprove”	77.69	(76.9–78.4)	22.31	(21.6–23.0)	0.26	(0.25–0.27)
“Strongly disapprove”	93.27	(93.0–93.5)	6.73	(6.5–7.0)	0.07	(0.06–0.07)
Young adults (ages 18–25)						
“Neither approve nor disapprove”	55.66	(55.3–56.0)	44.34	(43.9–44.7)	1.00	
“Somewhat disapprove”	82.07	(81.5–82.6)	17.93	(17.4–18.5)	0.27	(0.25–0.28)
“Strongly disapprove”	94.57	(94.3–94.8)	5.43	(5.2–5.7)	0.07	(0.07–0.07)

Odds ratios adjusted for age, gender, race/ethnicity, household income, and father in household (adolescent respondents only). Odds ratios and confidence intervals in bold are statistically significant at $p < 0.001$.

lifetime use was low among younger adolescents (4.79% and 6.04%, respectively) and increased markedly among the older adolescent and young adult subgroups.

Marijuana use disapproval and use by developmental subgroup

Table 2 presents the association between varying degrees of disapproval of marijuana use and the use of marijuana over the past 12 months. Controlling for age, gender, race/ethnicity, household income, and father in household (adolescents only), youth of all the developmental subgroups who reported that they “somewhat disapprove” or “strongly disapprove” of marijuana use were significantly less likely to report past 12 month use. Notably, although the odds ratios for both gradations of disapproval were statistically significant ($p < 0.001$), important effect size differences were identified. Specifically, the odds ratios for “somewhat disapprove” suggested medium-sized effects, while the effects for “strongly disapprove” represented large to very large effects (23).

Trends among younger adolescents (aged 12–14)

Figure 1 and Table 3 display the prevalence estimates and significance tests for trend data on “strong disapproval” of marijuana use initiation as well as lifetime/past 12-month self-reported marijuana use among the younger adolescent (aged 12–14) subgroup. Between 2002 and 2013, the proportion of younger adolescents reporting “strong disapproval” increased from 74.38–78.92%. Logistic regression analyses indicated that this increase was statistically significant ($OR = 1.03$, 95% $CI = 1.02–1.03$) such that each additional year was associated with a 2.7% increase in the likelihood of younger adolescents reporting “strong disapproval” of marijuana use initiation. Supplementary analyses (see Table 4) suggested that the upward trend was stable among early adolescents ages 12 ($AOR = 1.03$, 95% $CI = 1.02–1.05$), 13 ($AOR = 1.02$, 95% $CI = 1.01–1.03$), and 14 ($AOR = 1.02$, 95% $CI = 1.02–1.03$).

Figure 2 displays additional information about the trends in early adolescent disapproval of marijuana use initiation.

Specifically, while the proportion of younger adolescents reporting “strong disapproval” increased, a small ($\Delta = 2.80\%$) but statistically significant ($OR = 0.98$, 95% $CI = 0.97–0.98$) decrease was observed between 2002 and 2013 in the proportion of younger adolescents reporting that they “somewhat disapprove” of marijuana use initiation.

With regard to marijuana use, we saw a significant decrease in lifetime ($OR = 0.97$, 95% $CI = 0.96–0.98$) and past 12-month marijuana use ($OR = 0.98$, 95% $CI = 0.97–0.99$) among younger adolescents. While the change between 2002 and 2013 for lifetime/past 12-month prevalence may appear slight ($\Delta = 2.45\%$ and 1.50% , respectively), the relative importance of these changes should not be underestimated. Indeed, due to the low base rates for marijuana use among younger adolescents, the changes between 2002 and 2013 represented a 31% decrease in lifetime use and a 25% decrease in past 12-month use. Supplementary analyses (see Table 4) suggest that these decreases may be driven primarily by use in the latter stages of early adolescence. Specifically, the decreases in lifetime and past year use were not significant among 12-year-olds, but significant changes in trend were identified for 13-year-olds (Lifetime: 0.97 , 95% $CI = 0.95–0.99$) and 14-year-olds (Past 12-month: $AOR = 0.97$, 95% $CI = 0.96–0.99$; Lifetime: $AOR = 0.97$, 95% $CI = 0.95–0.98$).

Trends among older adolescents (aged 15–17)

Figure 3 displays the prevalence estimates and 95% confidence intervals for trend data among older adolescents (aged 15–17). Overall, the proportion of youth reporting “strong disapproval” of marijuana use initiation did not significantly change between 2002 and 2013; however, supplementary analyses (not shown) revealed a significant upward trend between 2002 and 2008 ($OR = 1.04$, 95% $CI = 1.03–1.06$) as a 6.19% increase in older adolescents reporting “strong disapproval” was observed. Supplementary analyses (not shown) also revealed a significant decrease in “strong disapproval” between 2009 and 2013 ($OR = 0.96$, 95% $CI = 0.95–0.98$) as the prevalence of disapproval returned to levels similar to those of 2002. As shown in Table 4, we also

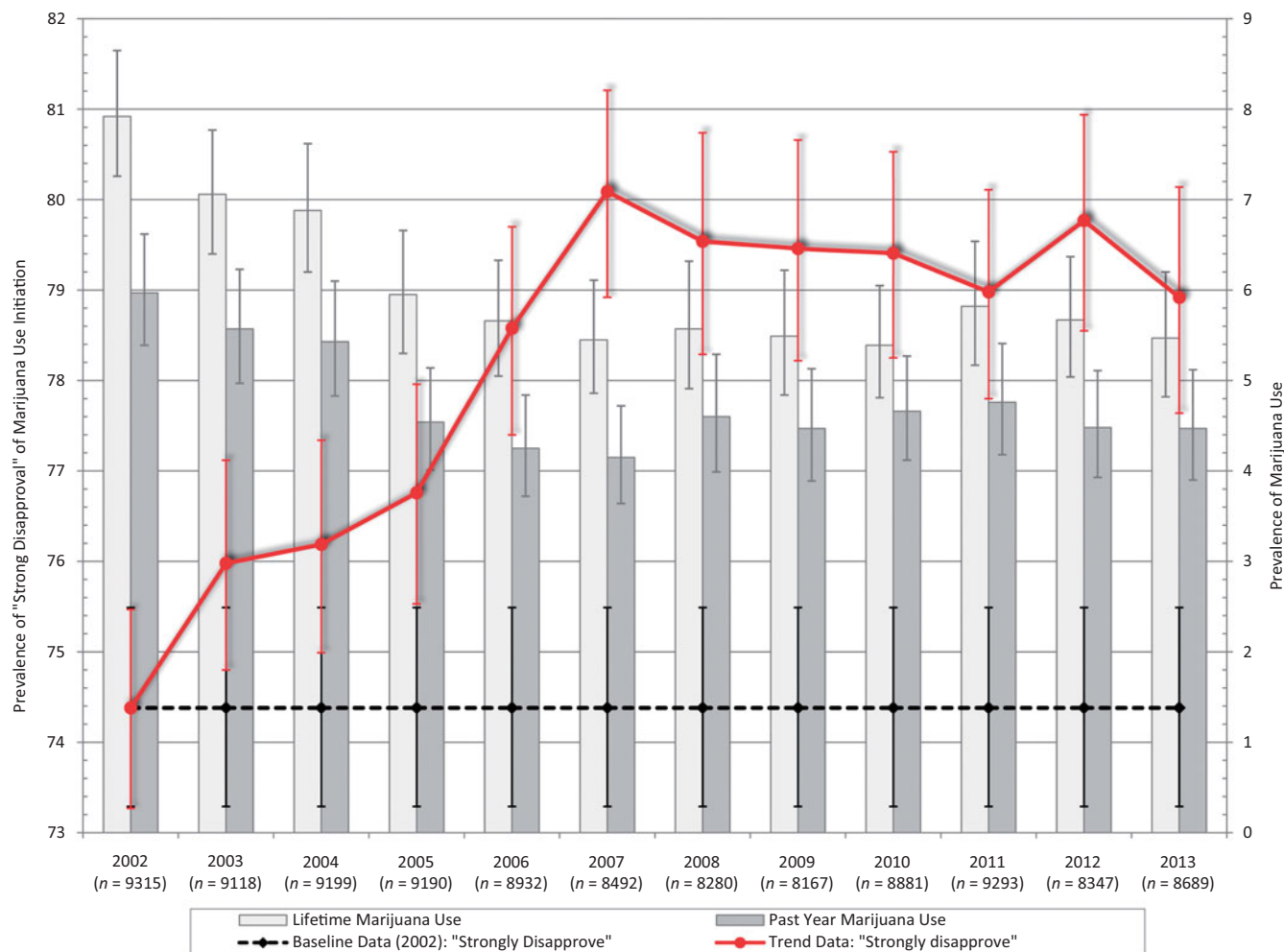


Figure 1. Prevalence estimates and 95% confidence intervals for younger adolescent (aged 12–14) marijuana disapproval and use. (This Figure is reproduced in color in the online version of *The American Journal of Drug and Alcohol Abuse*.)

Table 3. Tests of significance for trends in disapproval and use of marijuana: 2002–2013.

	How do you feel about someone your age trying marijuana or hashish once or twice?						Marijuana use (self-report)			
	Somewhat disapprove		Somewhat + strongly disapprove		Strongly disapprove		Lifetime use		Past 12 months	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Adolescents										
Younger adolescents (aged 12–14)	0.98	(0.97–0.98)	1.02	(1.01–1.03)	1.03	(1.02–1.03)	0.97	(0.96–0.98)	0.98	(0.97–0.99)
Older adolescents (aged 15–17)	0.99	(0.98–1.00)	0.99	(0.99–1.00)	1.00	(0.99–1.01)	0.97	(0.97–0.98)	0.99	(0.98–0.99)
Young adults										
Young adults (aged 18–25)	0.97	(0.97–0.98)	0.94	(0.93–0.94)	0.94	(0.94–0.95)	1.00	(0.99–1.00)	1.02	(1.01–1.02)

Odds ratios (OR) adjusted for race/ethnicity, age, gender, household income, and father in household (adolescent respondents only). ORs and 95% CIs in bold are statistically significant ($p < 0.001$).

looked at 2002–2013 trends in disapproval among 15, 16, and 17-year-old older adolescents. These analyses suggested year-by-year differences. Specifically, analyses revealed a small but statistically significant increase in disapproval among 15-year-olds (AOR = 1.01, 95% CI = 1.00–1.02), no change among 16-year-olds, and a small but statistically significant decrease in disapproval among 17-year-olds (AOR = 0.99, 95% CI = 0.98–1.00).

In respect to youth who “somewhat disapprove” of marijuana use initiation (see Figure 4), a slight but not

statistically significant decrease was observed between 2002 and 2013 ($\Delta = 1.43\%$). During the same time period, significant decreases in marijuana use were observed among older adolescents. Specifically, lifetime use decreased from 34.29% in 2002 to 26.62% in 2013 (OR = 0.97, 95% CI = 0.97–0.98). In relative terms, this represented a 22% decrease in lifetime use among older adolescents over the period of the study. A slightly smaller but still statistically significant (OR = 0.99, 95% CI = 0.98–0.99) decrease was observed with regard to past 12-month use of marijuana (2002 = 26.19%,

Table 4. Prevalence estimates and 95% confidence intervals for adolescent marijuana disapproval and use, by age.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Strong disapproval												
*12 years	83.91	85.35	85.48	86.72	86.85	86.63	87.18	87.36	88.75	88.30	89.52	86.59
(n = 33,843)	(82.2–85.5)	(83.6–86.9)	(83.7–87.1)	(84.9–88.3)	(85.1–88.5)	(84.8–88.3)	(85.2–88.9)	(85.5–89.0)	(87.0–90.2)	(86.6–89.8)	(87.9–90.9)	(84.5–88.4)
*13 years	75.49	77.21	78.12	77.47	78.77	82.34	81.72	80.68	79.48	78.77	80.01	81.67
(n = 35,918)	(73.6–77.3)	(75.2–79.1)	(77.2–79.9)	(75.3–79.5)	(76.7–80.7)	(80.4–84.1)	(79.5–83.7)	(78.5–82.7)	(77.4–81.4)	(76.6–80.8)	(77.9–81.9)	(79.6–83.6)
*14 years	63.37	65.58	65.62	67.11	71.19	71.52	70.39	71.33	70.07	70.93	70.21	69.87
(n = 36,142)	(62.3–66.4)	(63.3–67.8)	(63.3–67.9)	(64.7–69.4)	(69.0–73.2)	(69.2–73.7)	(68.1–72.6)	(69.0–73.5)	(67.8–72.2)	(68.7–73.0)	(67.5–72.2)	(67.5–72.2)
*15 years	53.38	56.42	57.16	55.64	59.30	61.39	61.80	59.67	57.99	58.54	58.83	57.23
(n = 37,010)	(51.1–55.6)	(54.1–58.7)	(54.8–59.5)	(53.3–57.9)	(57.0–61.5)	(59.0–63.7)	(59.4–64.1)	(57.3–62.0)	(55.7–60.3)	(56.1–60.9)	(56.4–61.2)	(54.8–59.7)
16 years	49.00	49.28	50.79	51.59	53.54	54.50	56.68	51.33	52.48	50.15	51.57	50.09
(n = 37,284)	(46.7–51.2)	(46.9–51.6)	(48.4–53.1)	(49.3–53.9)	(51.2–55.9)	(52.1–56.8)	(54.3–59.0)	(48.9–53.7)	(50.1–54.8)	(47.9–52.4)	(49.1–53.9)	(47.6–52.5)
*17 years	45.56	47.89	45.82	46.05	49.81	48.92	48.26	49.25	47.61	47.57	44.90	42.45
(n = 36,655)	(43.3–47.8)	(45.6–50.2)	(43.4–48.2)	(43.7–48.4)	(47.5–52.2)	(46.6–51.3)	(45.8–50.7)	(46.8–51.7)	(45.3–49.9)	(45.3–49.9)	(42.4–47.4)	(39.9–44.9)
Past year use												
12 years	1.29	1.13	1.03	1.01	1.15	1.01	1.17	1.01	0.98	1.17	1.12	1.38
(n = 33,843)	(0.9–1.9)	(0.7–1.8)	(0.7–1.6)	(0.6–1.6)	(0.6–2.1)	(0.7–1.6)	(0.7–1.9)	(0.6–1.8)	(0.6–1.6)	(0.7–2.0)	(0.7–1.8)	(0.9–2.1)
13 years	4.49	4.06	4.31	4.12	3.29	3.12	3.87	3.48	3.83	4.09	3.70	3.12
(n = 35,918)	(3.6–5.5)	(3.3–5.0)	(3.5–5.3)	(3.2–5.3)	(2.5–4.3)	(2.4–4.0)	(2.9–5.2)	(2.6–4.6)	(3.0–4.8)	(3.2–5.2)	(2.9–4.7)	(2.4–4.0)
*14 years	11.83	11.49	10.70	8.18	7.90	8.26	8.49	8.48	9.22	8.64	8.53	8.38
(n = 36,142)	(10.5–13.3)	(10.0–13.1)	(9.2–12.3)	(7.0–9.5)	(6.8–9.2)	(7.0–9.7)	(7.2–10.0)	(7.2–10.0)	(7.9–10.6)	(7.4–10.1)	(7.2–10.0)	(7.1–9.9)
*15 years	20.21	18.84	16.89	15.59	16.01	13.98	14.43	15.87	17.70	17.65	13.87	14.52
(n = 37,010)	(18.5–22.0)	(17.1–20.7)	(15.2–18.7)	(14.0–17.3)	(14.4–17.7)	(12.5–15.6)	(12.8–16.2)	(14.2–17.6)	(16.0–20.0)	(15.8–19.6)	(12.3–15.6)	(12.9–16.3)
*16 years	26.22	27.04	25.00	22.78	22.31	21.77	21.04	22.65	22.11	23.63	22.74	22.45
(n = 37,284)	(24.3–28.2)	(23.0–27.1)	(23.0–27.1)	(20.9–24.8)	(20.4–24.3)	(19.9–23.7)	(19.2–22.9)	(20.7–24.7)	(20.2–24.1)	(21.7–25.6)	(20.8–24.8)	(20.5–24.5)
17 years	32.31	29.40	29.90	27.20	26.50	26.05	27.63	27.42	29.66	28.91	29.67	28.68
(n = 36,655)	(30.3–34.4)	(27.4–31.5)	(27.8–32.1)	(25.2–29.3)	(24.5–28.6)	(24.1–28.1)	(25.5–29.9)	(25.3–29.6)	(27.5–31.9)	(26.9–31.0)	(27.5–32.0)	(26.5–30.9)
Lifetime use												
12 years	1.92	1.51	1.66	1.39	1.50	1.22	1.50	1.53	1.04	1.49	1.32	1.62
(n = 33,843)	(1.4–2.6)	(1.0–2.2)	(1.1–2.4)	(1.0–2.0)	(0.9–2.5)	(0.8–1.8)	(1.0–2.2)	(1.0–2.4)	(0.6–1.7)	(0.9–2.4)	(0.9–2.0)	(1.1–2.4)
*13 years	6.30	5.59	5.45	5.54	4.63	4.25	4.95	4.39	4.56	5.24	4.74	3.91
(n = 35,918)	(5.3–7.5)	(4.6–6.7)	(4.5–6.5)	(4.5–6.8)	(3.7–5.7)	(3.4–5.3)	(3.8–6.4)	(3.4–5.7)	(3.6–5.7)	(4.2–6.5)	(3.8–5.9)	(3.1–4.9)
*14 years	15.17	14.04	13.23	10.49	10.34	10.84	9.97	10.04	10.62	10.26	10.83	10.24
(n = 36,142)	(13.7–16.8)	(12.5–15.7)	(11.6–15.0)	(9.1–12.1)	(9.0–11.8)	(9.4–12.4)	(8.6–11.5)	(8.7–11.6)	(9.3–12.1)	(8.9–11.8)	(9.4–12.5)	(8.7–12.0)
*15 years	24.88	23.67	22.68	20.11	20.80	17.58	18.71	18.97	21.25	20.93	18.17	17.88
(n = 37,010)	(23.0–26.8)	(21.8–25.7)	(20.8–24.7)	(18.3–22.0)	(19.0–22.7)	(15.9–19.4)	(16.9–20.7)	(17.2–20.9)	(19.4–23.2)	(19.0–23.0)	(16.4–20.1)	(16.1–19.8)
*16 years	34.90	34.77	33.01	29.08	28.69	27.65	26.62	27.79	27.14	28.85	27.62	27.11
(n = 37,284)	(32.8–37.1)	(32.6–37.0)	(30.9–35.2)	(27.0–31.2)	(26.6–30.8)	(25.6–29.8)	(24.6–28.7)	(25.7–30.0)	(25.1–29.2)	(26.8–30.9)	(25.5–29.8)	(25.0–29.3)
*17 years	43.36	39.85	39.47	37.44	35.78	35.73	34.89	36.04	36.77	36.51	37.22	34.92
(n = 36,655)	(41.1–45.6)	(37.6–42.1)	(37.2–41.8)	(35.2–39.7)	(33.6–38.0)	(33.5–38.0)	(32.6–37.2)	(33.8–38.4)	(34.5–39.1)	(34.3–38.7)	(34.8–39.7)	(32.6–37.3)

*Signifies that 2002–2013 trend significant at $p < 0.05$.

Figure 2. Disapproval of marijuana use among for younger adolescents (aged 12–14) in the United States. (This Figure is reproduced in color in the online version of *The American Journal of Drug and Alcohol Abuse*.)

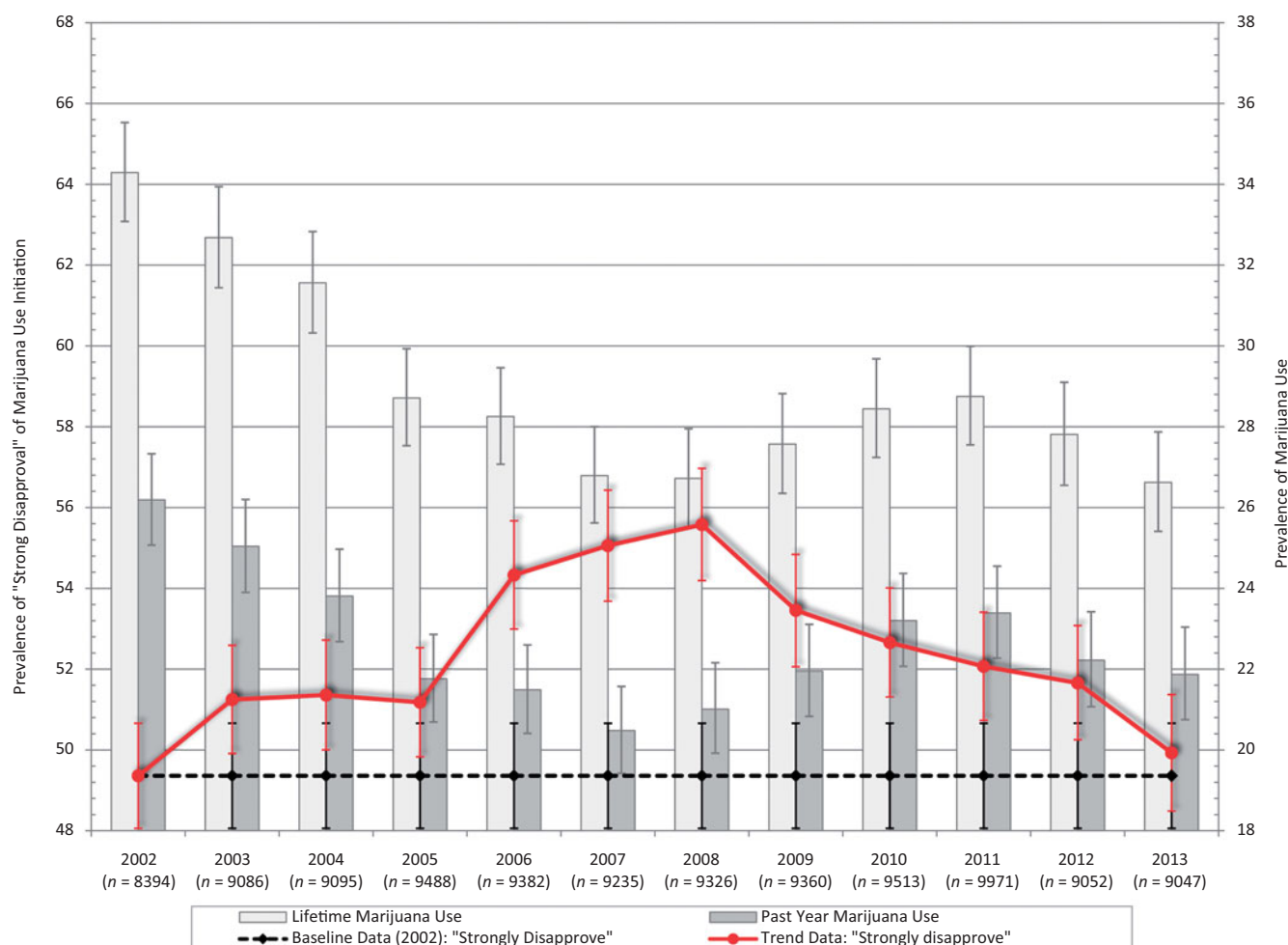
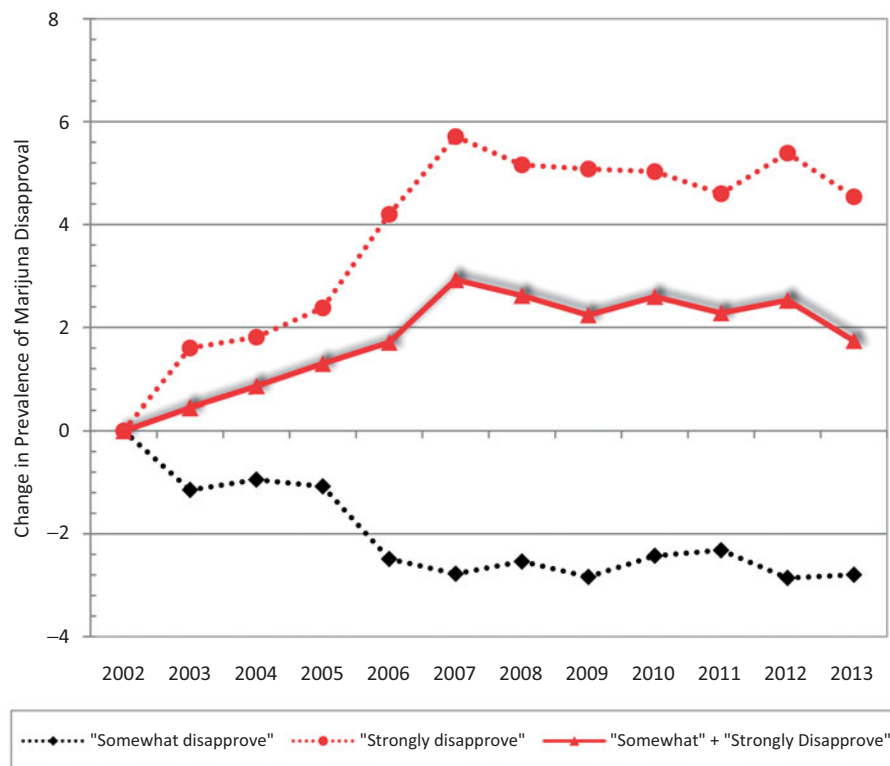
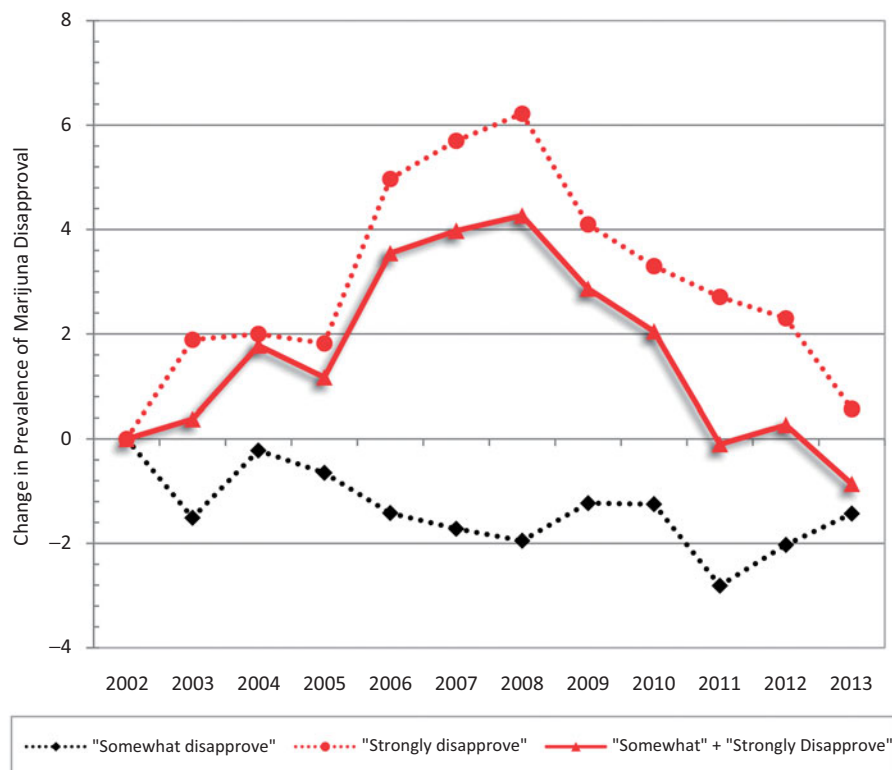


Figure 3. Prevalence estimates and 95% confidence intervals for older adolescent (aged 15–17) marijuana disapproval and use. (This Figure is reproduced in color in the online version of *The American Journal of Drug and Alcohol Abuse*.)

Figure 4. Disapproval of marijuana use among older adolescents (aged 15–17) in the United States. (This Figure is reproduced in color in the online version of *The American Journal of Drug and Alcohol Abuse*.)



2013 = 21.87%). This represented an overall relative decrease of 16% between 2002 and 2013 and pointed to a 1.2% yearly decrease in the likelihood of past 12-month use during the same time period. Supplementary analyses (shown in Table 4) suggest that the downward trend in past 12-month use among older adolescents may be driven primarily by those aged 15 (AOR = 0.98, 95% CI = 0.97–0.99) and 16 (AOR = 0.98, 95% CI = 0.97–0.99) as no significant trend was identified for 17-year-old older adolescents. The downward trend in lifetime use was stable among older adolescents ages 15 (AOR = 0.97, 95% CI = 0.96–0.98), 16 (AOR = 0.97, 95% CI = 0.96–0.98), and 17 (AOR = 0.98, 95% CI = 0.97–0.99).

Trends among young adults (aged 18–25)

Figure 5 displays the prevalence estimates and 95% confidence intervals for the trend data among young adults (aged 18–25). Between 2002 and 2013 we saw a substantial decrease – from 40.54% in 2002 to 22.65% in 2013 – in the proportion of young adults reporting they “strongly disapprove” of marijuana use initiation. Logistic regression analyses revealed that this was a statistically significant downward trend (OR = 0.94, 95% CI = 0.94–0.95) and that the likelihood of young adults reporting “strong disapproval” decreased by 5.5% annually over the time period of the study. Figure 6 also reveals a significant downward trend in the proportion of young adults who “somewhat disapprove” of marijuana use initiation (OR = 0.97, 95% CI = 0.97–0.98). Combining these two forms of disapproval revealed a 25.26% decrease in the proportion of young adults who disapproved, to a greater or lesser degree, of marijuana use initiation. Supplementary analyses (shown in Table 4) suggest that the downward trend observed among young adults was stable for each of the individual ages (e.g. 18, 19, etc.) examined.

Despite these substantial changes in disapproval, no significant increase was observed in respect to lifetime marijuana use among this developmental subgroup. However, a more fine-grained analysis revealed that a small but significant downward trend was observed among 18-year-olds (AOR = 0.99, 95% CI = 0.98–1.00), 19-year-olds (0.98, 95% CI = 0.98–0.99), and 21-year-olds (AOR = 0.98, 95% CI = 0.97–0.99). In contrast, a small but statistically significant increase in lifetime marijuana use was observed among 24/25-year-olds (AOR = 1.01, 95% CI = 1.00–1.02) between 2002 and 2013. Additionally, a relatively small ($\Delta = 2.21$) but statistically significant (OR = 1.02, 95% CI = 1.01–1.02) increase in past 12-month marijuana use was identified between 2002 and 2013. This represented a 7% relative increase in the proportion of young adults who reported past year marijuana use during this time period. Supplementary analyses (see Table 5) revealed that similarly sized trends for past 12-month use were observed among 18-year-olds (AOR = 1.01, 95% CI = 1.00–1.02), 20-year-olds (AOR = 1.02, 95% CI = 1.01–1.03), 21-year-olds (AOR = 1.01, 95% CI = 1.00–1.02), 22/23-year-olds (AOR = 1.02, 95% CI = 1.01–1.02), and 24/25-year-olds (AOR = 1.03, 95% CI = 1.02–1.04).

Discussion

In the present study we examined trend data on the disapproval and use of marijuana among younger adolescents (aged 12–14), older adolescents (aged 15–17), and young adults (aged 18–25) in the US between 2002 and 2013. Results suggested that important changes have taken place with regard to the perception and use of marijuana among American youth, but that these changes are markedly different among youth from distinct developmental subgroups.

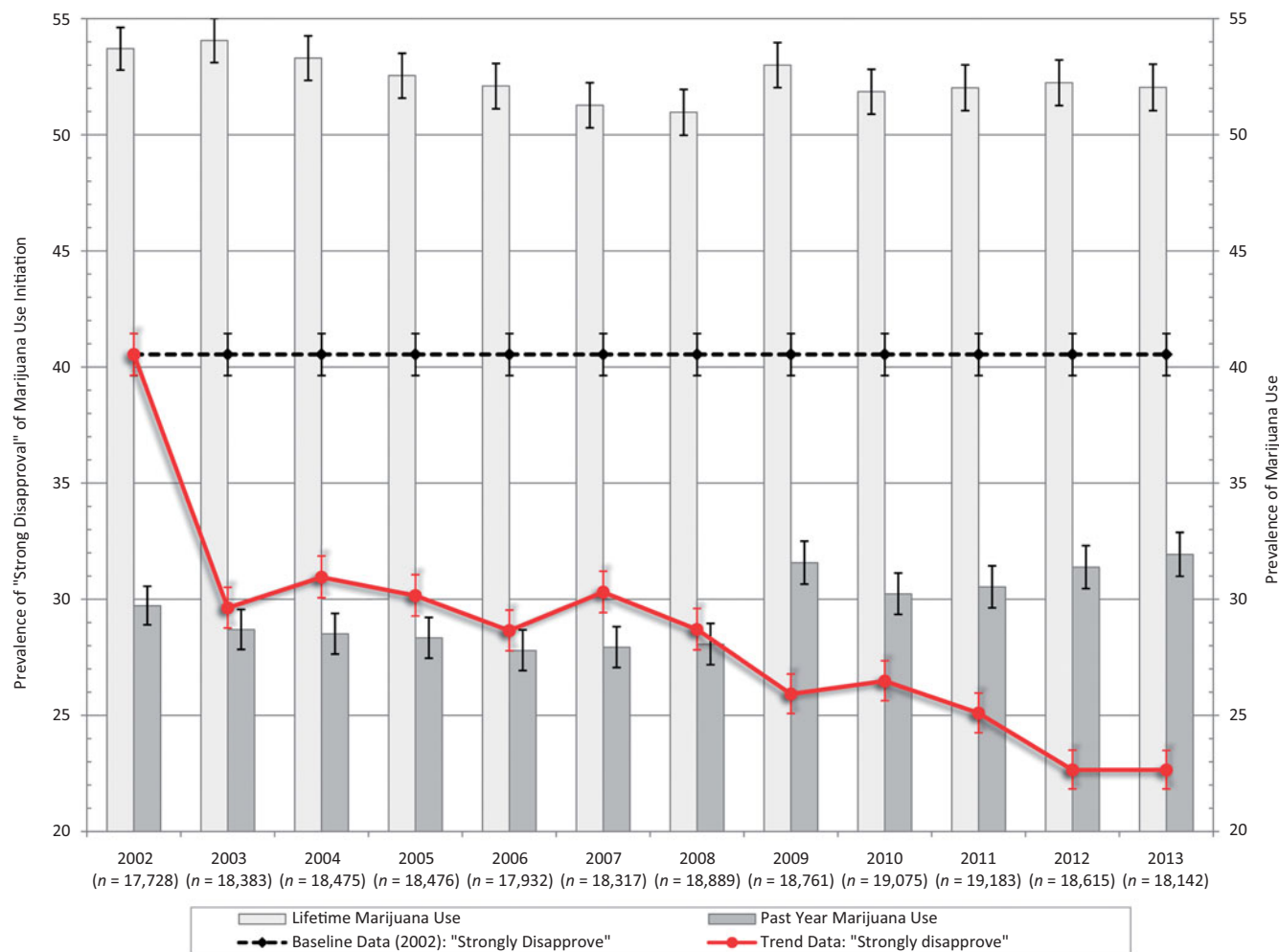


Figure 5. Prevalence estimates and 95% confidence intervals for young adult (aged 18–25) marijuana disapproval and use. (This Figure is reproduced in color in the online version of *The American Journal of Drug and Alcohol Abuse*.)

Below we detail a number of key findings that emerged from our analyses.

Trends in perception and use of marijuana by developmental subgroup

Younger adolescents

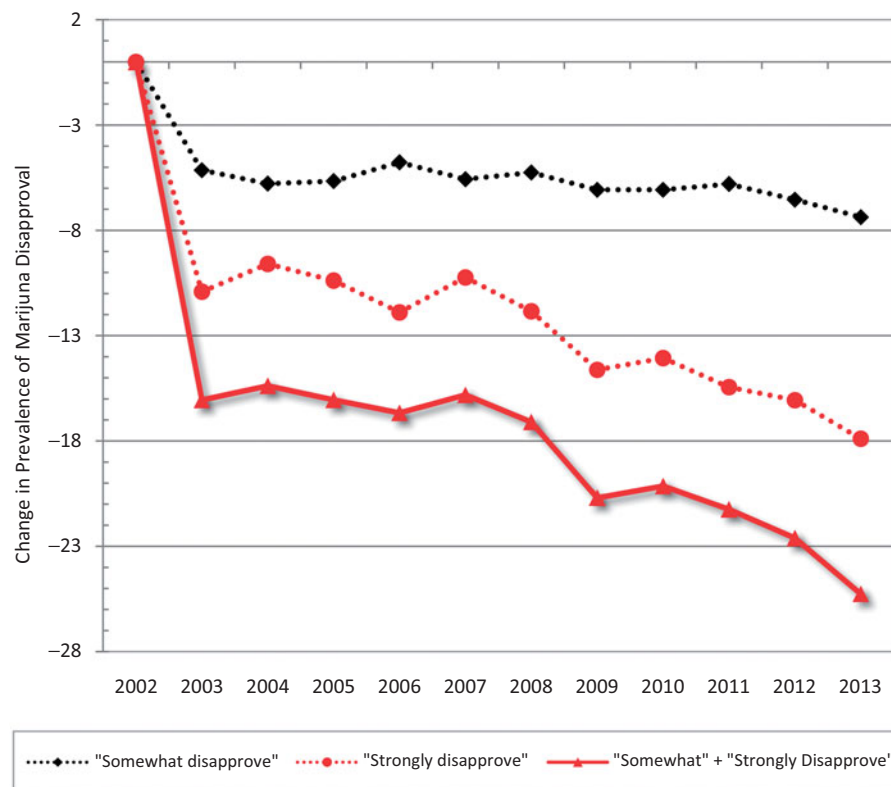
With regard to younger adolescents (aged 12–14), we observed a significant increase in the proportion of youth reporting “strong disapproval” of marijuana use initiation over the last decade. Specifically, the prevalence of youth reporting “strong disapproval” increased by 4.5% between 2002 (74.4%) and 2013 (78.9%) with large increases observed between 2002 and 2007 and a stable prevalence observed between 2008 and 2013. The change in disapproval was slightly smaller when examining both “somewhat disapprove” and “strongly disapprove” as we only observed a 1.74% increase over the same time period. It should be noted that these findings do not necessarily converge with evidence from the MTF which indicate slight decreases in disapproval in recent years (15). Specifically, Johnston and colleagues identified a 1.3% decrease among 8th graders in the prevalence of either “disapproval” or “strong disapproval” of marijuana use initiation between 2002 and 2013.

During the same period of time we saw a corresponding drop in marijuana use among younger adolescents. More precisely, we identified a 25% decrease in the relative proportion of early adolescent marijuana users as the prevalence of younger adolescents reporting past year marijuana use decreased from 6% in 2002 to 4.5% in 2013. While prior NSDUH studies have not examined trends in marijuana use among this particular developmental subgroup (16), the findings from the present study were consistent with MTF trend studies which suggested similar decreases in past year (1.9%) and lifetime (2.7%) use between 2002 and 2013 (15). Put together, our results seemed to suggest that the perceptions and practices of younger adolescents with respect to marijuana have not been negatively impacted by recent marijuana-related changes in public policy and perception. In fact, we observed significant increases in disapproval and decreases in both past year and lifetime marijuana use among this important developmental subgroup.

Older adolescents

We saw a distinct pattern among older adolescents (aged 15–17) between 2002 and 2013. Among this subgroup, no overall trend differences were observed in respect to “strong

Figure 6. Disapproval of marijuana use among for young adults (aged 18–25) in the United States. (This Figure is reproduced in color in the online version of *The American Journal of Drug and Alcohol Abuse*.)



disapproval” of marijuana use initiation between 2002 (49.4%) and 2013 (49.9%). However, closer inspection suggested that merely examining the overall trend data may mask shorter-term upward and downward trends among older adolescents over the last decade. Specifically, we found that the overall proportion of older adolescents reporting “strong disapproval” of marijuana use initiation increased significantly between 2002 (49.4%) and 2008 (55.6%) before decreasing significantly between 2008 (55.6%) and 2013 (49.9%). Evidence from the MTF study seems to tell a somewhat different story in terms of disapproval of marijuana use initiation. Specifically, Johnston and colleagues (2015) (15) identified a 4.6% decrease in disapproval among 10th-graders and a 2.5% decrease among 12th-graders over the same time period. However, closer inspection of the MTF data also pointed to evidence of an uptick in marijuana use initiation disapproval between 2002–2007/2008 followed by a steep decline between 2008 and 2013 among youth from both the 10th and 12th grade samples.

With regard to trends in marijuana use, a significant decrease in lifetime and past year use was observed between 2002 and 2013. Indeed, reported past year use decreased by 4.3% between 2002 (26.2%) and 2013 (21.9%) which represented a 16% relative decrease in use among older adolescents. Notably, the observed decrease among the older adolescent (aged 15–17) subgroup was substantially larger than that which has been observed in prior NSDUH studies (2.4%) that relied exclusively upon data for all adolescents between the ages of 12 and 17 (16). Additionally, we should note that the downward trend in use observed in the present study was distinct from MTF studies examining past year and lifetime use over the same time period (15). Between 2002 and 2013, past year use

was stable among the 10th and 12th grade MTF samples and comparatively smaller decreases were observed in lifetime use among these samples (10th grade = 2.9% decrease, 12th grade = 2.3% decrease). In sum, the findings from the present study suggested that – despite an increased acceptance of marijuana use among American adults – older adolescents have not become more permissive in their views on marijuana and have progressively decreased their use over the past decade.

Young adults

Among young adults (aged 18–25) the proportion of individuals reporting “strong disapproval” of marijuana use initiation decreased markedly from 40.5% in 2002 to 22.6% in 2013. In relative terms, this represented a 44% drop in the proportion of young adults expressing unequivocally critical views on the use of marijuana. This trend stands in clear contrast to the results identified among the younger and older adolescent subsamples and suggests that important changes in perception are underway among young adults. The steep downward trend is also generally in keeping with findings from the MTF (14). Specifically, between 2002 and 2013, noteworthy drops in disapproval were observed among young adults between the ages of 19 and 20 (4.5%) and 23 and 26 years of age (14.3%).

Despite the clear downward trend in disapproval, however, we did not observe a corresponding spike in marijuana use. Indeed, no significant increase was observed in terms of lifetime marijuana use and the increase in past year use, although significant, was relatively diminutive in magnitude. Specifically, last year use among this population increased by only 2.2% between 2002 (29.7%) and 2013 (31.9%). In

Table 5. Prevalence estimates and 95% confidence intervals for young adult marijuana disapproval and use, by age.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Strong disapproval												
*18 years	46.57	34.60	34.60	36.30	32.98	34.15	34.28	31.18	29.24	30.48	28.29	27.44
(n = 30,976)	(44.1–49.1)	(32.2–37.1)	(32.1–37.1)	(33.8–38.8)	(30.6–35.4)	(31.7–36.6)	(31.9–36.8)	(28.8–33.6)	(27.0–31.6)	(28.1–32.9)	(25.9–30.8)	(25.1–29.9)
*19 years	40.30	31.74	31.74	30.38	32.36	32.00	30.11	27.71	30.29	27.69	25.99	24.99
(n = 28,168)	(37.9–42.8)	(29.3–34.3)	(29.3–34.3)	(28.0–32.9)	(29.9–34.9)	(29.6–34.5)	(27.7–32.6)	(25.4–30.1)	(27.9–32.8)	(25.3–30.2)	(23.5–28.6)	(22.6–27.6)
*20 years	40.93	28.58	32.40	28.67	29.87	31.38	27.93	27.78	26.55	25.48	24.17	22.21
(n = 27,334)	(38.4–43.5)	(26.2–31.1)	(29.8–35.1)	(26.3–31.2)	(27.3–32.5)	(28.9–34.0)	(25.5–30.5)	(25.4–30.3)	(24.2–29.0)	(23.2–27.9)	(21.9–26.6)	(20.0–24.6)
*21 years	36.94	28.77	28.19	30.15	27.05	28.27	29.25	25.02	26.37	24.06	25.94	22.54
(n = 27,653)	(34.5–39.4)	(26.4–31.3)	(25.8–30.7)	(27.6–32.8)	(24.7–29.6)	(25.8–30.8)	(26.7–31.9)	(22.7–27.5)	(23.9–29.0)	(21.7–26.5)	(23.5–28.5)	(20.2–25.0)
*22/23 years	38.81	26.76	29.69	28.38	26.37	28.73	26.54	22.74	24.81	22.90	22.14	20.38
(n = 54,520)	(37.0–40.6)	(25.1–28.5)	(27.9–31.5)	(26.6–30.2)	(24.7–28.1)	(26.9–30.6)	(24.8–28.3)	(21.1–24.4)	(23.2–26.5)	(21.3–24.6)	(20.6–23.7)	(18.9–22.0)
*24/25 years	40.74	29.02	30.41	29.07	26.71	29.05	26.73	24.37	24.56	23.22	23.38	21.46
(n = 53,325)	(38.9–42.6)	(27.3–30.8)	(28.6–32.3)	(27.2–30.9)	(25.0–28.5)	(27.3–30.9)	(24.9–28.6)	(22.7–26.1)	(22.9–26.3)	(21.5–25.0)	(21.8–25.1)	(19.9–23.2)
Past year use												
*18 years	32.61	32.15	31.79	31.33	30.53	29.44	30.33	33.47	33.81	33.19	35.11	33.55
(n = 30,976)	(30.4–34.9)	(29.8–34.5)	(29.4–34.3)	(29.0–33.8)	(28.2–32.9)	(27.1–31.9)	(28.0–32.7)	(31.1–35.9)	(31.4–36.3)	(30.7–35.7)	(32.6–37.7)	(31.0–36.2)
19 years	34.35	34.07	34.08	33.08	29.98	31.91	32.41	34.68	34.18	35.34	34.16	34.79
(n = 28,168)	(31.5–36.8)	(31.5–36.8)	(31.5–36.7)	(30.6–35.6)	(27.6–32.5)	(29.5–34.4)	(29.9–35.0)	(32.2–37.2)	(31.7–36.7)	(32.7–38.0)	(31.4–36.9)	(32.0–37.6)
*20 years	32.34	34.94	32.68	32.78	31.87	31.72	31.74	35.49	32.09	35.66	37.01	35.48
(n = 27,334)	(30.0–34.8)	(32.5–37.5)	(30.2–35.3)	(30.3–35.4)	(29.2–34.7)	(29.2–34.4)	(29.2–34.4)	(32.8–38.2)	(29.6–34.6)	(33.0–38.4)	(34.3–39.8)	(32.8–38.3)
*21 years	34.53	29.94	30.89	28.56	30.32	30.88	30.08	34.36	32.39	30.02	32.81	36.41
(n = 27,653)	(32.1–37.0)	(27.5–32.5)	(28.4–33.5)	(26.1–31.2)	(27.8–32.9)	(28.3–33.6)	(27.6–32.7)	(31.7–37.1)	(29.9–34.9)	(27.6–32.5)	(30.3–35.5)	(33.7–39.3)
*22/23 years	28.20	26.23	26.13	27.41	26.79	26.72	26.27	31.01	29.05	30.01	29.74	29.15
(n = 54,520)	(26.6–29.9)	(24.6–27.9)	(24.5–27.8)	(25.7–29.2)	(25.1–28.6)	(25.0–28.5)	(24.5–28.1)	(29.2–32.9)	(27.3–30.9)	(28.2–31.9)	(27.9–31.6)	(27.4–31.0)
*24/25 years	22.37	22.28	22.70	22.18	22.54	22.28	23.13	25.65	25.07	24.51	25.83	28.51
(n = 53,325)	(20.8–24.0)	(20.7–23.9)	(21.0–24.4)	(20.5–23.9)	(20.9–24.2)	(20.6–24.0)	(21.4–24.9)	(23.8–27.6)	(23.4–26.9)	(22.8–26.3)	(24.1–27.6)	(36.7–30.4)
Lifetime use												
*18 years	46.49	46.39	45.28	44.82	42.13	40.86	40.99	43.43	43.73	42.57	44.37	42.34
(n = 30,976)	(44.0–49.0)	(43.8–48.9)	(42.7–47.9)	(42.2–47.4)	(39.6–44.7)	(38.3–43.4)	(38.5–43.5)	(40.9–46.0)	(41.2–46.3)	(40.0–45.2)	(41.7–47.1)	(39.7–45.1)
*19 years	51.65	51.18	50.72	50.53	45.89	47.35	46.77	48.05	48.02	48.46	46.38	45.87
(n = 28,168)	(49.2–54.1)	(48.4–53.9)	(48.0–53.4)	(47.9–53.2)	(43.2–48.6)	(44.7–50.0)	(44.1–49.5)	(45.4–50.7)	(45.4–50.7)	(45.7–51.2)	(43.5–49.3)	(43.0–48.8)
20 years	53.55	57.06	53.13	51.14	53.16	51.33	50.38	53.90	50.00	53.37	53.41	52.08
(n = 27,334)	(50.9–56.1)	(54.4–59.7)	(50.4–55.8)	(48.4–53.8)	(50.3–56.0)	(48.6–54.1)	(47.6–53.2)	(51.1–56.6)	(47.3–52.7)	(50.6–56.1)	(50.6–56.2)	(49.3–54.9)
*21 years	62.39	55.47	56.93	52.75	55.43	54.01	53.04	56.08	53.80	51.12	52.88	54.69
(n = 27,653)	(59.9–64.8)	(52.8–58.1)	(54.2–59.6)	(50.0–55.5)	(52.7–58.1)	(51.2–56.8)	(50.2–55.8)	(53.3–58.8)	(51.0–56.6)	(48.4–53.8)	(50.1–55.6)	(51.8–57.5)
22/23 years	54.68	57.39	55.29	56.26	55.79	55.30	54.63	56.78	54.73	55.39	55.77	55.11
(n = 54,520)	(52.8–56.5)	(55.5–59.3)	(53.4–57.2)	(54.3–58.2)	(53.8–57.7)	(53.3–57.3)	(52.6–56.7)	(54.8–58.7)	(52.8–56.7)	(53.4–57.3)	(53.8–57.7)	(53.1–57.1)
*24/25 years	53.34	54.37	55.56	55.15	55.07	54.49	55.14	55.84	55.70	55.65	55.04	55.97
(n = 53,325)	(51.4–55.2)	(52.4–56.3)	(53.6–57.5)	(53.1–57.1)	(53.1–57.0)	(52.5–56.4)	(53.1–57.1)	(53.8–57.9)	(53.7–57.7)	(53.6–57.7)	(53.1–57.0)	(53.9–57.9)

*Signifies that 2002–2013 trend significant at $p < 0.05$.

relative terms, this represented only a 7% increase in the proportion of adults reporting marijuana use over the last decade. Very similar increases were observed among young adults in the MTF study between 2002 and 2013 (14).

These findings are potentially quite important. Prior studies have consistently found substance use disapproval and other critical drug use attitudes to be protective against substance use (e.g. 4–7,9,13). We also found that – pooling data for all years – the link between disapproval and use was quite robust for young adults; however, we found a noteworthy pattern in which the proportion of young adults reporting disapproval of marijuana use initiation dropped markedly in recent years, but very little change was observed in respect to marijuana use. Although our data cannot disentangle the underlying reasons for these ostensibly paradoxical findings, we can identify some possibilities. First, the measure of disapproval used in this study asked young adults about their perceptions with regard to “adults trying marijuana or hashish once or twice”. Given the rather general phrasing of this question, it may be that young adults have grown increasingly open to marijuana use in general without changing much in respect to how they feel about their personal use. In other words, the rise of medical marijuana, the relaxing of marijuana use laws, and increased exposure of marijuana as perhaps normative (as well as no longer immoral) may be influencing how young adults feel about *others using marijuana*, but not impacting beliefs about *one’s own use of marijuana*. Another possibility is that, among young adults, there are simply other psychosocial factors that play a far more important role than disapproval in influencing marijuana use. It may be that, among individuals between the ages of 18 and 25, factors such as access to marijuana and perceived school or work-related consequences may be the driving force that determines whether or not young people use. The third possibility is that there may be some cohort effects in play such that, while young adults have become less disapproving of use over time, their perceptions of use at younger ages may have nevertheless made a lasting impact on their marijuana use behaviors (even during young adulthood). Regretfully, our data only allow us to speculate as to such possibilities. We encourage future trend studies to delve more deeply into the changes in disapproval and use, particularly among young adults.

Gradations of marijuana use disapproval and marijuana use

In addition to trends in “strong disapproval” we also examined the links between various degrees of disapproval and marijuana use as well as the degree to which the various gradations of disapproval changed over time. Consistent with prior research, we identified a robust link between disapproval and marijuana use among younger and older adolescents, as well as among young adults (4–7). Notably, our results clearly indicate that – although disapproval in general is protective for marijuana use – the prevalence of use among youth reporting they “strongly disapprove” of marijuana use initiation was between three (older adolescents, young adults) and seven (younger adolescents) times lower than that of youth reporting that they “somewhat disapprove”. This finding underlines the importance of examining gradations in disapproval and suggests that

“strong disapproval” is of primary importance to efforts designed to prevent marijuana use initiation.

Examining the trends in various gradations of disapproval (i.e. [1] “somewhat disapprove”, [2] “strongly disapprove”, and [3] “somewhat” or “strongly disapprove”) yielded several important findings. First, while an increase in “strong disapproval” was observed for younger adolescents, a 2.8% decrease in the proportion of younger adolescents reporting they “somewhat disapprove” of marijuana use initiation was observed between 2002 and 2013. This suggests that lumping together various forms of disapproval may serve to mask important trend changes. On the other hand, we found that – in addition to the 17.9% decrease in “strong disapproval” – the percentage of young adults who “somewhat disapprove” of marijuana use initiation also dropped by 7.4%. This finding also seems to suggest that an assessment of changes in various gradations of disapproval is important in understanding broad changes in the perception of illicit drug use.

Study limitations

Findings should be interpreted in light of several limitations. First, all variables used in this analysis – including the measures of perceptions and use of marijuana – were derived from self-report data. As such, adolescents may have under- or over-reported their disapproval and use of marijuana. Second, use of the publicly available NSDUH data did not allow for an analysis of state level differences. Recent evidence suggests that, due to state-level variation in decriminalization and legalization, such an approach may yield important information (24). Finally, while we examined the relationship between disapproval and use, it should be noted that these data are cross-sectional and, consequently, we cannot draw causal conclusions from the associations observed between these variables. Future research would benefit from the incorporation of such factors into study designs.

Conclusions

Despite recent changes in public perception and policy relating to the use and distribution of marijuana, relatively little research has accrued on the longer-term trends relating to adolescent and young adult perceptions and lifetime use of marijuana. Findings from the present study suggest that changes are certainly underway in terms of the perception and use of marijuana among American youth. Importantly, however, these changes differ in important ways among youth from distinct developmental subgroups. Study findings point to the importance of examining changes in the perception and use of marijuana with an appreciation for developmental differences.

Acknowledgement

We wish to thank an anonymous reviewer for pointing out the importance of our findings among young adults.

Funding

This research was supported in part by grant numbers R25 DA026401 (PI: Valdez) and R25 DA030310 (PI: Anthony) from the National Institute on Drug Abuse at the National Institutes of Health.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

References

- Swift A. For first time, Americans favor legalizing marijuana. 2013. Available from: www.gallup.com [last accessed 17 Jun 2015].
- Pew Research Center. Majority now supports legalizing marijuana. 2013. Available from: www.pewresearch.org [last accessed 17 Jun 2015].
- National Institute on Drug Abuse. Research report series: marijuana. Washington (DC): National Institute on Drug Abuse; 2012.
- Bachman JG, Johnston LD, O'Malley PM. Explaining the recent decline in cocaine use among young adults: further evidence that perceived risks and disapproval lead to reduced drug use. *J Health Soc Behav* 1990;31:173–184.
- Bachman JG, Johnston LD, O'Malley PM. Explaining recent increases in students' marijuana use: impacts of perceived risks and disapproval, 1976 through 1996. *Am J Public Health* 1998;88:887–892.
- Keyes KM, Schulenberg JE, O'Malley PM, Johnston LD, Bachman JG, Li G, Hasin D. The social norms of birth cohorts and adolescent marijuana use in the United States, 1976–2007. *Addiction* 2011;106:1790–1800.
- Keyes KM, Schulenberg JE, O'Malley PM, Johnston LD, Bachman JG, Li G, Hasin D. Birth cohort effects on adolescent alcohol use: the influence of social norms from 1976 to 2007. *Arch Gen Psychiatry* 2012;69:1304–1313.
- Palamar JJ, Halkitis PN, Kiang MV. Perceived public stigma and stigmatization in explaining lifetime illicit drug use among emerging adults. *Addict Res Theory* 2013;21:516–525.
- Palamar JJ, Kiang MV, Halkitis PN. Development and psychometric evaluation of scales that assess stigma associated with illicit drug use. *Subst Use Misuse* 2011;46:1457–1467.
- Best D, Rawaf S, Rowley J, Floyd K, Manning V, Strang J. Drinking and smoking as concurrent predictors of illicit drug use and positive drug attitudes in adolescents. *Drug Alcohol Depend* 2000;60:319–321.
- de Leeuw RN, Engels RC, Vermulst AA, Scholte RH. Do smoking attitudes predict behaviour? A longitudinal study on the bidirectional relations between adolescents' smoking attitudes and behaviours. *Addiction* 2008;103:1713–1721.
- Palamar JJ. Predictors of disapproval toward "hard drug" use among high school seniors in the US. *Prevent Sci* 2014;15:725–735.
- Palamar JJ, Kiang MV, Halkitis PN. Predictors of stigmatization towards use of various illicit drugs among emerging adults. *J Psychoactive Drugs* 2012;44:243–251.
- Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE, Miech RA. Monitoring the Future national survey results on drug use, 1975–2013: Vol. 2. College students and adults ages 19–55. Ann Arbor (MI): Institute for Social Research, University of Michigan; 2014.
- Johnston LD, O'Malley PM, Miech RA, Bachman JG, Schulenberg JE. Monitoring the Future national survey results on drug use: 1975–2013: overview, key findings on adolescent drug use. Ann Arbor (MI): Institute for Social Research, University of Michigan; 2015.
- Substance Abuse and Mental Health Services Administration (SAMHSA). Results from the 2013 National Survey on Drug Use and Health: summary of national findings. Rockville (MD): SAMHSA; 2014.
- Substance Abuse and Mental Health Services Administration (SAMHSA). Trends in adolescent substance use and perception of risk from substance use. Rockville (MD): SAMHSA; 2013.
- Vaughn MG, Salas-Wright CP, Maynard BR. Drug abuse and addiction careers: a cell to society perspective. In: Beaver KM, Barnes JC, Boutwell BB, eds. *The nurture versus biosocial debate in criminology*. Thousand Oaks (CA): Sage Publications; 2014. pp. 301–313.
- Chambers RA, Taylor JR, Potenza MN. Developmental neurocircuitry of motivation in adolescence: a critical period of addiction vulnerability. *Am J Psychiatry* 2003;160:1041–1052.
- Centers for Disease Control and Prevention. Interpretation of YRBS trend data. 2014. Available from: http://www.cdc.gov/healthyyouth/yrbs/pdf/YRBS_trend_interpretation.pdf [last accessed 17 Jun 2015].
- Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA* 2006;295:1549–1555.
- StataCorp. Stata Statistical Software: Release 13. College Station (TX): StataCorp LP; 2013.
- Chen H, Cohen P, Chen S. How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communic Statistics Simulat Computat* 2010;39:860–864.
- Miech RA, Johnston L, O'Malley PM, Bachman JG, Schulenberg J, Patrick ME. Trends in use of and attitudes toward marijuana among youth before and after decriminalization: the case of California 2007–2013. *Int J Drug Policy* 2015;26:336–344. Advance online publication. doi: 10.1016/j.drugpo.2015.01.009.

Childhood Abuse, Neglect, and Household Dysfunction and the Risk of Illicit Drug Use: The Adverse Childhood Experiences Study

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ABSTRACT. *Objective.* Illicit drug use is identified in *Healthy People 2010* as a leading health indicator because it is associated with multiple deleterious health outcomes, such as sexually transmitted diseases, human immunodeficiency virus, viral hepatitis, and numerous social problems among adolescents and adults. Improved understanding of the influence of stressful or traumatic childhood experiences on initiation and development of drug abuse is needed.

Methods. We examined the relationship between illicit drug use and 10 categories of adverse childhood experiences (ACEs) and total number of ACEs (ACE score). A retrospective cohort study of 8613 adults who attended a primary care clinic in California completed a survey about childhood abuse, neglect, and household dysfunction; illicit drug use; and other health-related issues. The main outcomes measured were self-reported use of illicit drugs, including initiation during 3 age categories: ≤ 14 years, 15 to 18 years, or as an adult (≥ 19 years); lifetime use for each of 4 birth cohorts dating back to 1900; drug use problems; drug addiction; and parenteral drug use.

Results. Each ACE increased the likelihood for early initiation 2- to 4-fold. The ACE score had a strong graded relationship to initiation of drug use in all 3 age categories as well as to drug use problems, drug addiction, and parenteral drug use. Compared with people with 0 ACEs, people with ≥ 5 ACEs were 7- to 10-fold more likely to report illicit drug use problems, addiction to illicit drugs, and parenteral drug use. The attributable risk fractions as a result of ACEs for each of these illicit drug use problems were 56%, 64%, and 67%, respectively. For each of the 4 birth cohorts examined, the ACE score also had a strong graded relationship to lifetime drug use.

Conclusions. The ACE score had a strong graded relationship to the risk of drug initiation from early adolescence into adulthood and to problems with drug use, drug addiction, and parenteral use. The persistent graded relationship between the ACE score and initiation of drug use for 4 successive birth cohorts dating back to 1900 suggests that the effects of adverse childhood experiences transcend secular changes such as increased availability of drugs, social attitudes toward drugs, and recent massive expenditures and public information

campaigns to prevent drug use. Because ACEs seem to account for one half to two third of serious problems with drug use, progress in meeting the national goals for reducing drug use will necessitate serious attention to these types of common, stressful, and disturbing childhood experiences by pediatric practice. *Pediatrics* 2003; 111:564–572; *childhood abuse, domestic violence, drug use, substance abuse, parenteral drug use.*

ABBREVIATIONS. ACE, adverse childhood experience; CTS, Conflict Tactics Scale; CTQ, Childhood Trauma Questionnaire; SD, standard deviation; OR, odds ratio; CI, confidence interval; ARF, attributable risk fraction.

Psychoactive substances have been used and abused for thousands of years.¹ It is now known that illicit drug use increases the risk of behaviors that lead to sexually transmitted diseases, intentional and unintentional injuries, cardiac problems, interpersonal violence, disability, and crime.^{2–13} Moreover, parenteral drug use is an important avenue for transmission of hepatitis B and C and the human immunodeficiency virus.^{13–16} Because of these multiple serious consequences, substance abuse is 1 of the nation's 10 leading health indicators outlined in *Healthy People 2010*, which includes the goal of reducing the proportion of people who use illicit drugs.¹³

Drug use is usually initiated during adolescence¹⁷; thus, many national studies have focused on members of this age group,¹⁸ who often find illicit drugs readily available. In fact, a recent national study of 12- to 17-year-olds found that 55% find marijuana easy to obtain.¹⁸ Furthermore, as part of a normal developmental pathway, adolescents often experiment and behave impulsively¹⁹ and seek independence and autonomy.²⁰ This constellation of inherent behaviors combined with easy access to drugs may contribute to the increased risk of using illicit drugs during adolescence.^{19–21}

Despite this body of knowledge about the use of illicit drugs, additional research is needed to understand and assess the influence of experiential factors that may contribute to the initiation and subsequent problems with illicit drug use at any age. Previous studies suggested that early childhood trauma can lead to an array of negative health outcomes and behaviors, including substance abuse, among both adolescents and adults.^{22–25} For example, childhood physical and sexual abuse has been shown to be associated with illegal drug use.^{26–28} Although these

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Received for publication Mar 20, 2002; accepted Jul 22, 2002.

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studies provide evidence that most substance abusers come from abusive homes, many of these studies have taken a "categorical" approach to examine the relationship between 1 or 2 forms of these childhood exposures and subsequent drug abuse; few studies have examined illicit drug use and abuse in relation to multiple disturbing or stressful childhood exposures. Previous reports from the Adverse Childhood Experiences Study have established that forms of childhood abuse, neglect, and household dysfunction tend to co-occur,^{29,30} and the effects of these developmentally disruptive childhood experiences have repeatedly been shown to be strong and cumulative.^{29–35}

This study examined the association between 10 categories of adverse childhood experiences (ACEs): abuse (physical, emotional, or sexual); neglect (physical or emotional); and growing up with household substance abuse, criminality of household members, mental illness among household members, and parental discord and illicit drug use. We then use a cumulative stressor model to examine the relationship between the number of ACEs (ACE score) and the initiation of illicit drug use by three age categories. We assess the relationships between the ACE score and lifetime use of illicit drugs for four successive birth cohorts dating back to 1900, problems with illicit drug use, addiction to illicit drugs, and parental drug use. Finally, we estimate the proportion of each of these three serious problems of drug abuse that are attributable to adverse childhood experiences.

METHODS

The Adverse Childhood Experiences (ACE) Study is a collaboration between the Kaiser Health Plan's Health Appraisal Center in San Diego, CA, and the Centers for Disease Control and Prevention. The overall objective is to assess the impact of numerous, interrelated, ACEs on a wide variety of health behaviors and outcomes.²⁹ The ACE Study was approved by the Institutional Review Boards of the Southern California Permanente Medical Group (Kaiser Permanente), Emory University, and Office of Human Research Protection, Department of Health and Human Services (formerly Office of Protection from Research Risks, National Institutes of Health). Recent publications from the ACE Study have shown a strong, graded relationship between the number of ACEs and the leading causes of death in the United States²⁹ and priority health and social problems such as smoking,³⁰ unintended pregnancies,³¹ sexually transmitted diseases,³² male involvement in teen pregnancy,³³ alcohol problems,³⁴ and attempted suicides.³⁵

Study Population

The study population included adult members of the Kaiser Health Plan who received a standardized medical and biopsychosocial examination at Kaiser's Health Appraisal Center in San Diego, CA. In any 4-year period, 81% of adult members received the examination, and >50 000 members receive it annually. The primary purpose of the evaluation is to perform a complete health assessment rather than provide symptom- or illness-based care. The ACE Study consisted of 2 survey waves (wave I and wave II). Wave I was conducted among 13 494 consecutive members who attended the Health Appraisal Center between August 1995 and March 1996, and the response rate was 70% ($n = 9508$). Wave II was conducted between June and October 1997 among 13 330 members, and the response rate was 65% ($n = 8667$). The overall response rate was 68% (18 175 of 26 824).

The ACE questionnaire was mailed to each member 2 weeks after his or her evaluation at the Health Appraisal Center and contained detailed information about ACEs, including abuse (emotional, physical, or sexual) or household dysfunction (paren-

tal separation or divorce, domestic violence, substance abuse, crime, or mental illness) as well as additional information about health-related behaviors from adolescence to adulthood. The wave II questionnaire added questions to obtain more thorough information about health topics shown to be important during the analysis of wave I data.^{29,31} For these analyses, we used data from wave II only, because it included detailed questions about illicit drug use that were not included in the wave I survey.

Assessment of Representativeness, and Response or Reporting Bias

As part of the wave I study design, the standardized health examination data from the clinic visit were abstracted for both respondents and nonrespondents to the ACE Study questionnaire; this enabled a detailed assessment of the study population in terms of possible bias in demographic characteristics and health-related issues.³⁶ Although nonrespondents tended to be younger, less educated, or from racial/ethnic minority groups, the probabilities of both psychosocial and health problems were remarkably similar between respondents and nonrespondents after controlling for demographic differences. In addition, assessment of the relationships between childhood sexual abuse and numerous health behaviors, diseases, and psychosocial problems that were abstracted from data from the Health Appraisal Center showed that they were virtually identical for respondents and nonrespondents.³⁶ Thus, there was no evidence that respondents were biased toward attributing their health problems to childhood experiences such as sexual abuse.³⁶

Exclusions From the Study Cohort

We excluded 3 respondents with missing information about race and 35 with missing information about educational attainment. We also excluded 16 people who reported using illicit drugs but did not report age at initiation. Thus, the final study cohort included 99% of the respondents from wave II only (8613 of 8667).

Definition of ACEs

All questions about ACEs pertained to the respondents' first 18 years of life. For questions adapted from the Conflict Tactics Scale (CTS),³⁷ response categories were "never," "once or twice," "sometimes," "often," or "very often." Questions used to define emotional and physical neglect were adapted from the Childhood Trauma Questionnaire (CTQ).³⁸ Response categories were "never true," "rarely true," "sometimes true," "often true," and "very often true" and were scored on a Likert scale (1–5), respectively. Some items from the CTQ were reverse-scored on the basis of the context of the question.³⁸

Abuse Variables

Emotional abuse and physical abuse were defined by 2 questions from the CTS. For emotional abuse, the questions were as follows: 1) "How often did a parent, stepparent, or adult living in your home swear at you, insult you, or put you down?" 2) "How often did a parent, stepparent, or adult living in your home act in a way that made you afraid that you might be physically hurt?" Responses of "often" or "very often" to either item defined emotional abuse during childhood. For physical abuse, the questions were as follows: "Sometimes parents or other adults hurt children. While you were growing up, that is, in your first 18 years of life, how often did a parent, stepparent, or adult living in your home 1) push, grab, slap, or throw something at you? 2) hit you so hard that you had marks or were injured?" Responses of "sometimes," "often," or "very often" to either item defined physical abuse during childhood.

Contact sexual abuse was defined by 4 questions from Wyatt³⁹: "Some people, while they are growing up in their first 18 years of life, had a sexual experience with an adult or someone at least 5 years older than themselves. These experiences may have involved a relative, family friend, or stranger. During the first 18 years of life, did an adult, relative, family friend, or stranger ever 1) touch or fondle your body in a sexual way, 2) have you touch their body in a sexual way, 3) attempt to have any type of sexual intercourse with you (oral, anal, or vaginal), or 4) actually have any type of sexual intercourse with you (oral, anal, or vaginal)?" A "yes" response to any 1 of the 4 questions classified a respondent as having experienced this kind of abuse.

Neglect Variables

For both emotional and physical neglect, sets of 5 CTQ items were used. For emotional neglect, these were 1) "There was someone in my family who helped me feel important or special." 2) "I felt loved." 3) "People in my family looked out for each other." 4) "People in my family felt close to each other." 5) "My family was a source of strength and support." All items were reverse-scored, then summed. Scores of ≥ 15 (moderate to extreme on the CTQ clinical scale) defined the respondents as having experienced emotional neglect.

The 5 items for physical neglect were 1) "I didn't have enough to eat." 2) "I knew there was someone there to take care of me and protect me." 3) "My parents were too drunk or too high to take care of me." 4) "I had to wear dirty clothes." 5) "There was someone to take me to the doctor if I needed it." Items 2 and 5 were reverse-scored, and all 5 scores were summed. Scores of ≥ 10 (moderate to extreme on the CTQ clinical scale) were defined as physical neglect.

Household Dysfunction Variables

Having had a battered mother was defined by the following item from the CTS: "Sometimes physical blows occur between parents." How often did your father (or stepfather) or mother's boyfriend do any of these things to your mother (or stepmother)? 1) Push, grab, slap, or throw something at her, 2) kick, bite, hit her with a fist, or hit her with something hard, 3) repeatedly hit her over at least a few minutes, or 4) threaten her with a knife or gun, or use a knife or gun to hurt her." A response of "sometimes," "often," or "very often" to the first or second question or any response except for "never" to the third or the fourth question was considered evidence of having a battered mother.

Parental separation or divorce was defined by a "yes" response to the question, "Were your parents ever separated or divorced?" Mental illness in household was defined by an affirmative response to 1 or both of the following questions: 1) "Was anyone in your household mentally ill or depressed?" 2) "Did anyone attempt to commit suicide?"

Household substance abuse was defined by 2 questions that asked the respondent whether she or he had lived with a problem drinker or alcoholic⁴⁰ or with anyone who used street drugs. An affirmative response to living with anyone who was a problem drinker or alcoholic or anyone who used street drugs defined this childhood exposure. An incarcerated household member was defined by a "yes" response to the question, "Did anyone in your household go to prison?"

Definition of Illicit Drug Use Outcomes

Lifetime Use, Age at Initiation

Lifetime use was defined as an affirmative response to the question, "Have you ever used street drugs?" Respondents who answered affirmatively were asked, "How old were you the first time you used them?" The mean age at initiation in years ($\pm$ standard deviation [SD]) was 19.7 (± 6.7 ; range: 7–54). We grouped the responses to age at initiation into 3 categories: ≤ 14 years, 15 to 18 years, and ≥ 19 years. In this study, these groups are described as early adolescence (mean age at initiation in years $\pm$ SD: 13.0 $\pm$ 1.2), mid-adolescence (16.6 $\pm$ 1.1), and adulthood (25.0 $\pm$ 7.0).

Other Illicit Drug Use Variables

"Ever had a drug problem," "ever addicted to drugs," and "ever used intravenous drugs" were defined, respectively, as "yes" answers to the following questions: "Have you ever had a problem with street drugs?" "Have you ever considered yourself addicted to street drugs?" "Have you ever injected street drugs?"

Statistical Analysis

Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were obtained from multivariate logistic regression models using SAS (v8.2; SAS, Inc, Cary, NC) that assessed the associations between each of the 10 categories of ACEs and both illicit drug initiation during early adolescence and lifetime use. In additional analyses, number of ACEs was summed for each respondent (ACE score range: 0–10). Because of the relatively small sample sizes, ACE scores of ≥ 5 were combined. Analyses were conducted with the summed score (1, 2, 3, 4, or ≥ 5) as dichotomous variables

(yes/no) with 0 experiences as the referent. Covariates in all models included age (continuous variable), gender, race (other versus white), and education (high school diploma, some college, or college graduate, versus less than high school). We performed tests for trend (graded relationship) between the ACE score and the likelihood of drug initiation for the 3 age categories, lifetime use, lifetime use by birth cohort, and drug use outcomes (problem, addiction, and parenteral drug use). This was done by entering the ACE score as an ordinal variable into logistic models, with adjustment for the demographic covariates.

People with incomplete information about an ACE were considered not to have had that experience ($n = 500$; 6%). This exclusion would likely result in conservative estimates of relationships between ACEs and drugs use because people who had potentially been exposed to an experience were misclassified as unexposed. This type of misclassification would potentially bias our results toward the null.⁴¹ However, to assess this potential effect, we repeated our analyses after excluding any respondent with missing information on any 1 of the ACEs and found no substantial differences in the final results.

Attributable risk fractions (ARFs) were calculated using adjusted ORs from logistic regression models based on ≥ 1 ACE with 0 ACEs as the referent, because a substantial increase in the risk of using illicit drugs was seen for people who reported at least 1 ACE. We used Levin's formula for these calculations: $ARF = P_1 (RR - 1) / 1 + P_1 (RR - 1)$, where P_1 is the prevalence of an ACE score ≥ 1 and $RR = OR$ of ever having drug problems, ever being addicted to drugs, and parenteral drug use for an ACE score ≥ 1 .⁴² The ARF is an estimate of the proportion of the health problem (eg, addiction to illicit drugs) that would not have occurred if no people had been exposed to the risk factor being assessed (ACEs).⁴²

RESULTS

Characteristics of the Study Population

The study population included 4665 (54%) women and 3948 (46%) men. The mean age ($\pm$ SD) was 55 years (± 15.5 years) for women and 57 years (± 14.5 years) for men. Seventy-three percent of women and 75% of men were white; 32% of women and 42% of men were college graduates, and another 42% of women and 39% of men had some college education. Only 8% of women and 7% of men had not graduated from high school.

The prevalence of each specific ACE was higher for women than men except for physical abuse and physical neglect (Table 1). Sixty-seven percent of respondents reported at least 1 of the 10 ACEs; 42% reported 2 or more.

Interrelatedness of ACEs

When a respondent was exposed to 1 of the ACEs, the probability of exposure to any other category of ACE increased substantially (Table 2). The median probability of exposure to any additional category given exposure to the first was 86.5%; for any 2 additional categories, the median probability was 69.5% (Table 2).

Age Adjustment of Drug Use Outcomes

Because illicit drug use is inversely associated with age (a secular trend),⁴³ we adjusted (by the direct method) the prevalence of lifetime use of illicit drugs to the age distribution of the US population, using the 2000 census.⁴⁴ After this age adjustment, the prevalence of illicit drug use in the study cohort increased from 18.5% to 27.0%. This increase demonstrates that the prevalence that we obtained is more

TABLE 1. Prevalence of Each Category of ACE and ACE Score by Gender

Category of ACE	Prevalence (%)		
	Women (<i>n</i> = 4665)	Men (<i>n</i> = 3948)	Total (<i>n</i> = 8613)
Abuse			
Emotional	12.2	7.8	10.2
Physical	25.1	27.9	26.4
Sexual	24.3	17.1	21.0
Neglect			
Emotional	16.7	12.4	14.8
Physical	9.2	10.7	9.9
Household dysfunction			
Battered mother	13.9	12.0	13.0
Parental separation or divorce	25.4	22.6	24.1
Mental illness in household	25.3	14.3	20.3
Household substance abuse	30.5	25.5	28.2
Incarcerated household member	6.9	4.9	6.0
ACE score			
0	31.3	34.2	32.7
1	24.2	27.3	25.6
2	14.8	16.4	15.5
3	10.4	9.3	9.9
4	6.8	4.8	5.9
≥5	12.5	8.0	10.5

likely an artifact of the age distribution of the study population than a reporting bias.

Association Between ACEs and Illicit Drug Use

Each category of ACE increased the likelihood of early drug initiation 2- to 4-fold and also increased the likelihood of lifetime use ($P < .05$; Table 3). In addition, each ACE category increased the likelihood of drug initiation during mid-adolescence and adulthood ($P < .05$; data not shown).

The ACE score increased the risk of initiating illicit drugs during early adolescence, mid-adolescence, and adulthood and for lifetime use in a strong graded manner ($P < .05$; Table 4), with initiation during early adolescence having the strongest graded relationship with the ACE score, with exception of experiencing 1 ACE, which was not statistically significant. To test for the significance of all 4 relationships, we entered the ACE score into the logistic models as an ordinal variable. The 4 ordinal ORs for initiation during early adolescence, mid-adolescence, and adulthood and lifetime drug use were 1.4 (95% CI: 1.3–1.5), 1.1 (95% CI: 1.1–1.2), 1.1 (95% CI: 1.1–1.2), and 1.3 (95% CI: 1.2–1.3), respectively. In each model, the coefficient for the ACE score was significant ($P < .01$). These results suggest that for every increase in the number of ACEs, the likelihood of initiation of illicit drug during early adolescence, mid-adolescence, adulthood, or at any age (lifetime) increases by 40%, 10%, 10%, and 30%, respectively.

The ACE Score and Serious Drug Use Problems

The ACE score increased the likelihood of ever having drug problems, ever being addicted to drugs, and parenteral drug use in a dose-response manner ($P < .05$; Table 5). The ordinal ORs for the test for trend between the ACE score and the 3 outcomes were 1.3 (95% CI: 1.2–1.4), 1.3 (95% CI: 1.2–1.4), and 1.4 (95% CI: 1.3–1.5), respectively. Thus, there was a

30% to 40% increase in risk for each of the illicit drug problems as the ACE score increased.

Relationship of ACEs to Illicit Drug Use in Different Birth Cohorts

For each birth cohort, a graded relationship was found between the ACE score and ever using illicit drugs ($P < .05$; Table 6). The strongest relationship was for people who were born between 1900 and 1932, for whom comparison between reporting no ACEs and reporting ≥ 5 ACEs yielded an OR of 10.7 (95% CI: 2.9–39.2), although the prevalence of illicit drug use was lowest for this group (Table 6). The test for trend between the ACE score and the likelihood of ever using illicit drugs was significant in all 4 birth cohorts: 1963–1978 (1.2; 95% CI: 1.1–1.3), 1948–1962 (1.2; 95% CI: 1.2–1.3), 1933–1947 (1.3; 95% CI: 1.2–1.3), and 1900–1932 (1.4; 95% CI: 1.2–1.6).

ARF

The estimated ARFs for ever having a drug problem, ever being addicted to illicit drugs, and ever using parenteral drugs were 56%, 63%, and 64%, respectively (ie, these percentages were attributed to experiencing 1 or more ACEs).

DISCUSSION

Each of the 10 categories of ACEs was associated with a 2- to 4-fold increase in the likelihood of illicit drug use by age 14 and increased the risk of use into adulthood. Because these ACEs rarely occur in isolation and tend to be highly interrelated,^{30,31,45} we examined their cumulative effect on illicit drug use. We found graded relationships between the ACE score and initiation for our 3 categories of age at initiation; this graded relationship was strongest for initiation by age 14. We also found a strong graded relationship between ACEs and reported problems with drugs, addiction to drugs, and parenteral drug

TABLE 2. Prevalence of Reporting of Additional Categories of ACEs Among Respondents Who Reported Exposure to First Category of ACE

First Category of ACE	(N)	Emotional Abuse	Physical Abuse	Sexual Abuse	Substance Abuse	Mental Illness	Battered Mother	Member Imprisoned	Parental Conflict	Emotional Neglect	Physical Neglect	Additional ACEs	
												≥1	≥2
Childhood abuse													
Emotional	876	—	82	42	53	49	40	14	45	59	31	98	90
Physical	2272	31	—	32	41	34	28	11	36	32	20	83	64
Sexual	1809	21	41	—	41	32	23	11	36	26	17	78	58
Childhood neglect													
Emotional	1271	41	58	37	48	41	32	12	43	—	38	93	79
Physical	854	32	53	36	49	37	36	14	43	56	—	89	75
Household dysfunction													
Substance abuse	2429	19	39	31	—	34	30	12	41	25	17	81	60
Mental illness	1747	25	44	33	47	—	24	13	40	29	18	84	65
Battered mother	1122	31	58	36	64	37	—	15	51	36	28	95	82
Incarcerated	515	23	46	38	56	42	33	—	46	28	23	90	74
household member													
Overt parental marital conflict*	2078	19	40	31	48	34	28	11	—	26	18	82	60
Median		25	46	36	48	37	30	12	43	29	20	86.5	69.5
Range		19–41	39–82	31–42	41–64	32–49	23–40	11–15	36–51	25–59	17–38	78–98	58–90

* Respondents reporting parental separation or divorce.

use. The ARFs for these drug use outcomes were large, ranging from 56% to 64%.

Our finding that the graded relationship was strongest for early adolescence is not surprising. The temporal proximity of ACEs and the cumulative effect of experiencing multiple ACEs may explain the strength of this relationship. Children and adolescents, who are exposed to the types of childhood experiences that we examined, may have feelings of helplessness, chaos, and impermanence and may have problems self-regulating affective states. Thus, illicit drug use may serve as an avenue to escape or dissociate from the immediate emotional pain, anxiety, and anger that likely accompany such experiences.^{46,47} The current findings are supported by previous studies that have reported associations between forms of childhood abuse and substance abuse in adolescents.^{46,48,49} The adverse developmental and emotional impact of these interrelated childhood experiences, combined with behaviors inherent among this age group,^{19–21} all may contribute to the especially strong graded relationship that we found in this age group.

We also demonstrated graded relationships between the ACE score and risk of initiating illicit drugs during mid-adolescence and adulthood. In the case of adult initiation, we can be certain that the exposure (ACEs) preceded the initiation. Information that the initiation of illicit drug use during adulthood is associated with adverse experiences during childhood underscores the powerful long-term effects of ACEs on vulnerability to illicit drug use.^{43,47}

The ACE score also had strong graded relationships to the likelihood of ever having problems with illicit drugs, being addicted to drugs, or using drugs parenterally. Given the many deleterious health, social, and economic consequences of these problems, the public health implications of these findings are myriad. This type of information may provide insights into the likely determinants of drug use and how illicit drugs become integrated into human communities, although there are many prohibitions against them.⁵⁰ In the era of the human immunodeficiency virus epidemic and high rates of hepatitis C among parenteral drug users,^{51–55} the contribution of ACEs to injected drug use is especially important.

Our estimates of the ARFs for serious forms of illicit drug use are of an order of magnitude rarely seen in epidemiology and public health. The current analysis suggests that approximately two thirds (64%) of parenteral drug use is attributable to the types of abusive or traumatic childhood experiences that we studied. Preventing, treating, and understanding the effects of ACEs pose major challenges, but the idea that dealing with ACEs may reduce the burden of parenteral drug use provides a greater impetus for meeting these challenges.

We age-adjusted the prevalence of lifetime illicit drug use to take into account that the ACE study population has an older mean age than the general US population (36 years).⁵⁶ The apparent low prevalence of lifetime illicit drug use (18.5%) in our study cohort was increased substantially to 27% after age adjustment and seems to be an artifact of the age

TABLE 3. Prevalence and Adjusted OR* of Initiation of Illicit Drugs During Early Adolescence (≤ 14 Years) and Lifetime Use of Illicit Drugs by Category of ACE

Category of ACE	Initiation of Illicit Drug Use				
	N	%	≤ 14 Years OR	%	Lifetime OR
Abuse					
Emotional					
No	7737	2.4	1.0 (Referent)	16.9	1.0 (Referent)
Yes	876	7.0	2.4 (1.8–3.4)	33.2	2.1 (1.7–2.5)
Physical					
No	6341	2.2	1.0 (Referent)	15.1	1.0 (Referent)
Yes	2272	4.6	1.8 (1.4–2.4)	28.0	2.0 (1.8–2.3)
Sexual					
No	6804	2.1	1.0 (Referent)	16.1	1.0 (Referent)
Yes	1809	5.8	2.8 (2.1–3.7)	27.8	2.0 (1.8–2.3)
Neglect					
Emotional					
No	7342	2.3	1.0 (Referent)	16.9	1.0 (Referent)
Yes	1271	5.7	2.4 (1.8–3.3)	27.7	1.8 (1.6–2.1)
Physical					
No	7759	2.6	1.0 (Referent)	18.4	1.0 (Referent)
Yes	854	5.3	2.5 (1.8–3.7)	19.9	1.3 (1.1–1.6)
Household dysfunction					
Mentally ill household member					
No	6866	2.0	1.0 (Referent)	15.6	1.0 (Referent)
Yes	1747	6.0	2.3 (1.8–3.1)	29.9	1.9 (1.7–2.2)
Witnessed violence against mother					
No	7491	2.4	1.0 (Referent)	17.3	1.0 (Referent)
Yes	1122	6.0	2.1 (1.5–2.9)	27.1	1.6 (1.4–1.9)
Substance abuse in home					
No	6184	1.3	1.0 (Referent)	13.6	1.0 (Referent)
Yes	2429	6.8	3.7 (2.8–4.9)	31.2	2.1 (1.8–2.4)
Parental separation/divorce					
No	6535	1.7	1.0 (Referent)	15.4	1.0 (Referent)
Yes	2078	6.5	2.5 (1.9–3.4)	28.3	1.7 (1.5–1.9)
Incarcerated household member					
No	8098	2.5	1.0 (Referent)	17.8	1.0 (Referent)
Yes	515	8.7	3.3 (2.2–4.8)	29.9	1.9 (1.5–2.4)
Total	8613	2.8	—	18.5	—

* ORs adjusted for gender baseline age, race, and educational attainment.

TABLE 4. Prevalence and Adjusted OR* for the Relationship Between the ACE Score and Age at Initiation of Illicit Drug Use and Lifetime Use

ACE Score†	Age at Initiation of Drug Use								
	N	≤14 Years		15–18 Years		Adult (≥19 Years)		Lifetime	
		%	OR	%	OR	%	OR	%	OR
0	2812	0.7	1.0 (Referent)	3.8	1.0 (Referent)	4.8	1.0 (Referent)	9.4	1.0 (Referent)
1	2205	1.5	1.5 (0.9–2.7)	6.5	1.4 (1.1–1.8)	7.2	1.4 (1.1–1.8)	15.2	1.5 (1.2–1.8)
2	1338	3.1	2.9 (1.6–5.0)	9.3	1.8 (1.3–2.4)	9.8	1.9 (1.5–2.4)	22.3	2.3 (1.9–2.8)
3	849	4.7	4.0 (2.3–7.1)	10.6	1.9 (1.4–2.6)	10.3	1.9 (1.4–2.6)	25.6	2.5 (2.0–3.2)
4	507	4.1	3.8 (2.0–7.2)	13.4	2.7 (1.9–3.8)	11.2	2.1 (1.5–3.0)	28.8	3.1 (2.4–4.0)
≥5	902	9.9	9.1 (5.4–15.2)	14.3	2.5 (1.9–3.3)	13.2	2.5 (1.9–3.2)	37.4	4.3 (3.5–5.4)
Total	8613	2.8	—	7.7	—	8.0	—	18.5	—

* ORs adjusted for gender, baseline age, race, and educational attainment.

† The trend for increasing ORs as the ACE score increases is significant ($P < .05$) in each model.

distribution of the study. This adjusted prevalence compares to other national studies,^{57,58} such as the Epidemiologic Catchment Area Study in which the prevalence for lifetime use of illicit drugs was 30%.⁵⁸

To control further for age, we examined the relationship between the ACE score and lifetime illicit drug use by birth cohort. The graded relationship that we found between the ACE score and lifetime illicit drug use for each of 4 birth cohorts dating back to 1900 suggests that the effects of ACEs on drug use behavior transcend secular changes in the availability and type of drugs used,¹ social mores, and the implementation of efforts to prevent drug abuse.

Thus, the strong association between the ACE score and drug use for the oldest birth cohort offers compelling evidence that the impact of ACEs on illicit drug use is a consistent phenomenon over time that transcends secular changes, perhaps as a result of the inherent biological effects of ACEs on the neurodevelopment of children²² that likely increases the risk of drug use.

Information from the neurosciences supports the biological plausibility of our findings. The biological processes that occur when children are exposed to stressful events such as recurrent abuse or witnessing domestic violence can negatively disrupt early

TABLE 5. Relationship of the ACE Score to Ever Having a Drug Problem, Ever Being Addicted to Drugs, or Injecting Illicit Drugs

ACE Score†	N	Ever Had Drug Problem		Ever Addicted to Drugs		Ever Injected Drugs	
		%	OR*	%	OR*	%	OR*
0	2812	1.3	1.0 (Referent)	0.8	1.0 (Referent)	0.3	1.0 (Referent)
1	2205	3.0	1.9 (1.3–2.9)	2.1	2.3 (1.4–3.8)	0.5	1.6 (0.7–4.0)
2	1338	3.9	2.0 (1.3–3.2)	3.1	2.7 (1.6–4.7)	1.2	3.0 (1.3–7.1)
3	849	5.0	2.5 (1.6–4.0)	4.1	3.5 (2.0–6.0)	1.4	3.5 (1.4–8.7)
4	507	7.5	4.2 (2.6–6.9)	3.9	3.4 (1.8–6.4)	1.0	2.4 (0.8–7.4)
≥5	902	12.0	6.5 (4.3–9.6)	9.2	7.7 (4.7–12.7)	4.3	10.1 (4.6–22.0)
Total	8613	4.0	—	2.9	—	1.1	—

* ORs adjusted for gender, baseline age, race, and educational attainment.

† The trend for increasing ORs as the ACE score increases is significant ($P < .05$) in each model.

TABLE 6. Prevalence and Adjusted OR* for Lifetime Use of Illicit Drugs by ACE Score, Stratified by Birth Cohort

ACE Score†	Ever Used Illicit Drugs (Birth Cohort; Year)											
	1963–1978			1948–1962			1933–1947			1900–1932		
	N	%	OR	N	%	OR	N	%	OR	N	%	OR
0	178	24.7	1.0 (Referent)	568	26.8	1.0 (Referent)	916	7.0	1.0 (Referent)	1150	0.4	1.0 (Referent)
1	217	36.9	1.7 (1.1–2.6)	519	34.3	1.4 (1.1–1.9)	696	9.5	1.6 (1.1–2.3)	773	1.3	3.3 (1.1–10.7)
2	145	42.1	1.9 (1.2–3.2)	361	44.6	2.2 (1.6–2.9)	467	14.1	2.4 (1.6–3.5)	365	2.7	7.3 (2.3–23.6)
3	109	41.3	2.0 (1.2–3.4)	256	50.4	2.8 (2.0–3.9)	278	14.8	2.6 (1.7–4.0)	206	1.0	2.3 (0.4–12.7)
4	61	44.3	2.6 (1.4–5.0)	179	48.0	2.6 (1.8–3.7)	159	18.2	3.4 (2.0–5.5)	108	3.7	9.9 (2.4–40.7)
≥5	130	57.7	3.6 (2.2–6.0)	345	56.8	4.0 (2.9–5.4)	288	20.8	4.1 (2.8–6.2)	139	4.3	10.7 (2.9–39.3)
Total	840	39.5	—	2228	40.5	—	2804	11.6	—	2741	1.3	—

* ORs adjusted for gender, baseline age, race, and educational attainment.

† The trend for increasing ORs as the ACE score increases is significant ($P < .05$) in each model.

development of the central nervous system. This may in turn impede their ability to cope with negative or disruptive emotions,⁵⁹ leading to problems with emotional and behavioral self-regulation later in life.²² Thus, behaviors such as substance use may manifest as a means to help regulate emotional states.

A potential weakness of studies with retrospective reporting of childhood experiences is that respondents may have difficulty recalling certain events. For example, longitudinal follow-up of adults whose childhood abuse was documented has shown that their retrospective reports of such abuse are likely to underestimate actual occurrence.^{60,61} Difficulty recalling childhood events likely results in misclassification (classifying people who truly were exposed to ACEs as unexposed) that would bias our results toward the null. Another potential source of underestimation of the strength of these relationships is related to the lower number of childhood exposures reported by older people in our study. This could be an artifact caused by premature mortality in people with multiple adverse childhood exposures; the clustering of multiple risk factors among people with multiple childhood exposures is consistent with this hypothesis.²⁹ Thus, this potential weakness may have resulted in underestimates of the true relationships between ACEs and the illicit drug use outcomes.⁴¹

Our data cannot provide certainty about the temporal relationship between ACEs and drug use that was initiated before age 19 because both the exposure and the outcome were reported as occurring at 18 years or younger. Despite these limitations, the powerful association observed between the ACE

score and initiation of illicit drugs by age 14 merits serious consideration.

The prevalence of childhood exposures that we report is nearly identical to those reported in surveys of the general population. We found that 16% of the men and 25% of the women met the case definition for contact sexual abuse, similar to findings by Finkelhor et al⁶² that 16% of men and 27% of women had been sexually abused. As for physical abuse, 28% of the men from our study reported experiencing this as boys, which closely parallels the percentage found (31%) in a recent population-based study of Ontario men that used questions from the same scales.⁶³ The similarity of the estimates from the ACE study to those of population-based studies suggests that our findings are likely to be applicable in other settings.

CONCLUSION

ACEs were common with close to two thirds reporting 1 or more. The number of ACEs to which a person is exposed had a strong graded relationship to the risk of drug initiation from early adolescence into adulthood and to problems with drug use, drug addiction, and parenteral use. The persistent graded relationship between the ACE score and initiation of drug use for 4 successive birth cohorts dating back to 1900 suggests that the effects of ACEs transcends secular changes such as increased availability and type of drugs used, social attitudes toward drugs, and recent massive expenditures and public information campaigns to prevent drug use.^{50,64} Because ACEs seem to account for one half to two thirds of serious problems with drug use, progress in meeting the national goals for reducing drug use will neces-

sitate serious attention to these types of stressful and disturbing childhood experiences by pediatric practice.

Pediatricians play a prominent role as family health advisors during childhood and adolescence development. Pediatricians who identify drug use among their patients must take the time to screen the family for potential forms of abuse, and household dysfunction. As such, recommendations set by the American Academy of Pediatrics, which emphasize the role of the pediatrician in family support programs, will likely facilitate in the evolving efforts to prevent and treat children who have experienced growing up in stressful household environments, and subsequently may reduce the occurrence of illicit drug use and serious drug use problems.⁶⁵ Continued medical education programs that provide pediatricians with the skills to assess psychosocial issues in pediatric care will also contribute to these evolving efforts.⁶⁵

REFERENCES

- Coleman P. Overview of substance abuse. *Prim Care*. 1993;20:1-18
- Sly DF, Quadagno D, Harrison DF, Eberstein I, Riehman K. The association between substance use, condom use and sexual risk among low-income women. *Fam Plann Perspect*. 1997;29:132-136
- Shafer MA, Boyer CB. Psychosocial and behavioral factors associated with risk of sexually transmitted diseases, including human immunodeficiency virus infection, among urban high school students. *J Pediatr*. 1991;119:826-833
- van den Hoek A. STD control in drug users and street youth. *Genitourin Med*. 1997;73:240-244
- Crowe AV, Howse M, Bell GM, Henry JA. Substance abuse and the kidney. *Q J Med*. 2000;93:147-152
- Ghuran A, Nolan J. Recreational drug misuse: issues for the cardiologist. *Heart*. 2000;83:627-633
- Henry JA. Metabolic consequences of drug misuse. *Br J Anaesth*. 2000;85:136-142
- Matlock T, Slate JR, Saarnio DA. Familial variables and domestic violence. *J Ark Med Soc*. 1995;92:222-224
- Smith JW. Addiction medicine and domestic violence. *J Subst Abuse Treat*. 2000;19:329-338
- Brookoff D, O'Brien KK, Cook CS, Thompson TD, Williams C. Characteristics of participants in domestic violence. Assessment at the scene of domestic assault. *JAMA*. 1997;277:1369-1373
- Bennett LW. Substance abuse and the domestic assault of women. *Soc Work*. 1995;40:760-771
- Easton CJ, Swan S, Sinha R. Prevalence of family violence in clients entering substance abuse treatment. *J Subst Abuse Treat*. 2000;18:23-28
- US Department of Health and Human Services. *Healthy People 2010, I: Understanding and Improving Health and Objectives for Improving Health, Part A*. 2nd ed. Washington, DC: US Government Printing Office; 2000
- Singer M, Stopka T, Siano C, et al. The social geography of AIDS and hepatitis risk: qualitative approaches for assessing local differences in sterile-syringe access among injection drug users. *Am J Public Health*. 2000;90:1049-1056
- Thorpe LE, Ouellet LJ, Levy JR, Williams IT, Monterroso ER. Hepatitis C virus infection: prevalence, risk factors, and prevention opportunities among young injection drug users in Chicago, 1997-1999. *J Infect Dis*. 2000;182:1588-1594
- Prevalence of hepatitis C virus infection among clients of HIV counseling and testing sites-Connecticut, 1999. *MMWR Morb Mortal Wkly Rep*. 2001;50:577-581
- Kandel DB. Persistent themes and new perspectives on adolescent substance use: a lifespan perspective. In: Jessor R, ed. *New Perspectives on Adolescent Risk Behavior*. Cambridge, UK: Cambridge University Press; 1998:43-89
- Substance Abuse and Mental Health Services Administration. *Summary of Findings from the 2000 National Household Survey on Drug Abuse*. Rockville, MD: Office of Applied Studies; 2001 (NHSDA Series H-13, DHHS Publication No. [SMA] 01-3549
- Baer JS, MacLean MG, Marlatt GA. Linking etiology and treatment for adolescent substance abuse: toward a better match. In: Jessor R, ed. *New Perspectives on Adolescent Risk Behavior*. Cambridge, UK: Cambridge University Press; 1998:192-220
- Steinberg L. *Adolescence*. 5th ed. Boston, MA: McGraw Hill; 1999
- Reif CJ, Elster AB. Adolescent preventive services. *Prim Care*. 1998;25:1-21
- Van der kolk BA, Perry JC, Herman JL. Childhood origins of self-destructive behavior. *Am J Psychiatry*. 1991;148:1665-1671
- Kendall-Tackett KA, Williams LM, Finklehor D. Impact of sexual abuse on children: a review and synthesis of recent empirical studies. *Psychol Bull*. 1993;113:164-180
- Osofsky J D. The impact of violence on children. *Future Child*. 1999;9:33-49
- Mullen PE, Martin JL, Anderson JC, Romans SE, Herbison GP. Childhood sexual abuse and mental health in adult life. *Br J Psychiatry*. 1993;163:721-732
- Heffernan K, Cloitre M, Tardiff K, Marzuk PM, Portera L, Leon AC. Childhood trauma as a correlate of lifetime opiate use in psychiatric patients. *Addict Behav*. 2000;25:797-803
- Kendler KS, Bulik CM, Silberg J, Hettema JM, Myers J, Prescott CA. Childhood sexual abuse and adult psychiatric and substance abuse disorders in women: an epidemiological and cotwin control analysis. *Arch Gen Psychiatry*. 2000;57:953-959
- Rohsenow DJ, Corbett R, Devine D. Molested as children: a hidden contribution to substance abuse? *J Subst Abuse Treat*. 1988;5:129
- Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*. 1998;14:245-258
- Anda RF, Croft JB, Felitti VJ, et al. Adverse childhood experiences and smoking during adolescence and adulthood. *JAMA*. 1999;282:1652-1658
- Dietz PM, Spitz AM, Anda RF, et al. Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. *JAMA*. 1999;282:1359-1364
- Hillis SD, Anda RF, Felitti VJ, Nordenberg D, Marchbanks P. Adverse childhood experiences and sexually transmitted diseases in men and women: a retrospective study. *Pediatrics*. 2000;106(1). Available at: www.pediatrics.org/cgi/content/full/106/1/e11
- Anda RF, Felitti VJ, Chapman DP, et al. Abused boys, battered mothers, and male involvement in teen pregnancy. *Pediatrics*. 2001;107(2). Available at: www.pediatrics.org/cgi/content/full/107/2/e19
- Dube SR, Anda RF, Felitti VJ, Edwards VJ, Croft JB. Adverse childhood experiences and personal alcohol abuse as an adult. *Addict Behav*. 2002;27:713-725
- Dube SR, Anda RF, Felitti VJ, Chapman D, Williamson DF, Giles WH. Childhood abuse, household dysfunction and the risk of attempted suicide throughout life span: findings from the Adverse Childhood Experiences Study. *JAMA*. 2001;286:3089-3096
- Edwards VJ, Anda RF, Nordenberg DF, Felitti VJ, Williamson DF, Wright JA. Bias assessment for child abuse survey: factors affecting probability of response to a survey about childhood abuse. *Child Abuse Negl*. 2001;25:307-312
- Straus M, Gelles RJ. *Physical Violence in American Families: Risk Factors and Adaptations to Violence in 8,145 Families*. New Brunswick, NJ: Transaction Press; 1990
- Bernstein DP, Fink L, Handelsman L, et al. Initial reliability and validity of a new retrospective measure of child abuse and neglect. *Am J Psychiatry*. 1994;151:1132-1136
- Wyatt GE. The sexual abuse of Afro-American and white American women in childhood. *Child Abuse Negl*. 1985;9:507-519
- Schoenborn CA. Exposure to alcoholism in the family: United States, 1988. *Adv Data*. 1991;205:1-13
- Rothman KJ. *Modern Epidemiology*. Boston, MA: Little, Brown; 1986
- Haddix AC, Teutsch SM, Shaeffer PA, Dunet DO. *Prevention Effectiveness: A Guide to Decision Analysis and Economic Evaluation*. New York, NY: Oxford University Press; 1996
- Robins LN. The natural history of drug abuse. *Acta Psychiatr Scand Suppl*. 1980;284:7-20
- Klein RJ, Schoenborn CA. *Age Adjustment Using the 2000 Projected U.S. Population*, 2001. Hyattsville, MD: National Center for Health Statistics; 2001. DHHS Publ. No. [PHS] 2001-1237
- Finkelhor D. Improving research, policy, and practice to understand child sexual abuse. *JAMA*. 1998;280:1964-1965
- Bensley LS, Spieker SJ, Van Eenwyk JV, Schoder J. Self-reported abuse history and adolescent problem behaviors. II. Alcohol and drug use. *J Adolesc Health*. 1999;24:173-180
- Lebling C. Child abuse as precursor to adult abuse of alcohol and drugs. *Med Law*. 1986;5:239-245
- Dembo R, Williams L, Wothke W, Schmeidler J, Brown CH. The role of

- family factors, physical abuse, and sexual victimization experiences in high-risk youths' alcohol and other drug use and delinquency: a longitudinal model. *Violence Vict.* 1992;7:245–266
49. Malinosky-Rummell R, Hansen DJ. Long-term consequences of childhood physical abuse. *Psychol Bull.* 1993;114:68–79
 50. National Association for Public Health Policy. A public health approach to mitigating the negative consequences of illicit drug abuse. *J Public Health Policy.* 1999;20:268–281
 51. Bensley LS, Van Eenwyk J, Simmons KW. Self-reported childhood sexual and physical abuse and adult HIV-risk behaviors and heavy drinking. *Am J Prev Med.* 2000;18:151–158
 52. Thomas DL, Vlahov D, Solomon L, et al. Correlates of hepatitis C virus infections among injection drug users. *Medicine.* 1995;74:212–220
 53. Trends in injection drug use among persons entering addiction treatment—New Jersey, 1992–1999. *MMWR Morb Mortal Wkly Rep.* 2001;50:378–381
 54. Alter MJ, Kruszon-Moran D, Nainan OV, et al. The prevalence of hepatitis C virus infection in the United States, 1988 through 1994. *N Engl J Med.* 1999;341:556–562
 55. Hunter GM, Stimson GV, Judd A, Jones S, Hickman M. Measuring injecting risk behaviour in the second decade of harm reduction: a survey of injecting drug users in England. *Addiction.* 2000;95:1351–1361
 56. US Census Bureau. *Resident Population Estimates of the United States by Sex, Race, and Hispanic Origin: April 1, 1990 to July 1, 1999, With Short-Term Projection to November 1, 2000.* Washington, DC: Population Estimates Program, Population Division, US Census Bureau; 2000
 57. Substance Abuse and Mental Health Services Administration. National Household Survey on Drug Abuse Population Estimates 1998. Rockville, MD: Office of Applied Studies (NHSDA Series H-9, DHHS Publication No. [SMA] 99-3327)
 58. Anthony JC, Helzer JE. Syndromes of drug abuse and dependence. In: Robins LN, Regier DA, eds. *Psychiatric Disorders in America: The Epidemiologic Catchment Area Study.* New York, NY: Free Press; 1991:116–154
 59. Perry BD, Pollard R. Homeostasis, stress, trauma, and adaptation: a neurodevelopmental view of childhood trauma. *Child Adolesc Psychiatr Clin N Am.* 1998;7:33–51
 60. Della Femina D, Yeager CA, Lewis DO. Child abuse: adolescent records vs. adult recall. *Child Abuse Negl.* 1990;14:227–231
 61. Williams LM. Recovered memories of abuse in women with documented child sexual victimization histories. *J Trauma Stress.* 1995;8:649–673
 62. Finkelhor D, Hotaling G, Lewis IA, Smith C. Sexual abuse in a national survey of adult men and women: prevalence, characteristics, and risk factors. *Child Abuse Negl.* 1990;14:19–28
 63. MacMillan HL, Fleming JE, Trocme N, et al. Prevalence of child physical and sexual abuse in the community: results from the Ontario Health Supplement. *JAMA.* 1997;278:131–135
 64. Kleiman MAR. An informed approach to substance abuse: drugs and drug policy—the case for a slow fix. *Iss Sci Technol.* 1998;15:45–52
 65. American Academy of Pediatrics, Committee on Early Childhood and Adoption, and Dependent Care. The pediatrician's role in family support programs. *Pediatrics.* 2001;107:195–197

DARING TO SMOKE

“... Smokers are more likely to take risks, act defiantly, and rebel against cultural norms than are nonsmokers. Smokers, for instance, are less likely to wear seat belts and more likely to be divorced. They are even said to have higher sex drives. So while government health warnings and growing antitobacco sentiments certainly scared many smokers off the habit, those very prohibitions also served to solidify many smokers' loyalties, partly because the more smoking was vilified, the more rebellious and appealing it seemed. 'Smoking has always been somewhat daring and has become much more so since the 1960s,' writes David Krogh in *Smoking: The Artificial Passion* (repr. 1992). 'There's a commercially approved way of being daring, and it's called smoking cigarettes.'”

Parker-Pope T. *Cigarettes.* New York, NY: New Press; 2001

Submitted by Student

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DOI: 10.1542/peds.111.3.564

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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

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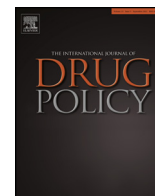
[/content/111/3/564.full.html](http://content/111/3/564.full.html)

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Review

Cannabis for Therapeutic Purposes and public health and safety: A systematic and critical review



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ARTICLE INFO

Article history:

Received 26 June 2014

Received in revised form 4 September 2014

Accepted 5 September 2014

Keywords:

Cannabis for Therapeutic Purposes

Medical cannabis

Systematic review

Public health and safety

ABSTRACT

Background: The use of Cannabis for Therapeutic Purposes (CTP) has recently become legal in many places. These policy and legal modifications may be related to changes in cannabis perceptions, availability and use and in the way cannabis is grown and sold. This may in turn have effects on public health and safety. To better understand the potential effects of CTP legalization on public health and safety, the current paper synthesizes and critically discusses the relevant literature.

Methods: Twenty-eight studies were identified by a comprehensive search strategy, and their characteristics and main findings were systematically reviewed according to the following content themes: CTP and illegal cannabis use; CTP and other public health issues; CTP, crime and neighbourhood disadvantage. **Results:** The research field is currently limited by a lack of theoretical and methodological rigorous studies. The review shows that the most prevalent theme of investigation so far has been the relation between CTP and illegal cannabis use. In addition, the literature review shows that there is an absence of evidence to support many common concerns related to detrimental public health and safety effects of CTP legalization.

Conclusion: Although lack of evidence provides some reassurance that CTP legalization may not have posed a substantial threat to public health and safety, this conclusion needs to be examined in light of the limitations of studies conducted so far. Furthermore, as CTP policy continues to evolve, including incorporation of greater commercialization, it is possible that the full effects of CTP legalization have yet to take place. Ensuring study quality will allow future research to better investigate the complex role that CTP plays in relation to society at large, and public health and safety in particular.

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Introduction

Although Cannabis for Therapeutic Purposes (CTP) played a significant role in western medicine towards the end of the 19th century (Bostwick, 2012; Grinspoon, 2005; Mikuriya, 1969), around the turn of the century and onwards its use has gradually vanished. One major force in this development was that CTP use and research was made increasingly difficult by the 1961 UN Convention on Narcotic Drugs which classified cannabis as a Schedule I drug, meaning no accepted medical use and high potential for abuse (Ballotta, Bergeron, & Hughes, 2008; Bostwick, 2012; UN, 1961). Medical developments also contributed to the decline of CTP as new medicines that were deemed safer and more predictable were developed and took CTP out of favour (Grinspoon, 2005; Kalant, 2001; Zuardi, 2006). Furthermore, other social, economic and legal

factors contributed to the decline of CTP. For instance, import to Europe and the U.S. of high quality Indian hemp became increasingly difficult due to constraints in India and the influence of the two world wars (Fankhauser, 2008).

Novel pharmacological developments of the past few decades have brought a new wave of interest into the structural and physiological properties of cannabis. Furthermore, recent clinical trials have improved the evidence-base for the medical benefits of CTP (Campbell et al., 2001; Gates, Albertella, & Copeland, 2014; Lynch & Campbell, 2011; Machado Rocha, Stéfano, De Cássia Haiek, Rosa Oliveira, & Da Silveira, 2008; Martín-Sánchez, Furukawa, Taylor, & Martin, 2009; Tramer et al., 2001), indicating that cannabis may be a promising therapeutic agent.

The increased clinical evidence-base for CTP has been accompanied with expanding social and political pressures in many places to change regulatory frameworks to enable legal use of CTP. Hitherto, 23 states in the U.S. have legalized CTP (NCSL, 2014), as well as other countries, including Israel, Canada and the Netherlands (Belle-Isle et al., 2014). Additional states and countries are currently

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considering CTP legalization, including New Zealand and Australia (NCSL, 2014; Shipton & Shipton, 2014). These legal changes have brought about scientific and political debates regarding the possible detrimental and positive effects of CTP legalization on society (Levinthal, 2008). Concerns have, for instance, been raised that legalizing CTP may increase illegal cannabis use and may harm adolescents in particular (Joffe & Yancy, 2004). Others have pointed out that CTP legalization may be related to a substitution effect, where people move from alcohol use to cannabis use, which in turn may reduce alcohol-related harm in society (Lucas et al., 2013). From a different perspective, concerns have also been raised that cannabis dispensaries may cause crime in already disadvantaged communities (City of La Puente, 2008; The Denver Post, 2011).

Clearly, aside from strictly pertaining to clinical and medical issues, CTP is essentially a social matter, as it integrates cultural, legal, economic and political concerns. Social sciences have the potential to play a substantial role in developing our understanding of CTP, particularly at this point in time when CTP legal frameworks are changing (Holland, 2010; NCSL, 2014). In particular, social science research is essential in order to reach an understanding of the ways in which CTP use and policies are associated with public health and safety. Furthermore, social CTP research may inform the development of evidence-based CTP policies.

The current paper is the first to critically synthesize studies related to CTP policy and public health and safety. The review was guided by the following objectives: (1) to describe the nature and characteristics of CTP research related to public health and safety and thereby to identify trends in the research area; (2) to highlight the significant contributions in the field of CTP/public health and safety research; and (3) to identify gaps in the literature in order to point out directions for future research.

Methods

Search strategy

A search on PubMed, Sociological Abstracts, Social Citation Index, and PsychINFO, was conducted to identify relevant keywords in titles, abstracts and subject descriptors. Searches included combinations of the following terms: “medical cannabis”, “medical marijuana”, “cannabis dispensaries”, “medical cannabis legalization”, “medical marijuana legislation”, “Cannabis for Therapeutic Purposes”. Searches included all literature that was published before June 2014 and the total number of papers found through all search combinations was 5667.

Selection of papers identified through the initial database search was conducted by independent review of all identified papers by the two authors based on titles and abstracts of the papers and the inclusion and exclusion criteria outlined in Table 1. The process resulted in the exclusion of 5643 papers, and the inclusion of 24 papers. Next, backward and forward searches were performed to identify any studies that the initial search might have

missed (Greenhalgh, 2005). For backward searching, bibliographies of identified studies were checked, while for forward searching, Science Citation Index was used to identify subsequent citations of the identified studies. The five journals with the highest yield of references were additionally hand searched for further relevant references. Four additional papers were included through these search strategies, leading to 28 studies being finally included in this review.

Data extraction

Identified papers were organized into content areas and coded according to seven different variables. Firstly, studies were coded for type of study population (children/adolescents, adults or other) and type of data (primary or secondary data). Studies were also coded for data collection period and CTP policy change focus. In the U.S. (which is the location of all studies reviewed but one), individual states have legalized CTP at various time points since 1996. However, these states were acting under federal prohibitionist policy until 2009 when the federal government released a memo stating that federal resources should not focus on prosecuting CTP patients or caregivers who act according to state laws (Ogden, 2009). This shift sparked commercialization of CTP at the state level, including large scale retail sale and increasing levels of promotion (Salomonsen-Sautel, Min, Sakai, Thurstone, & Hopfer, 2014; Schuermeyer et al., 2014). Effectively, studies using data prior to 2009 examine state CTP legalization under enforced federal prohibition, whilst studies that use data after 2009 have the opportunity to examine state legalization in an environment where these changes would likely have much more of an effect. In order to incorporate these nuances in the literature review, all articles reviewed were coded for data collection period and whether or not the analyses took the state and/or federal CTP policy changes into account in their analyses.

Studies were also coded according to research design quality. Lower quality studies are defined as studies using cross sectional (one time point) observations only, whereas higher quality studies are defined as those that used pre-post design (using observations from before and after a policy change). Another quality indicator is whether some form of comparison group was used; studies with no comparison groups are of lower quality. Lastly, studies were coded for whether analysis was guided by specific theoretical frameworks or not.

Results

Details of the studies reviewed are summarized in Table 2. During the literature search, three content areas were identified: (1) CTP and illegal cannabis use, (2) CTP and other public health issues, and (3) CTP, crime and neighbourhood disadvantage. The majority of studies were published in the last 4 years (86%, $n = 24$), and all studies but one were conducted in the U.S. (96%, $n = 27$). The area of research that has received most attention by researchers is CTP and illegal cannabis use, representing 57% of all studies reviewed.

Although 10 studies (36%) used data before and after 2009, only three studies focused specifically on the 2009 federal policy change towards relaxed prohibition of CTP. All other studies focused on state CTP legalization only. As shown in Table 2, the vast majority of studies used secondary data (75%, $n = 21$). Many studies (61%, $n = 17$) included control groups by utilizing the opportunity to compare data across states or locations with different CTP policies. Fewer studies used pre-post CTP policy change designs (39%, $n = 11$). Furthermore, very few studies were guided by a specific theoretical framework (21%, $n = 6$).

Table 1
Exclusion and inclusion criteria.

Exclusion criteria	Inclusion criteria
Study design based on commentaries of the literature	Focus on association between CTP and public health and safety
Abstracts, dissertations, government or other non-peer reviewed reports, conference proceedings	Scholarly literature (peer reviewed journal articles)
Main focus on medical/pharmaceutical properties of CTP, patients or physicians	Presentation of empirical analysis
Published in language other than English	

Table 2

Author(s), year	Study population	Data type	Data collection period	CTP policy change focus	Study design	Comparison group	Theory driven	Main findings
<i>CTP and illegal cannabis use</i> Anderson et al. (2013)	Adolescents (15–19 year-olds) and adults	Secondary	1990–2010	State	Pre-post	✓	✓	CTP legalization was associated with a reduction in traffic fatalities not involving alcohol and associated with decreases in the price of cannabis and alcohol consumption, especially in young adults.
Cerdá et al. (2012)	Adults	Secondary	2004–2005	State	Cross-sectional	✓	×	Residents of states with CTP laws had higher odds of cannabis use and cannabis abuse/dependence.
Choo et al. (2014)	Adolescents (grades 9–12)	Secondary	1991–2011	State	Pre-post	✓	×	There were no significant differences in adolescent cannabis use before and after CTP legalization. In two states there was a reduction in adolescent cannabis use after CTP legalization.
Friese and Grube (2013)	Adolescents (13–19 year-olds)	Secondary	2010	State	Cross-sectional	×	×	Counties with relatively high levels of CTP licenses were unrelated to lifetime or 30 day cannabis use. Voter approval of CTP was positively related to lifetime and 30 day cannabis use.
Gorman and Huber (2007)	Others – arrestees and ER patients	Secondary	1994–2002; 1987–2003	State	Pre-post	×	×	No statistically significant pre-law versus post-law differences were found in cannabis urine analysis among arrestees or in the proportion of emergency department visits in which cannabis was mentioned
Harper et al. (2012)	Adolescents and adults (12 year-olds and older)	Secondary	2002–2009	State	Pre-post	✓	×	CTP legalization decreased past-month use among adolescents and had no discernible effect on the perceived riskiness of monthly use.
Jaffe and Klein (2010)	Child and adolescent psychiatrists	Primary	Not stated	State	Cross-sectional	×	×	According to child and adolescent psychiatrist, adolescent patients have been influenced by the advent of CTP legalization in that they perceive cannabis to be more beneficial and more available.
Khatapoush and Hallfors (2004)	Adolescents and young adults (16–25 year-olds)	Secondary	1995, 1997 and 1999	State	Pre-post	✓	×	Although some cannabis-related attitudes changed after CTP legalization in California, use did not increase.
Lynne-Landsman et al. (2013)	Adolescents (12–18 year-olds)	Secondary	2003–2011	State	Pre-post	✓	×	No association was found between CTP legalization and adolescent illegal cannabis use
Masten and Guenzburger (2014)	Fatal-crash-involved drivers	Secondary	1992–2009	State	Pre-post	✓	×	The implementation of CTP laws was found to be reliably associated with increased cannabinoid prevalence in fatal-crash involved drivers in only three out of 12 states examined.
Pacula et al. (2010)	Arrestees	Secondary	2000–2003	State	Pre-post	✓	✓	CTP legalization was associated with a reduction in the price of illegal cannabis.
Salomonsen-Sautel et al. (2012)	Adolescents in substance abuse treatment (14–18 year-olds)	Primary	2010–2011	State	Cross-sectional	×	×	Approximately 74% of the adolescents in substance abuse treatment had used diverted CTP.
Salomonsen-Sautel et al. (2014)	Fatal-crash-involved drivers	Secondary	1994–2011	State and Federal	Pre-post	✓	×	CTP commercialization after 2009 federal policy change was associated with increasing numbers of cannabis positive drivers involved in fatal motor vehicle crashes. No such trends were found in states without CTP laws.
Schuermeier et al. (2014)	Adolescents and adults (12 year-olds and older)	Secondary	2003–2011	State and Federal	Pre-post	✓	×	Commercialization of CTP after 2009 federal policy change was associated with lower cannabis risk perception. Evidence was also found for increase in cannabis use/abuse after CTP commercialization.

Schwartz et al. (2003)	Parents and their adolescent children (13–19 year-olds)	Primary	1999	State	Cross-sectional	×	×	Twenty-eight percent of the parent group and 55% of the teenagers believed that passage of CTP legalization would make it easier for teens to smoke CTP.
Thurstone et al. (2011)	Adolescents (15–19 year-olds) in substance use treatment	Primary	2010–2011	State	Cross-sectional	✓	×	49% of adolescent in substance use treatment reported obtaining cannabis from someone with a CTP license.
Wall et al. (2011)	Adolescents (12–17 year-olds)	Secondary	2002–2008	State	Pre-post	✓	×	States that legalized CTP had higher average adolescent cannabis use and lower perception of cannabis riskiness than states that did not legalize CTP, even prior to CTP legal changes.
Wall et al. (2012)	Adolescents and adults (12 year-olds and older)	Secondary	2002–2008	State	Pre-post	✓	×	CTP legalization was unrelated to past-month use among adolescents
<i>CTP and other public health issues</i>								
Anderson et al. (2014)	Adolescents and adults (15 years and older)	Secondary	1990–2007	State	Cross-sectional	✓	×	CTP legalization was associated with a reduction in male suicide rates aged 20–39.
Hazekamp (2006)	CTP	Primary	Not stated	NA	Cross-sectional	✓	×	Compared to samples obtained from coffeshops, cannabis obtained from pharmacies was less contaminated with bacteria and fungi. No difference in potency was found.
Sevigny et al. (2014)	Cannabis seized by law enforcement	Secondary	1990–2010	State	Pre-post	✓	×	No significant difference in THC levels before and after CTP legalization was found.
Wang et al. (2013)	Children (0–12 year-olds)	Secondary	2005–2011	State and Federal	Pre-post	×	×	An increase in unintentional cannabis ingestions by young children was found after 2009, following new federal and state regulations.
Wang et al. (2014)	Children (0–9 year-olds)	Secondary	2005–2011	State	Pre-post	✓	×	Although the number of pediatric exposures to cannabis was low, the rate of exposure increased from 2005 to 2011 in states that had legalized CTP.
<i>CTP, crime and neighbourhood disadvantage</i>								
Boggess et al. (2014)	CTP centers	Secondary	2000, 2004 and 2006–2010	State	Pre-post	✓	✓	CTP centers are likely to be situated in neighbourhoods with higher crime rates and more retail employment. CTP center establishment was not associated with ethnic/racial neighbourhood composition or neighbourhood poverty.
Freisthler et al. (2013)	CTP dispensaries	Primary	2010–2011	State	Cross-sectional	×	✓	Dispensaries with security cameras and signs requiring an identification prescription card had significantly lower levels of violence within 100 and 250 feet.
Kepple and Freisthler (2012)	Census tracts in Sacramento	Secondary	2009	State	Cross-sectional	×	✓	No association was found between density of CTP dispensaries and crime
Morris et al. (2014)	Crime rates	Secondary	1990–2006	State	Pre-post	✓	×	No indication found that CTP legalization increases Part I offenses. Results showed that CTP legalization was associated with a decrease in homicide and assault rates.
Morrison et al. (2014)	Adult population in California	Primary	2009	State	Cross-sectional	×	✓	Cannabis dispensaries were located in areas of more cannabis demand, poverty and alcohol outlets

CTP and illegal cannabis use

A main concern regarding CTP legalization is that it may increase illegal cannabis use in the general population and among adolescents in particular (Gorman & Huber, 2007; Joy, Watson, & Benson, 1999). There are various hypothetical mechanisms through which this may occur. CTP legalization may: (1) reduce the perceived legal risk of illegal cannabis use, (2) reduce the perceived harm associated with illegal cannabis use, and (3) increase the availability of cannabis primarily through greater commercial promotion and availability of the substance, or through diversion of CTP to the black market (Joffe & Yancy, 2004; Pacula, Kilmer, Grossman, & Chaloupka, 2010). All these factors are known to increase illegal cannabis use (Botvin, Griffin, Diaz, & Iffill-Williams, 2001; Elek, Miller-Day, & Hecht, 2006). However, it is also plausible that legalizing CTP for severely ill patients could reduce the perception of cannabis as a recreational drug, thus resulting in reduced illegal cannabis use.

Two cross-sectional studies have examined the *perceived* likelihood that CTP legalization would increase illegal use of cannabis, one in a sample of child and adolescent psychiatrists (Jaffe & Klein, 2010) and one in adolescents (Schwartz, Cooper, Oria, & Sheridan, 2003). Respondents in both studies deemed it possible that CTP legalization would increase cannabis availability and prevalence. Still, these indirect measures of perceived effects may not reflect reality, and studies that examine the link between CTP legalization and actual illegal cannabis use have not reached coherent conclusions.

Three studies have examined this link in high risk groups (Gorman & Huber, 2007; Salomonsen-Sautel, Sakai, Thurstone, Corley, & Hopfer, 2012; Thurstone, Lieberman, & Schmiede, 2011). This approach is important, as it is reasonably assumed that as a drug becomes more available, those who are most “at-risk” will be the first to initiate use (Gorman & Huber, 2007). Gorman and Huber (2007) examined trends in cannabis use among two high risk groups (arrestees and emergency department patients) from the mid-1990s through 2002 in states that had passed CTP laws at some point during this time period. Results showed that the introduction of CTP laws was not associated with an increase in cannabis use among either arrestees or emergency department patients.

Two other studies, of relatively poorer quality (see Table 2 for details), have examined diversion of CTP in adolescents treated for substance use problems in states where CTP is legal (Salomonsen-Sautel et al., 2012; Thurstone et al., 2011). Both the studies used data after the 2009 federal CTP policy change and effectively they examine state legalization under federal policy not to enforce cannabis laws. Both studies found evidence of diversion in the sense that a substantial proportion of participants reported obtaining cannabis from someone with a CTP license; 49% in the study by Thurstone et al. (2011) and 75% in the study by Salomonsen-Sautel et al. (2012).

Of all studies that have examined the link between CTP and illegal cannabis use, the majority (66%, $n = 12$) have examined this link in the general (non-risk) population, and among these studies, the majority has included adolescents (83%, $n = 10$). Using fairly weak research designs (see Table 2 for details), one study has found that states with CTP legalization have relatively high cannabis use level (Cerdá, Wall, Keyes, Galea, & Hasin, 2012), and another study has found voter approval of CTP legalization to be positively associated with adolescent cannabis use (Friese & Grube, 2013). Both these studies were based on cross-sectional designs and thus cannot be used to infer that CTP legalization is causally related to relative high levels of illegal cannabis use. Using a pre-post CTP legal change research design, Wall et al. (2011) found that states that legalized CTP had higher average adolescent cannabis use and lower perception of cannabis riskiness than states that did not legalize CTP, even

prior to CTP legal changes. As such, evidence suggests that social norms at the state level contribute to both legalization of CTP and high levels of illegal cannabis use.

Of the eight studies that used a pre-post design and have looked at the relation between CTP and illegal cannabis use in the general non-risk population, five studies have found CTP legalization to be unrelated to a subsequent increase in illegal cannabis use (Choo et al., 2014; Harper, Strumpf, and Kaufman, 2012; Khatapoush & Hallfors, 2004; Lynne-Landsman, Livingston, & Wagenaar, 2013; Masten & Guenzburger, 2014). One study has also found that CTP legalization is unrelated to changes in perceived risk of cannabis use (Harper et al., 2012).

In contrast, two studies have found evidence that CTP legalization is associated with a reduction in illegal cannabis use (Choo et al., 2014; Harper et al., 2012). Although both these studies used relatively strong research designs (pre-post CTP legalization and control groups), a sensitivity analysis of the Harper et al. (2012) study showed that when two states with exceptional high cannabis use (Montana and Vermont) were dropped from analysis, no significant decrease in cannabis use after CTP legalization remained (Wall et al., 2012).

In addition to these studies, and in somewhat contrast to their findings, two studies with strong research designs (including both pre-post CTP policy change observations and control groups) have found an increase in cannabis use in Colorado after the 2009 federal change which sparked a growth in CTP commercialization including large scale retail. Furthermore, the studies show that these increases in cannabis use differed from trends in states without CTP legalization (Salomonsen-Sautel et al., 2014; Schuermeyer et al., 2014).

While all of the above-mentioned studies used self-reported survey or surveillance data in order to examine the effects of CTP legalization on illegal cannabis use, an alternative method is to examine the effect of CTP legalization on the price of cannabis. This line of research relies on economic theory, which suggests that a cannabis price increase is an indicator of increased demand. Following this logic, a potential cannabis price increase subsequent to CTP legalization is indicative of increased use. Two studies have used this approach focusing on state legalization only. Results are inconsistent in that Pacula et al. (2010) found evidence that the price of street cannabis increased after passing CTP legalization, whereas Anderson, Hansen, and Rees (2013), using different data and methods, found that CTP legalization was associated with a reduction in the price of cannabis.

In sum, while inconsistencies in findings are prevalent, quite a few studies that have examined the passage of CTP legalization have concluded that CTP legalization is unrelated to subsequent changes in cannabis use in the general population (Choo et al., 2014; Harper et al., 2012; Khatapoush & Hallfors, 2004; Lynne-Landsman et al., 2013; Masten & Guenzburger, 2014). This is in contrast to two studies that have found a negative relation (Choo et al., 2014; Harper et al., 2012) and two studies that have found a positive relation (Salomonsen-Sautel et al., 2014; Schuermeyer et al., 2014). Some evidence also points towards the possibility that CTP may get diverted to high risk adolescents who are in substance abuse treatment (Salomonsen-Sautel et al., 2012; Thurstone et al., 2011).

Noticeably, the two studies that have found a positive relation in the general population (Salomonsen-Sautel et al., 2014; Schuermeyer et al., 2014) are the only studies reviewed that focus on the 2009 federal change and subsequent CTP commercialization, as opposed to CTP state legalization per se. Both these studies are from Colorado and it is unclear whether results can be extrapolated to other places. Nevertheless, both the studies make the important point that although CTP was officially legalized in 2000, commercialization and large scale retail CTP dispensaries were only established in 2009, after the federal policy shift and after the

Colorado Board of Health cancelled the limit of numbers of patients and caregivers CTP distributes could serve (Ingold, 2009; Sensible Colorado, 2013). The fact that a relation between CTP policy and increased illegal cannabis use has so far only been found in these two studies and not in studies that look only at CTP state legalization, suggests that while state-wide CTP legalization may not encourage cannabis use in the general population, federal policy and subsequent commercialization may in fact do.

CTP and other public health issues

We located five studies that assessed the relation between CTP legalization and diverse public health implications other than the issue of illicit cannabis use. Studies were generally of high quality, with four studies using both a pre-post CTP policy change design and control groups.

Anderson et al. (2013) focused on state CTP legalization and showed it was associated with a reduction in alcohol consumption in adults. The authors suggest that the observed relation could be explained by a substitution effect; CTP legalization increases the use of cannabis, which in turn substitutes the use of alcohol. However, since studies that similarly focus on state CTP legalization have failed to find evidence that it increases cannabis use in the general population (see above section), the underlying mechanisms through which CTP legalization may reduce alcohol use remain unclear.

In a different study, Anderson, Rees, and Sabia (2014) showed that CTP state legalization was associated with a reduction in suicide rates among young males (but not among females). The authors noted that the results are consistent with the hypothesis that legalizing CTP leads to increased cannabis use, which in turn helps more individuals to cope with stressful life events. However, this is not strongly supported by the literature reviewed in the above section where quite a few studies focusing on state CTP legalization failed to find support for the hypothesis that legalization increases use of cannabis (Choo et al., 2014; Harper et al., 2012; Khatapoush & Hallfors, 2004; Lynne-Landsman et al., 2013; Masten & Guenzburger, 2014). However, if increased cannabis use after CTP legalization is confined to a small proportion of people with mental health problems, it is possible that previous studies that examine the general population lack sensitivity to capture this effect (see Table 2 for an overview of populations included in studies).

Moving away from alcohol and mental health issues, two studies have examined whether the increasing number of licensed CTP users increases the risk that children will unintentionally ingest cannabis. While both studies include 2009 data, only one focus explicitly on the 2009 federal change in CTP policy (Wang, Roosevelt, & Heard, 2013). Both studies do, however, find an increase in unintentional cannabis ingestions by young children after CTP legalization (Wang et al., 2013, 2014). Researchers have specified that unintentional cannabis exposure in children remained low even after CTP legalization (Wang et al., 2014), and that most pediatric unintentional ingestions were from CTP packaged in the form of food products, such as cakes (Wang et al., 2013).

While the observed increase in pediatric unintentional cannabis exposure may be caused by increased use and storage of cannabis in households, it is also possible that the observed increase is related to increased willingness to report unintentional CTP exposure in an atmosphere where CTP is legal. Indeed, a similar line of thought has been suggested in relation to data showing increases in mentions of cannabis use in emergency room records after cannabis depenalization (Model, 1993).

Concerns have also been raised that CTP legalization may be associated with a rise in cannabis potency, which in turn may have detrimental health effects in cannabis users (Crippa et al., 2009; Di Forti et al., 2009; Ramaekers, Berghaus, van Laar, & Drummer, 2004; Ramaekers et al., 2006). Sevigny, Pacula, and Heaton (2014)

recently examined the association between CTP legalization and cannabis potency and found no significant difference in THC levels before and after CTP legalization in the U.S. However, when specific CTP regulatory frameworks were examined, results suggested that average potency increased more in states that permit dispensaries as compared to states that allow home cultivation. The authors suggest that this may be caused by relatively greater quality control and higher potency of CTP in cannabis dispensaries as compared to home cultivation by patients and caregivers who may lack the necessary amenities, resources, or skills to cultivate potent CTP.

In a different legal context, a study from the Netherlands examined whether CTP sold at pharmacies differed in potency to cannabis sold in coffee-shops (Hazekamp, 2006). No differences were found in potency of cannabis sold in these two different locations. However, the CTP sold in pharmacies was less likely to have potentially damaging and dangerous contaminants than the cannabis sold in coffee-shops.

In sum, researchers have examined diverse public health outcomes of CTP legalization. Collectively, findings suggest that CTP legalization may on one hand reduce alcohol use and suicide rates, while on the other hand increase unintentional ingestion by children. In the U.S. there is some evidence that CTP legalization may increase potency under certain conditions, while the same seems not to be true in the Netherlands. Within each topic there is, however, only one or two studies published. This limits the ability to compare results across studies and to evaluate the overall stability and the general trends in findings.

CTP, crime and neighbourhood disadvantage

CTP legalization has been accompanied with a growth of cannabis dispensaries in the U.S., and concerns have been raised that dispensaries are breeding grounds for criminal networks, as they have on-site stock of cannabis and are predominantly cash-based businesses (California Police Chiefs Association's Task Force on Marijuana Dispensaries, 2009). Five studies have explored whether the establishment of CTP dispensaries or CTP legalization is related to local crime rates, two of these studies (Boggess, Pérez, Cope, Root, & Stretesky, 2014; Morris, TenEyck, Barnes, & Kovandzic, 2014) used strong study designs (including pre-post CTP policy change designs and control groups, see Table 2 for details). None of the studies reviewed in this section focused on the 2009 federal CTP policy change.

In particular, one of the studies examined whether different levels of security measures influence crime in the area around CTP dispensaries. Results showed that dispensaries with security cameras and signs requiring an identification prescription card had significantly lower levels of violent crimes within 100 and 250 feet than dispensaries without these security measures (Freisthler, Kepple, Sims, & Martin, 2013).

Boggess et al. (2014) found that cannabis dispensaries tend to be disproportionately opened in areas with high crime rates. The researchers suggest that this may be caused by dispensaries being established in areas with retail concentrations, which in turn tend to be locations related to crime. In a different study, Kepple and Freisthler (2012) failed to find cross-sectional associations between the geographic density of CTP dispensaries and violence or property crime rates. Using a stronger research design, Morris et al. (2014) echo the Kepple and Freisthler (2012) finding in that they found no association between relatively high state crime rates and CTP legalization. Morris et al. (2014) further showed that CTP legalization was related to a reduction in homicides and assaults, and the authors suggest that this may be mediated by lower alcohol consumption following CTP legalization, although the study did not test this assumption directly. As previously noted, one study has found CTP legalization to be related to lower alcohol use (Anderson

et al., 2013), although the mechanism through which this occurs remains unclear.

Examining the relation between CTP dispensaries and neighbourhood disadvantage more broadly, Morrison, Gruenewald, Freisthler, Ponicki, and Remer (2014) found that cannabis dispensaries tend to be located in areas of low income and of relatively high presence of alcohol outlets. These results stand in contrast to results from a study with a stronger research design, that show, after controlling for a range of confounders, that the number of cannabis dispensaries was not associated with poor neighbourhoods, and that they distribute equally with respect to race and ethnicity (Bogges et al., 2014). The study also found that establishment of CTP dispensaries was unrelated to increases in neighbourhood poverty rates or racial/ethnic isolation over time.

In sum, some of the studies that have examined the CTP-crime link are of relatively poor quality, lacking pre-post designs and control groups. Furthermore, although there have been concerns that CTP legalization may increase crime and social disadvantage, the relevant research is inconclusive; only one study finds support that dispensaries are positively related to high crime rates (Bogges et al., 2014), and in this study it is suggested that dispensaries do not cause crime, but rather that they are disproportionately established in communities with existing high crime rates. Additionally, two studies find no or a negative relation between dispensaries and crime rates (Kepple & Freisthler, 2012; Morris et al., 2014) and while one study found dispensaries to be linked with neighbourhood disadvantage (Morrison et al., 2014), an additional study failed to confirm this finding (Bogges et al., 2014).

Discussion

CTP legalization is a controversial topic and a valid empirical foundation is needed to guide a rational discussion regarding the associated public health and safety risks and benefits. The current literature review is one step towards achieving this as it aims to synthesize and evaluate the social CTP research in order to reach a better understanding of the achievements and gaps in the current knowledge base, and to indicate future research avenues pertaining to CTP and public health and safety.

The literature review has strengths in that it includes the most up-to-date literature identified by a comprehensive search protocol. However, it is possible that some literature may have been missed during the searches. In particular, the review excludes non-English literature. Most peer-reviewed journals are, however, published in English, and it is thus unlikely that exclusion of non-English literature leads to substantial omissions.

The blurred boundaries between CTP and illegal cannabis use

So far, the area of investigation receiving most attention from researchers is the relation between CTP and illegal cannabis use. As such, the literature is largely rooted in the assumption that the boundaries between CTP and illegal cannabis use are blurred. Yet, this is not explicitly elaborated on in the literature. For instance, researchers have noted that CTP legalization may increase illegal cannabis use through CTP diversion (Joffe & Yancy, 2004; Pacula et al., 2010), yet it is not clear what the parameters and definition of CTP diversion are. In studies on prescription medicines, diversion typically involves the intentional channeling of medicines from legal sources (e.g. patients) to people who use them illegally (Inciardi, Surratt, Kurtz, & Burke, 2006; Inciardi, Surratt, Kurtz, & Cicero, 2007). However, this concept is in need of further refinement when applied to CTP diversion. One consideration is, for instance, whether diversion includes CTP users sharing illegally

sourced cannabis with other CTP users. Another relevant consideration is whether any cannabis possessed by a licensed CTP user is in fact CTP.

The current literature review did not identify any study that directly examine the concept of CTP diversion and empirically test its extent and mechanisms. As such, the current review identifies a need for critical attention to the concept and empirical investigation of CTP diversion specifically and the blurred boundaries between CTP and illegal cannabis use more generally.

Absence of evidence and lessons learnt from other research fields

The current literature review shows that there is an absence of evidence to support the validity of some commonly held public concerns related to CTP legalization. For instance, a commonly held assumption is that CTP legalization increases crime rates (California Police Chiefs Association's Task Force on Marijuana Dispensaries, 2009; The New York Times, 2014), but there is no strong direct empirical evidence to support this (Freisthler et al., 2013; Kepple & Freisthler, 2012; Morris et al., 2014). Claims have also been raised that CTP legalization increases the prevalence of high potency cannabis (CNN, 2013; EMCDDA, 2004). However, only two studies have examined the validity of this claim; one study indicates that allowing dispensaries to sell CTP is associated with higher potency cannabis (Sevigny et al., 2014), while a study from the Netherlands found no potency differences between cannabis sold in pharmacies and cannabis sold in coffee shops (Hazekamp, 2006).

Another major concern, is that CTP legalization may increase illegal cannabis use in the general population (Gorman & Huber, 2007; Joy et al., 1999; NIDA, 2014; The Seattle Times, 2011); yet various studies fail to find evidence to support this (Choo et al., 2014; Harper et al., 2012; Khatapoush & Hallfors, 2004; Lynne-Landsman et al., 2013; Masten & Guenzburger, 2014). Two studies have, however, found an association between CTP legalization and subsequent increases in illegal cannabis use in the general population (Salomonsen-Sautel et al., 2014; Schuermeyer et al., 2014). These two studies differ from other studies reviewed in that they examine the 2009 federal change towards relaxed prohibition and subsequent CTP commercialization rather than state legalization per se. Taken together, the results of this review suggest that it is important to pay particular attention to federal policy and market forces rather than merely statewide legalization when examining CTP policy and its relation to public health and safety.

The fact that relatively few studies have directly examined the impact of the 2009 federal policy change towards CTP and the subsequent CTP commercialization suggests that the full effect of CTP legalization remains unknown. To guide further policy debate and research it may be useful to draw upon experiences in other relevant fields. Studies from the U.S., the Netherlands and Australia have, for instance, shown that eliminating (or significantly reducing) criminal penalties for first time possession of small quantitative of cannabis has either no or very small effects on the prevalence of cannabis use (see MacCOUN & Reuter, 2001a, 2001b for review). However, it has been suggested that the Dutch move towards a broader *de facto* legalization which allowed for greater access and increasing levels of promotion in the mid-1980s was associated with an increase in cannabis use (MacCOUN & Reuter, 2001a).

These findings echoes those of the current literature review in that there is a lack of evidence that CTP legalization at the state level alone increased cannabis use, whereas federal policy towards relaxed prohibition and subsequent CTP commercialization seems to have had this effect. Researchers have pointed out similar experiences in terms of commercialization of tobacco and that lessons learnt in this area may be useful for understanding how to prevent

detrimental public health effects of CTP legalization and subsequent commercialization (Richter & Levy, 2014).

Limitations related to data and theory

The use of natural, quasi-experimental study designs to study the effects of CTP on public health and safety has recently become possible thanks to recent introductions of CTP legalization in the U.S. and elsewhere. To a large extent, researchers have utilized this opportunity by making use of secondary cross-sectional data. While of considerable value, these data are limited as they rarely allow researchers to examine causal relations and underlying mechanisms. This is, for instance, evident in studies that find an association between CTP legalization and changes in crime rates, alcohol use, and suicide. In these studies it remains unclear how CTP legalization may cause the observed changes, especially in light of previous studies that fail to find evidence that CTP legalization causes changes in cannabis use in the general population (Choo et al., 2014; Harper et al., 2012; Khatapoush & Hallfors, 2004; Lynne-Landsman et al., 2013; Masten & Guenzburger, 2014).

In light of these limitations, one way forward is to gather primary longitudinal data with information that enables examination of potential underlying mechanisms of CTP legalization effects. Another strategy is to add CTP survey items to existing surveys that monitor drug use trends and attitudes. This would enable investigations of how CTP relates to illegal use of cannabis, alcohol and mental health issues more directly than what has been possible so far.

The vast majority of the studies reviewed in this article stem from the U.S. Since countries differ widely in terms of cannabis use prevalence rates (Hibell, 2012; Sznitman et al., 2013) and CTP regulatory systems (Hoffmann & Weber, 2010), results from the U.S. may not be directly relevant to other geographic areas. In order to better understand how different CTP regulatory systems influence public health and safety there is a need for studies outside of the U.S.

It is also possible to learn more about the influence of diverse CTP regulatory systems by conducting comparisons across U.S. states. So far, only two studies have used this approach, and found that different regulatory CTP systems within the U.S. have distinct effects in terms of potency (Sevigny et al., 2014), but probably not in terms of prevalence of cannabinoid in drivers of fatal vehicle crashes (Masten & Guenzburger, 2014). Furthermore, just a few studies have specifically focused on federal CTP policy and CTP commercialization (Salomonsen-Sautel et al., 2014; Schuermeyer et al., 2014; Wang et al., 2013). Many of the studies do, however, utilize data that could, if revisited, be used to tease out the individual and combined effects of state and federal CTP policy. There is thus some opportunity to further develop the field of social CTP research with existing data.

Finally, the current social CTP research may be improved by a more systematic inclusion of theory. For instance, researchers may adopt the “rational choice” perspective of modern economics, which specifies three mechanisms through which CTP legalization may influence cannabis use, namely drug availability, drug prices and deterrent effect of punishment. Researchers may also rely on other theoretical perspectives such as reactance theory (Brehm & Brehm, 1981), which suggests that the illicit status of cannabis enhances its attractiveness and causes a “forbidden fruit effect”. Following this line of thought researchers may start by examining whether the desirability of cannabis changes upon CTP legalization. Furthermore, labelling theory and social shaming (Braithwaite, 1989) may be applied for studying if and how CTP legalization effects the social control of cannabis use, which in turn play a major role in regulating substance use (Elliott, Huizinga, & Ageton, 1985; Paternoster, 1989). Previous research suggests that the effect of CTP legalization is difficult to determine (MacCoun & Reuter,

2001a). Relying more heavily on theoretical frameworks may help researchers understand the effects better.

Conclusion

Parallel to the evolving trends in CTP legalization around the world, the effects of CTP policies on public health and safety are deserving of continued close attention by scientists. This review shows that while social CTP research is an emerging and rapidly growing field, the literature is still limited, both by number and by lack of rigorous theoretical and methodological basis. In order to direct and assess policy changes with scientific data, instead of plain beliefs or misconceptions, further research developments are needed and more involvement of social scientists is encouraged.

Acknowledgements

The research was partly supported by a Marie Curie Reintegration Grant (Grant number 293591). The funding source had no involvement in the collection, analysis or interpretation of data, in the writing of the article or in the decision to submit it for publication.

Conflict of interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

References

- Anderson, M. D., Hansen, B., & Rees, D. I. (2013). Medical marijuana laws, traffic fatalities, and alcohol consumption. *Journal of Law and Economics*, 56(2), 333–369. <http://dx.doi.org/10.1086/668812>
- Anderson, M. D., Rees, D. I., & Sabia, J. J. (2014). Medical marijuana laws and suicides by gender and age. *American Journal of Public Health*, e1–e8. <http://dx.doi.org/10.2105/AJPH.2013.301612> [Epub ahead of print]
- Ballotta, D., Bergeron, H., & Hughes, B. (2008). Cannabis control in Europe. In S. Sznitman, & R. Room (Eds.), *A cannabis reader: Global issues and local experiences* (pp. 97–118). Lisbon, Portugal: European Monitoring Centre for Drugs and Drug Addiction.
- Belle-Isle, L., Walsh, Z., Callaway, R., Lucas, P., Capler, R., Kay, R., et al. (2014). Barriers to access for Canadians who use cannabis for therapeutic purposes. *International Journal of Drug Policy*, <http://dx.doi.org/10.1016/j.drugpo.2014.02.009>
- Bogges, L. N., Pérez, D. M., Cope, K., Root, C., & Stretesky, P. B. (2014). Do medical marijuana behave like locally undesirable land uses? Implications for the geography of health and environmental justice. *Urban Geography*. Retrieved from: <https://ssl.haifa.ac.il/doi/pdf/10.1080/01446807.2014.881018>
- Bostwick, J. M. (2012). Blurred boundaries: The therapeutics and politics of medical marijuana. *Mayo Clinic Proceedings*, 87(2), 172–186. <http://dx.doi.org/10.1016/j.mayocp.2011.10.003>
- Botvin, G. J., Griffin, K. W., Diaz, T., & Ifill-Williams, M. (2001). Drug abuse prevention among minority adolescents: Posttest and one-year follow-up of a school-based preventive intervention. *Prevention Science*, 2(1), 1–13.
- Braithwaite, J. (1989). *Crime, shame and reintegration*. England, Cambridge: Cambridge University Press.
- Brehm, S., Brehm, J., Brehm, S. S., & Brehm, J. W. (1981). *Psychological reactance*. Cambridge, England: Cambridge University Press.
- California Police Chiefs Association's Task Force on Marijuana Dispensaries. (2009). *White paper on marijuana dispensaries*. Retrieved from: http://www.chico.ca.us/document_library/departments/planning_department/mmj-87-156.pdf
- Campbell, F. A., Tramèr, M. R., Carroll, D., Reynolds, D. J. M., Moore, R. A., & McQuay, H. J. (2001). Are cannabinoids an effective and safe treatment option in the management of pain? A qualitative systematic review. *British Medical Journal*, 323(7303), 13. <http://dx.doi.org/10.1136/bmj.323.7303.13>
- Cerdá, M., Wall, M., Keyes, K. M., Galea, S., & Hasin, D. (2012). Medical marijuana laws in 50 states: Investigating the relationship between state legalization of medical marijuana and marijuana use, abuse and dependence. *Drug and Alcohol Dependence*, 120(1–3), 22–27. <http://dx.doi.org/10.1016/j.drugalcdep.2011.06.011>
- Choo, E. K., Benz, M., Zaller, N., Warren, O., Rising, K. L., & McConnell, K. J. (2014). The impact of state medical marijuana legislation on adolescent marijuana use. *Journal of Adolescent Health*, <http://dx.doi.org/10.1016/j.jadohealth.2014.02.018>

- City of La Puente. (2008). *A proposed ordinance prohibiting the establishment of medical marijuana dispensaries within the city*. Retrieved from: http://lapuente.granicus.com/MetaViewer.php?view_id=2&clip_id=491&meta_id=76943
- CNN. (2013, August). *Not your father's weed? Marijuana potency stronger than ever*. Retrieved from: <http://edition.cnn.com/2013/08/09/health/weed-potency-levels/>
- Crippa, J. A. S., Zuardi, A. W., Martin-Santos, R., Bhattacharyya, S., Atakan, Z., McGuire, P., et al. (2009). Cannabis and anxiety: A critical review of the evidence. *Human Psychopharmacology*, 24, 515–523.
- Di Forti, M., Morgan, C., Dazzan, P., Pariante, C., Mondelli, V., Marques, T. R., et al. (2009). High-potency cannabis and the risk of psychosis. *British Journal of Psychiatry*, 195(6), 488–491. <http://dx.doi.org/10.1192/bjp.bp.109.064220>
- Elek, E., Miller-Day, M., & Hecht, M. L. (2006). Influences of personal, injunctive, and descriptive norms on early adolescent substance use. *Journal of Drug Issues*, 36(1), 147–172. <http://dx.doi.org/10.1177/002204260603600107>
- Elliott, D. S., Huizinga, D., & Ageton, S. S. (1985). *Explaining delinquency and drug use*. Retrieved from: <https://ssl.haifa.ac.il/agris-search/Danainfo=agris.fao.org+search.do?recordID=US201300630571>
- EMCDDA. (2004). *An overview of cannabis potency in Europe*. European Monitoring Center for Drugs and Drug Addiction. Retrieved from: http://www.emcdda.europa.eu/attachements.cfm/att_33985.EN.Insight6.pdf
- Fankhauser, M. (2008). Cannabis as medicine in Europe in the 19th century. In S. Sznitman, & R. Room (Eds.), *A cannabis reader: Global issues and local experiences* (pp. 3–16). Lisbon, Portugal: European Monitoring Centre for Drugs and Drug Addiction.
- Freisthler, B., Kepple, N. J., Sims, R., & Martin, S. E. (2013). Evaluating medical marijuana dispensary policies: Spatial methods for the study of environmentally-based interventions. *American Journal of Community Psychology*, 51(1–2), 278–288. <http://dx.doi.org/10.1007/s10464-012-9542-6>
- Friese, B., & Grube, J. W. (2013). Legalization of medical marijuana and marijuana use among youths. *Drugs: Education, Prevention, and Policy*, 20(1), 33–39. <http://dx.doi.org/10.3109/09687637.2012.713408>
- Gates, P., Albertella, L., & Copeland, J. (2014). The effects of cannabinoid administration on sleep: A systematic review of human studies. *Sleep Medicine Reviews*, <http://dx.doi.org/10.1016/j.smrv.2014.02.005>
- Gorman, D. M., & Huber, J. C. J. (2007). Do medical cannabis laws encourage cannabis use? *International Journal of Drug Policy*, 18(3), 160–167. <http://dx.doi.org/10.1016/j.drugpo.2006.10.001>
- Greenhalgh, T. (2005). Effectiveness and efficiency of search methods in systematic reviews of complex evidence: Audit of primary sources. *British Medical Journal*, 331(7524), 1064–1065. <http://dx.doi.org/10.1136/bmj.38636.593461.68>
- Grinspoon, L. (2005). *History of cannabis as a medicine - DEA statement (Prepared for DEA administrative law judge hearing beginning August 22, 2005)*. Retrieved from www.maps.org/mmj/grinspoon_history_cannabis_medicine.pdf Accessed 15 Aug. 2014.
- Harper, S., Strumpf, E. C., & Kaufman, J. S. (2012). Do medical marijuana laws increase marijuana use? Replication study and extension. *Annals of Epidemiology*, 22(3), 207–212. <http://dx.doi.org/10.1016/j.annepidem.2011.12.002>
- Hazekamp, A. (2006). An evaluation of the quality of medicinal grade cannabis in the Netherlands. *Cannabinoids*, 1(1), 1–9.
- Hibell, B. (2012). *The 2011 ESPAD report: Substance use among students in 36 European countries*. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs.
- Hoffmann, D. E., & Weber, E. (2010). Medical marijuana and the law. *New England Journal of Medicine*, 362(16), 1453–1457. <http://dx.doi.org/10.1056/NEJMp1000695>
- Holland, J. (2010). *The pot book: A complete guide to cannabis: Its role in medicine, politics, science and culture*. Rochester, Vermont: Park Street Press.
- Inciardi, J. A., Surratt, H. L., Kurtz, S. P., & Burke, J. J. (2006). The diversion of prescription drugs by health care workers in Cincinnati, Ohio. *Substance Use & Misuse*, 41(2), 255–264. <http://dx.doi.org/10.1080/10826080500391829>
- Inciardi, J. A., Surratt, H. L., Kurtz, S. P., & Cicero, T. J. (2007). Mechanisms of prescription drug diversion among drug-involved club- and street-based populations. *Pain Medicine*, 8(2), 171–183. <http://dx.doi.org/10.1111/j.1526-4637.2006.00255.x>
- Ingold, J. (2009). *Medical marijuana rule change voided in Colorado*. The Denver Post. Retrieved from: <http://www.denverpost.com/greenbusiness/ci.13759034?source=pgk#ixzz2WbSz6p8h>
- Jaffe, S. L., & Klein, M. (2010). Medical marijuana and adolescent treatment. *American Journal on Addictions*, 19(5), 460–461. <http://dx.doi.org/10.1111/j.1521-0391.2010.00063.x>
- Joffe, A., & Yancy, W. S. (2004). Legalization of marijuana: Potential impact on youth. *Pediatrics*, 113(6), e632–e638.
- Joy, J. E., Watson, S. J., & Benson, J. A. (1999). *Marijuana and medicine: Assessing the science base*. Washington, D.C.: Institute of Medicine, National Academies Press.
- Kalant, H. (2001). Medicinal use of cannabis – History and current status. *Pain Resources Management*, 6(2), 80–91.
- Kepple, N. J., & Freisthler, B. (2012). Exploring the ecological association between crime and medical marijuana dispensaries. *Journal of Studies on Alcohol and Drugs*, 73(4), 523–530.
- Khatapoush, S., & Hallfors, D. (2004). “Sending the Wrong Message”: Did medical marijuana legalization in California change attitudes about and use of marijuana? *Journal of Drug Issues*, 34(4), 751–770. <http://dx.doi.org/10.1177/002204260403400402>
- Levinthal, C. (2008). *Drugs, society and criminal justice*. Boston: Pearson.
- Lucas, P., Reiman, A., Earleywine, M., McGowan, S. K., Oleson, M., Coward, M. P., et al. (2013). Cannabis as a substitute for alcohol and other drugs: A dispensary-based survey of substitution effect in Canadian medical cannabis patients. *Addiction Research & Theory*, 21(5), 435–442. <http://dx.doi.org/10.3109/16066359.2012.733465>
- Lynch, M. E., & Campbell, F. (2011). Cannabinoids for treatment of chronic non-cancer pain: a systematic review of randomized trials: Cannabinoids for pain. *British Journal of Clinical Pharmacology*, 72(5), 735–744. <http://dx.doi.org/10.1111/j.1365-2125.2011.03970.x>
- Lynne-Landsman, S. D., Livingston, M. D., & Wagenaar, A. C. (2013). Effects of state medical marijuana laws on adolescent marijuana use. *American Journal of Public Health*, 103(8), 1500–1506.
- MacCOUN, R. J., & Reuter, P. (2001a). *Drug war heresies: Learning from other vices, times and places*. Cambridge, England: Cambridge University Press.
- MacCOUN, R., & Reuter, P. (2001b). Evaluating alternative cannabis regimes. *British Journal of Psychiatry*, 178(2), 123–128. <http://dx.doi.org/10.1192/bjp.178.2.123>
- Machado Rocha, F. C., Stéfano, S. C., De Cássia Haiek, R., Rosa Oliveira, L. M. Q., & Da Silveira, D. X. (2008). Therapeutic use of *Cannabis sativa* on chemotherapy-induced nausea and vomiting among cancer patients: Systematic review and meta-analysis. *European Journal of Cancer Care*, 17(5), 431–443. <http://dx.doi.org/10.1111/j.1365-2354.2008.00917.x>
- Martín-Sánchez, E., Furukawa, T. A., Taylor, J., & Martin, J. L. R. (2009). Systematic review and meta-analysis of cannabis treatment for chronic pain. *Pain Medicine*, 10(8), 1353–1368. <http://dx.doi.org/10.1111/j.1526-4637.2009.00703.x>
- Masten, S. V., & Guenzburger, G. V. (2014). Changes in driver cannabinoid prevalence in 12 U.S. states after implementing medical marijuana laws. *Journal of Safety Research*, <http://dx.doi.org/10.1016/j.jsr.2014.03.009>
- Mikuriya, T. H. (1969). Marijuana in medicine: Past, present and future. *California Medicine*, 110(1), 34.
- Model, K. E. (1993). The effect of marijuana decriminalization on hospital emergency room drug episodes: 1975–1978. *Journal of the American Statistical Association*, 88(423), 737. <http://dx.doi.org/10.2307/2290758>
- Morris, R. G., TenEyck, M., Barnes, J. C., & Kovandzic, T. V. (2014). The effect of medical marijuana laws on crime: evidence from state panel data, 1990–2006. *PLoS ONE*, 9(3), e92816. <http://dx.doi.org/10.1371/journal.pone.0092816>
- Morrison, C., Gruenewald, P. J., Freisthler, B., Ponicki, W. R., & Remer, L. G. (2014). The economic geography of medical cannabis dispensaries in California. *International Journal of Drug Policy*, e1–e8. <http://dx.doi.org/10.1016/j.drugpo.2013.12.009>
- NCSL. (2014, April). *State medical marijuana laws – national conference of state legislatures*. Retrieved from: <http://www.ncsl.org/research/health/state-medical-marijuana-laws.aspx>
- NIDA. (2014). *DrugFacts: Is marijuana medicine?* National Institute on Drug Abuse. Retrieved from: <http://www.drugabuse.gov/publications/drugfacts/marijuana-medicine>
- Ogden, D. W. (2009). *Memorandum for selected United States attorneys: investigations and prosecutions in states authorizing the medical use of marijuana*. U.S. Department of Justice, Office of the Deputy Attorney General. Retrieved from www.justice.gov/opa/documents/medical-marijuana.pdf, Accessed 15 Aug. 2014.
- Pacula, R. L., Kilmer, B., Grossman, M., & Chaloupka, F. J. (2010). Risks and prices: The role of user sanctions in marijuana markets. *Journal of Economic Analysis & Policy*, 10(1) <http://dx.doi.org/10.2202/1935-1682.1992>
- Paternoster, R. (1989). Decisions to participate in and desist from four types of common delinquency: Deterrence and the rational choice perspective. *Law & Society Review*, 23(1), 7. <http://dx.doi.org/10.2307/3053879>
- Ramaekers, J. G., Berghaus, G., van Laar, M., & Drummer, O. H. (2004). Dose related risk of motor vehicle crashes after cannabis use. *Drug and Alcohol Dependence*, 73(2), 109–119. <http://dx.doi.org/10.1016/j.drugalcdep.2003.10.008>
- Ramaekers, J. G., Kauert, G., van Ruitenbeek, P., Theunissen, E. L., Schneider, E., & Moeller, M. R. (2006). High-potency marijuana impairs executive function and inhibitory motor control. *Neuropsychopharmacology*, 31(10), 2296–2303.
- Richter, K. P., & Levy, S. (2014). Big marijuana – Lessons from big tobacco. *New England Journal of Medicine*, 371, 399–401. <http://dx.doi.org/10.1056/NEJMp1406074>
- Salomonsen-Sautel, S., Min, S.-J., Sakai, J. T., Thurstone, C., & Hopfer, C. (2014). Trends in fatal motor vehicle crashes before and after marijuana commercialization in Colorado. *Drug and Alcohol Dependence*, <http://dx.doi.org/10.1016/j.drugalcdep.2014.04.008>
- Salomonsen-Sautel, S., Sakai, J. T., Thurstone, C., Corley, R., & Hopfer, C. (2012). Medical marijuana use among adolescents in substance abuse treatment. *Journal of the American Academy of Child & Adolescent Psychiatry*, 51(7), 694–702. <http://dx.doi.org/10.1016/j.jaac.2012.04.004>
- Schuermeier, J., Salomonsen-Sautel, S., Price, R. K., Balan, S., Thurstone, C., Min, S.-J., et al. (2014). Temporal trends in marijuana attitudes, availability and use in Colorado compared to non-medical marijuana states: 2003–2011. *Drug and Alcohol Dependence*, <http://dx.doi.org/10.1016/j.drugalcdep.2014.04.016>
- Schwartz, R. H., Cooper, M. N., Oria, M., & Sheridan, M. J. (2003). Medical marijuana: A survey of teenagers and their parents. *Clinical Pediatrics*, 42(6), 547–551. <http://dx.doi.org/10.1177/000992280304200610>
- Sensible Colorado. (2013). *History of Colorado's marijuana laws*. Retrieved from: <http://sensiblecolorado.org/history-of-co-medical-marijuana-laws/>
- Seigny, E. L., Pacula, R. L., & Heaton, P. (2014). The effects of medical marijuana laws on potency. *International Journal of Drug Policy*, 25(2), 308–319. <http://dx.doi.org/10.1016/j.drugpo.2014.01.003>

- Shipton, E. A., & Shipton, E. E. (2014). Should doctors be allowed to prescribe cannabinoids for pain in Australia and New Zealand? *Australian and New Zealand Journal of Psychiatry*, <http://dx.doi.org/10.1177/0004867413520048>
- Sznitman, S. R., Kolobov, T., ter Bogt, T., Kuntsche, E., Walsh, S. D., Boniel-Nissim, M., et al. (2013). Exploring substance use normalization among adolescents: A multilevel study in 35 countries. *Social Science & Medicine*, 97, 143–151. <http://dx.doi.org/10.1016/j.socscimed.2013.08.038>
- The Denver Post. (2011, January). *Medical-marijuana dispensaries' effect on crime unclear*. The Denver Post. Retrieved from: <http://www.denverpost.com/news/marijuana/ci.17178820#ixzz1ngbvMOII>
- The New York Times. (2014). *California pulling back on medical marijuana*. Retrieved from: http://www.nytimes.com/2008/06/09/world/americas/09iht-pot.1.13565173.html?pagewanted=all&_r=0
- The Seattle Times. (2011). *No medical records? No problem. Got my pot card at Hempfest*. Retrieved from: http://seattletimes.com/html/localnews/2015969811_marijuana21m.html
- Thurstone, C., Lieberman, S. A., & Schmiede, S. J. (2011). Medical marijuana diversion and associated problems in adolescent substance treatment. *Drug and Alcohol Dependence*, 118(2–3), 489–492. <http://dx.doi.org/10.1016/j.drugalcdep.2011.03.031>
- Tramer, M. R., Carroll, D., Campbell, F. A., Reynolds, D. J. M., Moore, R. A., & McQuay, H. J. (2001). *Cannabinoids for control of chemotherapy induced nausea and vomiting: Quantitative systematic review*. *British Medical Journal*, 323(7303), 16.
- UN. (1961). *Single convention on narcotic drugs*. Retrieved from: http://www.unodc.org/pdf/convention_1961_en.pdf
- Wall, M. M., Poh, E., Cerdá, M., Keyes, K. M., Galea, S., & Hasin, D. S. (2011). Adolescent marijuana use from 2002 to 2008: Higher in states with medical marijuana laws, cause still unclear. *Annals of Epidemiology*, 21(9), 714–716. <http://dx.doi.org/10.1016/j.annepidem.2011.06.001>
- Wall, M. M., Poh, E., Cerdá, M., Keyes, K. M., Galea, S., & Hasin, D. S. (2012). Commentary on Harper S, Strumpf EC, Kaufman JS. Do medical marijuana laws increase marijuana use? Replication study and extension. *Annals of Epidemiology*, 22(7), 536–537. <http://dx.doi.org/10.1016/j.annepidem.2012.03.003>
- Wang, G. S., Roosevelt, G., & Heard, K. (2013). Pediatric marijuana exposures in a medical marijuana state. *JAMA Pediatrics*, 167(7), 630. <http://dx.doi.org/10.1001/jamapediatrics.2013.140>
- Wang, G. S., Roosevelt, G., Le Lait, M.-C., Martinez, E. M., Bucher-Bartelson, B., Bronstein, A. C., et al. (2014). Association of unintentional pediatric exposures with decriminalization of marijuana in the United States. *Annals of Emergency Medicine*, <http://dx.doi.org/10.1016/j.annemergmed.2014.01.017>
- Zuardi, A. W. (2006). *History of cannabis as a medicine: A review*. *Revista Brasileira de Psiquiatria*, 28(2), 153–157.

SOUTH AFRICA

Country Profile on Drugs and Crime

2002



**Regional Office
for Southern Africa**

**United Nations
Office on Drugs and Crime**

As of 1 October 2002, the United Nations Office for Drug Control and Crime Prevention (ODCCP) was renamed the United Nations Office on Drugs and Crime (ODC). It is comprised of the United Nations International Drug Control Programme (UNDCP) and the Centre of International Crime Prevention (CICP).

Second printing

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ACKNOWLEDGEMENTS

This Country Profile reflects the work of many dedicated individuals and organizations whose work we acknowledge throughout the text, and we are grateful for their contributions. In this sense, it is indeed a collaborative undertaking. I would like to offer a personal word of thanks both to all my colleagues in the United Nations Office on Drugs and Crime at our headquarters in Vienna, Austria and to the current and former staff members of our Regional Office for Southern Africa, especially Ugi Zvekic, Gary Lewis and Brigitte Strobel-Shaw, for without all their efforts this work would not have been possible.

FOREWORD

At the dawn of the new millennium, the unfortunate reality is that drug abuse, drug trafficking, crime, terrorism and corruption are global problems that touch every corner of the world. Moreover, they are inseparably linked to each other. Thus, not only do these phenomena cause havoc domestically, particularly for vulnerable nations striving to meet the basic development needs of their people, but they also threaten international prosperity and stability in the ever-increasing interconnected world in which we live. Fortunately, policy makers are beginning to recognize that combating these evils is not simply a matter of law enforcement, but also one of prevention. In this global market place that trades in human misery, there must be a reduction in demand as well as supply if the international community is to prevail over these evils.

South Africa is an important link in this international network. Today, the country is fully engaged in the activities of the region and the African continent, indeed, in the activities of the world. As a result, eight years after its new democracy burst onto the global stage, South Africa finds itself with a significant drug and crime challenge, as do many other nations. In South Africa's case, however, it finds itself having to confront the additional burden of serving as the regional hub for these illicit and dangerous activities. As with any nation, this in turn makes it more difficult for South Africa to pursue its goals of empowering its citizens and improving their lives. It also inhibits the attainment of broader goals, such as those of the New Economic Partnership for Africa's Development (NEPAD), as the effort of countering drugs and crime must compete for limited resources and energy that also are needed for such challenges as creating employment opportunities and stopping the devastating spread of HIV/AIDS. The good news is that although South Africa is facing this increasingly difficult challenge, it has recognized the need to meet it, and positive steps have been taken to meet it.

This Country Profile is intended to present a picture of South Africa's current drug and crime situation, as well as the related problems of terrorism and corruption, and the countermeasures being undertaken to oppose them. In some sense, it is meant to be a snapshot of today's reality, but in fact, wherever possible, we have endeavored to indicate both how that reality came about and how it is likely to evolve. In a similar vein, we also have tried to show a panorama of the wide range of social, economic and other demographic influences that bear on both the nature of these complex problems as well as their potential solutions.

Our hope is that this Country Profile will assist the people and Government of South Africa in their quest to reduce the problems of drugs and crime, both at home and abroad. We also hope that it will provide the international community with insights into the challenge facing South Africa so that informed international cooperation and assistance will be enhanced. The United Nations Office on Drugs and Crime will continue to support these efforts.



Rob Boone
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EXECUTIVE SUMMARY

DRUGS

South Africa in the Regional Context. South Africa is by far the largest market for illicit drugs entering Southern Africa. Drug trafficking and abuse have escalated in recent years, with the point of escalation traceable to the liberalization of most aspects of society in the years immediately surrounding the country's first democratic elections in 1994. This recent period also witnessed a concomitant relaxation of strict controls of land, air and sea borders, the enhancement of international trade and commerce, and the influx of new cultural trends among the more affluent segments of the population.

Consumption Trends. Cannabis is the most prevalent illicit drug used in South Africa. "Mandrax" (methaqualone) is the second most commonly-used illicit drug. Although the use of heroin, cocaine and ecstasy is less prevalent, this has increased notably since the mid-1990s. Since 2000, heroin use has also increased significantly in major urban areas, particularly in Gauteng (which includes Johannesburg and Pretoria) and Cape Town. In 2001, among treatment patients reporting heroin as their primary drug of abuse, evidence points to 51% of such patients in Cape Town reporting some injecting (or 'intravenous') use and 36% doing so in Gauteng. One risk associated with injecting heroin is the spread of HIV/AIDS. The second half of 2001 also witnessed the appearance of heroin users among the impoverished Black/African communities in South Africa's urban and peri-urban areas.

Ethnic Segmentation. Although increasing social ethnic integration is evident, the drug consumption markets of South Africa remain ethnically differentiated. The extreme income inequalities between the different broad ethnic segments affect drug affordability and thus consumer choice.

Drug Use and HIV/AIDS. Ongoing research in South Africa is demonstrating a link (other than that related to injecting drug use) between substance abuse and the spread of HIV/AIDS. It indicates that adolescents who use alcohol and other drugs are more likely to engage in sex and in unsafe sex than are adolescents who abstain from using them.

Prevention and Treatment. Official funding for both prevention and treatment is very limited. The health and education sectors have been only minimally involved in prevention activities. The non-governmental community plays an active role in both sectors. There is currently no national programme for primary prevention or awareness campaign.

Trafficking Trends. The drug trafficking activities of organized crime groups are linked to numerous other criminal acts, ranging from car hijackings and robberies, to the smuggling of firearms, stolen cars, endangered species and precious metals. South Africa now features prominently in international drug trafficking networks.

Law Enforcement. South Africa has the necessary legislative infrastructure to effect drug countermeasures and is aware of current production and trafficking trends. The specialized investigation units are being phased out of the police force. The impact of this on the country's medium- to long-term capacity to deal effectively with the threat posed by organized criminal groups dealing in drugs is unclear.

CRIME

General Trends. Overall levels of crime began to increase in the mid-1980s and continued throughout the 1990s. There are some indications, however, that the steep increase in crime has been abated in the last year or two; nevertheless, South Africa remains among the most crime-ridden and crime-concerned societies in the world. Also, organized crime, with clear international and regional links, has increased. Recently, the government has increased its criminal justice budget considerably.

Geographic Variations. The two most developed provinces, Gauteng and Western Cape, with high concentrations of business, public administration and urban centres (Johannesburg, Pretoria and Cape Town), are the two most crime-ridden, with the highest rates for violent, property and commercial crime. Among rural crimes, stock (livestock) theft is high in the remaining seven provinces.

Socio-economic Variations. Crime does not affect all people uniformly, and the risk of being a crime victim is strongly influenced by gender, ethnicity, age, income and place of residence. Ethnicity is still one important factor patterns in South Africa due to the legacy of the apartheid regime's policy of using race to determine much of one's socio-economic status. Thus, for example, while Blacks/Africans are at a higher risk for individual violent crimes, non-Blacks/Africans are at higher risk for property-related household crimes. Property and violent crimes pose the greatest risk for urban residents.

Violent Crime. Violent crimes, such as attempted murder, aggravated robbery, serious and common assault, and in particular violence against women and children (including rape of children), has shown a general increase since 1994 with a slight down turn in 2001-2002. Reported rates of rape are at the most serious levels in the world, and there is much concern about the increase in violence against women and in particular against children. Murder rates, by contrast, have been declining since 1994, by almost 30%. Much of the violence is attributed to the proliferation of firearms, both as a cross-border organized crime trafficking problem and as they are illegally appropriated for domestic criminal purposes.

Organized Crime. Organized crime in its many manifestations is highly present in South Africa and comprises a range of criminal activities from trafficking in drugs, firearms, persons and stolen vehicles, to smuggling of precious materials and endangered species, involving local, transnational and foreign organized crime groups. Recently instituted organized crime countermeasures, including a new strategy, laws, asset forfeiture operations, and investigative and prosecutorial structures, have made considerable achievements in dismantling certain organized crime groups and monitoring trends in syndicate activities and targets.

Corruption. Facing an ever-increasing public concern about corruption, the government has adopted a comprehensive anti-corruption strategy for the public sector, new anti-corruption legislation is under consideration, and considerable efforts to unveil corruption's roots and to promote "good governance and transparency" are being undertaken. There remain considerable problems in the coordination of the various agencies with anti-corruption mandates.

Crime Prevention. Fear of crime has resulted in an enormous growth in the private security industry and in reforms within the police force. The police are introducing new approaches to policing (“crackdown police areas” and “sector” policing), as well as the creation of metropolitan police services and the promotion of more police involvement with the local communities. There are some indications of increasing citizen confidence in the police, which over the past few years has been reflected in the increased reporting of crimes to the police.

Criminal Justice Reform. The entire criminal justice system has undergone substantial and substantive transformation and reorganization in the post-apartheid era. While much improvement has been achieved, there are still considerable problems in processing crimes and offenders through the criminal justice system, with particularly acute blockages at the judicial and correctional levels.

International Cooperation and Anti-Terrorism. South Africa has signed the United Nations Convention against Transnational Organized Crime as well as two of its protocols: trafficking in persons, especially women and children, and smuggling of migrants. It also is a signatory to new two SADC (Southern African Development Community) protocols on corruption and firearms. South Africa has ratified most of the international anti-terrorism conventions.

1. CONTEXT

1.1 General Background Statistics

SUMMARY STATISTICS			
INDICATOR	South Africa	Developed Countries Avg.	Developing Countries Avg.
Human Development Index / Rank (2002)	107th of 173 countries		
Land			
Size of country (square km)	1,221,037		
Arable land (square km)	147,530		
Population			
Population (million) (2001)	44.3		
Population growth (%) (2000)	1.6	0.3 (1998)	1.4 (1998)
Life-expectancy at birth (2000)	52.1	76.8	64.7
Population age 0-14 (%) (2000)	34.0		
Population age 15-64 (%) (2000)	62.4		
Population age 65+ (%) (2000)	3.6		
Share of urban population (%) (2001)	57.6	78.1 (1998)	39.0 (1998)
Economic Development			
GDP Growth (%) (2001)	2.2	1.0 (1999)	2.5 (1999)
GDP per capita, US\$ (2000)	2,988	21,770 (1998)	3,260 (1998)
GDP per capita, PPP US\$ (2000)	9,401	23,410	3,530
GNP per capita, US\$ (2000)	3,020		
GNP per capita, PPP US\$ (2000)	9,160		
Trade: Imports as share of GDP (%) (2001)	25.3	21.7 (1998)	30.2 (1998)
Trade: Exports as share of GDP (%) (2001)	27.8	22.7 (1998)	31.7 (1998)
Share of agriculture in GDP (%) (2000)	3.2	2.5 (1998)	13.5 (1998)
Total external debt, % of GNP (1998)	18.9		42.80
Poverty and Unemployment			
Population living on less than US\$1/day (1993-1999)	11.5		
Income distribution ratio (20% richest / 20% poorest) (2002)	22.6		
Income distribution ratio (Gini Index) (1993/94)	59.3		
Unemployment rate (2002)	24.9		
Unemployment rate, extended definition (see page 4) (2000)	40.9		
Youth unemployment rate (men, 15-24 years) (%) (2000)	57.9		
Youth unemployment rate (women, 15-24 years) (%) (2000)	53.3		
Health			
Public expenditure on health (% of GDP) (1990-1998)	3.3	6.2	2.2
Population with access to health services (%) (1999)	80		
Doctors per 100,000 people (1999)	56	246.0	78.0
Number of people living with HIV/AIDS (2001) (million)	5		
HIV prevalence rates: Women at antenatal clinics (%) (2001)	24.8		
Deaths due to AIDS (%) (2000)	25		
Deaths due to AIDS (15-49 years) (%) (2000)	40		
Deaths due to AIDS per annum (thousand) (2001)	360		
HIV prevalence (%) (2000)	12		
Education			
Adult literacy rate (% age 15 and above) (2000)	85.3	98.5 (1998)	72.3 (1998)
Combined enrollment ratio (%) (1999)	93	91.0	61.0
Radios per 1,000 people (2000)	335	1,005 (1995)	185 (1995)
Televisions per 1,000 people (2000)	127	621 (1998)	162 (1998)
Telephone lines per 1,000 people (2000)	114	524 (1998)	58 (1998)
Mobile phones per 1,000 people (2000)	190		

Sources: World Bank, UNDP, UN Department for Economic and Social Affairs (DESA), FAO, Statistics South Africa, USAID, UNAIDS, South African Institute for Race Relations, Medical Research Council (SA).

Note: for the period October 2001 - October 2002, the value of the South African rand to the US dollar hovered between 10 and 11 rand per dollar.

1.2 Major Characteristics of the Country

In its eighth year of democratic government, South Africa is a major power in Africa, carrying with it an enormous burden of regional leadership on most political and economic issues. Difficulties of social transformation in South African society are exemplified by the somewhat slower than expected pace of the redistribution of economic power throughout the society. Huge gaps remain in the distribution of wealth. Social transformation is also hampered by the harsh reality of an HIV/AIDS pandemic whose impact is falling principally upon the Black/African community. The medium to long-term effects on social capital of a generation of "AIDS orphans" are only now being calculated. South Africa combines, in many respects, the characteristics of a highly industrialized country with those of a developing country in sub-Saharan Africa. The following description highlights some of those characteristics and explains the special vulnerability of the country to drug abuse, drug trafficking and crime in general.

Geography

From the 1960s onwards, South Africa's geographical distance from the world's main drug production and consumption zones, coupled with its political and economic isolation, prevented the country from emerging as a major drug transit point. However, the country's re-integration into the international community in the 1990s has permitted its developed transportation and communications systems and advanced banking structure to be used for the purpose of illicit trafficking of many commodities, including drugs.



Map 1: South Africa

Population¹

According to Statistics South Africa (Stats SA 2001), South Africa's population was estimated at 44 million in 2001. This makes South Africa the fifth most populous country in Africa after Nigeria (127 million), Ethiopia (64 million), Egypt (64 million) and the Democratic Republic of the Congo (51 million) (UNDP 2002). The Statistics South Africa survey showed that 77.8% of the population were Black/African, 10.2% were White, 8.7% were Coloured, and 2.5% were Indian/Asian with the remainder unclassified.

Blacks/Africans are the majority throughout the country except for the provinces of Western Cape (which includes Cape Town) where they comprise 21% of the population, and Northern Cape (33%). There is a concentration of White South Africans in Gauteng (the province containing Johannesburg and Pretoria) where they comprise 23% of population, and in the Western Cape (21%). Coloured South Africans are concentrated in Western Cape (54%) and in Northern Cape (52%). Indians/Asians are concentrated in KwaZulu-Natal (9%), especially in and around the city of Durban.

Approximately 58% of the population lives in urban conglomerations compared with 34% in sub-Saharan Africa and 40% in developing countries on average (World Bank 2002). This proportion is forecast to grow to 67% by the year 2015 (UNDP 2002). Population growth during 2000 was estimated at 1.6% per annum (Stats SA 2001), but population growth rates are showing a downward trend. This is largely a result of declining fertility rates and the negative impact of HIV/AIDS on the demographics of the country. HIV prevalence rates for women attending ante-natal clinics for the public health services is 24.5% (Department of Health 2001). It is estimated that the number of HIV-positive babies born annually in South Africa is approximately 100,000 (Department of Health 2001). According to UNAIDS and the World Health Organization, South Africa has the highest number of people living with HIV/AIDS in the world at 5 million (UNAIDS 2002).

UNDP estimates that population growth will fall to 0.2% during the period 2000-2015. This is far below the projection for developing countries in general (1.4%) (UNDP 2002). In July 2001, South Africa's Medical Research Council estimated that the deaths of 40% of all South Africans aged between 15 and 49 in 2000 were due to HIV/AIDS (MRC 2001).² AIDS is expected to have a significant impact on South Africa's population in the future. UNDP reports that life expectancy in South Africa for the year 2000 was 52.1 years. This compares with its indication of an overall increase in life-expectancy in both the developing countries (65 years) generally, and the industrialized countries (77 years). (The World Bank reports that life-expectancy has dropped to 47.8 years in South Africa (World Bank 2002)). UNAIDS reported that during 2001 approximately 360,000 South Africans had

1 The demographic characteristics of substance users have proven an important element to include in drug-related research as they help to identify vulnerable groups within the population as a whole, and consequently to improve the prospects for effective preventive and other interventions (i.e., targeted awareness programmes). Statistics South Africa continues to classify people into population groups. Such classification is no longer based on a legal definition, but rather on self-classification. The categories currently used by Statistics South Africa are as follows: "Black/African", "Coloured", "Indian/Asian", "White" and "Other/Unspecified". See: <http://www.statssa.gov.za/default3.asp>. This report has adopted the categories used by Statistics South Africa.

2 The report is based upon data from the Department of Health's annual ante-natal survey and the Actuarial Society of South Africa's AIDS model. The report documents rapid changes in South Africa's mortality data with an increasing trend in the deaths of young adults since 1997, interpreted to be mostly caused by AIDS. The report projects that by 2010, if there has been no effective intervention: (a) there will be a threefold increase in deaths among children aged one to five; (b) the number of AIDS deaths will rise to double the number of deaths attributable to all other causes; and (c) population growth will be halted by the epidemic.

died of AIDS (UNAIDS 2002). Previously, the Government had predicted that by 2008 the annual number of fatalities attributable to HIV/AIDS would be more than half a million (Department of Health 1999).

Economic wealth and income distribution

South Africa's gross national product was US\$129 billion in 2001, equivalent to 41% of the total sub-Saharan GNP for the year. This alone underlines the country's economic importance in Africa. In addition, GNP per capita was US\$2,900 in 2001, surpassed in Africa only by Botswana, Mauritius and the Seychelles. However, South Africa – more than most countries – is characterized by a strong inequality of income distribution. The richest fifth of the population earns 22 times more than the poorest fifth. By comparison, in the United States, the richest fifth earn 9 times more than the poorest fifth. Even if compared with developing countries in sub-Saharan Africa, the existing income gaps in South Africa are large. The multiplier is 12 in Zimbabwe and 13 in Nigeria (UNDP 2002). All of this has a number of implications:

- (i) relatively higher levels of income in South Africa – even for the underprivileged – make the country attractive as a location for immigration which, as experience has shown, tends to create a favourable climate for drug trafficking activities;
- (ii) at the same time, strong income inequalities raise the readiness of underprivileged groups to participate in illegal activities, including drug trafficking;
- (iii) the high levels of income among the wealthy make the country attractive for drug imports from abroad.

Economic growth and unemployment

The political and economic isolation of the country under the apartheid regime in combination with a strong population growth resulted in an actual 0.6% decline in GDP per capita during the period 1975-97. By 2001, GDP growth was at 2.2%. This has occurred despite the high level of crime (drug-driven) and violence, perceived, among broad sections of the population, as being out of control. The lack of internal security has not contributed to an environment conducive to long-term investment. Investors have routinely cited crime as the biggest deterrent to conducting business in South Africa (EIU 1999-2000). In 1998, it was estimated that each day 1,000 people entered the labour market while the formal sector of the economy shed 200 jobs per day.³ The picture has not improved markedly since then. Using an extended definition of unemployment,⁴ the unemployment rate in 2000 stood at 40.9%. Among the young males, the figure in 2000 was 53.3%. By any comparative international standard, the unemployment rate in South Africa continues to be extremely high.

3 *The Economist*, 31 October 1998, p.51.

4 The expanded definition of unemployment includes not only people who are unemployed and looking for work, but also those who are too discouraged to try to find a job or too poor to travel to look for one. (SAIRR, 2000).

Foreign trade and financial markets

South Africa's foreign trade has expanded strongly since the end of the apartheid regime. The increases may not seem very large in dollar terms, but they are large in terms of the local currency. Exports grew – in rand (local currency) terms – by 62% during the 1994-1998 period, and imports rose by 88% over the same period. It comes as no surprise that such increases in legitimate trade are also exploited by drug trafficking and contraband smuggling organizations. Imports and exports of goods and services in South Africa were, respectively, 25% and 28% of GDP in 2001 (World Bank 2002). With the emergence of a democratically-elected government, the attractiveness of South Africa for commercial and financial transactions increased. Data on financial flows show a strong increase in both capital inflows and outflows over the last few years. Notably, portfolio investment increased, exceeding direct foreign investment flows. Capital inflows for portfolio investment grew – according to IMF data – from US\$1.1 billion in 1993 to US\$13 billion in 1998 (IMF 1999). These are large sums compared with flows to developing countries generally.⁵ There is therefore concern that parallel to the increased attractiveness of South Africa for legitimate investors, its appeal as a base for money laundering operations may have risen.

Education and Religion

South Africa has a comprehensive educational system. The overall literacy rate of 85% among adults is high for a developing country (comparable figures: Kenya 82%, Zambia 78%, Nigeria 64%, Malawi 60%, Cote d' Ivoire 47%, Mozambique 44%, Senegal 37%, Niger 16%), and authorities in South Africa have over the past few years strengthened efforts to further improve the situation and overcome the legacy of the apartheid regime (UNDP 2002). South Africa spent 7.6% of GNP on education (1995-97), more than most developing countries (3.6% on average) and more than some industrialized countries (5.1% on average). Almost all children enroll in primary education and 95% in secondary education. These are very high ratios, clearly exceeding the global average (88% in primary and 65% in secondary education) (UNDP 1999). Drug and crime prevention campaigns in schools should thus reach a majority of youths in the country. Religion plays an important role in the life of South Africans – a fact which can be taken into account in designing drug abuse and crime prevention campaigns. Churches are a potential partner in such campaigns. According to Statistics South Africa, almost 80% of the people are Christians, of which the vast majority are Protestants.

Health

Overall, South Africa has a well established health care system. Nonetheless, quality and availability of health services across the country is very uneven – again a legacy of the apartheid regime. There were 56 doctors per 100,000 inhabitants in 1999, almost four times more than in sub-Saharan Africa (13.4 per 100,000 people) in 1998, but less than the developing countries average (76 per 100,000). Cigarette consumption rose in South Africa by 28% over the last two decades (period 1970-1972 to 1990-1992). This was basically in line with a 21% increase in sub-Saharan Africa, but in sharp contrast to the 12% decline in the industrialized countries. Smoking of tobacco, notably the onset of smoking at an early age, has been found to increase the risks for cannabis smoking and subsequently the risk for

⁵ The net capital inflow for portfolio investment in 1997 was US\$1.5 billion in Thailand, US\$0.6 billion in Pakistan, US\$0.3 billion in Nigeria, US\$0.1 billion in Egypt and Morocco and less than US\$0.1 billion in all other African countries (UNDP 1999).

switching over to other drugs. Even more serious has been the rapid spread of HIV (estimated at approximately 20% of the adult population), even though this is not – as yet – reflected in reported AIDS cases.

2. OVERVIEW OF THE DRUG SITUATION

South Africa is by far the largest market for illicit drugs entering Southern Africa. Its relative affluence within the region makes it a tempting ‘emerging market’ in its own right. The country’s geography, porous borders and international trade links with Asia, Latin America, Western Europe and North America have made it an attractive drug transit country. Drug trafficking and abuse have escalated in recent years, with the point of escalation traceable to the liberalization of most aspects of society in the years immediately surrounding the country’s first democratic elections in 1994. The relaxation of strict controls of land, air and sea borders, along with the enhancement of international trade and commerce, plus the influx of new cultural trends among the more affluent segments of the population, are all associated with the increase in drug trafficking and abuse as well as violent and organized crime. To a greater degree than in many other countries, the drug trafficking activities of organized crime groups are linked to a multitude of other criminal acts, ranging from car hijackings and robberies to the smuggling of firearms, stolen cars, endangered species and precious metals.

South Africa is a society in transition. Drug use correlates strongly with the pressures placed upon social capital by rapid modernization and the decline in traditional social relationships and forms of family structure. This is particularly the case with respect to children (Frank and Fisher 1998). Another factor contributing to the increased prominence of illicit drug use in South African society is high unemployment. Among the non-White population, social injustice and the weakened family bonds which resulted from decades of apartheid policies have created an environment in which temporary escape from the harsh reality of everyday life is often sought through the consumption of psychoactive substances. Among the White population, anecdotal evidence also supports a connection between increased substance abuse and both increased availability of drugs and the psychological consequences of adjusting to life in the “new” South Africa.

Despite the fact that there are no official prevalence figures, common knowledge, coupled with the results of repeated localized surveys, points to cannabis as the most prevalent illicit drug used in South Africa. “Mandrax” (methaqualone) is the second most commonly used illicit drug.⁶ Mandrax is frequently smoked with cannabis, a combination referred to as “white pipe”. Although the use of heroin, cocaine and ecstasy is less common than that of cannabis and mandrax, sentinel surveillance has charted significant increases in their use, notably since the mid-1990s. Treatment data suggests that cocaine use is substantially more prevalent than heroin or ecstasy use. The number of people seeking treatment for cocaine use since mid-2000 has been broadly similar to that for mandrax. Worryingly, the increase in cocaine use has been particularly associated with crack cocaine in some urban areas over the last two to three years. Heroin use has also increased significantly in major urban areas – particularly in Gauteng province and Cape Town – albeit from a low base. Compounding this problem, there is evidence of an emerging trend toward injecting heroin use (SACENDU 2002). Glue and solvent sniffing is a common problem

⁶ Mandrax is a blend of the pharmaceutical drugs methaqualone and antihistamine. It was originally used legally as a sleeping tablet. The term “mandrax” refers to the common street name for a drug containing significant quantities of methaqualone. It derives from Mandrax®, the original Roussel trade name.

among children and youth, especially street children⁷, but there is limited available documentation on prevalence.

Although increasing ethnic integration is evident, the drug markets of South Africa remain ethnically differentiated. The extreme income inequalities between the different broad ethnic segments naturally affects drug affordability and, with it, consumer choice. These differences in disposable income and consumer choice also determine the differentiated marketing practices in various residential suburbs which are still to a large extent ethnically segregated. As a result, distinct dynamics emerge in the market chain of each major substance group (Leggett 2001; ISS 2002).

Cannabis cultivation remains in the hands of poor rural Blacks/Africans, although cannabis is also imported from Swaziland, Malawi, and Lesotho. Retail and consumption patterns defy easy generalization, with all ethnic groups being involved. Overall profitability is small due to the abundance of supply.

Law enforcement sources estimate that the bulk of **mandrax** consumed in South Africa is imported from overseas – principally China and India. Wholesaling remains in the control of the Coloured (particularly organized gangs) and Indian/Asian communities. Retail selling and consumption are still to be found disproportionately high among the Coloured and Indian/Asian populations, although all ethnic groups participate at this level (ISS 2002).

South Africa's **cocaine** market originally catered to upper-income consumer groups, with trafficking originally controlled by White networks. Following the influx of Nigerian criminal organizations in the early to mid-1990s, the cocaine import and distribution markets have come under the control of these groups. These criminal organizations tend to operate out of residential hotels in the large urban centres (Johannesburg, Cape Town, Durban and Port Elizabeth), but have been concentrated – until very recently – in the Hillbrow area of Johannesburg (SAPS 1996; SAPS 2001). Crack use has also become prominent among vulnerable groups in society, for example commercial sex workers.

Heroin is sourced by criminal organizations from markets in Southeast and Southwest Asia. As a low-volume/high-value item, it is couriered into South Africa principally via Johannesburg International Airport. Other sources of supply do exist, but these primarily involve seaport entry principally via Mombasa, Kenya and Dar es Salaam, Tanzania. The drugs are then transported down East Africa's main arterial road networks toward South Africa. Heroin use was uncommon until very recently, possibly because most South Africans are not familiar with injecting drugs, a trend which remains unchanged. However, the availability of high-purity smokable heroin has increased the drug's appeal. This, coupled with reported "loss-leader" supply-driven marketing strategies by trafficking groups which deliberately target upper- and middle-income consumers, has resulted in dramatic increases in heroin use since 1999. The year 2001 witnessed significant escalations in the number of people presenting for treatment who indicated heroin as their primary substance of abuse (SACENDU 2002). The second half of 2001 also witnessed a new

⁷ Statistics from a recent UNICEF discussion paper shows that South Africa already has 300,000 AIDS orphans, and in KwaZulu-Natal there are an estimated 100,000 AIDS orphans, many of them living on the streets. The paper claims that 11% of children under the age of 15 years in South Africa are orphans, and this figure is expected to rise to almost 17% by 2010 (UNICEF 2002).

feature in the local drug scene, the appearance of heroin addicts among the impoverished Black/African communities in South Africa's urban and peri-urban areas.

The use of “**club drugs**” (principally ecstasy and LSD, but including a wide range of substances) has grown dramatically in the White community since the early 1990s, in part due to active interaction with the youth cultures of industrialized nations. While amphetamine-type stimulants, notably ecstasy, are mainly imported from Europe to satisfy domestic demand in the club scene, there is also evidence of local manufacturing of these substances. Supply is dominated by highly structured White syndicates that control the security at both rave clubs and related mass events, where significant distribution occurs. These “bouncer mafias” allow syndicate dealers to operate in rave venues and muscle out any independent operators. There is evidence of recent involvement by Nigerian criminal organizations into these highly profitable markets often through cooperation with the bouncer mafias who contract out much of the import end of the business.

Following a decade of opening up to the outside world, South Africa has now unfortunately become part of major international **drug trafficking networks**. These are often organized by West African – principally Nigerian – criminal groups which since the late 1990s have established permanent operational bases in Southern Africa in general and South Africa in particular. Over the past few years, these groups have integrated South Africa into their pre-existing networks linking the drug producing countries of Latin America (cocaine) and Asia (heroin) with the “traditional” cocaine and heroin consuming markets of Western Europe and North America. Cannabis trafficking networks from South Africa to Western Europe tend to involve White South Africans and Dutch and British expatriates living in South Africa. There have been recent inroads into this market chain, however, by other organized criminal groups in the context of reported bartering arrangements (or at least two-way sales) of cannabis for other drugs which are then consumed within South Africa. As is noted below, this bartering is one factor which has served to buffer the price of imported drugs against the effect of the declining value of the South Africa rand.

Demand reduction: Prevention programmes are the responsibility of the Department of Social Development (formerly the Department of Welfare), while treatment falls under the auspices of the Department of Health. However, the respective roles are, in practice, blurred. Both Departments have developed programmes for prevention and treatment programmes, but constraints exist with regard to funding. Funding for treatment is very limited, and facilities are unevenly distributed throughout the country. The health and education sectors are only minimally involved in prevention activities. The latter gap is filled in part by a highly dedicated group of NGOs and concerned citizens, but their capabilities and mandates are limited. There is currently no national programme for primary prevention in place.

Law enforcement appears to be attuned to current production and trafficking trends, although there has been no clear or official re-prioritization away from cannabis and mandrax toward crack, heroin and the club drugs. Under the rubric of countermeasures against organized crime, action against drugs features alongside firearms and stolen vehicles. Specialized investigation units are being phased out, and staff are being integrated into the police organized crime component. It is as yet unclear whether this restructuring will continue or indeed whether it will have a positive impact on the country's medium- to long-term capacity to deal with the threat posed by organized criminal groups dealing in drugs.

Legislation: A variety of laws govern and adequately cover the country's law enforcement countermeasures, criminal procedures and prevention and treatment measures. Recently, the Financial Intelligence Centre Act was passed in October 2001 which will henceforth play a significant role in South Africa's response to the threat of money laundering. The National Drug Master Plan, approved in 1999, creates a quasi-governmental Central Drug Authority to monitor its implementation, but its role to date has been extremely limited due to insufficiency of resource support.

Conventions: South Africa is party to the 1961 Single Convention on Narcotic Drugs, the 1972 Protocol amending it, the 1971 Convention on Psychotropic Substances and the 1988 Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.

3. DRUG SITUATION

3.1. Cultivation and Production

Opium and coca: There is no cultivation of either opium poppy or coca bush in South Africa.

Cannabis: There is large-scale cultivation of cannabis. Most of the cannabis cultivation takes place in small, remote plots in the following provinces (by order of importance): Eastern Cape, KwaZulu-Natal, Limpopo (formerly Northern Province) and Mpumalanga. Cannabis is usually cultivated in mountainous or otherwise inaccessible areas, and – on a smaller scale – on the fringes of large, historically White-owned farms. In both the Eastern Cape (essentially the former "independent" Republic of Transkei) and in KwaZulu-Natal, a large number of rural families supplement their cash income with cannabis production. Almost all are Black/African small farmers who are poor. They supplement their subsistence agriculture with cannabis as a cash crop. Unlike other countries in the subregion, there is no evidence of plantation style cultivation in South Africa (Aziz 2001).

A considerable amount of cannabis is also imported into South Africa from Lesotho (ARQ 1998, Strydom 2000, OGD 1998a). Smaller quantities are also brought in to satisfy domestic demand from Swaziland and Malawi. Major domestic consumer markets are the metropolitan areas of Durban, Johannesburg and Cape Town.

Most of the cannabis consumed in the country is of South African origin. Authorities estimate that excess production enabled exports to grow from 15% of total production in 1991 to 70% of total production by 1996. Although the cultivation and wholesaling at domestic level is in the hands of rural Black/African communities and middlemen, much of the international

Brief history of cannabis in South Africa

The use of cannabis, known as *dagga* in South Africa, dates back to the 15th century AD. Arab as well as Persian and Indian merchants are reported to have been responsible for its spread along the eastern coast of the African continent in the 13th century. By the 15th century, Swahili merchants in East Africa and some Bantu tribes in Central and Southern Africa co-operated in bringing the plant to Southern Africa where it was later also cultivated. Cannabis gained in popularity in the 18th and 19th century (OGD 1996a). In 1928, authorities in South Africa introduced the first drug legislation concerning cannabis (Wright 1991). Historically, the controlled use and consumption of cannabis among the African population was ubiquitous throughout Southern Africa (MacDonald 1996). Cannabis was an integral part of the culture of traditional communities. Strict rules and values governed the circumstances under which it could be used. Availability was usually controlled by tribal elders. However, in the context of a modernizing, increasingly urbanized society, where traditional community controls are breaking down, the use of cannabis has now become the domain of the younger user and the poly-drug user. In South Africa, cannabis use is now often associated with alcohol and mandrax use. Over the past few decades cannabis use has also gained in popularity among all ethnic groups.

cannabis trafficking to Europe is reportedly in the hands of British and Dutch expatriates living in South Africa, working in conjunction with South Africans. Western Europe in general, and the United Kingdom and the Netherlands in particular, are the main final destinations. For example, within the past two years, based on seizure and arrest data as well as other sources of information, the UK has reclassified South Africa upward as the most significant source of herbal cannabis smuggled into that country, far outranking any other.⁸

Several neighbouring countries also report South Africa as a source country for the cannabis they seize. Authorities in Namibia, for instance, claim that 80% of the cannabis consumed within that country is from South Africa (ARQ⁹ 1996).

Estimates on the extent of cannabis cultivation in South Africa are made regularly. They are based largely on aerial surveys. These have been undertaken either by the South African Police Service's Aerial Application Unit or subcontractors. Both are related to crop eradication efforts. The resulting estimates have fluctuated significantly over the years, and there have been some apparent inconsistencies in reporting (see Table 1 below).

Table 1. Estimates on area under cultivation of cannabis in the Republic of South Africa, 1992-2000, in hectares (Ha)								
	1992	1993	1994	1995	1996	1997	1998	2000
Reported change of area under cultivation versus previous year (ARQ)	stable	stable	down	up	stable	down	down	stable
Estimates of areas under cultivation (ARQ)	6,000	5,000	2,140	82,000 ₍₁₎	1,200	2,000	1,300	1,247 ⁽³⁾
Other sources (see below)	n.a.	20,000 - 30,000		83,000		n.a.	n.a.	
Exported (in % of total domestic production) (ARQ)	15% ₍₂₎	25%		70%		n.a.	n.a.	n.a.
(1) – later reported to UNDCP to have been a gross over-estimate. (2) – 1991. (3) – SANAB directly (not yet reported via ARQ). Other sources: US Drug Enforcement Agency, the French Observatoire Geopolitique des Drogues, German Bundeskriminalamt, UK Home Office.								

In 1992, cannabis cultivation was estimated at 6,000 Ha by the South African authorities (ARQ 1992). For the next two years, South African authorities reported to UNDCP

8 In May 2001 alone, 16 persons (11 South Africans and 5 European citizens) were arrested at London’s Heathrow airport inbound from Johannesburg International Airport. Each was carrying an average of 28 kg of compressed herbal cannabis. The gender breakdown among the South Africans was 9 males and 2 females. The racial breakdown among the same group was 7 White, 3 Black/African and 1 Coloured.

9 ARQ means “Annual Reports Questionnaire”. This is an official report which the UN Commission on Narcotic Drugs requests each UN Member State to complete on an annual basis and return to ODC HQ in Vienna. It is divided into three sections: (a) legislative and administrative measures, (b) drug abuse, and (c) illicit supply of drugs.

that there was a decline in cultivation. By contrast, the US Drug Enforcement Administration, based on information received from South Africa, estimated an expansion of cannabis cultivation to between 20,000-30,000 Ha in 1993-94 (DEA 1996). If correct, this would have been more than all cannabis cultivation in Latin America (16,000-17,000 hectares) in the period 1993-94 according to US estimates (INCSR 1999). This high level of cultivation was subsequently also reported by the South African Police Service (SAPS). In the mid-1990s, an official SAPS report identified 56,000 acres under cannabis cultivation (equivalent to 22,700 Ha or 0.1% of the arable land) in 1994 (SAPS 1995).

Thereafter, estimates went even beyond levels that could be considered realistic. For 1995, South African authorities estimated the area under cannabis cultivation to have increased to more than 82,000 Ha, which would amount to 0.5% of arable land (SAPS 1996). These high figures did not go uncontested within the police force. The South African Narcotics Bureau (SANAB) continued to estimate that only about 2,200 Ha were being dedicated to cannabis cultivation,¹⁰ in contrast to the higher figure (see also Oosthuysen 1998) which pegged cultivation at 82,734 Ha. SANAB claimed that the higher figure had been the result of a calculation error. This claim was subsequently proved correct, but only following publication of the figures. Nonetheless, based on the higher figure, the authorities – applying a yield of 2,120 kg/Ha – estimated total cannabis production to amount 175,000 tonnes. This figure was subsequently also quoted for several years by other international organizations, including Interpol, INCB and various national organizations such as the UK Home Office and the German Bundeskriminalamt (BKA). Such a level of production would have meant that South Africa would have been – by far – the world’s largest producer of herbal cannabis. However, the estimate has not withstood the process of verification and critical validation.¹¹

In 1997, SAPS officially informed ODC that the 1995 estimate had been too high. Estimates were subsequently lowered from more than 80,000 Ha to levels of around 2,000 Ha, while the extent of cultivation was considered to have remained stable. The figure for 1998 estimates cultivation at 1,300 Ha reflecting some decline over the previous year. Based on South Africa’s standard yield of 2,120 kg/Ha, cannabis output was thus estimated at 2,760 tonnes in 1998 (roughly equivalent to some 830 tonnes of marijuana). The cultivation figure reported by SAPS for 2000 is 1,247 Ha.¹² A recent unpublished ODC study of the cannabis

¹⁰ SANAB (1998) Arrest and seizure data. Pretoria, (Unpublished statistics).

¹¹ First, the yield figures used in South Africa do not appear to reflect cannabis herb (marijuana) production but the overall weight of dry cannabis plant material, and are thus not directly comparable with cannabis herb production figures, as used in many other countries. In official South African publications it is mentioned that only 30% of cannabis production is “for smoking”, suggesting that cannabis herb accounts for about 30% of cannabis production (SAPS 1995). The actual marijuana yield would thus fall from 2,120 kg/ha to 636 kg marijuana per hectare -- a figure in line with yields reported from Latin America (some 660 kg/ha on average). Even taking this into account, South Africa would have still produced some 53,000 tonnes of cannabis herb in 1995. Considering the reported export rate of 70%, the actual amount for consumption in South Africa would have amounted to 16,000 tonnes of cannabis herb. The question therefore arises whether such levels of consumption are possible, as consumption in South Africa would have been six to ten times higher than overall marijuana consumption in the USA (1,600-2,400 tonnes p.a.) even though South Africa’s population is considerably smaller.

¹² South African Police Service, “Today’s Situation: Globalization and the Risk of Transnational Organizations” paper presented by S. Superintendent George Mason, at SACENDU report back session October 2000.

situation in South Africa indicated that the current SAPS estimate of 1,000-1,200 Ha appears to be accurate (Aziz 2001). This study found, *inter alia*, the following:

- The average size of a cannabis field in South Africa is 300 square meters. A good quality field of this size will yield approximately 10 kg of flowering tops and leaves and approximately 25-30 kg of poor quality marijuana (Majat). If the farmer sells the marijuana immediately after the harvest, the revenue will be approximately R700 for the top quality and approximately R500 for the remaining poor quality marijuana.
- Extrapolating to a hectare size field, the returns will be R40,000 from a total mass of between 1,155-1,320 kg of “usable” plant comprising 330 kg (flowering tops) plus 825-990 kg (dried leaves).
- In the cannabis growing areas of Eastern Cape and KwaZulu-Natal, the cannabis farmers are almost exclusively subsistence farmers, farming small plots of poor quality land. Cannabis is usually the only cash crop that they grow. The average annual household cash income from cannabis ranges between R1,200-2,000.

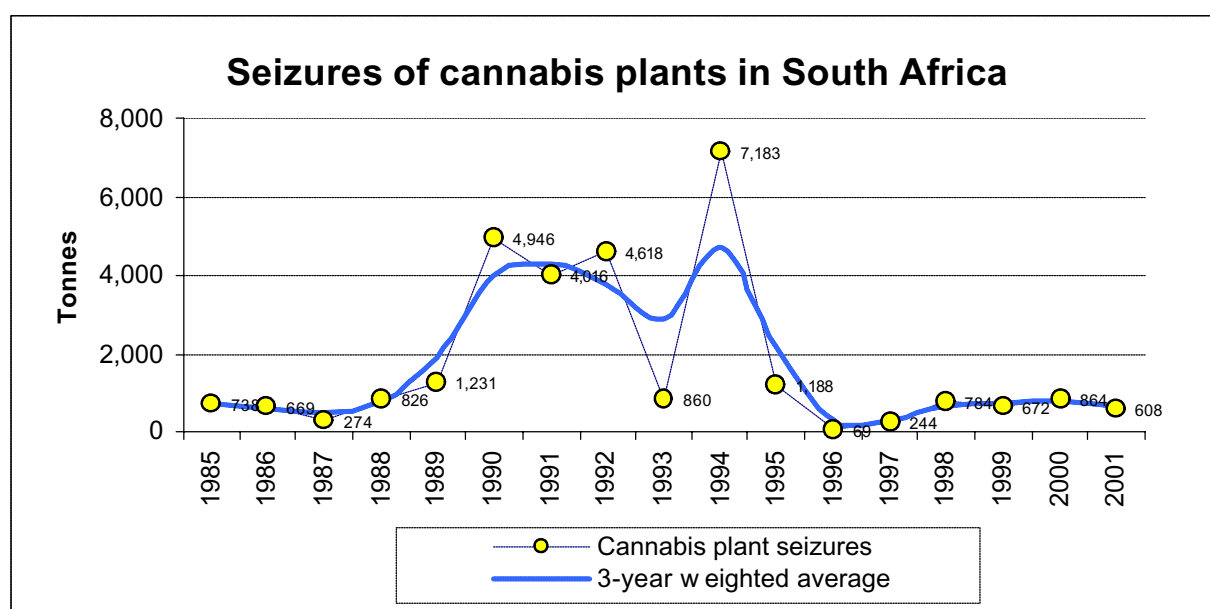


Figure 1: Seizures of cannabis plants in South Africa (1985-2001).

Sources: ARQs; SAPS. Note: While the remainder of the seizure statistics used in this report have been sourced from the records of the SAPS Forensic Science Laboratory, this is not the case for cannabis. Unlike other illicit drugs, cannabis seizures represent a low-value, high-bulk product. As a result, only a small percentage of cannabis cases are actually forwarded to the National Forensic Science Laboratory for analysis. For this reason, the cannabis statistics used in the above graph have been supplemented with information available from the South African Narcotics Bureau (SANAB).

The precise amount of land dedicated to cultivation remains a matter of dispute, as is the total quantity of cannabis produced, in view of the varying estimates of the number of crops harvested per year (typically between two and four). While intermittent eradication operations conducted by the SAPS do provide accurate details on the scope of these operations themselves¹³, they do not actually go further to indicate the totality of what is occurring with regard to cannabis cultivation in South Africa. Nonetheless, even at currently reported levels,

¹³ See for example, SAPS 1999 for details on Operation Motokwane (October - December 1999). More recently, cannabis eradication operations were conducted in the Umtata and Lusikisiki areas of Eastern Cape (October 2001).

South Africa is still one of the world's largest producers (UNODCCP 2001 and UNODCCP 2002). Though production estimates for other countries also have to be interpreted with considerable caution, South Africa's importance in the cultivation and production of cannabis internationally can be extrapolated from the huge quantity of seizures the country makes each year (see section 3.4). According to Interpol, South Africa is among the world's top four source countries for herbal cannabis (Interpol 2001).

3.2 Manufacture

After the Second World War, mandrax emerged as another important psychoactive substance. Following the identification of its abuse potential, mandrax was removed from the legal market and classified as a prohibited dependence-producing drug in part I of the schedule of the South African narcotics law (Act 41 of 1971). However, following its official withdrawal from the local market, mandrax tablets were diverted from international distribution channels – mostly originating in India and China. In recent times, they have also been illicitly manufactured in neighbouring African countries as well as in South Africa itself. Abuse was originally primarily concentrated in South Africa's ethnic Indian/Asian population. However, it is has since spread to other ethnic groups, notably the Coloured community, but also the country's Black/African population. There is hardly any use of this substance reported among Whites. In geographical terms, its use is heavily concentrated in the Western Cape province where there is a large Coloured population base.

Mandrax is today the second most widely abused illicit substance in South Africa after cannabis (SACENDU: all reports). Its use started to become a general problem for South African society in the late 1980s. There is evidence that the apartheid state promoted drug use as a form of chemical control ("pacification") against the democratic resistance (Leggett 2001, especially Chapter 4). During the late 1980s and early 1990s, apartheid agents reportedly produced one thousand kilograms of both mandrax and MDMA (henceforth ecstasy)¹⁴, and diverted massive amounts of the former drug from law enforcement seizures, allegedly for use in "crowd control". The Truth and Reconciliation Commission has expressed the view that these drugs were ultimately sold on the streets.¹⁵ There have been indications from the Truth and Reconciliation hearings that a "cosy relationship" existed between the apartheid government and certain criminal groups and that the apartheid government may have acquiesced in, if not encouraged, the trafficking in narcotics to some ethnic groups as a means of social and political control (INCSR 1999). Finally, allegations have also been made that, among the groups opposing the apartheid regime, some may have been involved in the trafficking of mandrax in the late 1980s and early 1990s to finance weapons purchases.¹⁶

Although South Africa does not currently appear to be a major manufacturing site for illicit drugs, there is firm evidence that clandestine manufacturing of illicit drugs has been taking place in the country for more than a decade. The trend is increasing.

14 MDMA is 3,4-methylenedioxymethamphetamine, commonly known as ecstasy.

15 TRC 1999, Volume 2, Chapter Six.

16 These allegations concern some groups linked to the Pan African Congress which are reported to have imported mandrax via Mozambique into South Africa (OGD 1996).

Manufacture of illicit drugs was originally limited to mandrax. The first clandestine mandrax laboratory was shut down by police in 1987. However, domestic production of mandrax has reportedly increased since then and continues to gain in importance. Laboratories were originally identified primarily within Gauteng. By 2000, laboratory seizures were taking place in all major metropolitan areas.

In recent years, the range of detected laboratories has also broadened to include facilities manufacturing amphetamine-type stimulants (ATS) including ecstasy and methamphetamine, as well as kitchen-type laboratories for the manufacture of crack cocaine. A laboratory manufacturing GHB (gamma hydroxy butyrate) was detected in 1998 (ARQ, 1998). GHB has, since November 2000, come under strict control in South Africa.¹⁷

Table 2. Laboratories detected and dismantled in South Africa									
	1987	1990	1996	1997	1998	1999	2000	2001	2002(*)
Mandrax	1	4	2	1	3	2	4	4	8
Ecstasy group			1	1		3	2	6	1
Crack cocaine					3		2		2
Methamphetamine					1	2			
GHB					1				
MDP2P / MDA						1			2
Cannabis processing								2	1
Methcathinone								1	9
Total	1	4	3	2	8	8	8	13	23
Sources: SAPS Forensic Science Laboratory (Pretoria), South African Police Service – “Dwelmmiddelanalise Sektie Pretoria: Klandestine Laboratorium Ondersoek (2000), SAPS Sanab, ARQ Data.									
(*) First 9 months.									

About three laboratories per year were dismantled over the 1987-97 period (see Table 2 above). During the period 1998-2000, the average number increased to eight per year, reflecting an underlying trend of increased domestic drug manufacture. Of the eight labs dismantled in 1999 two of these were dual- or poly-capacity laboratories.¹⁸ The upward trend continued with 13 labs being dismantled in 2001. For the year 2002, at the end of September, a total of 23 labs had been closed down in a similar fashion by the SAPS. Of interest is the recording, in 2001, of the first methcathinone lab used to synthesize what is known as ‘Cat’ in South Africa.¹⁹ By September 2002, a total of 9 methcathinone labs had been closed down for the year. The United Nations Office on Drugs and Crime is not aware of any significant emerging trends concerning methcathinone elsewhere, and the sudden upsurge of clandestine laboratories in South Africa would seem particular to this country.²⁰

17 GHB was scheduled as a Class I substance (highest restriction) in the US as of 1 April 2000. Since 11 November 2000 it has been included in Schedule 8 (“undesirably dependence-producing substances”) under South Africa’s Medicines and Related Substances Act (Act 101/65).

18 South African Police Service – Forensic Science Laboratory report 1999.

19 The chemical term for the drug known as ‘cat’ is methcathinone. It is an amphetamine which is synthesized from the *khat* (or *catha edulis*) plant, typically grown in East Africa and the Arabian peninsula.

20 There is continuing illicit manufacture of the substance in United States, but at very low level, certainly compared to methamphetamine. Similarly, there is ongoing clandestine manufacture in Russia and Central Asia.

3.3. Diversion of Precursors

Clandestine manufacture of drugs in South Africa is also reflected in seizures of precursor chemicals. Important seizures of **anthranilic acid** and of **N-acetylanthranilic acid**, the two main precursors for mandrax manufacture, were reported in 1995 and have continued in and around South Africa ever since. Approximately 70% of all seizures of **mandrax precursors** worldwide took place in South Africa in that year. During 2001, at the request of South Africa, the authorities in France stopped a shipment of 25 tons of anthranilic acid to Mozambique when it was determined that the consignment was to have been transshipped through Mozambique to South Africa, where it would be used in the illicit manufacture of mandrax.²¹ During December 2001, South Africa conducted a controlled delivery of 5 kg of **sassafras oil** from France to South Africa which led to the detection and dismantling of an illicit laboratory which manufactured methamphetamine and MDMA (UNDCP 2002; SAPS 2002b).

Trafficking groups capable of handling such large consignments are well-established and possess well-organized networks in order to transport, store and utilize such a large quantity of precursors (INCB 2001). In December 2001, another ten tonnes of anthranilic acid was seized in Maputo harbour in Mozambique en route to South Africa from Mumbai, India. In July 2002, in two linked enforcement actions, South African police and forensic experts raided warehouses in Gauteng and seized, inter alia, more than 100 metric tons of chemicals (principally anthranilic acid and acetic anhydride) which could be used to produce 90 million mandrax tablets. Precursor chemicals for the production of ecstasy were also recovered in these busts.

In addition to these typical mandrax precursors, a number of other chemicals have also been seized in South Africa, including acetic anhydride, hydrochloric acid, toluene, acetone, ethyl ether and sulphuric acid. Each of these chemicals can be used in the manufacture of mandrax. They also, however, may be used for licit industrial purposes as well as the manufacture of other drugs – thereby posing a problem for effective functioning of chemical monitoring programmes. It is becoming evident that foreign trafficking groups have started to target South Africa's chemical industry as a supplier of precursors. The magnitude of such attempts, as examples from the late 1990s have shown, has been considerably higher than domestic seizures of precursor chemicals in South Africa itself. The INCB highlighted in its 1999 annual report on precursors that large quantities (approximately 25 tonnes) of **methyl ethyl ketone (MEK)**²² originating in South Africa were shipped via Europe to Colombia. This may have resulted in the subsequent tightening of chemical controls in the United States and in Europe. Around this time, and following the revelation of the real reason for the strong MEK demand in Colombia, South African industry began working with the national authorities to prevent future diversion.

21 In the Mozambican operation referred to above, Mozambican and South African police also recovered 30 tonnes of chemicals and precursors – sufficient to make 7.5 tonnes of mandrax tablets.

22 MEK is one of the key substances in the manufacture of cocaine hydrochloride. It is used to extract and purify the cocaine.

There have also been some important attempts to import precursor chemicals into South Africa for illicit uses. In March 1998, for instance, China stopped a suspicious shipment of the enormous amount of 20 tonnes of **ephedrine**, the main precursor for the manufacture of methamphetamine, to a South African company. Global seizures of ephedrine in 1997 amounted to a mere 8 tonnes. A quantity of 20 tonnes of ephedrine would have been sufficient to produce 13 tonnes of methamphetamine, equivalent to more than 430 million doses of methamphetamine. While **phenylacetic acid** is not currently being seized on a large scale at illicit laboratories, the authorities in South Africa and the United Kingdom successfully carried out a controlled delivery of the substance during 2001, resulting in the dismantling of an illicit laboratory for the manufacture of methamphetamine and the arrest of those responsible for the import and diversion of the substance (INCB 2001).

In 1999, the SANAB established its Chemical Monitoring Programme. Since then there have been no seizures of the listed chemicals in terms of Section 3 of the Drugs and Drug Trafficking Act and Article 12 of the 1988 UN Convention. Thus, in the relatively short period since its inception, this unit has established an effective relationship with the chemical industry and receives regular reports from the latter regarding irregularities and possible diversion. During 2001, the Chemical Monitoring Programme dealt with 174 import notifications of precursor chemicals into South Africa as well as 89 export notifications. A total of 80 chemical and pharmaceutical companies were visited during 2001 (UNDCP 2002, SAPS 2002b).

3.4 Trafficking

Over the better part of the past decade, two distinct trends can be identified. First, a gradual decline in drug-related cases was followed, since, 1998, by a recent upsurge. Second, there has been an overall and sustained shift by law enforcement away from a heavy concentration in cannabis and mandrax-related arrests and seizures toward other drugs.

Regarding the first trend, police statistics for the country as a whole show that there were 47,323 drug-related cases reported in 1994. Figure 2 demonstrates how this figure declined to a low between the years 1996-98. Following 1998, the number of drug-related cases started to rise

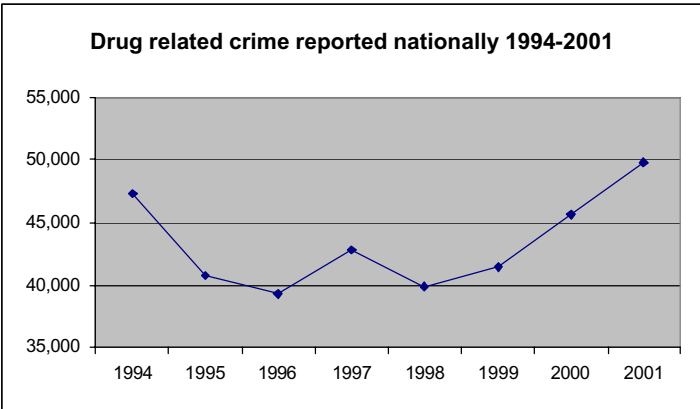


Figure 2: Drug-related crime in South Africa for all provinces. Source: Sanab.

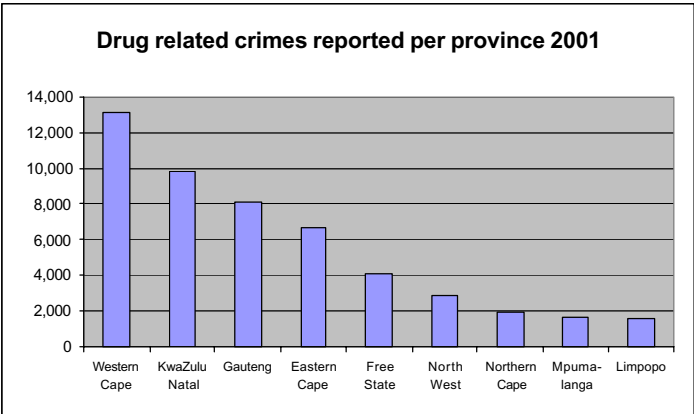


Figure 3: Drug crimes by province. Source: Sanab.

again. In 2001, the number stood at 49,839 (SAPS 2002). This constitutes an average of 4,153 cases per month or 135 cases per day. On a geographical basis, statistics prepared by the Crime Information Analysis System concerning drug-related occurrences during the year 2001 indicate that the highest number of drug-related crimes occurred in Western Cape, the province which contains Cape Town. Incidences of drug-related crime in that province in 2001 accounted for about one-quarter (26.4%) of all such crime in the country (SAPS 2002 see Figure 3). The next highest province in terms of drug-related crime is KwaZulu-Natal which contains Durban (19.8%). Gauteng (encompassing Johannesburg and Pretoria) has the third highest incidences of drug-related cases in 2001 (16%).

Regarding the second trend, while arrests and seizures in South Africa still remain overwhelmingly linked to **cannabis**, there has been a noticeable increase in the number of other drugs featuring in the arrest records (Figure 4) aside from mandrax. Approximately three-quarters of all people arrested for drug trafficking and abuse and 99% of all seizures in volume terms (if transformed into dosage units) are annually linked to cannabis herb (marijuana). Trafficking in cannabis resin (hashish) within South Africa is still limited due to the small consumer base for this substance.²³ The next two most widely trafficked illicit drugs are **mandrax** and **cocaine**. Just under 20% of all people arrested for drug possession and dealing in 2000 were arrested for mandrax and 5% for cocaine-related offences. Since 1999, a larger percentage of all reported drug-related arrests have been related to **ecstasy** as compared with cocaine. Arrests for ecstasy have gained in magnitude over the last few years rising from nil in 1993 to almost 350 in 2000. The importance of **amphetamine type stimulants** in the South African drug market is still limited. Arrests for possession/dealing in **heroin** have increased eight-fold since the product emerged in a very low-key manner onto the South African drug scene in the mid-1990s. However, the absolute number of arrests for this substance is still relatively low.

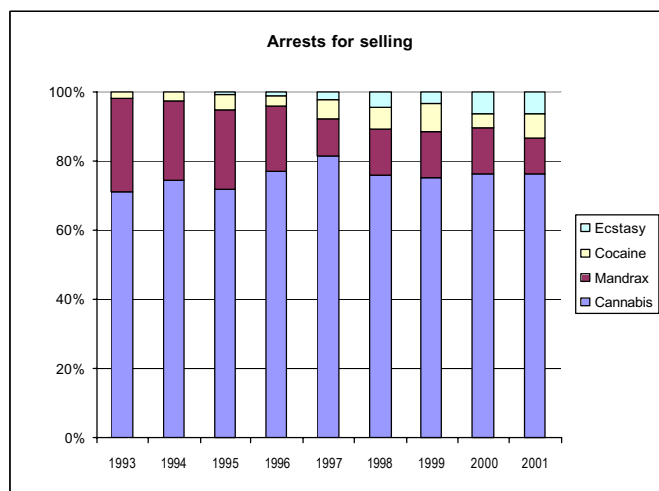


Figure 4: Percentage of total arrests for dealing by drug type in 2000. Source: SANAB. Note: this chart features only those drugs for which there have been significant numbers of arrests, hence the absence of heroin arrests.

The shift away from a predominant focus on cannabis and mandrax in arrests for dealing and possession may, in part, be explained by the re-prioritization of resources towards targeting new drug threats and more formidable criminal networks which do not yield immediate arrest results that would come from a strong emphasis on traditional street-level

²³ South Africa and Mozambique nonetheless witness much transshipment traffic in hashish. In October 2000, Durban's joint port drugs unit seized 11 metric tons of containerized hashish en route from South West Asia to Canada. It was being transshipped via South Africa. This proved to be the country's largest drug seizure worth over 1 billion rand (equivalent, at the time, to US\$150 million). Significant hashish hauls have occurred over the past decade in Mozambique, most recently involving 15 tonnes near the coastal city of Inhambane in August 2000. None of this appears intended for domestic markets in either country.

buy/bust operations. Reports from the SACENDU network²⁴ over the past four years (Table 3) are also able to look at the police data from a different perspective and on a provincial level. Across all the sentinel sites surveyed, there has been a decline in the number of persons arrested for cannabis-related offences as well as a corresponding increase in arrests for cocaine, heroin and ecstasy.

Table 3. Arrests for dealing (January 1997 - December 2001)										
Area	Period	Cannabis	Mandrax	Cocaine	Ecstasy	Heroin	LSD	Meth.	Other	Total (N)
Cape Town	1997a	54%	27%	10%	4%	<1%	3%	1%	0%	236
	2001b	29%	26%	26%	15%	1%	2%	1%	0%	255
Durban	1997a	66%	9%	11%	9%	0%	0%	5%	<1%	227
	2001b	27%	40%	23%	4%	0%	0%	0%	5%	162
Gauteng	1997b	70%	12%	14%	2%	<1%	1%	<1%	0%	417
	2001a	29%	16%	33%	11%	2%	8%	1%	0%	567
Source: SACENDU 2002b. Note: Gauteng is the province containing Johannesburg and Pretoria. 1997a indicates first half of 1997; 2001a indicates first half of 2001; 2001b indicates second half of 2001.										

A drugs / crime nexus

Within the past three years, ground-breaking research work by the South African Medical Research Council and the Pretoria-based Institute for Security Studies has confirmed a high positive correlation between drug use and crime even though the chain of causality remains unclear in many respects. Results of the 3-Metros Arrestee Study (in Gauteng, Cape Town, Durban) conducted between August 1999 and September 2000 among a representative sample of arrestees (n=2,859) have revealed much about the drugs / crime link in South Africa.²⁵ The study found that the percentage of arrestees testing positive from urinalysis for at least one drug was 46%. Positive tests for cannabis, mandrax and cocaine occurred in 40%, 21% and 4% of the cases, respectively (Parry, Louw and Pluddemann 2001). Arrestees under the age of 20 were most likely to test positive for some substance (66%). Those testing positive for a substance (51%) were more likely than those who tested negative (29%) to have been arrested before (ISS 2002). The research suggests a very strong link between drug use and various crimes. For example, the percentage of arrestees testing positive for any drug (excluding alcohol) in connection with housebreaking, motor vehicle theft and rape was, respectively, 66%, 59% and 49%. Up to one-third of arrestees who indicated that they were under the influence of substances at the time of the crime took place stated that they had used

24 The SACENDU (South African Community Epidemiology Network on Drug Abuse) system monitors trends in alcohol and drug abuse, using multi-source information from 46 specialist treatment centres, psychiatric hospitals, mortuaries, trauma units, the SAPS, and from research conducted in schools, with sex workers, street children, patients attending primary health care clinics, arrestees and persons attending rave parties. The main benefit of this network is the facilitation of an evidence-based approach to local and national policy formation. Since 1997, the SACENDU network has compared arrest and seizure trends across the major population sites in South Africa on a semi-annual basis.

25 The study followed closely the methodology used by the Arrestee Drug Abuse Monitoring (ADAM) project in the United States and related projects worldwide.

substances to assist them committing the offense. The research also highlighted major differences between ethnic groups in terms of levels of drug use and different kinds of substances of abuse. For example, a much higher proportion of Coloured arrestees (64%) tested positive for drugs as compared with Black/African arrestees (38%) with Indians/Asians and Whites other two groups falling somewhere in between. The drug/ethnic segmentation nexus was found to be linked to income. White arrestees (most likely to be in the highest income group), for example, were most likely to test positive for cocaine (43% as compared to 3% for Blacks/Africans) (Parry, Louw and Pluddemann 2001).

Linkages to organized crime

Trafficking of illicit drugs has increased dramatically in South Africa over the last decade. Aside from the fact that drugs are highly associated with dependency or addiction and thus the frequently desperate search for instant cash – often through prostitution or acquisitive crime – there are other obvious links to criminal activity. Drug trafficking is an extremely profitable enterprise for organized crime syndicates which are often otherwise heavily engaged in the trafficking of stolen vehicles, illegal firearms, precious metals, endangered species and human beings. For example, organized crime syndicates have also become involved in stealing vehicles and trading them across South Africa's land borders in exchange for drugs (INSCR 2001, Shaw 2001).

Drug trafficking and organized crime have unquestionably grown in a symbiotic relationship in South Africa since the mid-1990s. In 1997, the SAPS conducted a survey which demonstrated the existence of 192 organized crime groups operating in South Africa of which 92 were focused primarily on the international smuggling of drugs. This survey formed the basis of the SAPS Organized Crime Threat Analysis (OCTA) system. The current SAPS OCTA (early 2002) shows 238 listed threats. Criminal violence associated with drug trafficking is particularly visible in Cape Town (especially in the Cape Flats and Mitchells Plain areas²⁶) where drug trafficking groups fight over market share.²⁷ The level of violence is reduced in Durban where the drug market is more strongly structured and controlled (Leggett 2000). In broad anecdotal terms, the level of drug-related violence in Johannesburg would sit somewhere between these two extremes.

Money laundering

South Africa's position as the major financial center in Southern Africa and its relatively sophisticated and unprotected banking and financial sector make it vulnerable to organized crime activities, including money laundering.²⁸ At this stage, there are no statistics

26 Arrest reports and other information available on the situation in the gang-dominated Cape Flats and Mitchells Plain areas support almost exclusive Coloured gang control of the distribution of crack and mandrax in these areas and beyond. The "Americans", "Hard Livings" and other gangs dominate. Some efforts at Nigerian encroachment have been met by market sharing deals.

27 Responding to such in-fighting, an Islamic vigilante group, called People Against Gangsterism and Drugs (PAGAD) has declared war on gangs and drug dealers but has itself been allegedly involved in violence against the state, leading the Minister for Safety and Security to denounce its activities in 2000. See Garson 1997 and Galant & Gamielien 1996. See also Section 8.3 of this Country Profile.

28 See also *International Narcotics Control Strategy Report*, U.S. Department of State, March 2002.

available on money laundering in South Africa. Furthermore, there have to date been no prosecutions for money laundering. This does not, however, mean that money laundering does not occur in South Africa. From the statistics available on organized crime and its growth, it can be deduced that money laundering is taking place and is likely to increase in the coming years.²⁹ In addition, the work of the Asset Forfeiture Unit of the National Directorate for Public Prosecution (NDPP), particularly the high number of proceedings initiated for the confiscation or forfeiture of the proceeds and instruments of criminal activity and the large value of the assets involved, gives an indication as to the high volume of proceeds from criminal activity finding their way into the South African economy. In December 2001, the Financial Intelligence Center Bill became law. This law should substantially increase the Government's capacity to combat these crimes. Money laundering is dealt with, in particular, under chapters 2, 3 and 4 of the Act. The law provides for the establishment of a Financial Intelligence Center to coordinate policy and efforts to counter money laundering activities and to serve as a centralized repository of information. In August 2002, South Africa signed the Memorandum of Understanding of the Eastern and Southern African Anti-Money Laundering Group which is open to 14 countries in Eastern and Southern Africa.

Foreign criminal networks

Just as the South African drug abuse market is highly culturally and economically segmented, so too is the drug trafficking related to it (Leggett 2000; ISS 2002). Of particular prominence in the drug trafficking market is the presence of West African criminal networks. Most of these have become established since the early 1990s. The operations of these groups – centering principally, but not exclusively, on Nigerian criminal networks – are central to the illicit drug economy of South Africa.³⁰ Their role in this industry and its links to other criminal activities – primarily but not exclusively advance fee fraud (the so-called 419 scams³¹), kidnapping, cheque and credit card fraud, dealing in stolen vehicles, and trafficking in and smuggling of human beings – have been analyzed in detail elsewhere (Allen 1999, Gastrow 1999, Leggett 1999c, Leggett 2000, SAPS 2001, Shaw 2001). During 2001, South African police conducted 39 **controlled deliveries** with foreign anti-narcotics agencies (UNDCP 2002). As an indicator of South Africa's profile in the context of international trafficking, the majority of South African citizens in **foreign prisons** have been incarcerated for drug smuggling (SAPS 2001).

Johannesburg International Airport

The vulnerability of Johannesburg International Airport to trafficking opportunities is central to developing countermeasures for the trafficking in high-value, low-volume drugs into

29 Pieter Smit, Clean Money- Suspect Source: *Turning Organized Crime against Itself*, ISS Monograph Series, No. 51, Institute for Security Studies, January 2001.

30 The extent of penetration of the heroin trafficking networks by Tanzanian organized criminal syndicates since 2001 has become a law enforcement concern in South Africa. The operations of Chinese Triads in South Africa have also, at times, involved the smuggling of mandrax into the country within the last three years.

31 The "419 Scam" is named after Section 419 of the Nigerian Penal Code which deals with advance fee fraud. The scheme is operated by a fraudster who is usually a member of a criminal syndicate. Such individuals lure victims into false money schemes with the promise of huge returns – instead they are typically robbed of their money and sometimes kidnapped and murdered.

South Africa. A review of cocaine and heroin seizures by Johannesburg International Airport SANAB during 2000 versus drug quantities seized by all other SAPS components nationally is striking, as shown in Table 4.

Table 4. Prominence of Johannesburg International Airport in Drug Trafficking in South Africa (2000)			
Drug	Total Quantity Seized	Quantity Seized by JIA SANAB	% seized by JIA SANAB
Cocaine	91.2 kg	59.4 kg	65 %
Heroin	15.4 kg	13.7 kg	89 %
ATS (incl. ecstasy)	297,021 tablets	195,679 tablets	66 %
Source: South African Police Service.			

Trafficking in cannabis

Seizures of cannabis herb in South Africa in volume terms, as reported to ODC have been subject to major annual fluctuations over the last decade (see also Figure 1 in Section 3.1). Once the data are smoothed, the overall seizure trend from the mid-1990s is steeply downwards, stabilizing at a lower level with minor fluctuations in that lower range. The magnitude of South Africa’s cannabis production and its related enforcement measures nonetheless testify to the country’s importance in international trafficking terms. As Figure 5 demonstrates, in 2000 – the latest year for which comparative figures exist – South Africa’s cannabis herb seizures accounted for almost 68% of all cannabis herb seizures in Africa. At the global level, South Africa’s cannabis herb seizures were almost 16% of the world total. In the year 2000, South Africa (718 metric tons) ranked second behind Mexico (2,050 mt) in terms of cannabis tonnage seized (UNODCCP 2002). In Africa, only Malawi (312 mt) and Nigeria (212 mt) came close.

Cultivation and domestic transport of cannabis herb from the farm gate to the distribution centres within South Africa are generally controlled by rural Blacks/Africans with links to both the farm gate and the urban market. Domestic trafficking in cannabis is also mainly in the hands of Blacks/Africans (Leggett 2000; ISS 2002). The large Black/African former “townships” (sometimes referred to as “disadvantaged communities” and especially the hostels located there) tend to serve as cannabis storage and redistribution centres (e.g., Soweto and Alexandra in Johannesburg, Bambayi in Kwa-Zulu-Natal, Inanda and

KwaMashu in Durban, and Gugulethu in Cape Town) (see also OGD 1997, OGD 1998).

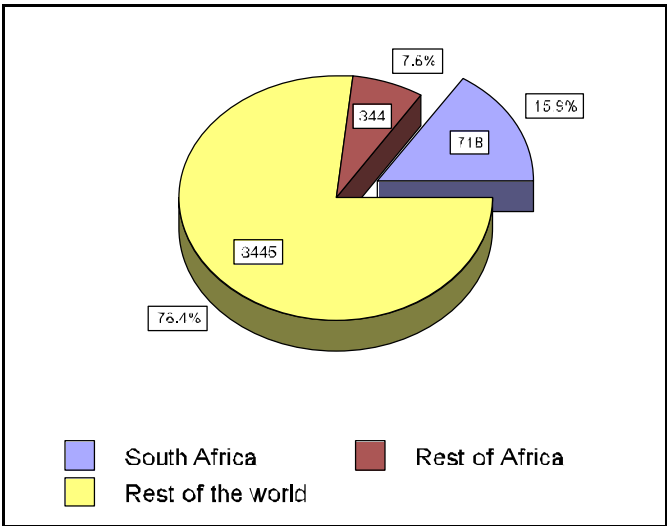


Figure 5: World cannabis herb seizures in 2000 (figures in metric tons). Source: UNODCCP 2002.

While South Africa is an important exporter of cannabis, the country is also a significant importer. Cannabis is transported to South Africa from countries such as Malawi, Zambia, Lesotho and Swaziland (MRC 1998, OGD 1997, Aziz 2001) often with overseas exporting as the express purpose. In particular, Swaziland and Malawi have specialized in the production of cannabis varieties with a reportedly high THC³² content, known as “Swazi” and “Malawi Gold”.³³

Given the need for large-scale exporters of cannabis to have business connections with the shipping community and courier contacts in the UK and Netherlands, the controllers of this traffic are unlikely to have a profile similar to those who run domestic production and trafficking operations. For example, the majority of couriers currently trafficking herbal cannabis into the UK are White South Africans. The significant penetration of the South African organized criminal world by Nigerian criminal organizations has also meant that such groups have managed to forge an effective, but not dominant, link to the trade in cannabis (SAPS 2000; Shaw 2001). During the period 1999-2000, the UK reported the seizure of multi-tonne consignments smuggled from South Africa by way of containers, indicating a preference for this manner of maritime trafficking. Available evidence is inconclusive regarding whether South Africa is a net importer or exporter of cannabis.

In the recent past, the bartering of South African cannabis for European ecstasy and LSD had been reported (OGD 1997; OGD 1998; Leggett 2001). Cocaine and heroin, however, now also appear to be part of bartering arrangements. Information available to police and other sources inside South Africa points to a strong link between the syndicates exporting cannabis from South Africa and the import of cocaine, heroin and club drugs from overseas. This, coupled with the relatively low price in South Africa of club drugs, heroin and cocaine – at a time when the rand is weak – has reinforced suspicions of a direct link in the trafficking of these drugs into and out of the country (see also Leggett 2001; ISS 2002).

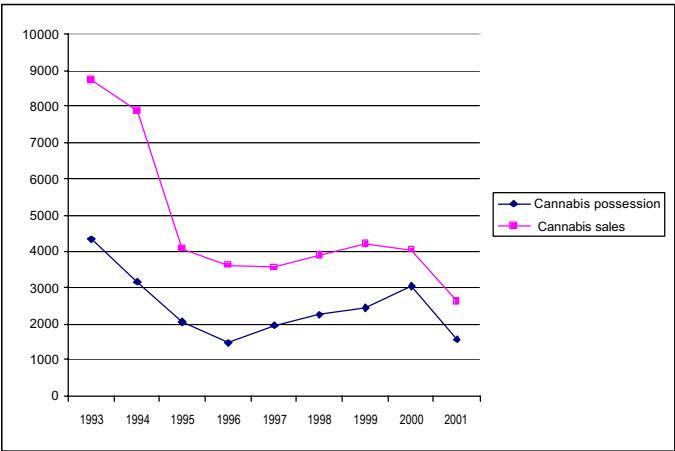


Figure 6: Cannabis arrest data 1993-2001. Source: SANAB.

The cannabis seizure pattern described above has also been paralleled, in general terms, in arrest data for the better part of the past decade. In other words, a significant decline during the mid-1990s leveling off at the lower level with smaller fluctuations to 2001 (see Figure 6). It is unlikely that the overall decline between 1993 and 2001 reflects a shift in the dynamics of the cannabis market within South Africa. The market appears as robust as ever. A number of other factors are probably more relevant in explaining the decline. First, some of the earlier large seizures were actually due to the fact that cannabis seized in containers in ships transiting

32 Tetra-hydro-cannabinol, the active ingredient in cannabis.

33 A cannabis enforcement operation conducted in Swaziland in 2000 yielded compress machines which produced blocks of herbal cannabis for export to the UK.

South Africa (including cannabis resin from Pakistan and cannabis herb from Colombia en route to Europe) were included in the statistics (OGD 1997, OGD 1998). As a result, the figures, though officially recorded in the seizure statistics, are not directly comparable. Second, but perhaps more significantly, is the noticeable shift in enforcement priorities (Leggett 2000). The emergence of other highly dangerous drugs in the South African market over the past decade has clearly prompted the authorities to target them with greater vigour.

Trafficking in mandrax (methaqualone)

In many respects, the extent and trend of the illicit consumption of mandrax in South Africa is unique in the world. Anecdotal evidence from the law enforcement and treatment communities within the country indicates that South Africa is by far the world’s leading consumer of the drug. Some estimates suggest that as much as 80% of worldwide clandestine production of mandrax may be destined for the South African market (Venter 1998). In 1998, the South African Association of Retail Pharmacists claimed that South Africa consumed between 70-90 per cent of the world’s production of mandrax (CIIR 1998).

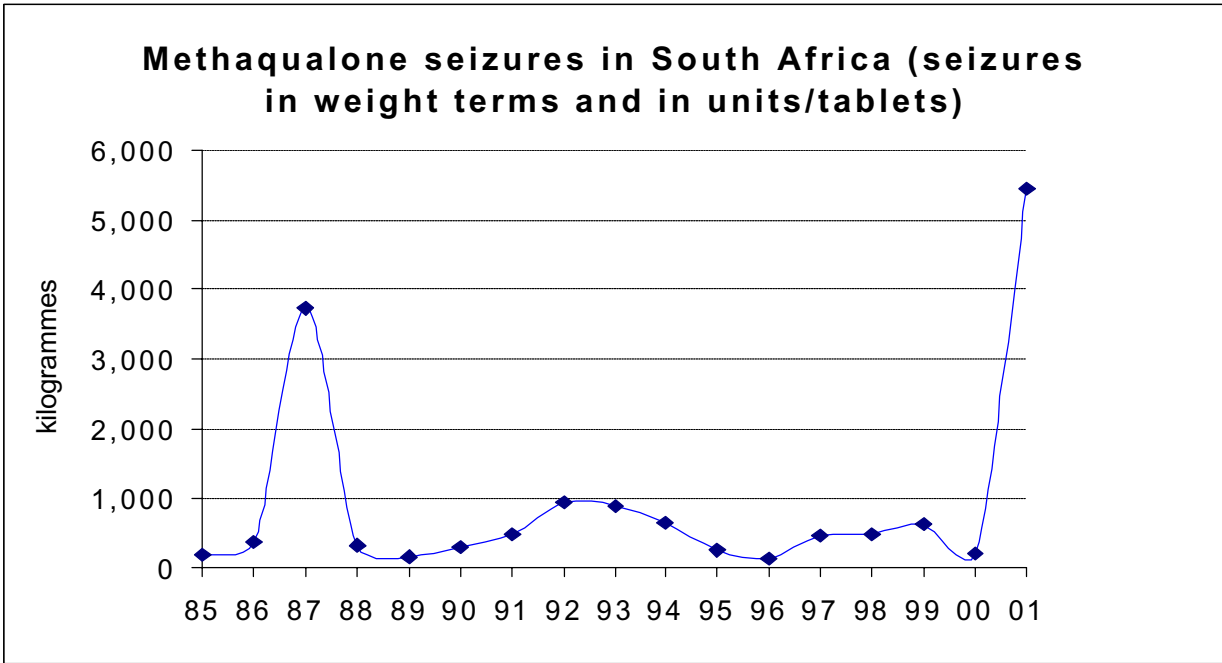


Figure 7: Mandrax seizures (1985-2001).
Sources: UNDCP, ARQs; SAPS Forensic Science Laboratory (for 1999 and 2000-to-October figures).
Note: The analysis of seizure data is complicated by reporting practice. Mandrax seizures are reported overwhelmingly in terms of units (tablets), but reports also are made in weight terms (kg). In order to gain an overall picture, the two measurements have to be combined even though the results are then only rough approximations and have to be interpreted with caution. In addition, it is normally the case that a transformation ratio is used to reflect pure methaqualone as opposed to the weight of the tablet/mass which contains other additives. The numbers used in this diagram reflect a standard Roussel® transformation ratio of 250 mg of methaqualone per unit (tablet) and 500 mg per powdered gram. Thus, for example, the seizure figure for the year 2001 was arrived at in the following manner. Seizures of tablets = 1,280,224 tablets x 0.25 = 320,056 g = 320.056 kg + Seizures of powder = 10,231.276 kg x 0.5 = 5,115.638 kg. Total = 5,435.695 kg.

For many years mandrax use was widespread among the Coloured and Indian/Asian communities. However, since the late 1980s and early 1990s, its use has also started to spread to the Black/African community. Although some of the mandrax tablets are produced locally

(the precursors for which are generally imported), most of the tablets seized on the streets in South Africa have been imported. The main source countries are India and China, with the latter eclipsing the former in recent years as the primary source of supply. Within the last three years, the number of significant seizures of mandrax originating in China has proven a source of concern for South African law enforcement officials. The February 2000 seizure and dismantling of the largest mandrax laboratory in the southern hemisphere in Maputo indicates the extent to which South Africa is seen as a lucrative market for organized criminal groups operating in Mozambique.³⁴ Moreover, there have been reports in Zambia (Grove 1994, van Aarde 1997, SAPS 1998) and known cases in Mozambique of the production of mandrax for export to South Africa.

The pattern of mandrax seizures in South Africa has tended to reflect massive busts followed by periods of sparse enforcement success between – as well as within – successive years (see Figure 7). The data suggests that mandrax seizures rose in the late 1980s – with what was then a record high reported in 1987 following the dismantling of the first large mandrax laboratory in the country. Following gradual increases over the 1989-1992 period, seizures fell during 1992-1996. They started rising again during the 1996-1998 period, reaching the levels of the early 1990s, again, on account of large factory-type seizures. Such patterns may not reflect shifting enforcement priorities but rather successful police work which simply resulted in large busts. The seizure figures for 2001 show a steep increase following the seizure, during the second quarter, of 2.1 tonnes of powdered mandrax inbound from China. This trend will certainly increase in 2002 with the seizure of significant numbers of mandrax tablets and precursor chemicals from India.

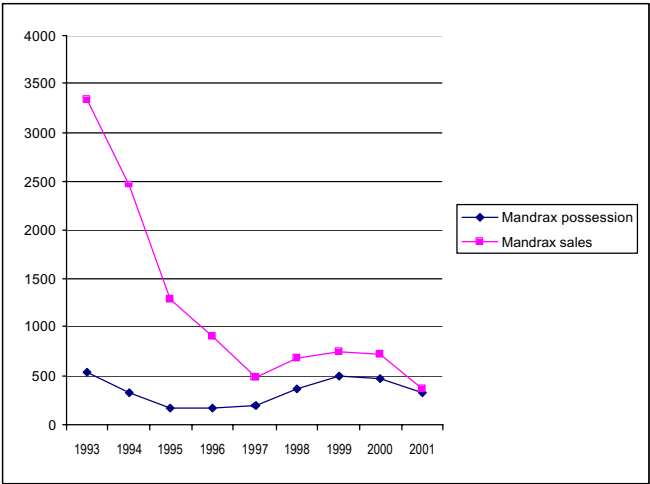


Figure 8: Mandrax arrest data 1993-2001. Source: SANAB.

Arrest data for mandrax (see Figure 8) also mirror, to a degree, the seizure data with a significant fall from the peaks of the early 1990s. There has been a tendency to plateau off at the lower level from 1996. This may support the contention that policing priorities were readjusted to tackle the more addictive drugs which were then entering the South Africa drug scene.

Until very recently, informed opinion held that, of the amount of mandrax consumed within South Africa, slightly less than half was produced locally.³⁵ Given the sizeable

34 In February 2000, South African police provided support to the Mozambican government in this operation which resulted in the seizure of 292 kg of mandrax tablets.

35 Local production was argued to be increasing substantially to meet local demand. A causal connection was even surmised in respect of the crackdown on mandrax production in India in the early 1990s as it was argued that this then resulted in increased domestic production (OGD, 1997/98).

quantities being seized at South Africa's ports of entry, this assumption may need to be revised downward. The overwhelming bulk of mandrax is still seized in "units" (i.e., tablets or end-product) and not in weight terms (normally reflecting powder seizures at the site of clandestine laboratories). However, even here there is room for debate because the 2.1 tonne mandrax seizure in 2001 was evidently destined for pill presses located inside South Africa itself which would convert the drug into the tablets normally bought on the street.

On mandrax, then, it is possible to conclude with two points. First, because of its political history, the origins of mandrax's introduction into South Africa will perhaps always remain shrouded in mystery. Second, mandrax remains a commodity much in demand, as judged by the continued alarmingly high level of seizures. These trends weaken the explanatory power of an earlier contention that mandrax use had been supplanted by the introduction of crack cocaine since the mid-1990s.

Trafficking in cocaine

Cocaine used to be classed as a drug only consumed by small sections of the South African White upper class. When consumed as cocaine hydrochloride (i.e., cocaine powder), this claim largely remains accurate. However, since 1995, crack cocaine has emerged as a significant feature of the South African drug market and, along with cannabis, crack is the drug most consumed on a trans-ethnic basis.

While South Africa initially served mainly as a point of transshipment for cocaine leaving the Andean countries en route to Europe, it has – in recent years – started to emerge as an important market in and of itself. Most of the South African-bound cocaine from the Andean region still leaves mainland South America via Venezuela or Brazil (SAPS 2000). From there it enters South Africa either directly or via other African countries. The

latter may either have a language connection to Brazil (e.g., Angola and Mozambique) or a perceived proximity advantage (e.g., Zimbabwe).³⁶ During the early to mid-1990s, almost all of the cocaine entering South Africa was couriered from Brazil directly into Johannesburg by air. However, following enforcement successes countering this smuggling route, a number of alternative routes emerged, including flights to Cape Town and flights to other African

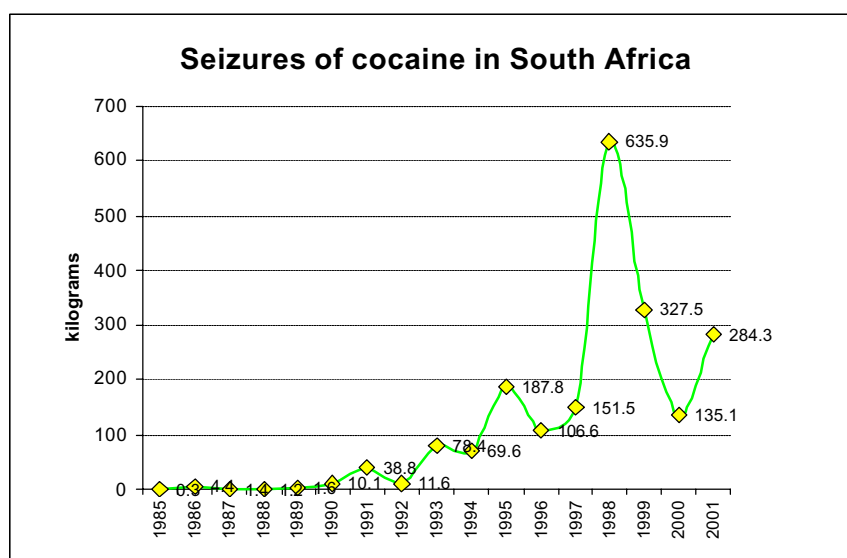


Figure 9: Cocaine seizures. Sources: ARQs, SAPS Forensic Science Laboratory (Pretoria).

36 SAPS and other reports in 2001 speak of South African couriers bringing cocaine from Brazil in transit via Johannesburg International Airport en route to Harare. From Harare the drugs are placed in vehicles and smuggled back into South Africa by overland route.

countries and then overland to South Africa, including from Mozambique, Angola, Zambia, Zimbabwe and Namibia (OGD 1997, OGD 1998).

South African police statistics show that 65 per cent of all cocaine seizures in South Africa in the year 2000 occurred at Johannesburg International Airport. The utilization of air passenger couriers is still the dominant mode of smuggling cocaine into South Africa, although smuggling via air freight occurs regularly. A cocaine smuggling ring among employees of South African Airways was discovered in 2000. Seizure statistics for 2001 show increases owing primarily to two large seizures of cocaine by Cape Town enforcement officials (in July and August) aboard ocean going vessels originating in Latin American ports and destined for China. In March 2002, SAPS seized 350 kg of cocaine hidden in a container vessel in Cape Town harbour with a street value of approximately US\$10 million which was destined for onward shipment to Lome, Togo.

On the strength of these trends, South Africa is demonstrating itself to be an important – perhaps even the most significant – market for cocaine within Africa.³⁷ According to the most recent comparative analysis (for the year 2000) more than 21% of all cocaine seizures on the African continent took place in South Africa, up from a share of just 5% in 1993 (UNODCCP 2002). In 1999, South Africa accounted for 82% of Africa's cocaine seizures (UNODCCP 2002). These statistics point to a shift in the balance of African cocaine trafficking from Nigeria in today's terms (currently 13%, UNODCCP 2002) from where it stood in 1993 (well over 90% of all African cocaine seizures, ARQ 1993). The shift from Nigeria to South Africa does not, however, reflect a loss of influence of Nigerian drug trafficking groups (Shaw 2001). Police and other data show a strong correlation between the migration of Nigerian nationals into South Africa starting in 1992 and the introduction of high quality cocaine into the country (Venter 1998a). The immediate result was a dramatic price fall for the drug within a short time. South African estimates put the percentage of its cocaine trade in the hands of West African trafficking organizations, notably Nigerians, to be in the vicinity of 80% (Drug Advisory Board 1998, Leggett 2000, SAPS 2001).³⁸ Police and other sources report that since 1993 the bulk of the trafficking has been in the hands of Nigerian organized crime syndicates (SAPS all reports, Leggett 2001, Shaw 2001).

Even omitting the year 1998 – which witnessed an unusually large seizure³⁹ – data for the 1990s (see Figure 9) shows an overall increase in the seizure levels of cocaine. The escalating trend is also noted in the generally rising arrest figures (Figure 10). While the picture regarding arrests and seizures is uneven, the overall trend increase is nonetheless clear. Not depicted in either the seizure or arrest statistics, but still of significance, is the fact that there is a very definite shift towards dealing in crack cocaine as opposed to cocaine powder.

37 South Africa's level of cocaine seizures is still relatively small when measured globally. For example, in 1998, it accounted for 0.2% of global cocaine seizures.

38 The perception of Nigerian domination of the trade has been challenged. See for example: Tangeni Amupadhi and Miepje Commandeur "Blame it all on the Nigerians", electronic *Mail & Guardian*, April 18, 1997. For more recent critiques see Aminu 2001 and Chukwuma and Alemika 2001.

39 This was due to a single seizure of a container in which approximately 300 kg of cocaine (suspended in liquor) was concealed.

This change in the pattern of consumption indicates that increasing numbers of users are choosing crack – probably because of its potency combined with its affordability.⁴⁰

There can be no doubt that trafficking in cocaine has exhibited a strong increase in recent years whether one looks at arrest data or seizure figures. Whichever indicator is used, over the past few years cocaine powder and crack cocaine have both been making inroads into the South African drug market scene. The upward trend is reflected in seizure and arrest data. There has been a strong increase in cocaine seizures in recent years which, arguably, cannot be accounted for exclusively in terms of increased law enforcement efforts.⁴¹ Violence related to the cocaine market tends to be related more to acquisitive violent crime (mainly robbery) associated with the crack market than to competition for market share.

Ethnographic research within South Africa indicates that the growth in the cocaine market did not simply happen, but was actively developed by organized drug trafficking groups, often through free give-aways to sex workers in exchange for their assistance in promoting and distributing cocaine (especially crack-cocaine) among their clients (Leggett 1998 and 1999c). Foremost among these have been Nigerian criminal groups which have thus developed the market. This market is now maintained through a rather sophisticated system in which addicts have the option of paying either in cash, or in kind. This means that they can pay with stolen goods which are then re-sold again to individuals in disadvantaged communities at relatively low prices.

Some of the cocaine imports from Latin America for “White” rave clubs are allegedly controlled by individuals and groups associated with the Italian mafia (notably the Cosa Nostra). Following the crackdown on the mafia in Italy, a number of mafiosi took up refuge in South Africa and started their new careers with both legal and illegal activities. Illegal activities include involvement in the cocaine trade and in money laundering operations (OGD 1998).

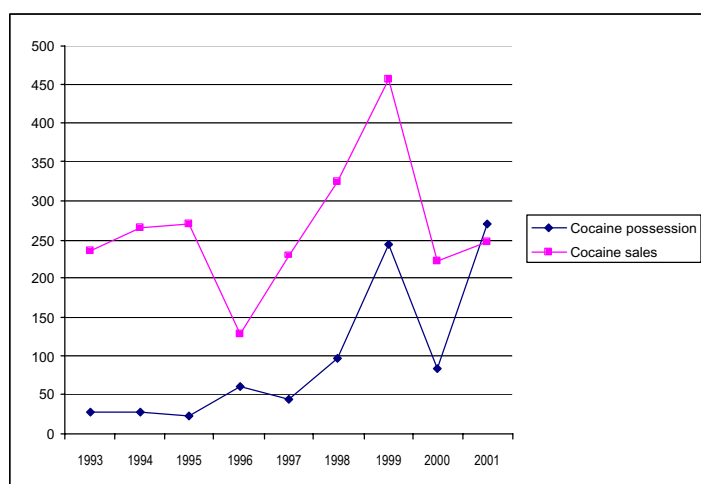


Figure 10: Cocaine arrest data 1993-2001. Source: SANAB.

Some of the crime and violence in South Africa would appear to be linked to the need to pay for cocaine consumption as well as to the fights among gangs trying to increase their market share of this particular drug (Leggett 2001, Parry, Louw and Pluddemann 2001). Cape Town has been affected by such gang wars. Cape Town and Gauteng remain the largest

40 The price of one rock (1g) was, on average, R50 = US\$5.00 in April 2002.

41 Note: for a discussion of the issue of whether or not increased seizures reflect a greater volume of trafficking, see UNODCCP 2000, pp 36-37, “Following the tracks: Using seizures to identify trends”. The report concludes that “seizure statistics – even without additional information – are a relatively good indicator for the identification of trafficking trends once longer periods are investigated.”

cocaine markets in South Africa. Acquisitive violent crime (robbery) is also related to the crack market in the Hillbrow district of Johannesburg (ISS 2002).

Trafficking in heroin

Over the past decade, perhaps the most disturbing trend in the South African drug market has been the alarming rise in heroin trafficking and consumption. Figures 11 and 12 depict this sustained upward trend. The broad pattern in the arrest and seizure data is mirrored in the consumption data.

During the 1990s, in marked contrast to South Africa’s role as an important transshipment point and market for cocaine, the extent of heroin trafficking could reasonably be termed modest. However, recently it has increased markedly. Even though the quantities involved are still small – with earlier significant seizures in 1990 and 1994 of heroin adding incongruous blips to the overall trend line (Figure 11) – seizure data for the past half decade show a sustained and strong trend increase. Arrest data for both possession and dealing since 1993 also depict a similar steeply upward trend.

Although the transshipment – via South Africa – of heroin destined for the US and Europe has been detected, it is clear that the majority of the heroin trafficked into South Africa is intended for domestic consumption. Most worryingly, its use is spreading rapidly in the school-going population, especially, but not exclusively, among those whose income base permits experimentation in this substance. A growth of evidence, both from sentinel surveillance sites (MRC 2001a) as well as anecdotal sources, points to significant increases in heroin consumption predominantly among White suburban school-going youth. However, even this trend is changing as cheaper heroin becomes available to the poorer residents in disadvantaged communities (e.g., Langa in Cape Town and Hammanskraal north of Pretoria).

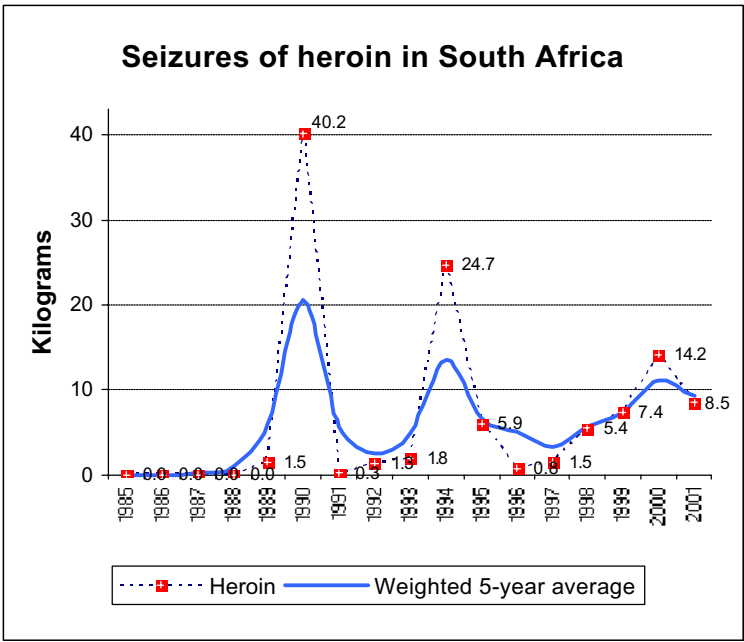


Figure 11: Heroin seizures. Sources: ARQs, SAPS.

Like cocaine, the heroin entering South Africa is mainly imported by air, principally via Johannesburg International Airport (see section 3.4 above). It comes from South East Asia and to a much lesser extent, South West Asia. There is increasing evidence of heroin originating in South West Asia entering South Africa overland via Kenya, Tanzania and Mozambique.

As is the case for cocaine trafficking, Nigerian criminal syndicates are heavily involved in trafficking heroin into and within South Africa (DEA 1996, Klein 1999, Leggett 2000, INSCR 2001). According to SAPS, most Nigerian immigrants – including many of those who have entered South Africa illegally – are law-abiding. Yet this diaspora also has attracted significant criminal elements who move from one country to another where the risk of law enforcement is perceived to be lower and opportunities for new forms of criminal entrepreneurship greater (SAPS 2000, SAPS 2001). The centre of cocaine and heroin smuggling operations has been located in the residential hotels located in the Hillbrow district of Johannesburg. Since mid-2001, largely due to enforcement activity by the SAPS, these operations have become more decentralized. Recent evidence from Cape Town and elsewhere also would suggest that while the cocaine and heroin trade is still largely in the hands of Nigerian syndicates, there appears to be prominent involvement in the heroin trade by nationals from Tanzania, Burundi, Kenya and Ethiopia, often under the misnomer “West African Nationals”.

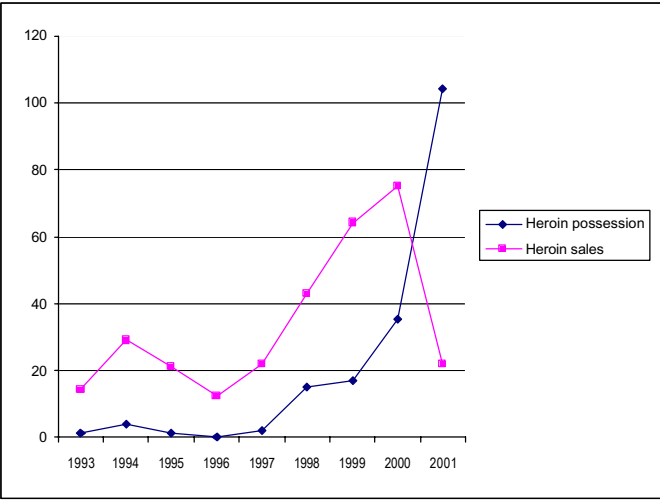


Figure 12: Heroin arrest data 1993-2001. Source: SANAB.

Trafficking in ecstasy, LSD and amphetamines

Mirroring trends in Europe, **ecstasy** has become a significant drug of abuse in recent years in South Africa. Similar also to the situation in Western Europe, use of ecstasy has been closely associated with rave parties and the club scene. In parallel with the increased popularity of this drug, seizures have also grown steadily. In 1998, South Africa had by far the highest number of ecstasy seizures of any African country and ranked 9th at the global level. Compared with Europe, however, the spread of ecstasy occurred rather late. Effectively it started only in 1994 following the opening up of South Africa to the outside world associated with the country's new democratic era. Rave parties can bring together an average of nearly 10,000 people at least twice a month in South Africa's largest cities (Johannesburg, Cape Town and Durban). Reports from the late 1990s estimated that on average 70% of youths attending these parties were taking synthetic drugs of which the preferred drug was ecstasy (OGD 1998). In 2000, a RaveSafe⁴²

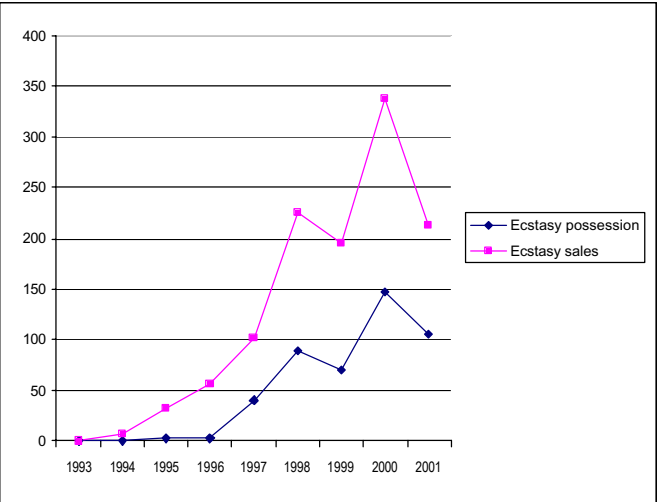


Figure 13: Ecstasy arrest data 1993-2001. Source: SANAB.

42 RaveSafe is an independent, South African non-profit organization run by volunteers whose stated objective is to inform ravers about how to avoid unnecessary danger when using drugs. They have stands at most big raves and distribute informational literature and provide advice.

study in Gauteng found that 88% of respondents had tried ecstasy at least once, and of these, 23% were using it weekly (SACENDU 2001).

Combined data on arrests for possession and dealing in ecstasy (Figure 13) show a steep rise, especially between 1999 (280) and 2000 (just under 500). Corresponding seizure figures are depicted in Figure 14. Year to date figures as of October 2002 indicate an increase in the number of tablets seized in that year over 2001. Although a few ecstasy laboratories have been seized in South Africa (see section 3.2 above), the bulk of what is consumed in the country is imported from Europe, notably from the Netherlands and the UK (SAPS 2000).

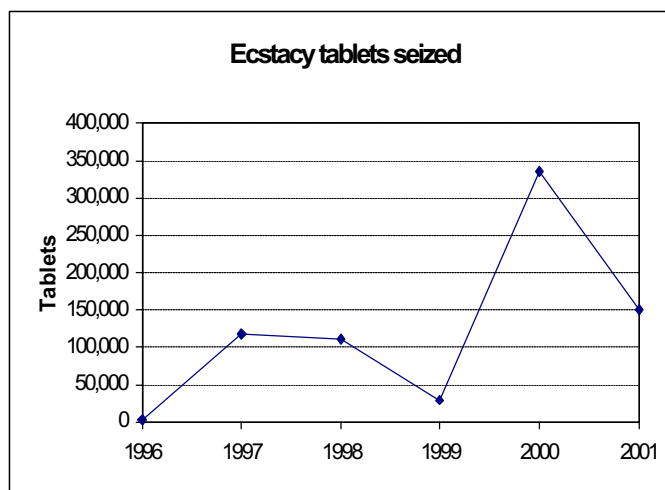


Figure 14: Ecstasy seizures 1996-2001. Source: SANAB.

Consumption and trafficking, until recently, have tended to be in the hands of White South African syndicates (the so-called "bouncer mafias") as well as some Europeans (notably from the UK and the Netherlands) (Leggett 2000). Within the past two years, however, and owing to their dominance of the trafficking market in cocaine and heroin, control of the market chain for the supply of ecstasy has, to a degree, shifted into the hands of organized criminal syndicates from Nigeria (SAPS 2001).

For product being imported into the country, the preferred mode of transport continues to be the postal system and fast courier services (SAPS 2000). South Africa's role in the international trafficking in club drugs – this time as a transshipment point – was underlined in May 2002 when 36,000 tablets of ecstasy were seized in a shipment en route to New Zealand.⁴³ The syndicate allegedly involved in this deal had a prior record of smuggling compressed cannabis from South Africa into Europe in barter deals for club drugs.

The consumption and trafficking of **LSD** is still largely in the hands of White South Africans. The popularity of LSD, and thus trafficking in this substance, is generally less significant than that of ecstasy. Nonetheless, seizures of LSD were the largest in Africa and the 15th largest worldwide in 1997, the most recent year for which comparative data is available.

Easy availability of **speed (methamphetamine)** has been reported from South Africa. Speed is frequently trafficked together with ecstasy or together with LSD (MRC 1999). However, large scale availability is not – as yet – reflected in South African seizure data reported to ODC. It is also important to note that what is often reported as "speed" in the South African context is not actually methamphetamine, but ephedrine. Thus, the seizure reports have to be treated with caution.

43 Report in *Pretoria News* 14 May 2002, confirmed by SANAB.

Trafficking in other drugs

Wellconal (dipipanone hydrochloride), a synthetic opiate, is still considered to be a “White” drug. It served, for many years prior to the opening up of South Africa, as the *de facto* substitute for heroin which was not readily available in the country. Trafficking in this substance seems to have diminished in recent years, with most illicit supply deriving from the forgery of doctors’ prescriptions. As is the case in many other countries, **benzodiazepines**, including **diazepam (Valium)**, have gained in popularity in recent years and is illegally obtained over the counter (OTC).

3.5 Diversion of Drugs

In addition to the trafficking of drugs from illicit sources, there is also some diversion from licit channels. Traditionally, diversions concerned mainly synthetic opiates such as **Wellconal, morphine or pethidine**. More recently, diversions were also reported for **benzodiazepines**, notably **diazepam (Valium)** (ARQ 1998 and previous years). There also have been cases of diversion of **flunitrazepam (Rohypnol)**, another benzodiazepine. The overall extent of diversions, however, seems to be less significant if compared to many other African countries. Up to 5% of patients seen at specialist treatment centres across a number of sentinel surveillance sites in Cape Town, Durban, Port Elizabeth and in the provinces of Gauteng and Mpumalanga, during the period January to July 2001, reported over-the-counter medicines or prescription medicines as their primary substance of abuse (SACENDU 2002).

3.6 Drug Prices

In line with reports of the general availability of illicit drugs in South Africa, drug prices have remained relatively stable in rand terms or have even declined. However, once they are translated into US dollars, the impact of South Africa’s currency depreciation in recent years yields a strong downward price trend. For example, according to information provided by the South African authorities in response to UNDCP’s Annual Reports Questionnaire (ARQ), heroin prices – if expressed in US dollars terms at the then current exchange rates – fell by more than 75% between 1992 and 2001 (see Figure 15). Cocaine prices fell by approximately the same margin over the same period (see Figure 16).

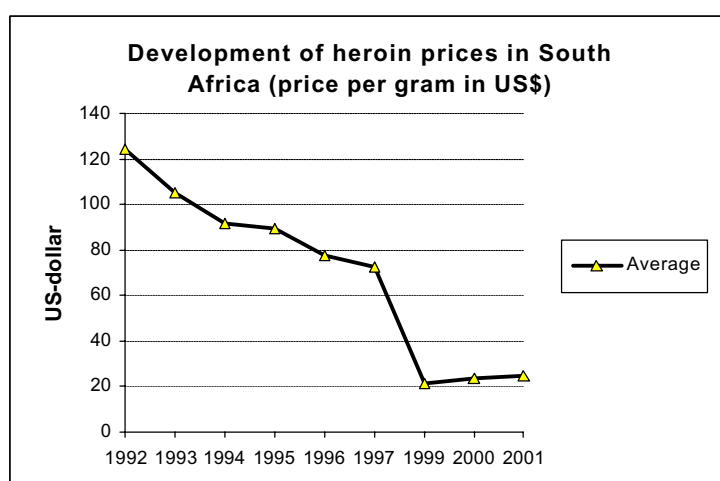


Figure 15: Heroin prices (price per gram in US dollars).

In rand terms, the values have remained stable or have declined somewhat. Lower prices, especially for crack cocaine, and, very recently, heroin, have made both drugs

affordable to a far broader range of people, including youth, than was the case previously. Measured in dollar terms, unit prices for both heroin and cocaine in South Africa are now substantially lower than in North America or Western Europe.

The continued low and even declining price of South Africa’s imported illegal drugs during a period of steady decline in the value of the rand (from the mid-1990s to the present) is a complex phenomenon. It has occurred while the prices of legitimate imports have predictably increased as a result of the depreciating rand. A number of explanations have been proffered

for this phenomenon, none of which — alone — is satisfactory.

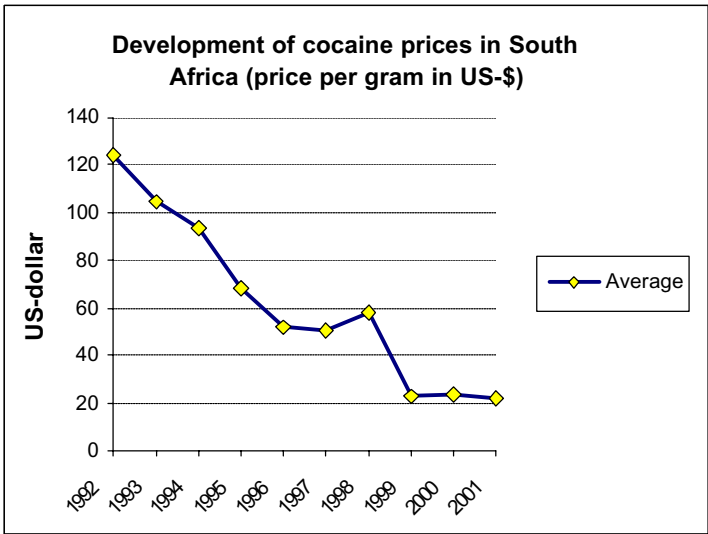


Figure 16: Cocaine prices (price per gram in US dollars).

First, it is a fact that illegal drugs like cannabis — or the results of other forms of criminal activity such as stolen cellphones, vehicles, and other property, etc. — are being exported under a form of barter arrangement for other imported drugs like ecstasy, cocaine and heroin. Such a barter arrangement, it has been argued, is a significant factor in the continued low price of these imported illegal drugs (Leggett 2001).

Second, there is the fact of greater 'competition', i.e., a larger number of smaller groups getting involved in importing drugs instead of a few big organizations. With unemployment relatively high and the economy far from booming, prospects to be able to generate sufficient legitimate income in the medium term are also limited. As a result, it is probable that individuals will be prepared to take more risk, without asking for more money. This will contribute to the price trend observed.

More speculative explanations have been advanced. One is the impact of a parallel decline in the international production cost of the various drugs. However, such a decline has not been consistently observed — at least in a manner that generally mirrors the South African rand-denominated stable or declining price trends.

Another possible explanation is declining purity levels. Declining purity would mean that drug producers and traffickers have lower costs for each unit of their drug, and this lower unit cost could be passed along to the drug user in the form of a lower price. Unfortunately, there have been no consistent surveys of drug purity in South Africa to permit a proper examination of this proposition.

Finally, a low price trend also could be accounted for by changes in the perception of risk by the trafficking organizations or other elements in the illegal drug market chain. Unlike the case for legitimate commodities, the element of perceived risk of law enforcement imposes additional costs to the eventual street price of any illegally-trafficked drug. If this perception of risk is high, the corresponding cost of trafficking the drug — and the resulting street price — will increase. If it is low, the reverse will be true.

Table 5. Street prices of illicit drugs in South Africa (national estimates) (at the current rand/dollar exchange rate)			
	1993 (in US\$)	1997 (in US\$)	2002 (in US\$)
Mandrax (tablet)	9.3	6.8	4.0
Ecstasy (tablet)	18.6*	13.5	8.0
Heroin (gm)	52.4	42.3	18.0
Cocaine (gm)	50.7	42.3	25.0
Cannabis (joint)	0.2	0.2	0.1
Speed (unit)	8.5**	8.5	3.8
LSD (unit)	n.a.	8.5	4.2
Hashish (gm)	n.a.	0.9	n.a.
Cat (gm)	n.a.	n.a.	12.0
* 1994 ** 1996 Sources: SANAB, quoted in Charles Parry and Andreas Plüddemann (South African Medical Research Council), "Draft Country Profile: South Africa for UN World Drug Report", October 1998. SACENDU 2001. South African Community Epidemiology Network on Drug Use (SACENDU) <i>Research Brief Vol 4 (1)</i> , 2001, covering the period July 1996 - December 2000, published by the South African Medical Research Council, 2001.			

3.7 Demand

Prevalence in the general population

As is the case worldwide, the illicit – and therefore hidden – nature of drug use makes the collection of information on drug consumption particularly difficult. South Africa is no exception. Drug users are often reluctant to admit to their drug use due to fear of prosecution or, as illicit drug use is also a highly stigmatised activity in many societies, persecution. This difficulty may be compounded by the tendency for illicit drug use to often be prevalent among socially marginalised populations. Thus, many drug users are difficult to access and are often under-represented in household and school surveys. As a result, drug use prevalence data in most regions of the world is sparse at best, often relying on proxy indicators of use, such as treatment demand, rather than direct measures of prevalence such as population surveys. At a global level, the quality of drug use estimates available for each country is generally directly proportional to the level of development in that country.

For this reason, the best prevalence estimates currently available describe the drug use situation in Western Europe, North America and Australasia. In most developing countries, prevalence estimates either simply do not exist or where they do exist they are often of poor reliability and validity. While South Africa does not differ from the majority of developing countries in this regard, by developing country standards there is a reasonable amount of good quality information available describing demand for illicit drugs in the country.

An integrated drug information system, the South African Community Epidemiology Network on Drug Use (SACENDU) has been operational in South Africa since July 1996. This network provides information on drug demand trends based primarily on indirect

indicators such as demand for treatment (in treatment centres and psychiatric hospitals), drug-related arrests, drug seizures and drug-related mortality. Data from SACENDU is supplemented by ad hoc surveillance studies such as rapid situation assessments and school surveys. Very few estimates have been made of the prevalence of illicit drug use in South Africa, and to date no household surveys have been conducted.

The South African Medical Research Council (MRC) has arrived at the ranking of the prevalence of illicit drug use in South Africa given in Table 6, based on a comprehensive review of all existing studies and the findings. In terms of drug-related morbidity, i.e., adverse health consequences (as reflected in treatment data), the MRC ranks cannabis and mandrax as the primary and secondary drugs of abuse in South Africa, followed by cocaine/crack.

The findings of SACENDU suggest that, as in almost all other countries of the world, the most widespread illicit drug used in South Africa is **cannabis**. While SACENDU does not attempt to estimate prevalence, a previous study (HSRC 1991) conducted in 1990 reported an annual prevalence of cannabis use among Black/African males (14 years and above) of between 5.3% and 22.3%. This compares to an annual prevalence of cannabis use in the general population of the EU and the U.S. of approximately 5.5% and 9% respectively (average in the 1990s). Trend data from SACENDU suggests that the prevalence of cannabis use has remained relatively constant since this study was conducted. In the major urban centres of Gauteng province, Cape Town, Port Elizabeth and Durban, cannabis has been found to dominate drug-related arrests since the introduction of SACENDU sentinel surveillance. Similarly, cannabis is consistently the dominant illicit drug abused by those seeking treatment, and it is reported as the primary substance of abuse by between 10 and 20 percent of patients.

Table 6. Drugs of abuse in South Africa Ranked according to estimated prevalence and morbidity (1997/98)			
Extent of use Ranking		Morbidity (as indicated by treatment data) Ranking	
1	Cannabis	1	Cannabis
2	Mandrax (methaqualone)	2	Mandrax (methaqualone)
3	Other depressants (mostly benzodizepines)	3	Cocaine/crack
4	Inhalants (glue, thinners)	4	Other depressants (mostly benzodiazepines)
5	Cocaine/Crack	5	Heroin and other opiates
6	Amphetamine-type stimulants (ecstasy and speed)	6	Amphetamine-type stimulants (ecstasy and speed)
7	LSD	7	LSD
8	Heroin and other opiates	8	Inhalants (glue, thinners)
Source: South African Medical Research Council, Draft Country Profile, October 1998.			

Cannabis used in conjunction with **mandrax** (methaqualone), a combination known as "white pipe", contributes to a further 5-15 percent of treatment admissions reported to SACENDU. The only data for this combination currently available suggest an annual prevalence of less than 4% among the male adult (14 years and above) population (Flisher

1998). This figure relates to a squatter settlement. It is likely that the figure for the general population is significantly lower. Treatment demand and arrest data suggest that this combination is more prevalent in the Cape Town and Durban regions. This may reflect the differences in the popularity of mandrax between cultures and regions. Between 10 and 50 percent of drug-related arrests are for mandrax.

Table 7. Treatment demand for illicit drug-related problems 1996-2001 (as % of total)									
Location	Period	Cannabis	Cannabis mandrax	Cocaine/ Crack	Heroin	Ecstasy	OTC / PRE	Other drugs	Alco- hol
Cape Town	1996b	4	9	2	1	<1	2	2	81
	2001b	12	25	6	6	1	2	2	46
Durban	1996b	10	10	1	< 1	< 1	1	4	73
	2001b	26	7	8	< 1	1	<1	<1	58
Port Elizabeth	1997a	23		< 1	< 1	< 1	5	13	58
	2001b	36		1	0	1	4	<1	58
Gauteng	1998a	11	5	8	< 1	< 1	4	3	69
	2001b	24	5	6	7	<1	4	2	52
Mpumal- anga	1999a	13	1	3	< 1	< 1	3	2	76
	2001b	15	3	2	1	2	5	3	69
a/ January-June b/ July-December OTC = Over-the-counter drugs; PRE = prescription drugs Source: SACENDU 2002b.									

Although increasing ethnic integration in South Africa is evident, the drug markets of South Africa remain somewhat ethnically segmented. This is likely to be related to extreme income inequalities between the different broad ethnic segments which affect drug affordability and, with it, consumer choice. This has been underscored by recent research. For example, evidence from a recent study of arrestees (Parry, Louw and Pluddemann 2001) suggests that mandrax is most popular among the Coloured population. Nationwide, mandrax was the second most frequently detected illicit substance among those tested in police holding cells. In urinalysis, Coloured and Indian/Asian arrestees were approximately four times more likely to test positive for mandrax than Black/African and White arrestees, with 46% of Indian/Asian and 53% of Coloured arrestees testing positive, as compared with 12% and 13% of Black/African and White subjects respectively (Parry, Louw and Pluddemann 2001). These results do need to be interpreted with some caution however, as arrestees may not be representative of the broader population. In the Black/African population, mandrax appears to be most popular in former township communities where it has been associated with gangsterism. While mandrax continues to play a role as a “come down”⁴⁴ drug, it has been

44 The use of a drug to “come down” refers to the process of taking a drug – usually a depressant – to return the user to something similar to his or her original state following their preceding use of another drug – typically a stimulant – to get high.

suggested that it is being supplanted by crack to some extent among sex workers (Leggett 2000).

Treatment demand data suggest the emergence of **cocaine** as an important drug of abuse in South Africa (Table 7). From 1997 to 2000, the proportion of treatment centre patients reporting cocaine, in the form of both powder and **crack**, as their primary drug of abuse has increased from approximately 1% to between 5-10%. Regionally, treatment demand for cocaine is greatest in Gauteng, Cape Town and Durban, and it is still relatively uncommon in Port Elizabeth (Eastern Cape) and the predominantly rural province of Mpumalanga. Arrest data support this trend, with the proportion of arrests for cocaine in Gauteng, Cape Town and Durban increasing from approximately 10% to approximately 20% between 1997 and 2000. Data from the arrestees study suggests that cocaine use is more prevalent among the White and relatively more affluent communities. Arrestees testing positive for cocaine were disproportionately White, female and reported a higher average income. It is likely however that this result reflects the high proportion of sex workers among those arrested and is again unlikely to be representative of the pattern of use in the general population arrested.

Heroin use is an emerging trend in South Africa (Table 7). In Cape Town and Gauteng, heroin was reported as the primary drug of abuse by approximately 5% of treatment centre clients in 2000, having increased from approximately 1% in 1997. This trend is also apparent in arrest data for these regions, increasing from 1 to 5% of drug-related arrests between 1997 and 2000. Existing evidence suggests that the majority of heroin use occurs among the younger White middle class population in the major urban areas, namely Cape Town, Johannesburg and Pretoria. While the majority of heroin users are male, the ratio of males to females is lower than for other illicit drugs. The limited evidence currently available suggests a transition from smoking to injecting as a route of administration among some heroin users. For example, the most recent SACENDU findings report that “intravenous use by patients with heroin as their primary drug of abuse seems to be increasing with 51% of heroin patients in Cape Town reporting some injecting versus 36% in Gauteng” (SACENDU 2002b).

While arrests for **amphetamines** are rare – consistently comprising less than 1% of all drug-related arrests – arrests for certain amphetamine-type stimulants (e.g., ecstasy) have fluctuated significantly between years and across sites, ranging from 2% to 22% of all drug-related offences. As with arrests, treatment demand for amphetamine-type stimulants remains very low, accounting for less than 1% of treatment demand for the years 1997 to 2000. This may reflect the fact that users of these substances are generally under-represented among treatment populations, despite often having a relatively high prevalence of use.

There are also some important regional differences in South Africa’s drug market. Based on the proportion of people in treatment centres, with regard to their primary substance of abuse, data suggest (a) that Gauteng may be the largest market for cocaine, followed by Cape Town; (b) that Gauteng may be also the largest heroin market; and (c) that Durban is the largest market for cannabis, ahead of Port Elizabeth.

Data also appear to confirm that the strongest growth throughout South Africa in recent years was in cocaine, although there has also been an increase with regard to heroin.

Prevalence in the youth population

The most comprehensive school-based prevalence study conducted to date (Flisher 1998) generally confirms these patterns of use (see Table 8). However, among 11th grade pupils, inhalants (primarily glue) appear to be more popular than in the wider population, and the use of ecstasy exceeds that of crack cocaine. This study also confirms that drug consumption is two to three times more common among males than among females, as international experience would lead one to expect. The only exception to this pattern is for ecstasy use, where male abuse is only one third higher than abuse among females.

Table 8. Life-time prevalence of substance abuse among 11th graders in Cape Town in 1997 (n=2,770)				
	Cape-Town			U.S. 1997
	Male	Female	Unweighted average	10 th graders (Monitoring the Future study)
Cannabis	32.0%	13.1%	22.6%	42.3%
Glue / inhalants	15.8%	4.9%	10.4%	18.3%
“White pipe” (cannabis/mandrax)	5.7%	1.9%	3.8%	n.a.
Ecstasy	4.3%	3.1%	3.7%	6.9%*
Crack-cocaine	2.6%	1.0%	1.8%	7.1%
Other	3.9%	2.4%	3.2%	n.a.
* = figure for 12 th graders. Source: Flisher 1998.				

According to preliminary results of research during 2000 regarding grade 7, 10 and 11 students from 35 secondary schools in Pretoria, conducted by the Department of Criminology and the Institute for Criminological Sciences of the University of South Africa, more than one quarter of the respondents had witnessed illegal drugs being sold on their school grounds, while 42% had personally seen illegal drugs being sold in their neighbourhood. When the results were broken down according to race, approximately 75% of Coloured students had witnessed illegal drugs being sold at school. This compares with 42% of Indians/Asians, 25% of Blacks/Africans and 13% of Whites. Approximately 83% of Coloureds, 55% of Indians/Asians, 42% of Blacks/Africans and 29% of Whites had observed drugs being sold in their neighbourhoods (Neser et. al. 2001).

The same survey revealed that when asked whether they knew a friend or classmate who had been using illegal drugs such as LSD, ecstasy, cocaine or heroin, the majority of Coloureds (79.3%) confirmed that they did. Of the other groups approximately 57% of Indians/Asians, 40% of Whites and 37% of Blacks/Africans answered in the affirmative. On the question of whether they thought their particular school was drug free, approximately 75% of Coloureds, 64% of Indians/Asians, 49% of Blacks/Africans and 46% of Whites answered that they thought it was not. One-third of the respondents admitted to having smoked cannabis, of which 23% were under the age of 12 and 34% were 15- and 16-year olds. One quarter of the respondents indicated that they had inhaled substances such as glue, petrol and

thinner, and 27% had consumed mandrax, ecstasy, LSD and 22% had smoked crack or cocaine and mandrax (Neser et. al. 2001).

A survey by Bridges — a Cape Town NGO engaged in prevention — of five high schools in the Cape Town metropolitan area during 2000 found that approximately 23% of the students had tried cannabis at least once with the highest proportion (35%) being grade 12 students. Ecstasy was found to be the second most common drug ever used (6% overall) with 12% of the grade 12 students having used the substance. The study also indicated that 36% of students who responded to the questions on drug abuse indicated that someone in their family was experiencing a drug problem (Fisher 2000). Using a larger catchment area, Bridges conducted a similar survey in 2002. Significantly, it was the first to monitor drug and alcohol use among primary school children in the Cape Town metropolitan area. The survey involved a total of 991 primary school and 387 high school pupils. Of the 20% who had tried drugs, 19% were still using them and the average age of first using drugs was 12.1 years. In high schools, 45% had tried any drug, and 32% were still using drugs (Fisher 2002).

The indicator data on prevalence among the youth would seem to suggest the following. Cannabis is the most common illegal drug being used by school children, followed by inhalants, mandrax, ecstasy and crack cocaine. A higher proportion of White adolescents report heroin, cocaine and ecstasy as their primary drug of abuse, with Coloureds and Indians/Asians most likely to report cannabis smoked with mandrax ('white pipe'). Black/African adolescents are most likely to report alcohol as their primary substance of abuse. While it is likely that cocaine — and especially crack — are still generally being used more often (and by more adolescents) than heroin, SACENDU data for Cape Town and Gauteng would seem to indicate that heroin may be overtaking cocaine in the adolescent age group. For example, in the second half of 2001, 9% of patients younger than 20 years in Cape Town treatment centres reported heroin as their primary substance of abuse compared with 3% for cocaine/crack. In Gauteng, 6% of patients younger than 20 years reported heroin as their primary drug of abuse compared with 2.5% for cocaine/crack in the same period (SACENDU 2002b).

Although it may not be possible to generalize national prevalence from statistics obtained in Cape Town and Gauteng, the lifetime prevalence estimates reported in these studies suggest that levels of drug abuse among high school students in South Africa nonetheless remain lower than those of students in the United States and Australia and on a par with those in much of Europe (UNODCCP 2002).

One of the only available studies examining risk and protective factors was undertaken during August 2001 by Research Surveys (Research Surveys 2001). It was conducted among 800 teenagers aged 13-19 years from major metropolitan areas throughout South Africa on their experiences with illegal drugs. The study found that 71% of the total sample had had a discussion with their parents about the risks of using illegal drugs. Whereas 83% of White parents had discussed the risks with their teenagers, only 59% of non-White parents had done so. The survey reported that 70% of White and 93% of Black/African teenagers had never been offered illegal drugs. When teenagers had been offered illegal drugs, two-thirds had been offered the drugs by a friend.

While this data would suggest that talking about drug use is linked to lower rates of experimentation, the fact that drug use is high among Whites in South Africa points to the need to further investigate other potential risk and protective factors in addition to family

functioning. Such factors would include disposable income, peer influence, educational prospects, socio-economic status and other environmental factors (e.g., the acceptability or non-acceptability of drug use among a particular social group).

3.8 Treatment Consequences

The adverse consequences of increasing rates of drug consumption are reflected in rising treatment demand. In the first half of 1998, a total of 4,500 patients were treated in Cape Town, Port Elizabeth and Johannesburg/Pretoria for drug abuse. Another consequence is drug-related violence as is reflected in drug-related injury statistics. A 1997 study of drug-related trauma undertaken by the South African Medical Research Council, found that 40% of injuries at a large hospital in Cape Town were drug-related. Chemical analysis revealed that 29% of the patients had THC in their urine, 10% had mandrax, and 2% had cocaine in their blood. Most patients (85%) were injured as a result of violence, which – at least indirectly – was drug-related (MRC 1998). The results of the 3-Metros (Johannesburg/Pretoria, Cape Town, Durban) study would appear to support this (Parry, Louw and Pluddemann 2001).

Another serious problem is the high rate of HIV infection. In 1997, a national survey of women attending ante-natal clinics (n=12,343) revealed that 16% had already tested positive for HIV, representing a 13% increase over the previous year, and subsequent studies have shown even higher rates. As indicated in Section 1.1 above, this figure is now estimated nationally to be in the vicinity of 24.8% (Department of Health 2000; Department of Health 2001; MRC 2001).

In South Africa, the Department of Welfare reported in 1999 that one in five of the economically active population was HIV-positive. The population of KwaZulu-Natal has already gone into decline as a result of AIDS-induced premature deaths.⁴⁵ As a result, the risk of a proportion of “AIDS orphans” growing up into criminal adulthood is to be considered a human security concern in South Africa (Schonteich 1999). Latest estimates from the South African-based Institute for Security Studies claim that some 300,000 children had already been orphaned by HIV/AIDS with projections that up to 3 million children would be orphaned under similar circumstances between 2002-2012. A burgeoning orphan population, growing up under extreme levels of poverty and without parental supervision will be likely, as a survival strategy, to “turn to crime, drugs, gangs and the sex trade”.⁴⁶

However, the question of delineating a clear chain of causality between drug abuse and HIV/AIDS remains complex. It is possible that the link goes in both directions. In other words, drug abuse is known to be a causal factor in the spread of HIV/AIDS, and HIV/AIDS is also believed to be a factor in causing drug abuse, although this second link needs to be investigated further.⁴⁷

45 As reported in 1999, the national antenatal average for women testing positive for HIV/AIDS was 23%. The provincial figure for KwaZulu-Natal was 32%.

46 Quoted in the *Sunday Independent*, 6 October 2002.

47 There are *prima facie* indications nonetheless that a relationship may exist, especially if the following two factors are considered. The first factor is a combination of the desperation and marginalization that people affected by HIV/AIDS suffer which could be one of the factors leading to drug abuse. For example, the findings

The following four points review the drugs-HIV/AIDS connection:

- (a) Unprotected sex under the influence of drugs: In South Africa, the main mode of transmission of the HIV virus is unprotected heterosexual sex.⁴⁸ Non-injecting drug abuse is a significant factor that influences the sexual transmission of HIV. It has been demonstrated that unprotected sex is more common under the influence of drugs due to a loss of control. In other words, in the context of sexual intercourse, the main psychoactive effect of drug abuse is to: (a) alter an individual's judgment, (b) make it more difficult to say "no", and (c) make it harder to negotiate the use of a condom.
- (b) Commercial sex work and drugs: Available research in South Africa⁴⁹ has demonstrated that drug-using sex workers report having much larger client volumes than non-users, as many as 9 clients on a "good night" working 7 nights a week, and even into the daylight hours. By comparison, sex workers who are not drug dependent have an average of 2-4 clients per night and generally work only 4-5 nights a week. Women who have been in the industry for some time complain that crack has increased the number of women on the street and driven down the median age. Increased competition also has driven down prices for commercial sex, forcing women to handle greater volumes of clients in order to maintain income levels. This also has led to an increase in demand for unsafe sex – such as condom-free sex and anal sex – as the competition among sex workers has reduced their ability to refuse business. These dimensions have clear implications for HIV transmission. In addition, crack has been blamed by some women for the increase in client violence. The problem of crack use therefore has worrying social health implications owing to its links with the spread of HIV/AIDS, mainly through its overall disinhibitory effect on safe sex practices.⁵⁰
- (c) Drug abuse and its consequences on people living with HIV/AIDS: The WHO has indicated that some psychoactive drugs may hasten the onset of AIDS by depressing immune functions.⁵¹ This aspect needs to be further studied. It is known, for example, that there is a relationship between alcohol abuse and the weakening of the immune system. Drug abuse may also be a contributing factor in the development of AIDS from HIV. In the context of South Africa, if a connection were to be found between

of a study conducted by a Tanzanian psychiatrist appear to demonstrate that some HIV/AIDS sufferers generally tend to (a) simply wither, (b) become religious, or (c) take drugs in order to escape their depression. (A variation on this theme is the so-called "Titanic phenomenon" for AIDS-induced drug taking – "why not enjoy the last few hours"? See Franzen 1998, pp. 27-29.) The second factor is the case of "AIDS orphans". The chain of causality in this situation is indirect. Orphans created by the AIDS-related death of their parents may be lured into illicit activities – possibly including aspects of the drug trade – in order to survive.

48 It is estimated that 85% of infections occurs through heterosexual transmission, 10% through mother-to-child transmission and the remaining 5% through same-sex transmission, injecting drug use and occupational exposure. See Parry and Karim 1999.

49 See, for example, Leggett 1999a.

50 Research in the U.S. has demonstrated that crack users exhibit seropositivity levels rivalling those of injecting drug users due to the unprotected sexual activity involved both in procuring the drug and in response to its effects.

51 "WHO Expert Committee on Drug Dependence", WHO Technical Report Series, Number 836, Geneva, 1993.

the abuse of cannabis (which is highly prevalent) and a weakening of the immune system, this would have major public health implications.

- (d) Injecting drug use: IDU is not common in South Africa, but information on drug abuse is not complete, and the real situation may be more problematic than it currently appears. Recent evidence indicates that the injecting of heroin is increasing in South Africa. For example, 51% of heroin patients in Cape Town report some injecting. The figure for such patients in Gauteng is 36% (SACENDU 2002a and SACENDU 2002b). While efforts must therefore remain focused on addressing transmission via heterosexual sex, a failure to address IDU in South Africa may result in leaving open a space for the disease to affect the population by an additional route.

Research by the South African MRC into the link between substance abuse and the spread of HIV/AIDS is currently underway. The research correlates broadly with similar work undertaken in other countries in respect of the drugs-HIV/AIDS nexus where IDU is also not a principal vector of transmission. In general, the provisional MRC research findings indicate that adolescents who use alcohol and other drugs are more likely to engage in sex and in unsafe sex, than are adolescents who abstain from using alcohol and other drugs.

4. POLICY

Main Characteristics of National Drug Control Policy

The basis for the national drug control framework is the **National Drug Master Plan** (Master Plan), adopted by parliament in February 1999. The elaboration of such a plan was necessary as the Government's response to the drug problem – as stated in the Master Plan – had become “disjointed, fragmented and uncoordinated.” A number of national plans and strategies to address different aspects of substance abuse were drafted during the 1980s and early 1990s. They did not, however, provide a comprehensive response to the deteriorating drug problem of South Africa, and they were not properly implemented. Thus in 1997, the Minister of Welfare and Population Development requested the Drug Advisory Board to develop a Master Plan for South Africa to rectify these problems “in accordance with international practice”.

Taking a balanced approach to reducing the supply and demand for drugs, the overall objectives of the Master Plan are “to build a drug free society together and to make a contribution to solving the global problem of substance abuse.” The Master Plan's six priority areas are: (a) to reduce drug-related crime, (b) protect youth, (c) support community health and welfare, (d) strengthen research and information dissemination, (e) encourage international involvement, and (f) improve communication on substance abuse with all groups in South Africa's highly diverse population. One aspect of the Government's demand reduction policies includes “harm reduction”, which aims to reduce the negative social and health consequences associated with drug use rather than to reduce or eliminate drug use per se.

The Master Plan sets forth a broad strategy for integrating the efforts of various government departments and civil society to prevent and reduce drug-related problems, substance abuse and illicit drug trafficking in South Africa. Recognizing the social costs of addiction, the document calls for greater resources to be diverted to disadvantaged communities. It calls for a workable strategy at the community level through **Local Drug Action Committees** (in all 382 magisterial districts) and **Provincial Drug Forums** comprising the various government agencies, the private sector, experts and community organizations. It stresses the importance of shifting the focus from supply to demand reduction and from the individual to the community. Further, the Master Plan aims to ensure that “all educational material and other information [that] is disseminated is contextually correct, that is in a form and language appropriate to the culture, language, level of education and socio-economic background of its intended recipients”.⁵²

The link between drug use and the spread of HIV/AIDS is not emphasized anywhere in the Master Plan. There are only two minor references to the drugs-HIV/AIDS nexus in South Africa.⁵³

A **Central Drug Authority** (CDA) comprising both governmental appointees and experts from the non-governmental sector was established in 2000. The CDA is charged with giving a lead to the nation's drug control efforts and monitoring implementation. It makes

52 See Drug Advisory Board, 1998, pp. 7-8.

53 See Drug Advisory Board, 1998, pp. 1 and 21.

provision for a chairman and features representation from all concerned government agencies, as well as selected members of civil society. The latter come from research councils, universities, trade unions and business establishments concerned about drug abuse. The CDA is required to report back to Parliament on regular occasions regarding progress achieved. Local drug action committees and provincial drug forums are in various stages of formation and readiness. The entire Master Plan architecture can be considered to be only slowly making process.

Budgetary allocations

It is impossible to determine accurately the amount of Government spending on drug supply and demand reduction activities, but a drop in spending on demand reduction and treatment activities relative to supply reduction has almost certainly occurred over the past few years. With respect to forensic support it has stayed constant. Some treatment centres have been closed, and a plan to have more substance abuse cases handled by way of the primary health care system has not been developed. Without an increase in the budget for prevention activities, the national and provincial Departments of Social Development (formerly Welfare) generally have had to reduce their support to NGOs involved in prevention activities and have themselves initiated few prevention activities, one exception being the national “I’m Addicted to Life” campaign launched in 1995 which ran for just over one year (IMR 1997).

Convention adherence

South Africa is a party to the 1961 UN Single Convention on Narcotic Drugs, the 1972 Protocol (which amended the Single Convention), the 1971 Convention on Psychotropic Substances and the 1988 UN Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.

Legislation

The control of licit drugs in South Africa is organized and managed through a number of pieces of legislation, two of which are of special note:

- The Medicines and Related Substances Control Act (101/1965): This supports the processes set out in the major UN Conventions on drug control and provides the definitional and conceptual basis for drug control policy in South Africa.
- The South African Drugs and Drug Trafficking Act (140/1992): This makes it an offense to supply substances to anyone while knowing or suspecting they will be used for the manufacture of illegal drugs. The Act further prohibits any person from converting property that he or she knows or suspects to be gained from the proceeds of drug trafficking, and it makes dealing in dangerous and undesirable drugs an offense punishable by up to 25 years imprisonment. The maximum sentence for the possession of drugs is 15 years. There are no prescribed minimum sentences.

Other relevant legislation includes:

- The Mental Health Act (18/1973)
- The Criminal Procedures Act (51/1977)
- The Prevention and Treatment Act (20/1992)
- The Financial Intelligence Centre Act (38/2001)
- The Prevention of Organized Crime Act (21/1998)

Drug control institutions – supply reduction and law enforcement

Official SAPS policing priorities place measures against drug trafficking under the category of organized crime where it features in the targeting of criminal organizations (along with firearms and stolen vehicles). Commercial crimes and corruption also fall under the category of organized crime. The cabinet's inter-agency "Justice Cluster" has a role in attempting to coordinate drug law enforcement on a national basis.

Under the 1992 Drugs and Drug Trafficking Act, the South African Police Service's Narcotics Bureau (SANAB) is given the lead on the enforcement side primarily in terms of detecting and investigating drug crimes.⁵⁴ However, there is also an important profiling, interdiction and controlled delivery role for SAPS Border Police and SARS (South African Revenue Service) Customs.⁵⁵ An attempt to coordinate law enforcement work at the country's borders by SAPS Border Police, SARS Customs and Home Affairs (Immigration) was attempted in the mid-1990s. This occurred under the auspices of the National Inter-Departmental Structure on Border Control (NIDS) which was disbanded in 2001. Border control coordination now takes place under a Border Control Coordinating Committee.

Over the past two years, however, a series of restructuring initiatives has resulted in unclarity within police ranks regarding which entity is primarily responsible for drug law enforcement. At present, the Organized Crime "component" (which operates under the Detective Service Division) has been given responsibility for this mandate within the police service. As constituted, the Organized Crime component serves as the reporting entity for several units including the Specialized Investigating Units, one of which is SANAB. The Organized Crime component also has 24 "task teams" reporting to it from throughout the country, each of which in principle contains at least one officer with specialized narcotics expertise. Specialized investigation units are being phased out, and some staff being integrated into the Organized Crime component. With some 40 per cent of SANAB offices already closed in this manner, the future of the remaining units is still uncertain.

In late 1999, a new organization was created and was given, *inter alia*, a drug law enforcement role. Entitled the "Directorate for Special Operations", but more commonly known as the "Scorpions", the unit was launched under the authority of the National Director of Public Prosecutions, who reports to the Minister of Justice but is required to report on issues related to the Scorpions directly to the President. The Directorate, combining elements of criminal justice investigation and prosecution, was formed to tackle high profile crimes and corruption, including drug crimes.

In the absence of precise mandate clarity, serious questions have arisen over the jurisdictional roles and operational functioning of SANAB, the Organized Crime component's task forces and the Scorpions in respect of drug law enforcement.⁵⁶

54 SANAB was established in 1974 to combat drug trafficking and abuse. In 1995, its investigative activities were divided into crimes involving large drug trafficking syndicates, to be dealt with by the Organized Crime Project Investigations Unit, and smaller cases of possession and dealing, which were handled by regular SANAB units. In 1995, SANAB split from the Organized Crime Unit.

55 In 2001, the restructuring of SARS Customs resulted, *inter alia*, in the creation of anti-smuggling units with a direct counter-narcotics role.

56 See, for example, H. Ludski, "It's Turf War!" *Sunday Times*, (Johannesburg) 9 April 2000.

The Drug Section of the **SAPS Forensic Science Laboratory** deals with analysis, crime scene attendance, illicit laboratory investigations⁵⁷, drug intelligence, and recording and keeping of seizures. There are four forensic drug sections which are based in Pretoria, Cape Town, Port Elizabeth and Durban.⁵⁸

The SAPS established a **Chemical Monitoring Programme** in 1999 primarily to prevent the diversion of precursor chemicals from the licit market to illicit drug manufacturing. Legislation has made it a criminal offence to import or export any of the listed chemicals without first being in possession of a permit issued by the Department of Trade and Industry and without the permit being approved by the Chemical Monitoring Programme of SANAB. Any company wishing to import or export a listed chemical must complete a Declaration of Intent to Import/Export, and the competent authorities are informed in order to consider whether investigations are necessary.

Drug control institutions – demand reduction, prevention and treatment

Prevention programmes are the responsibility of the Department of Social Development (formerly Welfare), while treatment falls under the auspices of the Department of Health. However, the respective roles are blurred in practice. Both Departments have allocated resources to prevention and treatment programmes, but constraints also exist with regard to funding. The Department of Social Development's budget for treatment is severely limited, and facilities are unevenly distributed throughout the country. The health and education sectors are minimally involved in prevention programmes. The latter gap is filled in part by a highly dedicated group of NGOs and concerned citizens, but their capabilities and mandates are limited. Government thus largely provides resources for the treatment of persons having substance abuse problems through NGOs such as the South African National Council on Alcoholism and Drug Abuse (SANCA).

The Department of Social Development and the Department of Education both support public awareness programs on the dangers of drug abuse, as do several NGOs. For example, "Soul City", which receives funding from the public and private sectors, is a highly successful multi-media health education initiative advocating healthy lifestyles for youth. SANCA has a network of drug treatment and outreach centres around the country and also trains drug abuse counsellors and others in related roles (e.g., teachers and social workers).

Department of Social Development: The Department's objective is "a welfare system which facilitates human capacity and self-reliance within a caring and enabling socio-economic environment". It funds – often through subventions to SANCA (see below) – drug prevention care and treatment services in many communities. Treatment falls into the following categories: (a) voluntary treatment in the community, (b) voluntary institutional treatment, and (c) statutory treatment under the terms of the Prevention and Treatment of Drug Dependence Act (1992). Prior to the early 1990s, the main efforts in substance abuse in South Africa tended to focus on treatment and rehabilitation. The shift toward preventive measures

57 This includes intelligence interpretation, training of agents, pre-raid briefings, raids, post-raid clean-ups, reconstruction and expert witnesses.

58 Note: There are approximately 10,000 submissions to the Forensic Science Lab per year (+/- 10 seizures per investigating officer per year). The Forensic Science Laboratory has approximately 20 scientists dealing with the same number of submissions (+/- 350 analyses per scientist per year).

was boosted in May 1995, following directives from the first democratic government which was concerned about the impact of drug abuse on the “re-stabilization process”.

At that juncture, the national and provincial departments of Social Development embarked upon a national school-based educational initiative called “I’m Addicted to Life”, aimed at teenagers between the ages of 11-20 years.⁵⁹ Its budget was approximately R2.5 million. The “I’m Addicted to Life” programme ended abruptly in 1997. Although the programme is seen as having raised awareness, it is not possible to gauge its impact on changing attitudes since the programme featured no built-in monitoring and evaluation systems (see IMG 1997). In terms of a coordinated effort at a national prevention programme, nothing preceded it other than various poster / pamphlet-based awareness campaigns. In 1999, the national Department of Social Development outlined that henceforth its financing policy would emphasize, *inter alia*, that future proposals from service providers would be favourably considered if they emphasized preventive approaches and if they were “redistributive, taking into account historical imbalances in terms of demography and the urban-rural divide” (Department of Welfare 1999a).

The Department of Social Development is providing interim secretariat services for the functioning of the Central Drug Authority. The Department has developed a prevention strategy (Department of Welfare 1999b) aimed at youth, which is currently in the form of a discussion document. The present document falls into line with overall direction of the strategy as regards useful indicative preventive approaches for youth, parents and adults in general. The strategy also recognizes the importance of ensuring political commitment to preventive approaches. The strategy foresees funding, *inter alia*, from international donors.

Department of Education: The Department of Education is implementing its Revised Curriculum 2005 initiative. This includes a Life Orientation Area of Learning which has a component that seeks to address adolescent risk behaviours, such as drug use and teenage sexuality as part of a holistic initiative aimed at the healthy development of young people. The substance abuse component is currently being reviewed and made stronger in order to address the escalation of the drug abuse problem within South Africa. As substance abuse is now within the curriculum, it also means that students will be examined on their knowledge and, as with all Outcomes Based Education, this is measurable. The Department has developed a “Policy Framework for the Management of Drug Abuse by Learners in Schools and Further Education and Training Institutions” which is intended to give guidance to schools in developing substance abuse policy. The ethos of the policy is restorative and supportive and treats substance abuse as a health and safety issue. The policy also calls for all teachers, both pre- and in-service, to receive appropriate education on substance abuse, as it does for all parents. Guidelines are currently being developed for the implementation of the policy. It is also envisaged that the Department will start to accredit prevention programmes that go into the schools.

59 The television series involved 13 9-minute episodes and 13 2-minute endorsements which were flighted in the afternoons and evenings. Thirteen 3-minute radio spots in 11 languages were also produced. In addition, 13 30-second personality endorsements were produced and flighted. Anti-drug posters were produced and distributed to every school in the country, and an anti-drug pledge campaign was initiated. Information leaflets were also produced and distributed to schools. The campaign was also expanded to include a video and teacher’s manual.

Department of Safety and Security: Aside from its drug law enforcement responsibilities, the Department, through its Secretariat for Safety and Security, supports – jointly with the Central Drug Authority and the United Nations Office on Drugs and Crime in Pretoria – the **Ke Moja** pilot drug awareness campaign. This campaign, launched in June 2002, uses various channels and outlets to reach youth at risk and their parents/guardians. It aims to empower individuals with the knowledge to make the right decision – by saying "Ke Moja" or "No thanks, I'm fine!" – when challenged with the pressure to take drugs. The campaign is being evaluated prior to an anticipated national roll-out in late 2002.

Department of Health: Although the main role of this department pertains to treatment, it also provides different levels of tertiary prevention. The Department's policy is still evolving but appears to aim essentially to ensure greater access to treatment via (a) primary care, (b) general hospitals, and (c) existing treatment centres. Responsibility for implementation of national policy is however at the provincial level. In 1999, the Department's Mental Health and Substance Abuse Directorate funded an initiative to develop a practical programme on how substance abuse prevention can be integrated into the life skills HIV/AIDS education programmes in schools.⁶⁰ This initiative is linked to the evolution of the Department of Education's Curriculum 2005 programme. The Department of Health is also involved with the WHO's Programme on Substance Abuse in an initiative funded by ODC to develop a five-year community-based project, aimed at the primary prevention of substance abuse among young people.

SANCA: Established in 1956, SANCA is a non-governmental organization whose major objectives are prevention and treatment of alcohol and drug dependence. SANCA is a national umbrella organization consisting of 38 alcohol and drug help centres providing over 76 service points / satellite offices in all nine provinces of South Africa. SANCA plays an important role in drug treatment and prevention in South Africa and partially fills gaps left by the Government's limitations in those fields. Information on alcohol and drugs is provided as well as skills training to address issues such as self-image and peer pressure. SANCA's Teenagers Against Drug Abuse (TADA) programme involves the setting up of youth action groups in high schools or youth groups after hours. It aims to prevent substance abuse among peers and promote alternatives. SANCA Johannesburg Society: This entity is constitutionally independent from, but affiliated with, SANCA. It comprises four divisions. Two of them – Phoenix House (an in-patient clinic) and the Centre for Alcohol and Drug Studies⁶¹ – are run autonomously.

Soul City: Soul City is a multi-media health education / counter-advertizing initiative seeking to address a range of risk behaviours, including alcohol / smoking and violence against women, through a very popular prime-time sitcom aired on TV, as well as on radio and via the print media. The strategy embraces the concept of "edu-tainment", in which pro-social messages are creatively woven into drama programmes on both radio and television. The print media serves to supplement these programmes, providing in-depth information in synergy

60 The substantive preparation of the material has been subcontracted to the Institute of Health Training and Development, a private sector entity based in Johannesburg.

61 CADS has evolved and is currently implementing a Preventive Life Skills Education Programme involving over 15 schools both public and private in Gauteng – including underprivileged schools in the Soweto, East Rand and Westbury areas.

with the dramas.⁶² Soul City forms partnerships with community-based organizations and government departments, the private sector and international donors. Soul City (Phase 6) is tackling the issue of substance abuse. An evaluation of its initial activities has been conducted.⁶³ Soul City is considering broadening its message base to include substance abuse with a focus on drugs.

SACENDU – South African Community Epidemiology Network on Drug Use: SACENDU was established in 1996 by the Medical Research Council of South Africa and the University of Durban-Westville's School of Psychology with the technical assistance of the WHO/PSA and the U.S. National Institute on Drug Abuse (NIDA). It is a network of researchers, practitioners and policy makers (e.g., law enforcement, health and welfare treatment services, and public health research) from sentinel areas in South Africa (Cape Town, Durban, Port Elizabeth, Gauteng and Mpumalanga). Members of SACENDU meet every six months to report on alcohol and other drug (AOD) use trends and associated consequences through the presentation and discussion of quantitative and qualitative research and other data.⁶⁴

MRC – Medical Research Council: The MRC is primarily engaged with epidemiological research into the nature and extent of alcohol and other drug use and with measuring the health impact of the misuse of alcohol and other drugs. Another key focus of the MRC is in the area of formulating local and national policy.

CSIR – Council for Scientific and Industrial Research: In the field of substance abuse, its research has mainly concentrated on alcohol and drug-related traffic infringements. It coordinated the 1999 3-Metros research project cited above.

HSRC – Human Sciences Research Council: The HSRC researches all aspects of substance abuse through its Centre for Alcohol Drug Related Research. Its research includes major surveys that target specific population groups, national surveys and expert analysis of statistical data.

SAAPSA – South African Alliance for the Prevention of Substance Abuse: SAAPSA was established in 1995 with the assistance of, *inter alia*, WHO/PSA. It includes members

62 Its three core work activities are as follows: (1) Soul City: TV programmes consist of 13 1-hour soap dramas with pro-social messages. It started in 1994. Its fourth series was released in 1999. "Soul City" is mixed-language with English subtitles. Messages are heavily research-dependent with a slow materials-development process (literature review, focus groups and contracting substantive experts as resource persons). The related "Soul City" radio drama series constitutes 60 episodes of a 15-minute daily drama. Unlike the TV programme, this possesses a more rural slant. It was evaluated in 1999 to have a catchment of several million. 750,000 booklets accompany each phase and are slipped into major national newspapers. (2) Post Mass Media initiatives: This is premised on the need to do more to effect a change in attitudes and behavior. It involves (a) a life skills programme for 12-18 year olds, and (b) an adult education package. (3) Soul Buddy: This is a 26-part TV drama for children aged 8-12. It focuses on HIV, sexuality and child abuse. It also involves children's radio containing a 10-minute drama, a 10-minute information insert and a 10-minute talk show hosted by children. Print material includes 900,000 copies of a 120-page booklet for Grade 7s.

63 See Community Agency for Social Enquiry (CASE), "Let the Sky Be The Limit – Soul City Evaluation Report", Jacana Education, South Africa, 1999.

64 See SACENDU Research Briefs, published by the Medical Research Council's Mental Health and Substance Abuse Division.

from over 70 organizations. Its goal is to “facilitate networking among all organizations, government and civil society, concerned with drug and alcohol abuse in South Africa with a view to optimizing cooperation in the prevention and treatment of alcohol and drug abuse.”

Other NGOs prominent in the drug field include:

- Lovelife (campaigns promoting life skills and healthy lifestyles; no direct drug content)
- Cape Town Drug Counselling Centre (treatment, training, prevention and research)
- Narcotics Anonymous
- Bridges (prevention programmes in schools)
- RaveSafe (harm reduction at major rave parties)
- Drug Wise (counsellors)
- Horizon Programme (treatment, affiliated to SANCA)
- Elim Clinic (treatment)
- Stepping Stones (treatment)
- Institute for Security Studies (includes drug-related research)

There is a relatively wide network of public and private substance abuse treatment facilities in South Africa. These include some 300 organizations where support and after-care are provided: 67 community treatment facilities, 147 provincial and private hospitals and psychiatric hospitals, 12 detoxification facilities, and 25 specialist in-patient units/half-way houses.

All these facilities are largely in urban areas. The overcrowded former townships, informal settlements and rural areas are grossly under-served. For example, there are no in-patient treatment facilities at all in the Northern Cape Province. Detoxification services, at hospitals in particular, are generally inadequate or non-existent. Further, insufficient funds and lack of personnel threaten existing services and their further development, while after-care services providing for the reintegration of patients into the community are either inadequate or not available.

International and Regional Cooperation

The Master Plan cites the need for “international involvement” as one of its six main areas of focus. The South African Police Service has accordingly posted an international Drug and Organized Crime Liaison Officer (DOCLO) in the United Kingdom and Brazil and has approved the appointments of DOCLOs to Pakistan, India, Argentina, Thailand, Kenya, Nigeria, Zambia and Zimbabwe. The expansion of the DOCLO network is intended to enhance cooperation on intelligence sharing and joint investigations with participating countries.

In terms of regional cooperation, South Africa is also a signatory to the Protocol on Combating Illicit Drug Trafficking in the Southern African Development Community (SADC) region. This was ratified by Parliament in July 1998. The Protocol provides a policy framework that allows the SADC countries to reduce the regional supply of and demand for illicit drugs destined for international markets. South Africa is also an active member of the Southern African Regional Police Chiefs Cooperation Organization (SARPCCO).

Cooperation with International Bodies

The South African Government is an active participant in international organizations concerned with drug control and crime prevention. For example, the Government sent a

delegation of senior officials—headed by the Minister of Safety and Security—to the UN General Assembly’s June 1998 Special Session on the World Drug Problem. South Africa participates actively in the UN Commission on Narcotics Drugs (CND).

Close operational ties exist between the South African Police Service and the International Criminal Police Organization (Interpol). One very successful area of cooperation has been the use of the Interpol X400 system to circulate the identities of potential couriers employed by drug traffickers to alert the law enforcement agencies of other countries.

South Africa hosts drug liaison officers (DLOs) from the United States (Drug Enforcement Administration, Customs Service, and Federal Bureau of Investigation), the United Kingdom (Customs and Excise), France (SCTIP) and Germany (Bundeskriminalamt).

Nearly all major industrialized countries provide technical assistance for the strengthening of the judicial and law enforcement capacities of the Government of South Africa. Within drug control, the bulk of the assistance to date has been directed towards law enforcement as compared with demand reduction.

South Africa has an active mini-Dublin group. During the period 1999-2000, the group was chaired by the Swedish Embassy. During October 2000 – mid-2002 it was actively chaired by the United States. It is now chaired by France.

Since July 1998, South Africa has hosted the regional office for Southern Africa of the United Nations Office on Drugs and Crime Prevention in Pretoria.

5. OVERVIEW OF CRIME AND CRIMINAL JUSTICE

Crime is among the most pressing and visible social problems facing South Africa. It has been referred to by the Government as a high priority issue. Crime also features prominently in the public's concern along with issues of poverty, job creation and HIV/AIDS.

While the levels of recorded crime in the country began to increase in the mid-1980s, a dramatic increase was noted in the early 1990s. Crime in South Africa does not affect all people uniformly, although, for instance, the risk of victimization of violent property crimes, such as robbery and car hijacking, is fairly evenly spread throughout the population. However, the likelihood of a person falling victim of crime is strongly influenced by, among other things, gender, age, income, place of residence and race. Race is still one of the interpretative keys of the victimization pattern in South Africa. As in other countries, socio-economic factors and living circumstances are key determinants of who is victimized by what type of crime. Given that apartheid policies in South Africa ensured that the race of any individual determined that person's socio-economic standing, race itself was (and to some extent still remains) one of the key determinants of the country's victimization patterns.

The nature of the 1994 transition, particularly the opening of the borders, led to an increase in organized crime. Since the definitions and criteria for identification of organized crime varied considerably over the past few years, the number of organized crime groups (termed 'syndicates' by the South African Police Service) varied too. Still, there appears to be a consensus that they are numerous and that there was a major increase in their numbers during the past five years. Local organized crime is generally less tightly knit and well-structured than the sophisticated foreign mafias. Crime syndicates in South Africa are regarded to be more loosely structured and dynamic, effectively constituting a network of individuals engaged in illicit activities, posing serious challenges for the law enforcement. Some of the local organized crime groups have international links with Chinese Triads, Russian criminal organizations, the Italian Mafia, and West African organized crime groups.

From an international comparative perspective, South Africa has a high overall level of crime, whether measured by police-recorded crimes or based on citizens' victimization experience. By any global standard, South Africa has high levels of violent crime (e.g., murder, robbery, rape), while with respect to property-related crimes its international standing is more favourable.

Generally speaking, the whole of the criminal justice system has undergone substantive transformation and reorganization in the post-apartheid South Africa. This is particularly the case with the police and prosecution services. South Africa has adopted important new legislation and strategies in crime prevention and control not only in order to face the challenges of an increased crime threat and the fear of crime and insecurity, but also to build up the citizens' confidence in criminal justice system, which for a long time was a visible symbol of the repressive apartheid regime. It appears that these efforts are paying off in terms of halting a post-1994 trend of increasing crime (at least for those crimes that are considered the priority crimes) and increasing the public confidence in criminal justice.

There is a general view that much work is still needed in the areas of crime prevention, reporting, detection and processing of cases. There are still considerable problems in processing crimes and offenders through the criminal justice system, and there are serious problems with prison overcrowding.

South Africa is a signatory to several SADC Protocols in the crime prevention and criminal justice area as well as the United Nations Convention against Transnational Organized Crime, the Protocol to Prevent, Suppress and Punish Trafficking in Persons, especially Women and Children, and the Protocol against Smuggling of Migrants by Land, Sea and Air. In addition, it has signed, or is a party to, a multitude of bilateral extradition and mutual legal assistance agreements as well as international anti-terrorism conventions.

This part of the Country Profile relies on two sources of statistical data: the official criminal justice statistics (police and prisons) and victimization surveys. Each of these has many limitations, including that the most recently released police statistic⁶⁵ are based on a new methodology developed in 2001 with new crime classifications and the periodicity corresponding to the fiscal rather than the calendar year. On the other hand, the victimization survey data are used more as illustrations since the samples of citizens who were asked about their experience with crime differ from survey to survey. Moreover, it is very difficult to compare victim-based data with police-recorded offences.

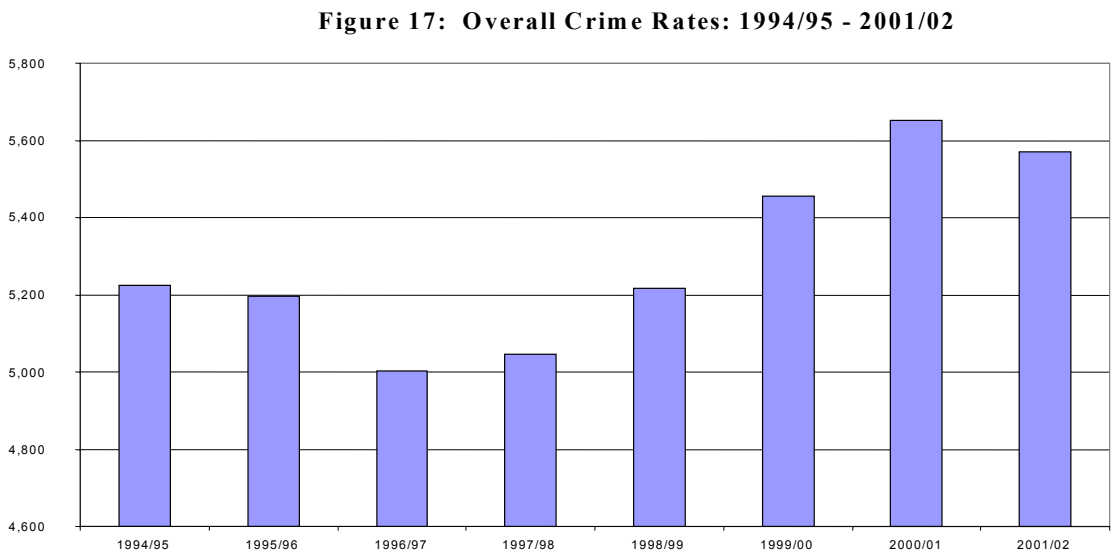
⁶⁵ Annual Report of the National Commissioner of the South African Police Service, 1 April 2001 to 31 March 2002, Department of Safety and Security, South African Police Service, September 2002; also available on: www.saps.org.za. All tables and graphs are elaborated on data contained in the Annual Report if not otherwise indicated.

6. SUMMARY STATISTICS

6.1 Crimes Recorded⁶⁶

The expectation which many had in 1994 that crime – especially violent crime – would decrease has not fully materialized. Crime figures for 2000 indicate that the number of recorded crimes was at an all-time high, although the figures for a majority of crimes have decreased somewhat in the last period under observation: 2001/2002 (although still at higher levels than for the period 1994/95- 1999/2000).

Table 9: Overall crime rates: 1994/95 – 2001/02 (per 100,000 population) ⁶⁷							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
5,224.0	5,195.6	5,003.8	5,045.8	5,217.9	5,456.4	5,653.0	5,571.0



Thus, there was a certain decrease in the overall crime level through 1996/97 followed by a steady increase with peak high rates in 2000/2001. This upward trend was arrested in the last reporting period of 2001/2002.

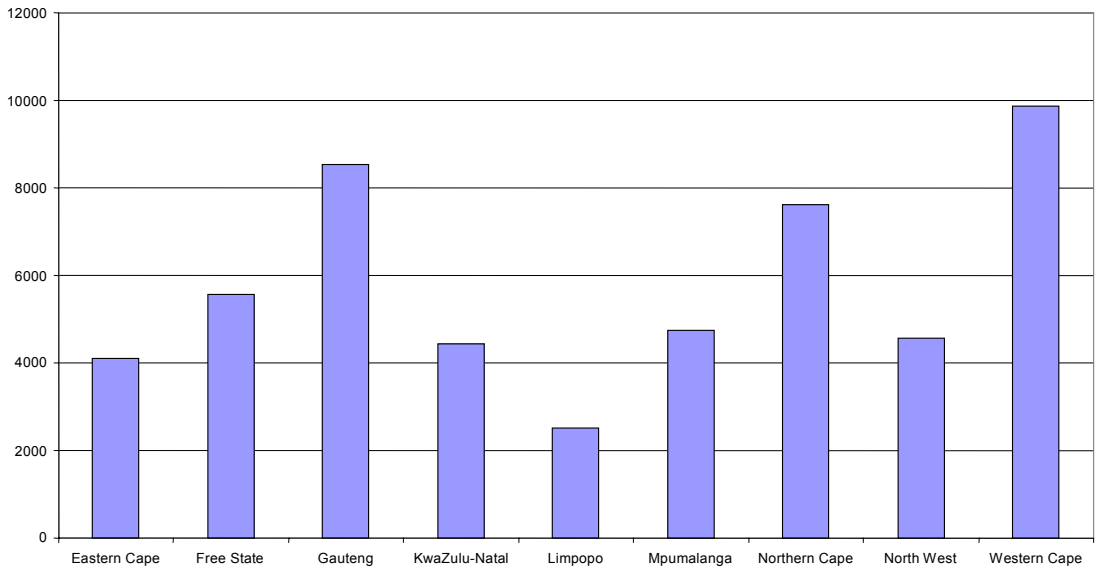
⁶⁶ 2000 was the last full calendar year for which official police crime statistics based on old methodology were released by the Crime Information Analysis Centre (CIAC) of the South African Police Service. A moratorium on police crime statistics was introduced in early 2000 in order to review the methods for gathering and presenting police statistics. New data were released in November 2001 covering the period between January and September 2001, but the new methodology was for the first time fully used in the 2001/2002 Annual Report. Pre-1994 data should not be considered to be reliable as the mechanism of collection and verification of the eleven police agencies operating in the country varied enormously in their composition and quality.

⁶⁷ The total crimes recorded per year is based on the following crimes: murder, attempted murder, robbery with aggravating circumstances, other robbery, rape, serious assault (grievous bodily harm, GBH), common assault, housebreaking (business and residential premises), stock (livestock) theft, shoplifting, theft of motor vehicles, theft out of motor vehicles, other thefts, arson, malicious damage to property, all frauds, drug-related crime, driving under influence of alcohol or drugs, illegal possession of firearms or explosives, hijacking of cars or trucks, cash-in-transit robberies, and bank robberies.

Obviously the overall country crime rates provide only certain indications regarding general trends. However, there are significant variations in the geographical location of crime within the national territory as there are diverse patterns exhibited by different crime types or singular crimes (see also section 7).

Figure 18 depicts overall crime rates for each of the nine provinces in South Africa (2001/2002).⁶⁸

Figure 18: Overall crime rates per province, 2001/02



The two provinces (Western Cape and Gauteng) with an overall crime rate higher than 8,000 crime incidents per 100,000 stand out. These are the most developed provinces of South Africa with a concentration of business, public administration and large urban areas (Cape Town, and Johannesburg and Pretoria). It is interesting to note that these two provinces have the highest rates of murder and aggravated robbery, and among the highest rates of serious assault (violent crime) as well as of residential and business break-ins (property crime) and commercial crime. The least crime-ridden province is that of Limpopo, while Eastern Cape, KwaZulu-Natal, Mpumalanga and North West exhibit similar overall crime levels.

6.2. Further Case Processing

Of the nearly two and one half million recorded crimes in 2000, 1,455,895 went “undetected” (cases where (a) the suspect is unknown and where there is insufficient evidence to enable the police to identify a suspect, and (b) where the suspect is known and a warrant for arrest has been issued, but the suspect’s whereabouts are unknown and no charge has been laid). In addition, just under another half million cases were withdrawn. Of the 609,928 cases that were sent to court, 211,762 ended in a conviction of the accused (Schonteich 1999).

⁶⁸ The Annual Report also provides data for 2000/2001 and an analysis of trends in the so called “more policeable crimes” (crimes such as aggravated robbery, housebreaking, theft of/from motor vehicles, and stock theft, which it is claimed can be deterred and prevented by an increase in conventional styles of policing). However, caution should be exercised in comparing only two consecutive yearly rates and focusing on the potential of different policing styles to influence trends in crime.

The number of cases that resulted in a conviction, as a proportion of the number of reported cases, was rather low. In 2000, it ranged from 49% for drug-related offences, 18% for murder, 8% for rape, and 2% for car jacking. This means that on average only one out of every five and one half reported murders end in the conviction of the perpetrator. For rape, the comparable ratio is one out of 11, and for car jacking one out of 53 (Schonteich 1999).

Once a case enters the prosecution service, the criminal justice system improves. On average, of all crimes that are prosecuted some three quarters result in a conviction of the accused (Schonteich 1999). This is a result which compares favorably internationally.

6.3 Budget and Financial Resources

Since 1994, there has been a constant increase of government expenditures on the safety and justice sectors. Still, only part of these expenditures went directly into crime prevention and control. Undergoing radical transformation, both the police and justice sectors have had to direct a significant portion of funds into the restructuring process itself, including the recruitment of new staff and balancing of the ethnic composition of the work force.

The 2001 national budget reflects the Government's commitment to improving its services in the area of crime prevention and criminal justice. The Government's awareness that raising capacity and improving the quality of service delivery in the justice system are critical to the quality of life of all its citizens led to additional budget allocations to the safety and security sector in 2001.

Table 10: Budget allocations 2001 in US\$	
Safety and Security (Police)	2,142,000,000
Justice (Prosecution and courts)	462,000,000
Correctional Services	772,000,000

Source: Government Budget 2001.

7. CRIME SITUATION

7.1 Main Characteristics

Crime is of increasing concern to South Africa's citizens and the Government. In its annual budget 2001, the Government prioritized fighting crime as an area of critical concern and increased expenditures for the safety and justice sectors. Crime is recognized as a deterrent to investment in the country and also having an adverse impact on the poor.

The overall levels of recorded crime in South Africa began to increase in the mid-1980s, dramatically so in the early 1990s. While levels stabilized between 1995 and 1996, crime has been increasing since then (Schonteich 1999), although in 2001/2002 there was a certain level of decrease, but still the rates were at a much higher level than in the period 1994/95. Police records indicating high levels of crime are supported by a number of victimization surveys, including the first National Victimization Survey⁶⁹, the International Crime Victim Survey (ICVS) and the International Crimes against Business Survey⁷⁰ as well as a number of local city surveys.

Among those countries that provide detailed crime statistics, South Africa reports some of the highest levels of violent crime. In 2000, one third of all crimes recorded by the police in South Africa were violent in nature (Schonteich and Louw 2001).

Violent crime is accentuated by the availability of firearms in the society. According to the police services' Central Firearms Registry, 3.5 million South Africans legally possess 4.2 million firearms, and it is estimated that a similar number of illicit firearms are circulating in the country. Most firearms used in crimes originate from theft or loss of private and state owned firearms.

Both official police records as well as victimization surveys confirm that crime does not affect all people uniformly. For example, while the wealthy run the risk of becoming victims of property crime, the poor are much more likely to become victims of violent crime, as well as property crime (Louw and Shaw 1997). In the rural areas of the country, stock theft is one of the most common crimes with particularly serious damage for the small farmers.

⁶⁹ Partially funded under a UNDP and ODC project.

⁷⁰ Sponsored by the United Nations Interregional Crime and Justice Research Institute (UNICRI), the ICVS was carried out in more than 70 countries across the world in 1989, 1992, 1996/97 and 2000. The ICVS in South Africa was carried out by the University of South Africa (UNISA: Professors Naude and Prinsloo) in 1992, 1996 and 2000, while the same team carried out the International Survey on Crimes against Business in South Africa in 1998.

7.2 Specific Crime Trends

The data suggests that after mid-1998, there was a steady increase in the total crime level. However, such an overall trend does not apply to all types of crime or to all specific crimes.

Table 11: Violent crime rates: 1994/95 – 2001/02 (per 100,000 population)⁷¹							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
1,546.6	1,543.3	1,500.9	1,487.6	1,514.4	1,613.7	1,677.2	1,659.5

Trends in violent crime follow the temporal pattern found for the overall crime trends in that after 1995/96 there was a decrease in reported violent crime incidences to that increased again from 1998/99 and reached a peak in 2000/01. In the period 2001/02, there was a slight decrease in the violent crime rate.

Table 12: Property crime rates: 1994/95 – 2001/02 (per 100,000 population)⁷²							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
3,300.4	3,308.4	3,156.3	3,199.4	3,364.8	3,488.1	3,631.6	3,581.2

As regards property crime, there was a steady increase from 1994/95 onwards with small variations in the period 1996/98. The figure for the last period under observation is lower than that of the previous year but still higher than for any other year after 1994.

The trend for the commercial crime category (e.g., all types of fraud, forgery, embezzlement, misappropriation) is different from the previous two crime types: from 1994/95 there was a steady decrease in recorded commercial crime incidents with the lowest recorded rate in 2001/2002 as presented in table below.

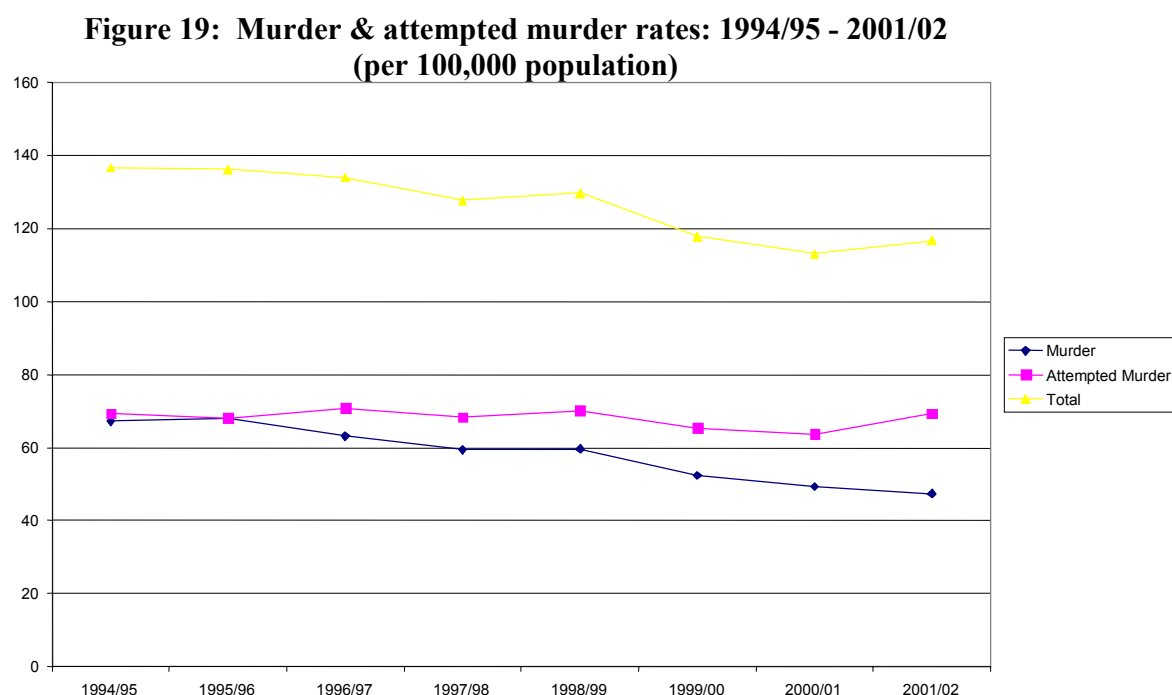
Table 13: Commercial crime rates: 1994/95 - 2001/02 (per 100,000 population)							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
163.2	154.4	154.1	153.5	150.4	157.5	150.9	124.5

The data for murder confirms that cases of murder have been declining steadily since 1994 with a total decrease of 29.5%. It is assumed that this is partly because of declining levels of political violence in the country, but there are obviously other reasons at play. However, attempted murder has not shown such a downward trend and has remained stable over the whole period under consideration.⁷³

⁷¹ Violent crime comprises murder, attempted murder, rape, serious and common assault, aggravated robbery. It should be noted that the Annual Report, SAPS 2001/02 uses somewhat different classification. In that report, violent crime is comprised of murder, attempted murder and aggravated robbery, while “social fabric crime” includes rape, serious and common assault.

⁷² Property crime comprises housebreaking (business and residential), theft of motor vehicles, theft out/ from of motor vehicles, other thefts, other robbery, stock theft, shoplifting, arson and malicious damage to property. It should be noted that the Annual Report, SAPS 2001/02 uses somewhat different classification. In that report, “violence against property” comprises arson and malicious damage to property, while the other crimes listed above comprise “property-related crimes”.

⁷³ As with other violent crimes, murder is characterized by a higher number of instances in December. These



Similar to attempted murder, serious assault and rape do not show steady declines. On the contrary, reported cases of serious assault have increased steadily over the past years, although a decrease is noted in the period 2001/2002, but still the level is higher than in any other period but for the immediately preceding ones. Common assault also shows a general upward trend to reach its peak in 2001/02.

Table 14: Serious assault rates: 1994/95 - 2001/02 (per 100,000 population)							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
558.3	565.1	573.8	569.6	564.5	607.2	623.9	584.9

Reported cases of rape increased between 1994 and 1999 with a certain downward trend exhibited in the last two periods under consideration. This increase has been attributed to increases both in the occurrence of actual incidence of the crime and also in a greater propensity to report it to the police.⁷⁴ The latest figures suggest, however, that this trend may be stabilizing at a very high level: still one of the single highest in the world.

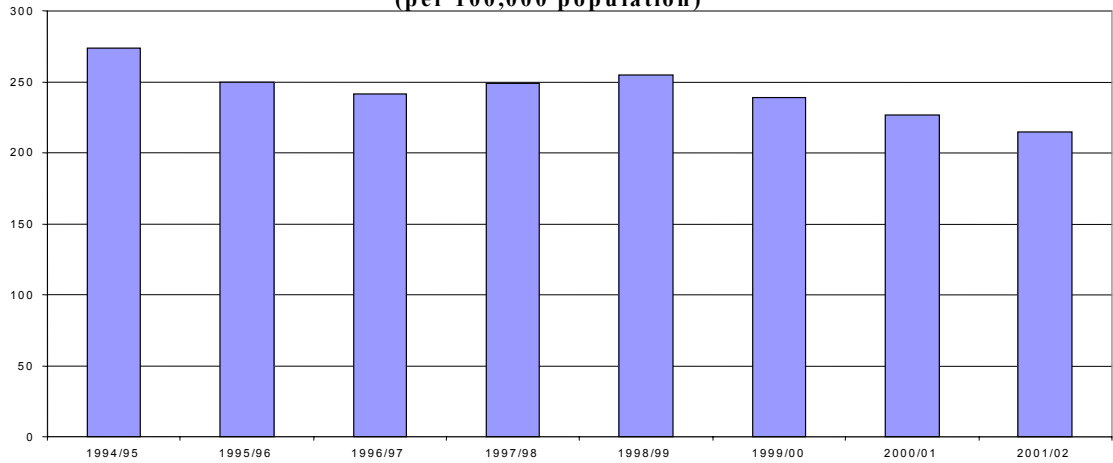
Table 15: Rape rates: 1994/95 - 2001/02 (per 100,000 population)							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
113.8	124.6	126	124.8	116.8	121.4	118.6	119.4

upswings in interpersonal violent crime at the end of each year are probably related to the holiday period around Christmas and the New Year, which may be attributed to an excessive consumption of alcohol and increased visits to places of entertainment during this time of year.

⁷⁴ ODC, jointly with the Government of South Africa, has carried out a project on Violence against Women. The project established two One-Stop Out-Reach Centers in Eastern Cape and Mpumalanga, providing counseling to victims, facilitating access to justice, and raising community awareness and that of actual and potential offenders.

Figures for serious property crime show contradictory patterns with evidence of clear stabilization for some crimes and marked increases characterizing others. Of all the serious property crimes, motor vehicle theft has continued to display a stable trend. However, it should be noted that declines in the crime between 1995 and 1997 continued after 1999 with the lowest recorded rate in 2001/02.

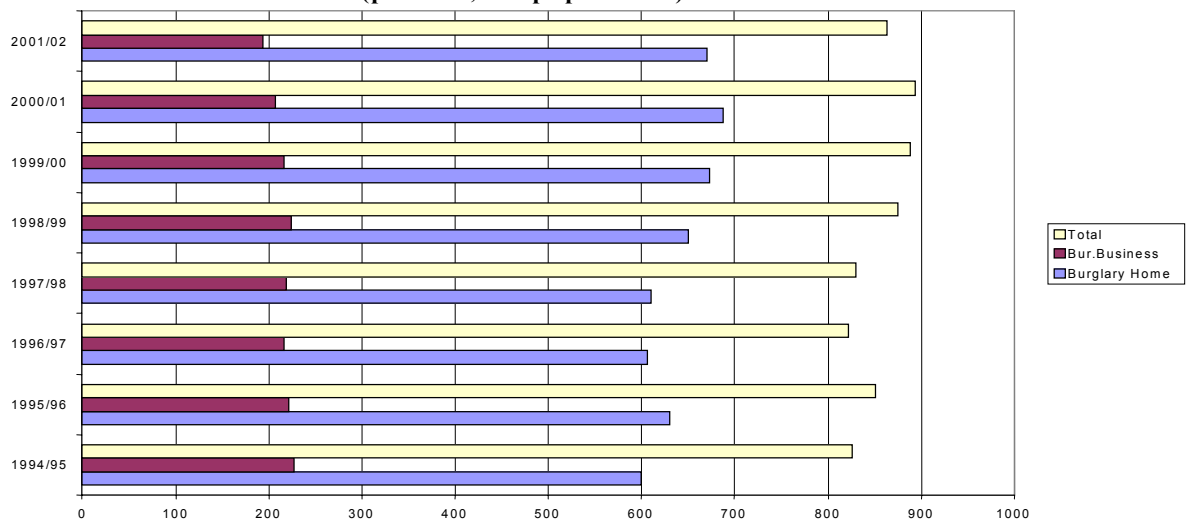
Figure 20: Motor Vehicle Theft: 1994/95 - 2001/02
(per 100,000 population)



It is possible that levels of motor vehicle theft have decreased given advanced vehicle security and increased surveillance of precincts, such as shopping areas, from where motor vehicles are often stolen.

Reported cases of residential housebreaking have shown slight variations since 1994 but generally have exhibited an upward trend. December of each year consistently shows a higher recording figure than previous months, presumably because residences are more likely to be broken into when people are away over the holiday period. On the other hand, the rates of business burglaries generally exhibited a downward trend, most probably due to security measures put in place in many business premises.

Figure 21: Burglary Rates: 1994/95 - 2001/02
(per 100,000 population)



Among current crime trends, there is great concern regarding aggravated robbery and the sub-category of vehicle hijacking. Cases of robbery with aggravating circumstances have shown a marked increase since 1994. Aggravated robbery, in its statistical expression, includes all cases of violent robbery where the assailants are armed. Thus, this also indicates the availability of firearms and their increased usage both for street crime as well as for gang or organized crime.

Table 16: Robbery (aggravated) rates: 1994/95 - 2001/02 (per 100,000 population)							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
219.5	195.5	164.0	177.2	219.9	229.2	257.7	258.5

A hijacking of cars and trucks (the majority of which occur in Gauteng), which is a sub-category of robbery with aggravating circumstances, reached its peak in the period 1998/99 and then started declining.

Table 17: Motor vehicle hijacking rates: 1994/95 - 2001/02 (per 100,000 population)							
1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
*	*	41.3	43.0	52.0	47.0	44.1	42.5

*Disaggregated data from aggravated robbery are not available.

There is ample evidence that organized crime groups are involved both in vehicle theft and vehicle hijacking and that both crimes are increasingly becoming transnational. For example, in the period 2001/02, over 900 arrests were made and over 1,300 vehicles were seized at the 72 South African border posts. Furthermore, car hijacking was identified by SAPS as one among the top ten organized crime dimensions in South Africa. The introduction of security devices and tracking systems as well as the SAPS Vehicle Circulation System and the Department of Transport National Traffic Information System contributed to declining rates in illegal appropriations of vehicles.

7.3 Victimization Patterns

National victimization patterns⁷⁵

During 1997, 20.6% of households were victims of crime. The most common crimes experienced were burglary (7.2%) and theft of livestock (4.9%); 1.4% of households had been victimized by hijacking or attempted hijacking, and 0.5% by murder.

The picture of crime changes when the data is analysed by examining the percentage of respondents who own or have access to particular types of property. Thus, 15% of all those who own or have access to livestock suffered one or more incidents of theft; 10.9% of those who owned or had access to bicycles were victimized by theft.

⁷⁵ The first national victim survey was carried out in South Africa in 1997/1998 by Statistics South Africa.

Wealthy households were more likely to experience property crime than poorer households. Thus, 28.7% of households earning R96,000 or more per year were victimised by some form of property crime. Violent household crimes were most likely to be experienced by the category of respondents earning between R48,000 and R96,999 per year. Only a small percentage of respondents in lower income categories were victimized by such violent household crimes.

Some 15% of individual respondents reported being victimized. The most common individual crime was theft of personal property (4.8%), followed by assault (4.2%), fraud (3%), robbery with force (2.4%) and corruption (2%).

The most likely place for individuals to be victimized by crime is in their own homes. Thus, 50% of all sexual offences and 30% of all assaults took place within people's own homes. In such cases, victims are more likely than not to know the offender.

While those earning above R96,000 a year were least likely to experience violent individual crimes (0.1%), victimization is distributed fairly consistently (at an average of 6.8%) across other incomes categories. However, 21.8% of the highest income category were victims of individual non-violent crime.

Indian/Asian and White households were far more likely to have experienced non-violent household crimes (25% each of respondents respectively) than were other communities. White respondents (4.3%) were more likely to experience violent household crimes than either Indian/Asian (0.4%), Coloured (2.4%) or Black/African (2.7%) respondents.

Individual Coloured and Black/African respondents were most likely to have experienced individual violent crimes during 1997. Individual White respondents were more likely to have been victimized by non-violent individual crimes (13.7%), followed by Coloured (11.3%), Indian/Asian (8.6%) and Black/African (8.3%) respondents.

Households in Gauteng (20.3%) and the Western Cape (19.8%) were most likely to have experienced non-violent household crimes, followed by the Northern Cape (16.9%) and Mpumulanga (14.9%). The national average was 14.7%.

Violent household crimes were most common in Free State (5.6%) and Mpumulanga (4%). KwaZulu-Natal and Gauteng (3.8% and 3.5% respectively) also displayed comparatively high levels of violent household crimes.

Individual violent and non-violent crimes showed a similar geographical pattern. Free State and Mpumulanga displayed the highest levels of violent individual crimes (11.8% and 10.8% respectively). The Eastern Cape (8.8%) and North West (8.8%) also showed high levels. KwaZulu-Natal (5.8%), Gauteng (4.6%) and the Western Cape (4.9%) showed comparatively lower levels.

Crimes against business

The first Survey on Crimes against Business in South Africa was carried out in 1998 (Naude, Prinsloo and Martins 1999). While it was not a national survey, it covered a representative sample of wholesale, retail and manufacturing businesses from Gauteng, the Durban metropole, in KwaZulu-Natal, the Cape Peninsula in the Western Cape and the Port Elizabeth-Uitenhage and East London areas in the Eastern Cape.

Almost 60% of companies consider crime as a serious problem, and more than half of companies report an increase in crime over the period 1995-98. Across the business sectors, the following crimes are considered as significant problems: theft of money or goods from the premises (68%), burglary (56%), employee theft (52%) and theft from motor vehicles (43%). Moreover, businesses located in built-up areas outside a city center (52%), as compared to 42% of businesses located in a town or a city center, consider crime as a serious problem in their area, and the former report the highest increase in crime (53%) over the past two to three years.

Most of the businesses (76%) have insurance coverage to compensate for financial losses caused by crime, and theft of vehicles is considered to cause the most serious financial loss. Employee theft involves higher financial damage than that by customers/clients. Security measures, such as burglar alarms (74%), entry control (67%), inspection of premises by security guards (61%), security patrols (55%), security lighting (51%) and other security measures have a positive impact on crime prevention but at a substantial financial cost to the businesses.

Business appears to be quite selective when it comes to reporting crimes to the police. It was noted that there was a higher propensity to report to the police customer theft (51%) as compared to 23% of employee theft and 30% of employee fraud. On the one hand, a significant portion of known crimes are dealt with as internal matters because of the “inconvenience, legal costs involved, minor cases, etc.”, while on the other hand, the reluctance to report to the police is based on previous experience with the police, lack of evidence and a perception of an extraordinary heavy police workload and police inability to deal with such cases. This negative attitude towards police is supported by the view that the police play a minor role in community crime prevention education and security advice to business. Only 30% of businesses had any contact with the police on crime problems and crime prevention, and most businesses (59%) consult security firms and insurance companies (39%) for advice on such matters. Crime appears to be seen by business as its “own matter” since most of the companies (71%) did not have any contact with local business chambers on crime problems, nor have they taken cooperative action against crime. It appears that, at least in 1998, the most significant business-driven anti-crime programme, “Business against Crime”, has not yet reached the majority of the business sector.

Victimization patterns in the metropolitan areas

There were four city victim surveys carried out in South Africa. Each of them used different methodologies and samples; thus, a straightforward comparison is very difficult, although an overall picture of city victimization patterns does appear. Property crimes (e.g., burglary and car theft) and violent crimes (e.g., robbery and assault) pose the greatest risk for urban residents.

Johannesburg

The ICVS was carried out in the Johannesburg area in 1992, 1996 and 2000 (Naude et. al 1999; Zvekic and Alvazzi del Frate 1995). As regards the last survey (2000), theft of vehicles (85%), theft of a motorcycle (82%), sexual offences (78%), burglary with entry (77%) and robbery (74%) were considered the most serious crimes. On average, some 44% of crimes were reported to the police with the highest reporting rate for car theft (91%), car hijacking (74%) and burglary with entry (62%). The reporting rates for other crimes varied significantly, with consumer fraud (9%), corruption (26%) and personal theft (29%) having the lowest reporting rates. Four in ten sexual incidents (39%) were reported to the police.

Personal crimes with elements of violence (robbery, assaults/threats, sexual offences) represent one third of the total victimization experienced by the citizens of Johannesburg (34% in 1992-96 and 30% in 2000). This is followed by burglary and attempted burglary which equaled 20% of total victimization experience in the period 1992-96 and increased to 26% in 2000. A similar pattern of increase is found with thefts of personal property (19% in 2000 as compared with 15% in the period 1992-96). On the other hand, theft of cars and from cars, car vandalism and bicycle theft have slightly decreased over the period 1992-2000 from 19% to 16% (car theft), from 8% to 6% (car vandalism) and from 5% to 4% (bicycle theft).

Overall, from 1992 to 2000, crime rates have remained fairly stable. In fact, theft from cars decreased considerably in the case of vehicle owners (about 6%), assault decreased by about 2% and corruption by about 4%.

However, fear of crime appears to have increased over this same period. In 1992, some 15% felt very safe walking in their residential areas while 44% felt very unsafe. In 1996, the “feeling safe” category decreased to 12% and subsequently to 9% in 2000, while the “unsafe” category decreased to 39% in 1996 and then increased to 53% in 2000. Fear of crime and insecurity appear to be of the major concerns to the citizens, indicating a need to focus crime prevention and security programmes on this important aspect of the quality of life. Coupled with data regarding the location of crime occurrence (“home”, “near home”, “area where the victim lives”), this points out that a more focused and visible crime prevention and policing are needed.

On the other hand, attitudes towards police have changed for the better. This is indicated by two measures: first, the rate of reported crimes, and second, the evaluation of police work. As regards the average levels of reporting to the police, these have significantly increased from 34% in 1992, to 42% in 1996, and 44% in 2000, representing an increase of 10% in the period from 1992 to 2000. Similarly, a bit more than one quarter of the respondents in 1992 and 1996 thought that police were doing a good job in controlling crime, while this positive evaluation has increased to 14% stating that police was doing a very good job and 32% stating that it was doing a fairly good job.

Durban

In the Durban metropolitan area, burglary and robbery were the most prevalent crimes: 11% of those surveyed said they were a victim of burglary in the past year (1997), and 10% said the same about robbery (Robertshaw 2001). Levels of assault (6%) and car theft (5%) were similar in the city, while 2% experienced a car hijacking and 1% sexual assault and 1% sexual harassment.

Overall, Black/African and Coloured people faced the greatest risk of victimization, followed by Indians/Asians and Whites. Women were more at risk of crime than men. Those aged between 16 and 25 years, followed by those over 61 years of age, faced greater chances of victimization than people in other age categories.

The risk of victimization varied most according to ethnicity and category of crime. Black/African people were most at risk of burglary, followed by Whites. Vehicle theft was more likely to be experienced by Whites, followed by Indians/Asians and Coloureds. Coloureds and Indians/Asians were more at risk of violent property crimes such as robbery and hijacking. Other violent crimes such as assault and sexual offences were more likely to be reported by Black/African people than other city residents.

Pretoria

In the Pretoria metropolitan area, the broad crime profile was similar to Durban, although crime levels were higher for all offences (Louw 1998). In 1997, 25% of those surveyed said they experienced a burglary. Car theft was the next most prevalent crime, with 21% reporting this theft to the survey. Robbery was experienced by 20% of respondents, and 15% said they had been assaulted. Car hijacking was also higher than in Durban, with 6% reporting having been victimised. A similar percentage of respondents were sexually assaulted (2%) in Pretoria as in Durban.

Overall, Blacks/Africans and Indians/Asians in Pretoria were more at risk of victimization than other ethnic groups. Indians/Asians and Blacks/Africans were more at risk of burglary than Whites and Coloureds. Blacks/Africans and Indians/Asians also were much more likely to experience robbery (17% each) than were Whites and Coloureds (9% each). Black/African people in Pretoria were also much more at risk of assault (15%) than Indians/Asians (4%), Whites (3%), or Coloureds (3%). The risk of car hijacking was similar across ethnic groups. Car theft, as in Durban, was more prevalent among the wealthier ethnic groups: 23% of Indians/Asians reported this crime to the survey, followed by 20% of Whites, 16% of Coloureds and only 12% of Blacks/Africans. In terms of other demographic variables, men were more at risk than women, and people between the ages of 25 and 39 years were more at risk than those in other age groups.

Cape Town

In the Cape Town metropolitan area, the broad crime profile was similar to the other metropolitan areas surveyed (Camerer et al. 1998). Burglary was the most prevalent crime, with 25% of people saying they were victims of burglary, followed by 24% for robbery, and 17% for vehicle theft. Fourteen percent of respondents experienced assault, and 2% reported being a victim of a car hijacking.

Overall, Coloureds were most at risk of victimization, followed by Whites and Blacks/Africans. In terms of other demographic variables, people between the ages of 21 and 35 years and those between 36 and 60 years were most at risk, followed by those between 16 and 20 years, and people over 60 years.

7.4 Issues of Specific Concern

Organized crime

Prior to 1970, criminal organizations in South Africa tended to be relatively unsophisticated, and very few had international contacts. During the 1970s and 1980s, however, the police increasingly diverted resources toward suppressing political opposition rather than combating crime. Organized crime expanded unchecked and became more sophisticated, increasing cross-border trade in stolen vehicles and narcotics. The nature of South Africa's transition since 1994, particularly the weakening of state structures, opening up of borders, growth in international trade and tourism, and uncertainty among members of the police, has led to an increase in organized crime (Gastrow 1998).

South Africa, with its air, road and sea links to the rest of the world and well functioning telecommunication facilities, provides organized crime groups with a well developed infrastructure to transport illegal goods through, into and out of its territory. In addition, South Africa is both a supplier of resources for organized crime and a market for it. South Africa has gold, diamonds, ivory, rhino horn, abalone, and motor vehicles, while it presents a market for illegal firearms and drugs (CIAC 1999).

The South African Police Service has developed an organized crime threat assessment methodology. The most recent data for the period June – September 2001 reveal the following characteristics:

Total number of organized crime threat groups:	238
Total number of individuals involved:	3,845
Top ten organized crime dimensions:	
-- Drugs	-- Corruption
-- Theft of motor vehicles	-- Illegal weapons and ammunition
-- Armed robbery	-- Other theft related
-- Fraud	-- Diamond and gold offences
-- Car hijacking	-- Murder related

As regards their areas of operation, the number of organized crime groups that are active at each level are as follows:

Local	47
Provincial	59
National	67
African	35
International	65

A total of 1,834 persons were arrested for their involvement in crime syndicates, and 343 members of the organized crime groups were prosecuted.

This data clearly shows that organized crime in South Africa has to be contextualized both with respect to organized crime in the region of Southern Africa as well as in the broader framework of international organized crime. Thus, the local organized crime groups are situated in a web of regional and international organized crime players. A number of the organized crime groups operating in South Africa have regional or international links. However, the distinction between the “indigenous” and “transnational” organized crime groups is not a clear one (Gastrow 2001). According to the police of SADC countries, many “indigenous” groups are very active in cross-border criminal activity. As regards South Africa, both groups are involved in very similar activities, the only exceptions being the somewhat more specialization of the indigenous criminal groups in diamonds and gold smuggling, and that of transnational organized crime groups in illegal weapons trafficking (Gastrow, 2001). Russian and Chinese groups are operating in South Africa, together with many West African groups. Nigerian organized criminals in South Africa helped create a serious cocaine and heroin problem that did not exist a few years ago. Overall, it appears that there has been a major increase in the number of organized criminals operating in South Africa during the past five years (Gastrow 2001).

Corruption

Corruption has long been a problem among the South African and related Bantustan administrations created under apartheid rule. Since 1994, achieving good governance and fighting corruption have become two of the most important challenges for the country. However, there appears to be much speculation and perception that corruption has in fact increased during the period of political and economical transition.

The fight against corruption is a top priority for the South African government. Since 1994, numerous anti-corruption programmes and projects have been put in place by the new government. Recent initiatives on corruption have focused on promoting accountability, transparency and the rule of law; good governance; a free press to report to the public on corrupt practices; and the establishment of government agencies to identify corrupt practices and bring perpetrators to justice. Indeed, South Africa has 12 government agencies which have anti-corruption within their mandates. This creates problems in coordination. The Government of South Africa adopted the Public Sector Anti-Corruption Strategy, including the creation of the Anti-corruption Coordinating Committee, to facilitate the coordination among various government agencies. Recently, a National Forum against Corruption, composed of the government, business and civil society, has been established, for coordinated multi-sectoral approach to curbing corruption. The new draft on Prevention of Corruption Bill has been tabled at the Parliament.

In March 2001, the Government signed an agreement with ODC within the framework of the UN Global Programme against Corruption to provide assistance to the various government departments and provinces to prevent, detect and fight corruption and to promote integrity, transparency, accountability and the rule of law. Within the framework of this programme, a comprehensive assessment of corruption and anti-corruption in South Africa is being carried out.

Trafficking in persons

In line with the South African Aliens Control Act, 1991, the Department of Home Affairs is responsible for investigating the problem of trafficking in persons. No data was available from the Department with regard to this issue. However, two recent reports from a South African NGO focused on the problem of trafficking in women and children for sexual exploitation (Molo Songololo 2000a, Molo Songololo 2000b). According to the reports, trafficking operations take two forms, namely cross-border and in-country, with the modus operandi differing according to the origins of the women and children and the origins of the traffickers involved. While traffickers may be single operators, they are more likely to operate within one of the following main syndicates: Chinese Mafia from South East Asia and in Swaziland, Bulgarian syndicates from Eastern Europe, Russian Mafia, and African criminal groups from mainly Angola, Nigeria and the Democratic Republic of Congo. While South Africa has no specific legislation prohibiting the trafficking in persons, provision is made for the prosecution of offences related to trafficking and some of the exploitative and abusive practices in the sex industry.

Proliferation of illegal firearms

Violent crime is accentuated by the availability of firearms in the society. According to the police Central Firearms Registry, 3.5 million South Africans legally possess 4.2 million firearms, and it is estimated that a similar number of illicit firearms are circulating in the country. Most firearms used to commit crimes originate from theft or loss of private and state owned firearms.

The theft of firearms has doubled since 1994. Murder with a firearm increased to 49% of all murders in 1999, while robbery with a firearm increased to 85% of all serious robberies. Three quarters of firearms victims are young men aged 18-39, and 85% of firearm perpetrators are young men aged 16-39.

As a response to this situation, the SAPS developed a four-pillar firearm programme within the framework of a Firearm Strategy which is “implementation friendly” and aims at establishing an effective firearm control system and eradicating the proliferation of firearms used to commit crimes.

Crimes against women and children

Violence against women and children is endemic to South Africa. In 2000, over 52,000 rapes and attempted rapes were reported, while for the period January-September 2001, more than 37,000 cases were reported. In particular, the level of reported rape is among the single highest in the world, and is of great concern to the government. The South African Police Service disclosed that in the period January-September 2001 more than 15,000 children (persons under the age of 18) were raped, while more than 1,800 girls were the victims of indecent assault. In the same period, almost 9,000 had become victims of violence, and 920 were murdered (with more than 1,600 victims of an attempted murder). In addition, the country experienced problems of in-country trafficking of women and children, mainly from rural areas and informal settlements to urban areas into the sex industry. Violence against women is typical in rural areas.

There appears to be a structural relationship between, on the one hand, female economic dependence and violence and abuse, and on the other hand, the prevailing social and cultural attitudes which generate conditions where violence against women is or becomes acceptable and tolerated. In 2001, cases of infants, as young as five months old, being raped and gang raped have been reported in the media, sparking both national and international outrage.

Rural violence

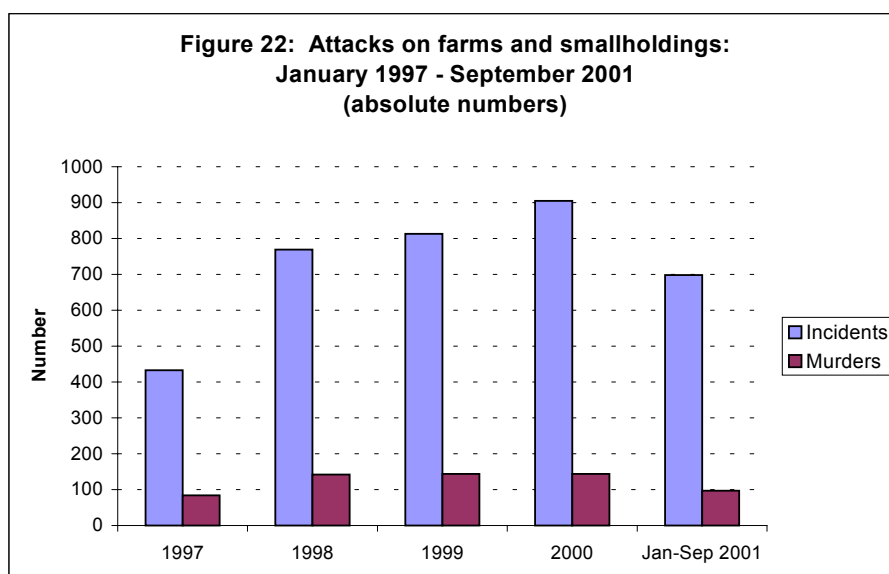
Violence in rural areas is an issue of great concern in South Africa. It is not only a security issue but also very much so a developmental and political issue. Poverty is concentrated in rural areas and, along the land ownership issue, is considered one of the developmental (and political) priorities. Broadly speaking, four crime issues are of particular importance: crimes committed on farms and smallholdings; rural women victimization; stock theft, and violence and crime related to witch-hunting. The Government is committed to prevent farm violence and provide for developmental security of the rural communities.⁷⁶

Since a large number of farmers possess firearms, attacks are often aimed at obtaining these weapons. Government acknowledges the importance of getting the problem under control, since it views a stable and productive farming community as an extension of the state's visible authority and order in rural areas (CIAC 1999). With the complaint of many farmers that rural violence that targets the commercial farming sector is aimed at removing them from the land, Government recognizes the acute political sensitivity of the issue.

The nature and scale of stock theft varies across South Africa (with high rates in Eastern Cape, KwaZulu-Natal, Free State, Mpumalanga, Limpopo, North West and Northern Cape). It is also one of the most commonly experienced crimes in South Africa. Its economic impact is severe regardless of the scale of farming. In the period 2001/02, the total value of R77,184,555 of stolen stock was seized. Many of the individual perpetrators themselves are unemployed and state that the primary motive was to take care of family needs and for domestic consumption. Thus, it appears to be a poverty-driven crime. This is not the case when an organized crime group is involved. In such cases there, is a clear rural-urban network for profit being exploited.

Witchcraft and related ritualistic practices have deep historical roots and form an intrinsic part of the belief systems in many rural communities. However, the specific practice of witch-purging and witch-hunting take the forms of banishment, assault and murder. More often than not, the victims are women, while the perpetrators are young men. These are among the most difficult crimes to investigate and prevent.

⁷⁶ SAPS and UNDP/ODC organized a national conference on "Rural Safety and Security: A Shared Responsibility for Development" from 23 to 25 October 2001.



Source: CIAC.

Crimes related to precious materials and endangered species

South Africa is rich in precious materials such as diamonds and gold, as well as in wildlife (flora and fauna). The mining industry was for a long time a driving economic sector in developmental terms, while the richness in bio-diversity and game parks provides for ever increasing opportunities for income-generating tourism and entertainment. Such natural opportunities linked with those related to the economy and transport infrastructure facilitate illegal activities. Involvement of organized crime in those illegal activities and its transnational nature has been also on increase, representing one of the top ten organized crime dimensions in South Africa.

In the period 2001/02, over 300 persons were arrested for the illegal possession, purchase and theft of unpolished or uncut diamonds. More than 1,100 persons were arrested for the illegal possession and/or theft of unwrought gold and other precious metals. In the same period, 339 kg. of ivory, 36 kg. of rhino horn, 975 kg. of flora cycads and 22,623 kg. of marine cases (abalone and others) were seized for a total value of R 16,669,330.

Policing the borders

The Border Police cover 53 land, 10 air and 9 sea border posts. In 2001, numerous arrests were made at the border posts, including 14,369 illegal migrants and 90 persons involved in aiding and abetting the smuggling of illegal migrants, 108 persons for false documents, and 108 for illegal firearms.

Over 1,300 vehicles, 250 firearms, 62,000 units of abalone and 52,000 units of crayfish were seized at the border posts. However, the majority of seizures were related to illicit substances such as dagga, mandrax, ecstasy, and cocaine.

Within the framework of the activities of the Southern African Police Chiefs Cooperation Organization (SARPPCO) and/or on a bilateral basis, a number of successful joint anti-crime and cross-border operations were undertaken targeting the smuggling of stolen vehicles and trafficking in drugs and firearms (e.g., Operation Voyager, Operation Makhuku, Operation Rachael).

Police safety

An average of some 200 police officers were killed in South Africa each year from 1994 until 2001: 265 in 1994, 224 in 1997, 204 in 1999 and 176 in 2000/01. In 2001/02, 135 were killed. This figure is high and of great concern to the Government. Some 40% of police officers were killed while on duty. A Directorate Public Safety was established, and it has developed preventive measures and programmes with the aim of reducing the risk of police officers being killed.

8. POLICY, LEGISLATION AND ORGANIZATION

8.1 Main Characteristics of the National Crime Prevention Strategy

The National Crime Prevention Strategy (NCPS) was initiated by the Government in March 1996 and is primarily a long-term programme aimed at creating conditions in which the opportunities and motivation for crime will be reduced, as well as improving the capacity of the criminal justice system. It is an ongoing programme of action which is being implemented by a wide range of government departments, with the line departments being Justice, Social Development, Correctional Services, Defense, Safety and Security, and Intelligence.

The NCPS has prioritized seven key crime categories, namely: (i) crimes involving firearms, (ii) organized crime, including the organized smuggling of illegal migrants and narcotics, and gangsterism, (iii) white collar crime, (iv) gender violence and crimes against children, (v) violence associated with intergroup conflict, such as political conflicts, taxi violence and land disputes, (vi) vehicle theft and hijacking, and (vii) corruption within the criminal justice system.

While the NCPS remains the overall framework for Government's programmes to counter crime, the reality of day-to-day departmental interventions suggests that the NCPS carries less weight than it did between 1996 and 1999. As public pressure has increased, the focus on crime prevention outlined in the NCPS has shifted to a heavier emphasis on law enforcement. Still, a number of crime prevention initiatives and programmes have been developed among which the following are of particular importance: community policing forums (attached to 90% of police stations), Cooperation with the Business Against Crime (e.g., victim support, commercial crime courts, CCTV surveillance in Cape Town and Johannesburg), the rural safety programme; violence prevention programme and victim empowerment programme, crime prevention development programme and a number of local crime prevention initiatives.

Operations at police stations level are guided by the National Crime Combating Strategy with a focus on the geographical areas with the most serious crime level (145 "crackdown stations" were identified). The Strategic Focus of SAPS consists of: organized crime; serious and violent crime; crimes against women and children, and service delivery at police stations.

8.2 Legislation

Principal laws

The major sets of legislation in criminal matters are:

- The Criminal Procedure Act, 1977
- The Corruption Act, 1992
- The Extradition Act, 1962 and the Extradition Amendment Act, 1996
- The Proceeds of Crime Act, 1996
- The Arms and Ammunition Act, 1969

The recent changes in criminal legislation include:

In 1996, Parliament passed the International Cooperation on Criminal Matters Act. The Extradition Amendment Act of 1996 provides for the designation of foreign jurisdictions where extradition may be effected in the absence of formal agreements.

The Aliens Control Act, 1991, as amended in 1995, together with the Immigration Bill and the Refugees Act, 1998, are of importance in relation to cross-border regional and international trafficking of persons.

The Criminal Procedure Second Amendment Act, 1997, denies bail to those accused of certain serious offences unless they can prove “exceptional circumstances” meriting their release.

The National Prosecuting Authority Act, 1998, centralizes prosecutorial authority in a national office. The National Director of Public Prosecutions (NDPP) is appointed by the President and reports to the Minister of Justice.

The South African Police Service Amendment Act, 1998, enables municipalities to create city police departments outside the authority of the South African Police Service. In addition to Durban, where the city police were a colonial inheritance, Johannesburg, Cape Town and Pretoria have established metropolitan police services, and there are plans for other communities to do so.

The Magistrates Court Amendment Act, 1998, requires the assignment of lay assessors to serve alongside magistrates in the trials of certain offences.

The Prevention of Organized Crime Act, which was “super-fast-tracked” through Parliament in December 1998 and amended in 1999, gives broad powers of civil and criminal asset forfeiture to law enforcement authorities, and it outlaws membership in criminal organizations. It makes provision for new powers for police and prosecutors to seize criminals’ assets on the grounds of “a balance of probabilities” rather than “beyond a reasonable doubt”. It outlaws certain criminal conspiracies and furthers countermeasures against money laundering. Shortly after being enacted, the law was successfully challenged in the court system, requiring the Government to revise it. During 2000, it was used more successfully. Criminal forfeiture is limited to illicit proceeds, while civil forfeiture can be used against “facilitating” property. The management of seized assets is coordinated by the Asset Forfeiture Unit under the National Director of Public Prosecutions.⁷⁷

The Domestic Violence Act, 1998, penalizes the coercion of a sexual act through harassment and intimidation, as well as the coercion to submit to sexual abuse.

The Witness Protection Act, 1998, provides for the establishment of an office for the protection of witnesses.

⁷⁷ The Asset Forfeiture Unit became a full division of the NPA in 2001 and since 1999 it exhibited constant growth in its operations. Over the past three years, it has frozen assets valued at over R370 million in terms of 150 orders that have been sought. As of March 2002, 55 forfeiture applications involving R22 million have been completed. Following an initial period of the “test cases” and numerous litigations of some 30 different legal and procedural issues (most not yet resolved), the AFU focused on processing cases among which economic and corruption as well as drug-related figure prominently.

The National Prosecuting Authority Amendment Act, 2000, makes provision for the establishment of the Directorate for Special Operations (DSO, the “Scorpions”) and provides for the investigating directorates established under the National Prosecuting Authority Act, 1998, to become part of the DSO. The DSO was established by the Directorate of Special Operations Act, 2001, for the effective investigation and prosecution of certain specified offences and the gathering of intelligence relating to such offences. On DSO matters, the NDPP reports directly to the President.

The Protected Disclosures Act, 2000, makes provisions in terms of protecting employees in both the private and the public sectors who disclose information regarding unlawful or irregular conduct by their employers or fellow other employees (whistleblower protection).

The Promotion of Access to Information Act, 2000, was enacted in order to foster a culture of transparency and accountability in public and private bodies by giving effect to the right of access to information and actively promoting a society in which the people of South Africa have effective access to information to enable them to more fully exercise and protect their rights.

The Firearms Control Act, 2001, establishes a comprehensive and effective system of firearms control by introducing competency certificates, licenses and permits, as well as regulations for storage and transport of firearms. It envisages an effective central firearms registrar. The Act has not yet come into effect, but the Minister of Safety and Security decided to implement two sections thereof dealing with the police powers to take body prints and bodily samples without warrant as well as to create the firearms free zones.

In October 2001, Parliament adopted the Finance Intelligence Centre Act, and it became law in November 2001. It envisages the creation of a financial intelligence centre which would receive financial information and statistics and analyse them in connection with anti-money laundering operations, thereby underpinning cases brought to trial. In the main, the law seeks to place certain obligations on institutions that may be used as channels for money laundering, and it attempts to create an institutional framework for the effective implementation of legislation. It requires specific financial institutions to combat money laundering from within their operations. Examples of “accountable institutions” include attorneys, estate agents, banks, investment brokers, public accountants, traders in financial instruments, management companies under the Unit Trusts Control Act, and those involved in the long term or short term insurance industry. The obligations imposed on these institutions are three-fold: (a) the duty to identify clients, (b) the duty to keep records, and (c) the duty to report cash transactions and suspicious transactions.

The following legislation is under development:

- The Child Justice Bill: Once enacted, it would focus on the diversion of children in conflict with the law away from the criminal justice system. It foresees the establishment of special child justice courts to offer a range of alternative, non-custodial sentences.
- The Interception and Monitoring Prohibition Bill: Once enacted, this would strengthen the powers of law enforcement agencies in the combating of serious crimes. It would bring the legislation dealing with the interception and monitoring of communication in line with latest telecommunications technology.

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- The Anti-Terrorism Bill: This bill foresees the enactment of specific legislation based on international instruments against terrorism. The accompanying discussion paper strongly recommends that South Africa signs, ratifies or accedes the respective international instruments.
 - The Prevention of Corruption Bill: It is intended to replace the Corruption Act of 1992 in order to provide for a more comprehensive coverage of corrupt practices.

Conventions, Extradition and Mutual Legal Assistance Agreements

South Africa is a signatory to the United Nations Convention against Transnational Organized Crime and two of the three Protocols thereto⁷⁸ as well as to the SADC Protocol against Corruption and the SADC Protocol on the Control of Firearms, Ammunition and Related Materials.

South Africa became a member of the Commonwealth in June 1994 and accordingly is now part of the London Scheme on Extradition and the Harare Scheme on Mutual Assistance. This provides potential coverage of over 50 countries.

South Africa has extradition agreements with the following countries: Australia, Botswana, Canada, Lesotho, Malawi, Swaziland, the United States and Zimbabwe. Negotiations on the conclusion of extradition treaties have been finalized with Argentina, Egypt, Hungary and Zambia. Further, South Africa has designated Namibia, the United Kingdom and Zimbabwe in terms of its Extradition Act.

South Africa has negotiated mutual legal assistance treaties with Canada and the United States. Other negotiations concluded are with Brazil, Egypt and Zambia.

The country is currently negotiating extradition and/or mutual legal assistance treaties with a number of countries, including Algeria, France, Nigeria, the United Arab Emirates and several countries in Latin America.

Domestic legislation also provides for extradition or the rendering of legal assistance in the absence of a treaty.

⁷⁸ South Africa has signed the Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, and the Protocol against Smuggling of Migrants by Land, Sea and Air; it has not signed the Protocol against the Illicit Manufacturing of and Trafficking in Firearms, their Parts and Components and Ammunition.

8.3 Anti-Terrorism

Urban terror: a domestic scene

Cape Town was rocked by a series of bomb blasts during the past few years, with over 100 attacks and three people having been killed and over 100 injured. With no group claiming responsibility for the planting of the devices, the phenomenon was difficult to explain (Shaw 2000). However, People against Gangsterism and Drugs (PAGAD), a vigilante group that originated in response to high levels of crime, is suspected of conducting these recurring bouts of urban terrorism. While originally targeted at drug dealers, the leadership of PAGAD was increasingly usurped by a radical Islamic group, which felt threatened by the state (US Department of State 2000). This resulted in a shifting of the targets of the bombing campaign from the homes of drug dealers in the Cape Flats to state buildings in central Cape Town, particularly police stations, and prominent tourist areas, as well as in the killing of a judge handling a case against a PAGAD member. PAGAD is believed to have masterminded the bombing on 25 August 1998 of the Cape Town Planet Hollywood restaurant (US Department of State 2000). Its strength is estimated at several hundred members. In an attempt to counter the bombings, "Operation Good Hope" was implemented by the South African Police Service in January 1999 (Boshoff, Botha, Schonteich 2001). It was intelligence-driven in focused areas, well coordinated, investigative, protective of specific targets, and in liaison with communities. It resulted in a major decrease in acts of urban terrorism in Western Cape and in over 4,000 arrests as well as the recovery of vehicles, firearms and ammunition (Boshoff, Botha, Schonteich 2001).

This, urban terror indicated that the existing anti-terrorist legislation in South Africa was inadequate, and preparations for the promulgation of a new Anti-terrorist Bill are well underway. The Report on Review of Security Legislation prepared by South African Law Commission clearly identified a need for such legislation (Law Commission 2002).⁷⁹ These legislative efforts were further intensified with the terrorist attacks of 11 September 2001 on New York and Washington D.C. and with the obligations of the South African Government ensuing from various international anti-terrorist instruments.

International cooperation

The 11 September terrorist attacks in the United States also brought about the intensification of the efforts on the part of the international community to provide for effective prevention and cooperation in the fight against international terrorism.

The United Nations has long been active in the fight against international terrorism dating back to 1963, with the adoption of a number of important legal instruments, many of which have been ratified by the majority of countries around the world, and only the most recent one of which is not yet in force. Such agreements have been developed by the United Nations General Assembly, the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO), and the International Atomic Energy Agency (IAEA).

⁷⁹ It should be noted that during the apartheid era a dozen of anti-terrorism laws were promulgated, aimed at suppressing any legitimate political protest and dissent within the framework of the freedom struggle for a democratic South Africa.

South Africa has acceded to some but not all of the international instruments listed below although there are a number of important domestic laws that address some of the issues dealt with by the UN conventions and protocols (Law Commission 2002). The list of these important instruments and South Africa's status vis-à-vis them is as follows:⁸⁰

- Convention on Offences and Certain Other Acts Committed on Board Aircraft, adopted in Tokyo in 1963; 171 States Parties; authorizes the airplane commander to impose reasonable measures on any person who has committed or is about to commit such acts, and requires States parties to take custody of offenders; developed by ICAO; *South Africa ratified on 20 May 1972.*
- Convention for the Suppression of Unlawful Seizure of Aircraft, The Hague, 1970; 174 States Parties; requires parties to punish hijackings by "severe penalties", and either extradite or prosecute the offenders; developed by ICAO; *South Africa ratified on 30 May 1972.*
- Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, Montreal, 1971; 175 States Parties; requires parties to punish offences by "severe penalties", and either extradite or prosecute the offenders; developed by ICAO; *South Africa ratified on 30 May 1972.*
- Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation, Montreal, 1988 (supplementing the 1970 Montreal Convention); 107 States Parties; extends the provisions of the Convention to encompass terrorist acts at airports; *South Africa ratified.*
- Convention on the Prevention and Punishment of Crimes against Internationally Protected Persons, including Diplomatic Agents, New York, 1973; adopted by the General Assembly; 107 States Parties; requires parties to criminalize and punish attacks against State officials and representatives; *South Africa has not signed.*
- Convention against the Taking of Hostages, New York, 1979; adopted by the General Assembly; 96 States Parties; parties agree to make the taking of hostages punishable by appropriate penalties; to prohibit certain activities within their territories; to exchange information; and to carry out criminal or extradition proceedings; *South Africa has not signed.*
- Convention on the Physical Protection of Nuclear Material, Vienna, 1980; 68 States Parties; obliges parties to ensure the protection of nuclear material during transportation within their territory or on board their ships or aircraft; developed by IAEA; *South Africa signed on 18 May 1981.*
- Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, Rome, 1988; 52 States Parties; obliges parties to either extradite or prosecute alleged offenders who have committed unlawful acts against ships, such as seizing ships by force and placing bombs on board ships; developed by IMO; *South Africa has not signed* (but the South African Law Commission considers that adequate provisions are contained in the Merchants Shipping Act of 1951 to provide for the enforcement of the Convention).

⁸⁰ Based on the Note No. 5679 of 19 September 2001 "United Nations Treaties against Terrorism" and the Report of the South African Law Commission on Security Legislation, August 2002.

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- Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf Rome, 1988 (supplementing the 1988 Rome Convention); 48 States Parties; extends the requirements of the Convention to fixed platforms such as those engaged in the exploitation of offshore oil and gas; *South Africa has not signed*.
 - Convention on the Marking of Plastic Explosives for the Purpose of Detection, Montreal, 1991; 67 States Parties; seeks to curb the use of unmarked and undetectable plastic explosives; developed by ICAO; *South Africa ratified*.
 - International Convention for the Suppression of Terrorist Bombings, New York, 1997: adopted by the General Assembly; 26 States Parties; seeks to deny safehavens to persons wanted for terrorist bombings by obligating each State Party to prosecute such persons if it does not extradite them to another State that has issued an extradition request; *South Africa signed*.
 - International Convention for the Suppression of the Financing of Terrorism, New York, 1999; adopted by the General Assembly; obligates States Parties either to prosecute or to extradite persons accused of funding terrorist activities, and requires banks to enact measures to identify suspicious transactions; will enter into force when ratified by 22 States; *South Africa signed*.

The UN Security Council as the principal international organ dealing with international peace and security has immediately after the 11 September terrorist attacks, adopted several Resolutions: 1368 (2001), 1333 (2001) and 1373 (2001) which condemn the terrorist attacks and call for an effective Cooperation in bringing the perpetrators to justice as well as in the prevention and suppression of the financing of terrorism.

While South Africa has no specific legislation related to the financing of terrorism in order to comply in particular with Resolution 1373 (2001), the powers given to the Exchange Control Department of the South African Reserve Bank under the Currency Exchange Act and the Exchange Control Regulations were implemented by the issuance of the Exchange Control Circulars on the 12 and 19 October 2001. The Circulars inform all authorized dealers about the content of a Notice by the South African Government (published in the Government Gazette of 12 October 2001) which contains details of the individuals and entities identified as terrorist by the United Nations.

The Organization of African Unity (now African Union) adopted the OAU Convention on the Prevention and Combatting of Terrorism (13 July 1999) which South Africa signed. In addition, in December 2001, the Committee on Defense and Security of the Southern African Development Community (SADC) agreed to take common action against terrorism in the region.

While the new Anti-terrorism Bill is still under preparation “there are a number of statutory provisions that can, to a greater or lesser extent, be used to combat terrorism and related offences” (Law Commission 2002). It is expected that a new Anti-terrorism Bill will provide comprehensive provisions for the prevention and fight against terrorism in compliance with a number of United Nations international instruments (Report of the UN Counter-Terrorism Committee, December 2001).

8.4 Crime Control Institutions

The police

The old South African Police (SAP) served as one of the key instruments of apartheid rule – enforcing laws and controlling often violent political demonstrations against the state. The SAP was supplemented by an additional 10 police forces, one for each of the independent or self-ruling bantustans. Such police forces, however, generally mirrored the approach and training of the SAP, engaging in serious human rights abuses and focusing more on the control of political dissent than crime prevention.

The challenge of police reform in the country since the attainment of democracy in 1994 has been two-fold. First, it has been to incorporate these 11 police agencies into a single police service, the SAPS. Second, the challenge has been to ensure that the newly created police service would respect human rights and then aim to police crime as their primary objective. These two factors, along with the essential requirement of building community support for the ‘new’ police, have ensured that South Africa is undergoing a comprehensive and difficult police reform process.

In the course of this process, a number of key institutions were established within the early period of the new democracy to bolster the system of police accountability. At police stations across the country, community police forums (CPF) were formed, constituting a channel through which community priorities and grievances could be communicated to the police. While not elected structures, CPF have been successful in many areas in making the police account more fully for their actions to the public. Legitimate questions remain, however, about the limited powers of the CPF and the degree to which they are taken seriously both by the police and the communities they are meant to represent.

Two other institutions established at the time are of some importance. The first is the Independent Complaints Directorate (ICD), charged with investigating complaints from the public of cases of police abuse and poor service delivery. Given the history of policing in South Africa, the ICD is an innovative and necessary institution. It would be fair to say, however, that the overall success of the ICD has been constrained by the large number of cases with which the institution has had to process as well as the related problem of limited funding.

Given that police policy had largely been made by police officers themselves, a key component of the reform process was the introduction of a civilian secretariat, reporting directly to a cabinet minister, and charged with policy development and the monitoring of police performance. The Safety and Security Secretariat played a key role in the early days of the new democracy in designing and monitoring the implementation of the new police agency. More lately however, as the police have assumed greater confidence and the fight against crime (as opposed to the redesign and transformation of policing) has assumed higher priority, so the influence of the Secretariat has waned. Nevertheless, the Secretariat remains a potentially important tool in measuring the effectiveness of the police and monitoring their efforts in the fight against crime.

The negotiations on a new political order in South Africa had determined that the country should have a single national police agency, partly so that the reform of policing could be controlled from the centre. Increases in crime, combined with the consolidation of the democracy itself – including most critically the establishment of elected institutions of local government – opened the debate as to the appropriateness of establishing local police agencies outside of the SAPS. Legislation to this effect is now in force, and cities and towns can establish their own police agencies subject to a series of criteria, the most important being that they are confined to crime prevention activities such as police patrol (they do not for example investigate crimes) and must be funded in their entirety by local government. A city police service already existed in Durban, and similar structures have now been established in Johannesburg, Cape Town and Pretoria.

Despite these developments, however, the SAPS remain the primary instrument of state policing in South Africa with a presence throughout the country. There are currently 102,354 police officers and 20,337 civilians working in the SAPS, making it one of the largest police agencies in the world. It is expected that by 2005 the police will reach 147,560 force. The new police agency has undergone a radical transformation in terms of its organization, racial and gender composition.

While police distribution has improved markedly since the early 1990s, the majority of police resources remain focused on former White areas and business districts. The police service is unevenly distributed across the provinces, ranging from the extreme of 313 residents per police officer in Free State to 669 residents per police officer in Limpopo (formerly Northern Province). The civilian to police officer ratio was 461:1 in 2001, and it is expected that it will become 389:1 by 2005/06.

If the first phase of the new democracy saw significant changes in the nature of policing, a second phase of reforms internal to the SAPS itself has been aimed at fighting crime more effectively. The most important of these initiatives has been the reduction in the several hundred specialized units that had been established to police a wide variety of different crime types. Some 500 specialized investigating units will be clustered into three specialized components focusing on organized crime, serious and violent crime, and commercial crime. To date, 208 specialized units were closed down, while the following new units were established:

- 24 Serious and Violent Crime units
- 24 Organized Crime units
- 17 Commercial Crime units
- 45 Family Violence, Child Protection and Sexual Offences units

The overall thrust of these changes appears to be a shift toward more multi-disciplinary policing teams, based on the assumption that, for example, organized criminal groups participate in multiple activities and thus require responses that aim at their organization rather than the specific crime types in which they engage.

Over time, and as crime has been increasingly perceived to be a serious threat, other agencies have become more actively engaged in traditional policing activities. Thus, the South African National Defense Force has engaged in crime prevention patrols, and the National Intelligence Agency and the South African Secret Service (the internal and external arms of the intelligence community respectively) have engaged in information collection on organized crime groups and activities. This broadening of the mandate of various security agencies into the area of crime has been matched by the burgeoning of the country's private security industry.⁸¹

The prosecution

South Africa's 1996 Constitution mandates the establishment of a national prosecution service. Section 179 of the Constitution outlines the form of the South African prosecution service.⁸² The section provides for a National Prosecuting Authority (NPA). The President appoints the head of the National Prosecuting Authority – the National Director of Public Prosecutions (NDPP).

In 1998, Parliament passed the National Prosecuting Authority Act which provides the legal framework for the prosecutorial system of the country.⁸³ Organizationally, the NPA consists of three specialist components, each headed by a Deputy National Director of Public Prosecutions (National Prosecution Service, Directorate of Special Operations, and Asset Forfeiture Unit).

The NPA is responsible for coordinating and assisting the traditional prosecuting structures throughout the country. There is a Director of Public Prosecutions (DPP) for each of the ten divisions of the High Court of South Africa, and there is one for the Witwatersrand Local Division of the High Court. Directors of Public Prosecutions, Investigating Directors and Special Directors are assisted by Deputy Directors of Public Prosecutions as well as senior and junior state advocates who have a right of appearance in the High Court. The prosecutorial staff at larger magistrates courts is managed by a Senior Public Prosecutor (SPP). At busy courts, SPPs delegate some of their managerial and administrative duties and responsibilities to Control Prosecutors.

The Directorate of Special Operations (DSO), also known as 'the Scorpions', brings together senior investigators, specialist prosecutors and intelligence analysts who work in project teams, with experienced prosecutors directing the investigations to ensure that they will be presented effectively in court.

The Asset Forfeiture Unit (AFU) assists the National Prosecution Service and the DSO in the use and application of South Africa's asset forfeiture legislation.

⁸¹ The private security industry (some 185,000 people as of December 2000) is one of the fastest growing service sectors in South Africa. It provides security services to the residential areas, business and even some government departments.

⁸² Section 179 of the Constitution of the Republic of South Africa Act No. 108 of 1996.

⁸³ National Prosecuting Authority Act No. 32 of 1998.

In addition to these above three components, the NPA is assisted by a number of specialised support services:

- The Specialized Commercial Crime Unit which investigates and prosecutes serious commercial crime.
- The Sexual Offences and Community Affairs Unit, or SOCA Unit, which prosecutes violent crime committed against women and children.
- The Witness Protection Unit which protects witnesses who testify for the prosecution in important criminal trials.
- Specialist Commercial Crime Unit which investigates high level fraud cases.

Over 95% of all criminal trials take place in the magistrates courts (also known as the lower courts). There are two types of magistrates courts: regional courts and district courts.

Only the most serious crimes, such as brutal murders, particularly violent rapes, robbery with aggravating circumstances where someone is seriously injured or killed, and fraud involving large amounts of money, are usually prosecuted in the High Court. The vast majority of murders, rapes and robberies, and crimes such as attempted murder, child abuse, kidnapping, sexual offences, housebreaking where the intention is not only to trespass, fraud and theft where the loss exceeds R40,000, and car theft are prosecuted in the regional courts.⁸⁴ Minor offences such as assault, most forms of theft and fraud, malicious injury to property, most drug-related offences, drunken driving offences, and other driving related offences are prosecuted in the district court. Unless legislation provides otherwise, regional courts have the jurisdiction to impose a maximum period of imprisonment of 15 years (and a fine of up to R300,000), while district courts have the jurisdiction to impose a maximum period of imprisonment of 3 years (and a fine of R60,000).⁸⁵ There is no sentencing limit for the High Courts.

The courts⁸⁶

The Constitutional Court is the highest court in the country, and it deals only with constitutional cases which are heard by 11 Constitutional Court judges.

The Supreme Court of Appeal is based in Free State, and, apart from the Constitutional Court, is the highest court in the country. It only hears appeals from the High Courts, and all cases are heard by three to five judges.

The High Courts can hear any type of criminal or civil cases, although they usually hear cases that are considered too serious for the Magistrates Courts. Cases of treason or murder can only be heard in the High Courts. The Judicial Services Commission recommends who should be appointed as a judge to the President. There are ten High Courts in the country, located in the different provinces, as well as three Local Division Courts.

⁸⁴ National Prosecuting Authority of South Africa Policy Manual, October 1999, Pretoria, pp. B.22 – B.25.

⁸⁵ Section 92(1), of the Magistrates' Courts Act No. 32 of 1944, as amended, read with GN R1411 (Government Gazette 19435) of 30 October 1998.

⁸⁶ This section is drawn directly from Chapter 3, Court Cases, in the Paralegal Manual, on the Paralegal advice website: www.paralegaladvice.org.za.

The Magistrates Courts are the lower courts and deal with less serious civil and criminal matters. There is usually one Magistrates Court in each town, and each court is presided over by a magistrate who is appointed by the Minister of Justice. Magistrates can be assisted by two lay assessors who are respected members of the community.

There are two types of Magistrates Courts: criminal courts and civil courts. Criminal courts are further divided into two types: Regional Magistrates Courts and District Magistrates Courts. The Regional Courts deal only with criminal cases and, as such, with more serious crimes like culpable homicide, rape, armed robbery and serious assault. These courts can hear all criminal cases except treason and murder. They can sentence a person to a maximum of 10 years in prison or a fine of R200,000.

The District Courts try less serious crimes and can sentence a person to a maximum of three years in prison or fine of R60,000. They also try civil matters, but they do not deal with matters such as divorce. Such matters are dealt with by Maintenance Courts which are located in the Magistrates Courts. Similarly, there are Children's Courts and Divorce Courts.

The Small Claims Courts were started in 1984. These courts aim to make access to justice easier, cheaper and faster. The courts deal with civil claims of up to R3,000. They are presided over by a Commissioner rather than a judge or a magistrate. Complainants are assisted by paralegals rather than the professional lawyers.

There are also several specialized courts that deal with particular kinds of cases:

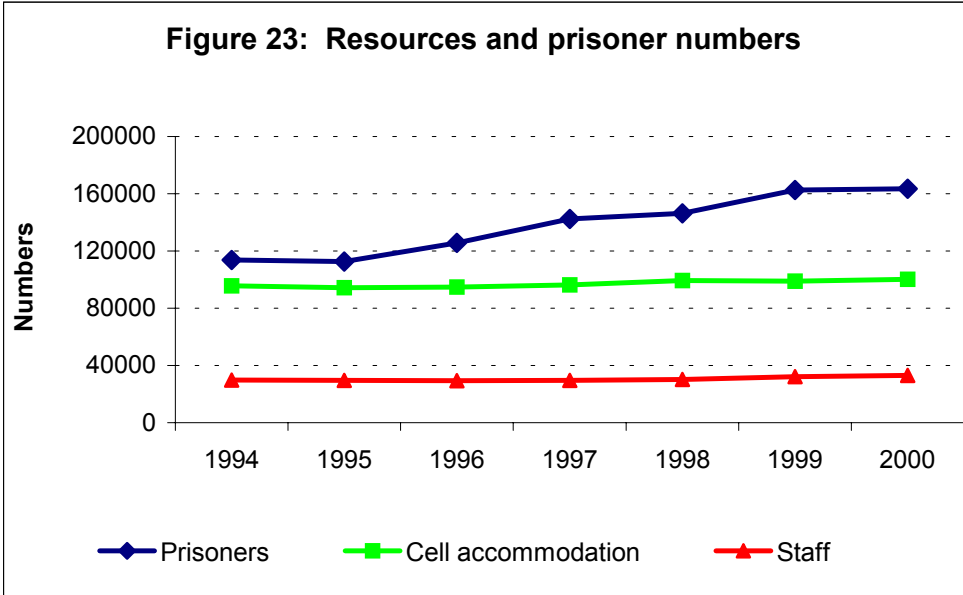
- Labour Appeal Court, which deals with appeals from the Labour Court
- Labour Court which, deals with disputes under the Labour Relations Act
- Land Claims Court
- Family Courts, which deal with family matters like divorce
- Tax Courts
- Water Courts
- Commercial Crime Court (at this stage only one exists in Pretoria, supported by the business community), and
- Sexual Offences Courts (at the end of 2000, 19 such courts had been established across the country).

The corrections

In 2001, the country's 238 prisons, designed to hold 105,000 people, were housing 176,000 inmates, and 33,093 officials were employed to manage the prison population. The available facilities consist of:

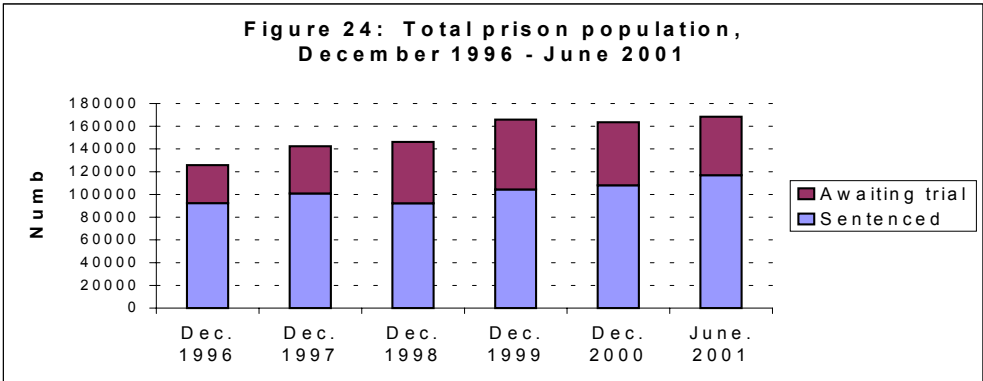
- 8 facilities for women
- 13 for youth
- 114 for men
- 99 for men and women
- 4 which are temporarily closed
- 2 private prisons.

The problems of severe overcrowding, a very high number of suspects awaiting trial in prison, and a high incidence of HIV/AIDS, pose a major challenge for the Department of Correctional Services (DCS) in South Africa. They also undermine the rights of those accused and convicted of crime who are held in custody, and they have serious negative effects on the implementation of the rehabilitation programmes.



Source: Department of Correctional Service Annual Report, 2001.

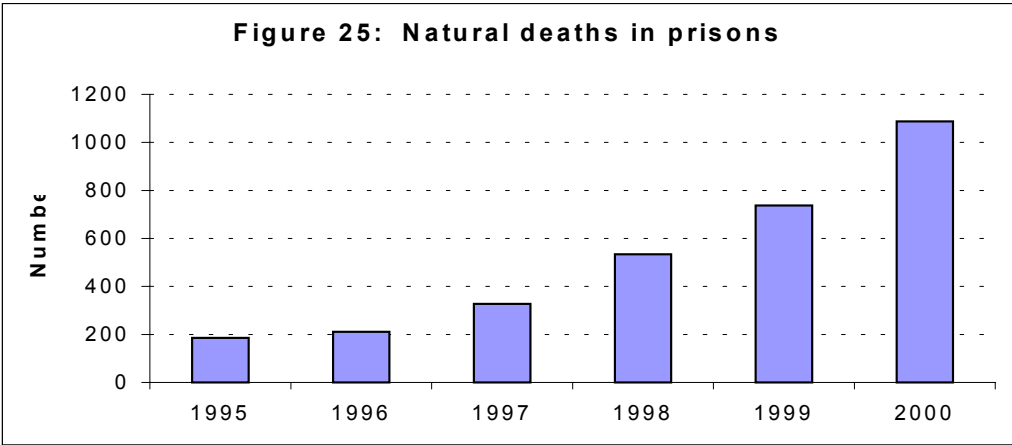
The high level of overcrowding arises from blockages in the criminal justice system. This is evidenced by that fact that the increase in the prisoner population since 1996 is largely attributable to a rise in the number of unsentenced prisoners held in correctional facilities. Between 1996 and June 2001, the total number of prisoners increased by 34%. The number of sentenced prisoners increased by 27%, compared to unsentenced prisoners, which, in turn, increased by 54%.



Another indicator of blockages in the criminal justice system is the increase in the number of days that the accused await the completion of their trials. In February 2002, the average figure was 139 days – up from 76 days in June 1996. Some suspects are held in prison awaiting a sentence for over four months and in some cases even several years.

One of the reasons for the large number of people held in prison while awaiting the completion of the trial is the inability to pay a bail. In June 2001, a total of 17,589 (34%) unsentenced prisoners were being held because they could not afford to pay bail. Over 11,000 of these had bail set at less than R1,000 (Masuku 2001).

Another major challenge facing the Department of Correctional Services is the control of communicable diseases and viruses, particularly HIV/AIDS and tuberculosis (TB). The current problem of overcrowding facilitates the spread of communicable diseases among the inmates. This problem is highlighted by the substantial increase in the number of “natural” deaths in prisons since 1995. Between 1995 and 2000, the number of natural deaths increased by 484%. According to post-mortems conducted, most of these deaths are believed to have been the result of HIV/AIDS.



Source: Judicial Inspectorate of Prisons Annual Report, 2001.

Organized crime control measures

As elsewhere, the expansion of organized crime and the need for international cooperation were the main driving forces to change the nature, scope and functions of law enforcement agencies and the legislative framework in South Africa. While South Africa’s 1994 transition gave rise to organized crime, it did not at the same time give rise to state institutions immediately in a position to counter the phenomenon.

From 1991 onwards, when the threat of organized criminal groups became apparent, police investigative methods changed from targeting customers, street level drug pushers and similar types of criminals to increasingly aiming at syndicate leaders and crime bosses, so called “targeting upwards”. However, insufficient detective skills and a weak system of crime intelligence remained stumbling blocks for the South African Police Service (Gastrow 1998).

In 1996, the Proceeds of Crime Act was passed, but problems were encountered in its implementation. Proceeds of crime have only recently been the target of organized crime prosecutions.

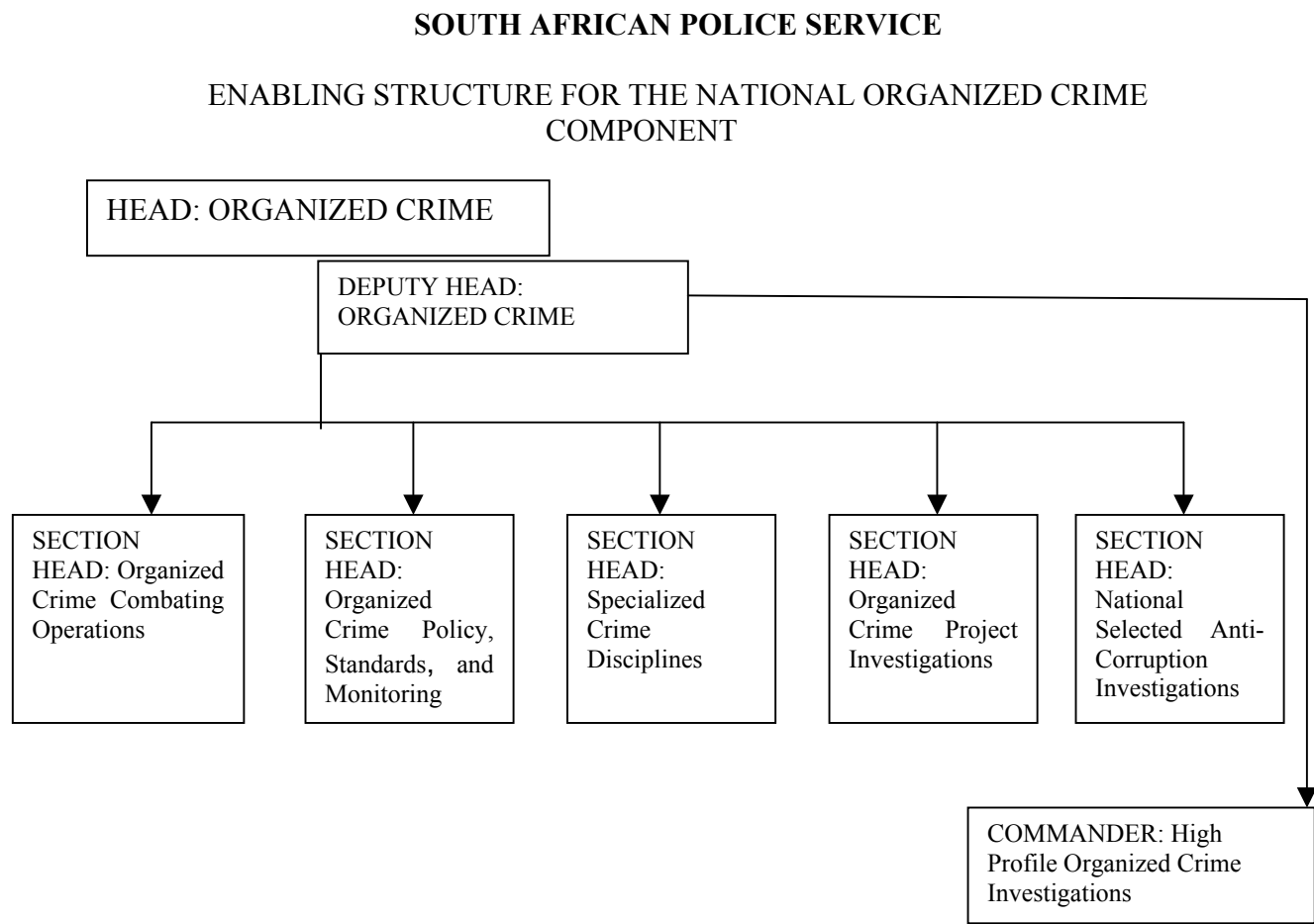
The Prevention of Organized Crime Act, 1998 as amended in 1999 makes provision for the following: (i) offences related to racketeering activities, money laundering and criminal gang activities, (ii) the restraint, confiscation and realization of the proceeds of unlawful activity, (iii) civil forfeiture of property which is either an instrumentality of an offence specified in the Act or is the proceeds of unlawful activity, and (iv) the establishment of a criminal assets recovery account and associated mechanisms which, *inter alia*, make provision for the allocation of moneys from the account to law enforcement.

Most significantly, the Act provides for the seizure of property by the state where “a reasonable suspicion” exists that it constitutes the proceeds of crime and the owner is unable to provide a satisfactory explanation of its origin. The Act also makes it a separate crime to directly or indirectly participate in or assist a criminal organization or gang. The early cases involving asset forfeiture (civil and criminal), prompted legal challenges on the ground that the Act should not extend to the proceeds of unlawful activities which occurred prior to the enactment of the legislation. Parliament has, however, removed all doubts and amended the Act to apply the asset forfeiture provisions to unlawful activities which occurred prior to the enactment.

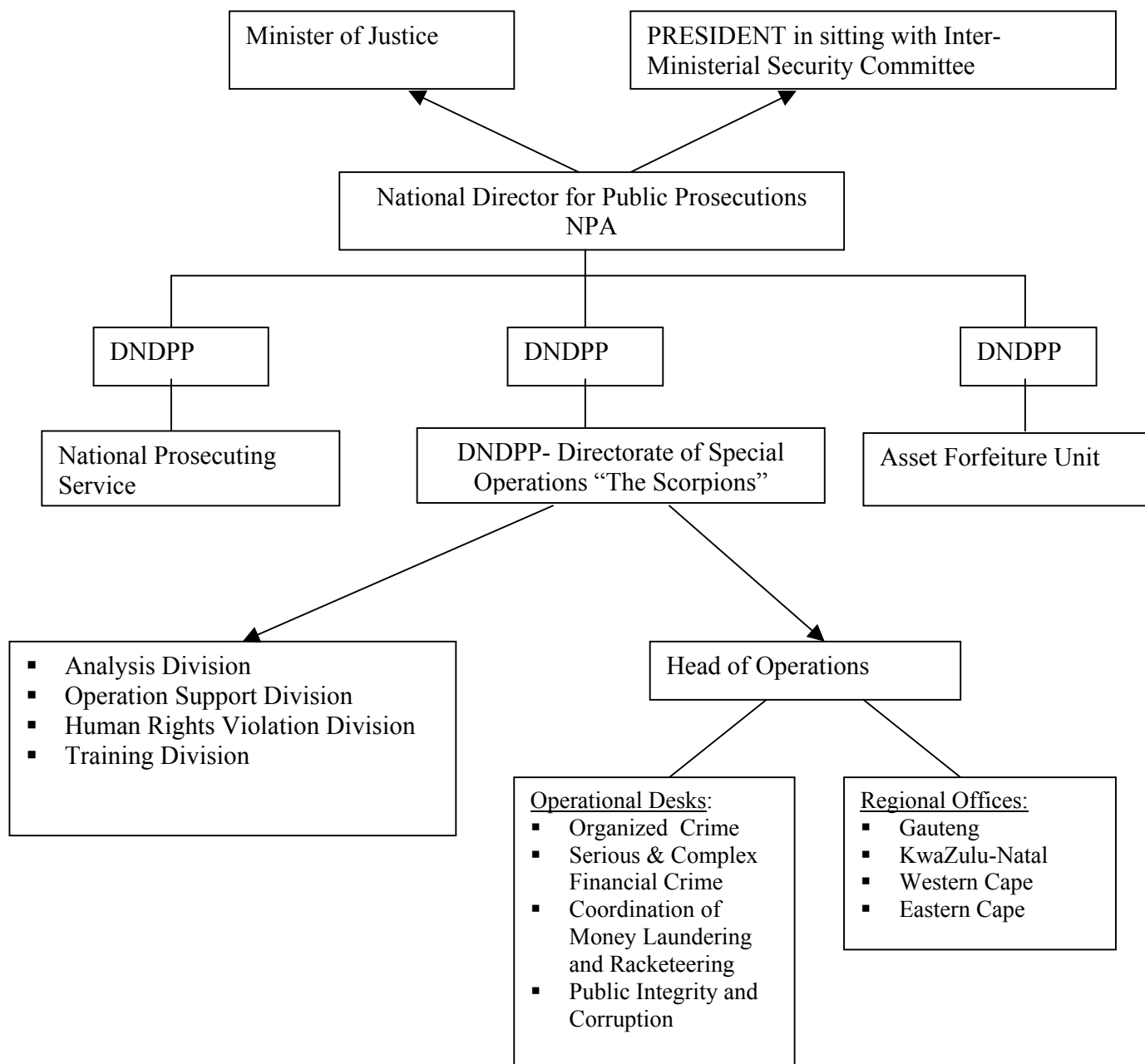
With regard to the implementing bodies, the National Prosecuting Authority Act makes provision for the establishment of three Investigating Directorates and the appointment of Special Directors to exercise powers and functions specified by the President by proclamation.

The National Director of Public Prosecutions established the Investigating Directorates on Organized Crime (IDOC) and Serious Economic Offences. He further established an Asset Forfeiture Unit. In 2000, the National Prosecuting Authority Amendment Act made provision for the establishment of the Directorate for Special Operations (the “Scorpions”). It further made provision for the existing investigating directorates to become part of the DSO. This Act was complemented by the DSO Act of 2001 which establishes the DSO for the effective investigation and prosecution of certain specified offences and the gathering of intelligence relating to such offences. The DSO is built on a three-pronged approach of intelligence, investigation and prosecution. The carrying out of prosecution-led investigations is permissible as the National Director of Public Prosecutions under the National Prosecuting Authority Act exercises powers and functions which are both investigative as well as prosecutorial.

The South Africa Police Service, following its major organizational restructuring in 2001, also established particular structures to deal with organized crime:



National Prosecuting Authority



9. BIBLIOGRAPHY

Allen 1999. Chris Allen, “Africa & the Drugs Trade”, in *Review of African Political Economy*, No 79, 1999.

Alvazzi del Frate 1995. Anna Alvazzi del Frate, *Victims of Crime in the Developing World*, Publication No. 55, UNCRI 1995.

Aminu 2001. L.S. Aminu, “Origins and Socio-political context of West African Criminal Organizations”, Conference Paper at the Growth and Impact of West African Organized Crime in Southern Africa (12 September 2001) at the South African Institute for International Affairs, University of Witwatersrand, South Africa.

Annual Report SAPS 2001/2002. Annual report of the National Commissioner of the South African Police Service, 2001 – 2002. September 2002.

Atkins A. 1997. A. Atkins, *The illegal drugs trade and development in South Africa: some observations*. Catholic Institute for International Relations, London 1997.

Aziz 2001, “Rapid Assessment Survey of Cannabis Cultivation and Related Eradication Options in South Africa”, Consultants Report prepared for UNODCCP by Temur Aziz Ahmed, November 2001.

ARQ. UNDCP, Annual Reports Questionnaire (various years).

Boshoff, Botha, Schonteich 2001. Henri Boschoff, Anneli Botha, Martin Schonteich. *Fear in the City: Urban terrorism in South Africa*. ISS Monograph No 63, September 2001.

Camerer, Louw, Shaw, Artz and Scharf 1998. Lala Camerer, Antoinette Louw, Mark Shaw, Lillian Artz and Wilfried Scharf, “Crime in Cape Town: Results of a city victim survey”, ISS Monograph No 23, April 1998.

CIAC 1999. “Attacks on Farms and Smallholdings”, Report 1/99, Crime Information Analysis Centre, South African Police Service, 1999.

CIIR 1998, Stephen Kibble, “Drugs and Development in South Africa: How Europe could help” a briefing for the Catholic Institute on International Relations, 1998.

Chukwuma and Alemika 2001. Innocent Chukwuma and Etannibi Alemika, “Patterns of Organized Crime in Nigeria: Structure, Extent and Potential Future Scenarios”, Conference Paper at the Growth and Impact of West African Organized Crime in Southern Africa (12 September 2001) at the South African Institute for International Affairs, University of Witwatersrand, South Africa.

Department of Health 1999. Department of Health, “HIV/AIDS in South Africa: The Impact and Priorities”, South Africa, 1999.

Department of Health 2000. Department of Health, “HIV/AIDS and STD – Strategic Plan for South Africa 2000-2005”, Pretoria, 2000.

Department of Health 2001. Department of Health, “National HIV and Syphilis Sero-Prevalence Survey of Women attending Public Antenatal Clinics in South Africa 2000, South African National Department of Health, Pretoria, 2001.

Department of Welfare 1999. Department of Welfare, National Drug Master Plan: Republic of South Africa, 1999-2004. Pretoria 1999.

Department of Welfare 1999a. “Financing Policy – Developmental Social Welfare Services”, Department of Welfare, March 1999 and “Financing Welfare for Transformation and Development – A Guide to Department of Welfare Policy, Department of Welfare, September 1999.

Department of Welfare 1999b. “Discussion Document on a Substance Abuse Prevention Strategy aimed at Youth”, Institute for Health Training and Development for Department of Welfare, November 1999.

Drug Advisory Board, 1998. Drug Advisory Board (Department of Welfare), Draft National Drug Master Plan: Republic of South Africa, 1999-2004. Pretoria 1998.

DEA 1996. U. S. Department of Justice, Drug Enforcement Administration, *Drug Trafficking in Africa* September 1996.

EIU 1999. The Economist Intelligence Unit, *Country Report South Africa*, 2nd Quarter 1999, London 1999.

EIU 1999-2000. The Economist Intelligence Unit, *Country Profile: South Africa*, 1999-2000, London 1999.

Fisher 2000. Fisher, S., “Bridges High School Survey”, SACENDU, Proceedings of Report Back Meetings, October 2000, p.63.

Fisher 2002. Fisher, S., “Bridges Primary and High School Survey in Cape Town”, unpublished, October 2002.

Flisher 1993. A.J. Flisher, C.F. Ziervogel, D.O. Chalton, P.H. Leger, B.A. Robertson, “Risk taking behaviour of Cape Peninsula high school students: V. Drug use”. *South African Medical Journal*, 83, 1993, pp. 480-482.

Flisher 1998. A.J. Flisher, C.D.H. Parrz, J. Evans, C.J. Lombard, M. Müller, “The South African Community Epidemiology Network on Drug Use (SACENDU): Part IV: Prevalence rates of alcohol, tobacco, and other drug use among Cape town students in Grades 8 and 11”. Symposium paper presented at the 4th Annual Congress of Psychological Society of South Africa, Cape Town, September 1998.

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- Foster 1996. A comparative study of the incidence of ethanol, methaqualone and cannabis in homicide and pedestrian transport accidents victims in the Western Cape metropole area. (Unpublished), University of Cape town, Faculty of Medicine, Department of Pharmacology, Cape Town 1996.
- Frank and Fisher 1998. Cheryl Frank and Sarah Fisher, "Kids, Drugs and Transformation: Raising Conceptual Issues," *Crime & Conflict*, No. 12, 1998.
- Franzen 1998. Bjorn Franzen, Substance Abuse and HIV/AIDS in Southern Africa", in *Urban Health and Development Bulletin*, Vol. 1, Number 4, December 1998.
- Galant & Gamiieldien 1996. Raashied Galant & Fahmi Gamiieldien (Eds.), *Drugs, Gangs People's Power – Exploring the Pagad Phenomenon*, Claremont Main Road Masjid, Cape Town, 1996.
- Garson 1997. Philippa Garson, "Study warns of more "Pagad" style violence", *Electronic Mail & Guardian*, 1 April 1997.
- Gastrow 1998. Peter Gastrow "Organized Crime in South Africa" ISS Monograph Series, No.28, Institute for Security studies, South Africa, August 1998.
- Gastrow 1999. Peter Gastrow, "The Network of Nigerian Criminal Groups in South Africa", unpublished paper, Institute for Security Studies, Cape Town, November 1999.
- Gastrow 2001. Peter Gastrow, "Organised Crime in the SADC Region" ISS Monographic Series, No. 60, August 2001.
- Grové 1994. "The drug trade as a national and international security threat". Paper presented at the "Security '94 Conference" organized by the Institute of Strategic Studies and Security Association, Pretoria, 1994.
- HONLEA 1994. "Curent Situation and Most Recent Trends in Illicit Drug Traffic in the African Region", Seventh Meeting of Heads of National Law Enforcement Agencies (HONLEA), Addis Ababa, 10-14 October 1994. UNDCP/HONLAF/1994/4.
- HSRC 1991. Human Sciences Research Council, "Alcohol and other drug use by black residents in selected areas in RSA", (report prepared by Lee Rocha-Silva) Pretoria, 1991.
- HSRC 1996. Human Sciences Research Council, "Nature, Extent and Development of Alcohol / Drug-Related Crime", Pretoria, 1996.
- IMF 1999. International Monetary Fund, *International Financial Statistics*, Washington, June 1999.
- IMR 1997. Integrated Marketing Research, "Addicted to Life – Campaign Evaluation Management Report", Johannesburg, March 1997.
- Interpol 1999a, Interpol/ICPO, *Heroin Situation in Europe*, March 1999.

Interpol 1999b, Interpol/ICPO, Cannabis Situation in Europe, March 1999.

Interpol 2001, Interpol/ICPO, The Global Illicit Drug Trade – Current Trends and Threats (2000-2001), March 2001.

ICPO 1995. Trends and Patterns of Illicit Drug Traffic 1994, Interpol/ICPO General Secretariat, March 1995.

ICPO 1995. Trends and Patterns of Illicit Drug Traffic 1994, Interpol/ICPO General Secretariat, March 1995.

INCB 1999. International Narcotics Control Board, 1998 Precursors, New York 1999.

INCB 2001. International Narcotics Control Board, 1998 Precursors, New York 2001.

INCSR 1999. United States Department of State, Bureau for International Narcotics and Law Enforcement Affairs, International Narcotics Control Strategy Report – South Africa, Washington, March 1999.

INCSR 2001, United States Department of State, Bureau for International Narcotics and Law Enforcement Affairs, International Narcotics Control Strategy Report – South Africa, Washington, March 2001.

ISS 2002, “Drugs and Crime in South Africa – A Study in Three Cities”, Institute for Security Studies Monograph Series No. 69, Pretoria, March 2002.

Law Commission 2002, Report on Review of Security Legislation, Project 105, South African Law Commission, August 2002.

Leggett 1998. Ted Leggett, “Crack – It’s the Real Thing”, Crime and Conflict (No. 13, 1998).

Leggett 1999. Ted Leggett, “For Better or Worse: 1998 Legislation”, Crime and Conflict 15, Durban (1999).

Leggett 1999a. Ted Leggett, “Drugs and sex work in the Durban CBD”, Urban Health and Development Bulletin 2(1), South Africa.

Leggett 1999b. Ted Leggett, Poverty and Sex Work in Durban, South Africa, Society in Transition 30(2), South Africa.

Leggett 1999c. Ted Leggett, “The Sleazy Hotel Syndrome: Housing Vice in Durban and Johannesburg”, Crime and Conflict (Summer 1999).

Leggett 2000. Ted Leggett, “Drug markets of Johannesburg”, UNODCCP Southern Africa Office, Pretoria. (Unpublished)

Leggett 2001. Ted Leggett, “Rainbow Vice: The Drugs and Sex Industries in the New South Africa”, David Philip / Zed Books, 2001.

Louw 1998. Antoinette Louw, “Crime in Pretoria: Results of a city victim survey”, Institute for Security Studies and IDASA, August 1998.

Louw and Shaw 1997. Antoinette Louw and Mark Shaw, “Stolen Opportunities: The impact of crime on South Africa’s poor”, ISS Monograph Series, No. 14, Institute for Security Studies, South Africa, July 1997.

MacDonald 1996. Dave McDonald, “Drugs in Southern Africa: An Overview” in Drugs: education, prevention and policy, Vol. 3, No. 2, 1996.

Martins, Naude and Prinsloo 1999. J. H Martins, C. M. B Naude and J.H Prinsloo, “Crimes against the South African Business Sector”, unpublished report, UNISA. Institute of Criminological Sciences, 1999.

Masuku 2001. Sibusiso Masuku, “Providing a ‘correctional service’? Overcrowding in South Africa’s prisons”, Nedbank ISS Crime Index Vol. 5, 2001.

Molo Songolo 2000a. “The Trafficking of Women into the South African Sex Industry”, Molo Songololo, South Africa, 2000.

Molo Songolo 2000b. “The Trafficking of Children for Purposes of Sexual Exploitation”, Molo Songololo, South Africa, 2000.

Monitoring the Future, 1998. University of Michigan and National Institute on Drug Abuse, National Survey Results on Drug Use from the Monitoring the Future Study, 1975-1998, Washington 1998.

MRC 1998. South African Medical Research Council, “Drug Country Profile: South Africa for UN World Drug Report”, October 1998.

MRC 1999. South African Medical Research Council, “Substance Abuse Trends in South Africa: Implications”, Cape Town, March 1999.

MRC 2001. South African Medical Research Council, “The Impact of HIV/Aids on adult mortality in South Africa”, Cape Town, July 2001.

NCIS 1995. National Crime Investigation Service (NCIS), The Illicit Drug Trade as a National and International Threat, Current Situation with Respect to Regional and Subregional Cooperation - Country report by South Africa, October 1995.

Neser et. al. 2001. Nesar J.J., et al, “Views of Learners on Drugs and Related Matters: Preliminary Findings”, Crime Research in South Africa, (www.crisa.org.za) – Volume 3 Number 3, June 2001.

OGD 1996. Observatoire Geopolitique des Drogues, "South Africa: Drugs: Mandela's New Struggle", OGD - The Geopolitical Drug Dispatch, April 1996.

OGD 1996a. Observatoire Geopolitique des Drogues, Atlas Mondial des Drogues, Paris 1996.

OGD 1997. Observatoire Geopolitique des Drogues, Annual Report , Paris 1997.

OGD 1998. Observatoire Geopolitique des Drogues, Annual Report, Paris 1998.

OGD 1998a. Observatoire Geopolitique des Drogues, "Cannabis in Lesotho: A Preliminary Survey" (Laurent Laniel) Discussion Paper No. 34, October 1998.

Omar 1997. D. Omar, 1997. "The Drug trade in Southern Africa". Paper presented at a workshop organized by the South African Institute of International Affairs on "The illegal drug trade in Southern Africa", Johannesburg, 5-6 June 1997.

Oosthuysen 1998. H. Oosthuysen, "South Africa in the global drug network", in A. Handley (Ed.), The illegal drug trade in Southern Africa: International dimensions to a local crisis (pp. 121-134) (The South African Institute for International Affairs), Johannesburg 1998.

Parry 1997. "The illegal narcotics trade in Southern Africa: A programme for action". Paper presented at a workshop organized by the South African Institute of International Affairs on "The Illegal drug trade in Southern Africa".

Parry 1997b. "The nature and extent of alcohol / drug use in South Africa", Briefing to Department of Welfare, 10 December 1997.

Parry, Louw and Pluddemann 2001. Charles Parry, Antoinette Louw and Andreas Pluddemann, The MRC/ISS 3-Metros Study (Phase 3) January 2001, Drugs and Crime in South Africa, 2001.

Parry and Karim 1999. Charles Parry and Quarraisha Abdool Karim, "Country Report: Substance Abuse and HIV/AIDS in South Africa", paper presented at the Second Annual Global Research Network meeting on HIV Prevention in Drug Using Populations, Atlanta, 26-28 August 1999.

Peden 1997. M.M. Peden & N. Sidzumo, "Trauma and drug study: provisional results". MRC Trauma Review, 5 (3), 7-8, 1997.

Research Surveys 2001. Research Surveys press release August 2001, www.researchsurveys.co.za/news.htm.

Robertshaw, Louw, Shaw, Mashiyane and Brettell 2001. Rory Robertshaw, Antoinette Louw, Mark Shaw, Mduduzi Mashiyane and Sid Brettell, "Reducing crime in Durban: A victim survey and safer cities strategy", ISS Monograph No 58, August 2001.

SACENDU 1998. South African Community Epidemiology Network on Drug Use (SACENDU) July-December 1998, published by the South African Medical Research Council, 1998.

SACENDU 2001. South African Community Epidemiology Network on Drug Use (SACENDU) Research Brief Vol 4 (1), 2001, covering the period July 1996 - December 2000, published by the South African Medical Research Council, 2001.

SACENDU 2001a. South African Community Epidemiology Network on Drug Use (SACENDU) Proceedings of Report Back Meetings (April 2001), published by the South African Medical Research Council, 2001.

SACENDU 2002. South African Community Epidemiology Network on Drug Use (SACENDU) Proceedings of Report Back Meetings (April 2002), meeting notes.

SACENDU 2002a. South African Community Epidemiology Network on Drug Use (SACENDU) Research Brief Phase 10 – Vol 4 (2), 2001, covering the period July 1996 – June 2001), published by the South African Medical Research Council, 2002.

SACENDU 2002b. South African Community Epidemiology Network on Drug Use (SACENDU) Research Brief Phase 11 – Vol 5 (2), 2002, covering the period July 1996 – December 2001), published by the South African Medical Research Council, 2002.

SAIRR 2000. “Fast Facts”, South African Institute of Race Relations, Johannesburg, No. 7, July 2000.

SAPS 1995. South African Police Service (SAPS), The Illicit Drug Trade as a National and International Threat, November 1995.

SAPS 1996. South African Police Service, “Illicit Cross-Border Drug Trafficking as a National and International Threat”, Country Report by South Africa presented to the 8th meeting of Heads of National Drug Law Enforcement Agencies (HONLEA), Cairo, 16-20 June 1996.

SAPS 1999. South African Police Services Aerial Application Unit, “Operation Motokwane – October to December 1999”, prepared by Commander F.J. Viljoen, 2000.

SAPS 2000. South African Police Service, “Today’s Situation: Globalization and the Risk of Transnational Organizations” paper presented by Senior Superintendent George Mason, at SACENDU report back session October 2000.

SAPS 2001, South African Police Service, “Nature and Extent of West African Nationals (especially Nigerians) in Organized Crime in Southern Africa”, presentation by Director Moki of SAPS at the 5th Interpol Meeting of Heads of African National Drug Services, Gaborone, Botswana, 28-30 June 2001.

SAPS 2001a. South African Police Service, “An Overview of Cannabis Destroyed in the Cultivation Areas since January 2000”, compiled by Capt. J.J.A. Reheder, SANAB Cannabis Eradication Programme, September 2001.

SAPS 2002. South African Narcotics Bureau, “Annual Report 2001”, Pretoria.

SAPS 2002b. South African Police Service, “Annual Report of the National Commissioner of the South African Police Service – 1 April 2001 to 31 March 2002: A Summary”, Pretoria, September 2002.

Schonteich 1999. Martin Schonteich, “Assessing the Crime Fighters”, ISS Papers, 40, Institute for Security Studies, South Africa, September 1999.

Schonteich 1999. Martin Schonteich, “Age and Aids: South Africa’s Crime Time Bomb”, in *African Security Review*, Volume 8 - Number 4, 1999, Institute for Security Studies, South Africa.

Schonteich and Louw 2001. Martin Schonteich and Antoinette Louw, “Crime in South Africa: A country and cities profile”, Institute for Security Studies, South Africa, March 2001.

Shaw 2001. Mark Shaw, “West African Criminal Networks in South and Southern Africa”, South African Institute of International Affairs, conference paper, 2001.

Shaw 2000. “Theatre of Terror: Responding to Cape Bombings”, *Crime & Conflict*, No.21, Spring 2000, Centre for Social and Development Studies, University of Natal, South Africa.

Smit 2001. Pieter Smit, “Clean Money- Suspect Source: Turning Organized Crime against Itself”, ISS Monograph Series, No 51, Institute for Security Studies, January 2001.

Stats SA 2001. Statistics South Africa, “Stats in Brief 2001”, Pretoria, 2001.

STRIDE. Drug Enforcement Administration, “System To Retrieve information From Drug Evidence” (STRIDE), 1981-1997, quoted in Office of National Drug Control Policy, National Drug Control Strategy, Washington 1999.

Strydom, J.L., “Report on the Rapid Assessment Survey Study on Substance Abuse in the Kingdom of Lesotho”, ODCCP Pretoria, January 2000.

TRC 1999. Truth and Reconciliation Commission Final Report, Special Investigation into Project Coast, Pretoria 1999.

UNAIDS 2000. UNAIDS, “Report on the Global HIV/AIDS Epidemic”, Geneva, June 2000.

UNAIDS 2002. UNAIDS, “Report on the Global HIV/AIDS Epidemic”, Geneva, July 2002.

UNDCP/WHO, 1998. UNDCP/WHO Global Initiative for Primary Prevention of Substance Abuse, Papers distributed at the Regional Consultation for Southern Africa, 24-26 February 1998.

UNDCP 1998. UNDCP HONLEA Africa, Current Situation with Respect to Regional and Sub-regional Cooperation, Abuja, 20-24 April 1998, Report UNDCP/HONLEA/1998/CRP.1.

UNDCP 2002. UNDCP HONLEA Africa, Country Report by South Africa, Nairobi, Kenya, 9-13 September 2002, Report UNDCP/HONLEA/2002/CRP.3.

UNDCP Mission, 1999. Information obtained from key informants (in meetings organized by Institute for Security Studies) during UNDCP mission (Illegal Drug Market Study) to South Africa, 19-23 April 1999.

UNDP 1999. United Nations Development Programme, “Human Development Report 1999”, (Oxford University Press), New York 1999.

UNDP 2001. United Nations Development Programme, “Human Development Report 2001”, (Oxford University Press), New York 2001.

UNDP 2002. United Nations Development Programme, “Human Development Report 2002 ”, (Oxford University Press), New York 2002.

UNICEF 2002. “The Impact of HIV/AIDS on the Health and Welfare of Children in South Africa and on Health and Welfare Services for Children” discussion paper prepared by the Child Health Policy Institute for UNICEF (May 2002).

UNODCCP FO (various). Reports from the ODC Regional Office for Southern Africa, Situation Reports (various).

UNODCCP 1999. United Nations Office For Drug Control and Crime Prevention, The Drug Nexus in Africa, (ODCCP Studies on Drugs and Crime), Vienna 1999.

UNODCCP 1999a. United Nations Office for Drug Control and Crime Prevention, Global Illicit Drug Trends (ODCCP Studies on Drug and Crime, Statistics), Vienna 1999.

UNODCCP 2000. United Nations Office for Drug Control and Crime Prevention, World Drug Report 2000, Oxford University Press, 2000.

UNODCCP 2001. “Global Illicit Drug Trends 2001”, United Nations, 2001.

UNODCCP 2002. “Global Illicit Drug Trends 2002”, United Nations, 2002.

United Nations 2001, United Nations Treaties Against terrorism, Note No, 5679, 19 September 2001.

US Department of State 2000. US Department of State 2000, “Patterns of Global Terrorism”, Washington, 2000.

Van Aarde 1997. J.J. Van Aarde, “The extent of drug trafficking in South Africa and the nexus between drugs and crime”. Paper presented at a workshop organized by the South African Institute of International Affairs on the Illegal Drug Trade in Southern Africa, Johannesburg, 5-6 June 1997.

Van der Burgh 1993. C. Van der Burgh, The contribution of the South African National Council on Alcoholism and Drug Dependence (SANCA) in Combating Alcohol and Drug Abuse in South Africa and a Drug Profile of South Africa, September 1993.

Venter 1998. C. Venter, “Input by forensic laboratory”. Presentation given at a meeting of the Cape Town component of the SACENDU Project (Phase IV), organized by the Medical Research Council, Cape Town, October 1998.

Venter 1998a. C.J.D. Venter, “Drug Abuse and Drug Smuggling in South Africa”, in Robert Rothberg and Greg Mills (Eds.), *War and Peace in Southern Africa*, Washington DC, Brookings Institution Press, 1998.

Weltalmanach '99. Der Fischer Weltalmanach '99; Zahlen, Daten, Fakten, (Fischer Taschenbuchverlag), Frankfurt am Main 1998.

World Bank 1998. World Bank, “World Bank Atlas 1998”, Washington 1998.

World Bank 2002. World Bank, “World Development Indicators Database”, Washington, April 2002.

Wright 1991. John Wright, “The Drugs Situation in South Africa - Drug Trafficking in South Africa and Trends in the Southern Sub-Region of Africa”, *Drugs Arena* 12/91.

Zvekic and Alvazzi del Frate 1995. Ugljesa Zvekic and Anna Alvazzi del Frate, *Criminal Victimization in the Developing World*, UNCRI 1995.

Cannabis and crime: findings from a longitudinal study

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ABSTRACT

Aim To examine the association between cannabis use during adolescence and young adulthood, and subsequent criminal charges. **Methods** Data were obtained from the Young in Norway Longitudinal Study. A population-based sample ($n = 1353$) was followed from 13 to 27 years of age. Data were gathered on cannabis use, alcohol consumption and alcohol problems, and use of other illegal substances such as amphetamines, cocaine and opiates. In addition, extensive information on socio-demographic, family and personal factors was collected. This data set was linked to individual-level information from official Norwegian crime statistics. **Findings** We found robust associations between cannabis use and later registered criminal charges, both in adolescence and in young adulthood. These associations were adjusted for a range of confounding factors, such as family socio-economic background, parental support and monitoring, educational achievement and career, previous criminal charges, conduct problems and history of cohabitation and marriage. In separate models, we controlled for alcohol measures and for use of other illegal substances. After adjustment, we still found strong associations between cannabis use and later criminal charges. However, when eliminating all types of drug-specific charges from our models, we no longer observed any significant association with cannabis use. **Conclusions** The study suggests that cannabis use in adolescence and early adulthood may be associated with subsequent involvement in criminal activity. However, the bulk of this involvement seems to be related to various types of drug-specific crime. Thus, the association seems to rest on the fact that use, possession and distribution of drugs such as cannabis is illegal. The study strengthens concerns about the laws relating to the use, possession and distribution of cannabis.

Keywords Alcohol, cannabis, crime, illegal drugs, longitudinal, marijuana.

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Submitted 9 February 2009; initial review completed 2 March 2009; final version accepted 19 June 2009

INTRODUCTION

Cannabis use has been increasing in most western countries during the last four decades, and recreational cannabis use at least is often regarded as a relatively harmless experience. However, a number of studies point in another direction: it seems well established that cannabis use may be a risk factor for reduced mental health [1,2]. A range of adverse social outcomes has also been linked to cannabis use, such as poor educational results, unemployment, problematic personal relationships and reduced life satisfaction [3–5]. However, the findings are not in complete agreement, and some studies question such effects [6,7]. The large methodological challenges in this area are also notable: many studies are

cross-sectional or based on selected samples, and even with population-based longitudinal studies it is difficult to eliminate possible consequences of confounding factors. Nevertheless, the picture evolving from recent research is that the adverse consequences of cannabis use may be more extensive than suggested previously [8].

One area that has received some attention during the last couple of decades is the possible association between cannabis use and crime. A number of researchers have addressed the complex associations between early delinquent behaviour and cannabis use, where some studies indicate that conduct problems are a risk factor for subsequent cannabis initiation [9], while other studies point in the direction of increased delinquent activity and petty crime in the wake of cannabis use [4,10]. A recent

meta-analysis also pointed to an association between cannabis use and more serious criminal involvement, an association that was even stronger for other illegal substances such as amphetamines, cocaine and opiates [11]. However, the bulk of the evidence stems from small, selected samples, often from detention centres [12] or based on samples of arrestees [13]. Even with the lack of population-based longitudinal studies, the picture evolving is that the relationship to later crime seems to be weaker for cannabis than for other illegal substances [11].

A number of studies have revealed that alcohol consumption and alcohol-related problems are also connected intimately to patterns of criminal involvement [14,15] and that giving up or reducing alcohol intake is a salient factor associated with desisting from crime [16]. However, it has been argued recently that drug use and the cultures in which many drug users are enmeshed have crime-related consequences that go beyond those of alcohol, because of the illegality of these substances [17]. It has been argued that drug use influences adult social role bonds as well as social network affiliations negatively. When investigating the possible adverse consequences of cannabis with regard to crime, it is also necessary to control for effects of alcohol as well as effects of other illegal substances.

Observed associations between cannabis use and later crime, when also controlling for the use of other substances, may be due to different pathways. First, it may be that cannabis use implies acute intoxication episodes, impaired memory or attention [8] or gradual cognitive impairment [18], any of which may encourage decisions leading to crime, even if recent studies question such effects for non-chronic users [19]. Secondly, it may be suggested that cannabis users interact with networks of substance-using peers as well as criminal dealers, where they are encouraged to take part in crime for gain or where they are exposed to a violent subculture [20]. However, there may be alternative explanations of such associations. In particular, it may be suggested that they arise because of selection factors associated with both cannabis use and crime. For example, cannabis use has been linked to childhood and family disadvantage, educational problems and underachievement and early-onset conduct problems [4,21,22]. It may also be suggested that these features increase the risk of later criminal involvement. Thus, an association between cannabis use and crime may reflect the fact that risk factors for cannabis use are also risk factors for crime.

In Norway, there has been a dramatic increase in the number of investigated drug-specific crimes which more than doubled from 20 000 in 1996 to 44 000 in 2001, an increase that has now levelled off [23]. There are

two main groups of drug offences. Serious drug crimes include the unlawful import, manufacturing and dealing of drugs. In Norway the use and possession of a number of drugs is also prohibited, but under the Act relating to medical goods. For these crimes the offences are detected, to a large extent, by either stop-and-search by the police or if drugs are found when a person is arrested for other acts. Although serious drug crimes are often thought to be committed by more professional criminals, it is also true that most of those convicted for serious crimes are also drug users [24].

A considerable part of the total volume of crime is drug-related. During the 1990s, we witnessed an increase in cannabis consumption in Norway [25] and the rest of Europe [26]. Thus, a possible association between cannabis use and subsequent charges for crime may reflect the illegality of use, possession, import and distribution of cannabis. To obtain an adequate picture and to prevent tautological inferences, it is necessary to also investigate the association between cannabis use and subsequent non-drug-specific crime.

A considerable proportion of previous studies in this area have utilized selected samples and cross-sectional designs. Moreover, self-reports of criminal involvement have generally been used, even if previous studies have indicated that a sizeable proportion of youths with official arrest records fail to report that they have been arrested [27]. In the research reported here, we aim to overcome some of these weaknesses. We will utilize a population-based longitudinal data set with follow-up from early adolescence until the late 20s. Self-reports are supplemented with data from the official crime register in Norway, where we are able to identify various groups of crimes, including those not related to illicit drugs. We are also able to control for a broad spectrum of possible confounding factors.

Aims of the study

The aims of the study are:

- 1 to investigate possible associations between cannabis use in early adolescence and young adulthood and later involvement in crime;
- 2 to examine whether possible associations are explained by confounding factors associated with cannabis use and the development of crime;
- 3 to examine whether possible associations between cannabis and crime are also present for non-drug-specific crime; and
- 4 to examine the relative importance of cannabis compared with alcohol and other illegal substances [e.g. amphetamines, 3,4-methylenedioxymethamphetamine (MDMA), cocaine and opiates] with regard to later criminal involvement.

METHODS

Participants

The research is based on the Young in Norway Longitudinal Study, which has been described in detail elsewhere [28,29]. A population-based sample of Norwegian adolescents was followed-up over a 13-year span from 1992 to 2005, with four survey-based data collections. The sampling was based on the school system. Schools were selected from a register that included every school in the country. The sample was stratified according to geographical region and school size, which in Norway is related closely to degree of urbanization. The number of students sampled in each stratum was proportional to the total number of students in the stratum (proportional allocation). Within each stratum, schools were drawn with probability proportional to size. All students from each school were included in the study. (Note that in Norway, 98.5% of the cohorts between 12 and 16 years of age attend the compulsory junior high school system.) For those who gave consent, these data were linked with data from Norwegian crime statistics. The adolescents were required to give written consent based on descriptions of the project formulated according to standards drawn up by the Norwegian Data Inspectorate. Written consent was obtained from their parents. The initial response rate was 97%; at age 20 years, we managed to obtain data from 84% of the sample and at age 27 years from 82%. The cumulative response rate over all data collections was 69%. Previous analyses [30] showed that predictors of attrition were sex (male), poor school grades, urban residence and the participant's prediction of manual work for occupation when aged 40 years. In the present study, we report new attrition analyses when we compare our data set with official Norwegian crime statistics. We draw on data from 1353 individuals followed-up at ages 13 (standard deviation 1.9), 15, 20 and 27 years.

Measures

Crime

Information on charges from the crime statistics, provided by Statistics Norway, was linked to the individuals by way of a unique national identification number. A reasonable interpretation of the term 'charge' is 'qualified suspect', as it denotes individuals who were alleged offenders when investigation was completed by the police. This implies that people who were suspects or charged legally at an earlier stage, but were no longer suspects at the end of the investigation, are not included. These suspects are recorded whether or not the person later receives a sanction, provided the suspect has been identified according to the police, and the data

therefore also include information on people under the age of criminal responsibility. An advantage of using charges, and not final sanctions, is that a significant proportion of criminal cases do not result in convictions. Nevertheless, the category is much more likely to reflect crimes committed than arrests only. The legal code differentiates between misdemeanors and crimes, where the former are less serious offences dominated by traffic offences and shoplifting. In the present study we include only serious measures of crime, which include offences such as theft, robbery, violence and drug offences. Because each single offence is recorded by the police with a code, it was possible to create detailed categories for this study. Drug crimes are of special interest for this study, and we have information about use and possession of drugs as well as more serious drug crimes. The majority of those who were charged for serious drug crimes were also charged for use and possession of drugs. Thus, we have chosen to classify drug-use crime in two groups: 'use and possession only' and 'all drug-specific crimes'.

Note that there are many offences committed that are not detected or where the perpetrator is not found. The overall clear-up rate in Norway has been approximately 30% over the past decade. The offending rate will therefore be lower in our data than in self-reports, but that does not necessarily bias our estimates. On the other hand, some offenders may be apprehended more easily than others, and we can only adjust for this so far as it is captured by the observed confounders.

Substance use measures

At each data collection, i.e. at ages 13, 15, 20 and 27 years, we asked respondents about their use of cannabis during the preceding 12 months on a six-point scale ranging from 'never' to 'more than 50 times'. We also asked about use of other illegal substances, such as MDMA, amphetamines, cocaine and heroin. Furthermore, we asked about the number of alcohol intoxication episodes during the previous 12 months. Alcohol problems were measured by a short version of the Rutgers Alcohol Problem Index, suited for adolescents and young adults [31].

Conduct problems

Those items approaching most closely DSM-III-R criteria for conduct disorder [32] were selected from Olweus's scale of antisocial behavior [33] and the National Youth Longitudinal Study [34], and age-appropriate questions were included in the different waves [35]. The conduct problems index is the number of problems reported (Cronbach's $\alpha = 0.85$).

Socio-economic background

Parental socio-economic status (SES) was measured at ages 13 and 15 years by classifying the father's and mother's occupations according to the ISCO-88, the official classification standard of the International Labour Organization [36]. We also asked about parental education, which was classified into five levels from 9 years of basic education to education at university level. A separate question was asked about whether the mother or father was living on social welfare or was unemployed (scored dichotomously). As a proxy for cultural capital [37], we asked about the number of books in the parental home.

Parental relationships, family characteristics and history of cohabitation

We monitored whether the respondents experienced parental breakup and divorce. At ages 13 and 15 an instrument of parental monitoring was used, which comprised questions relating to perceived parental norms and parental knowledge of the adolescent's actions [33]. An example question was: 'Do they know where you are at weekends?' (Cronbach's $\alpha = 0.83$). Based on an instrument developed by Sarason *et al.*, perceived parental support was measured in situations relating to feeling down or having done something illegal [38]. We also collected information about possible parental alcohol problems. Furthermore, we monitored the respondents' own history of cohabitation and marriage on a year-by-year basis.

Education, school dropout and sources of income

At ages 13 and 15, the respondents were asked about their school grades in the three major subjects: Norwegian, English and mathematics. We monitored their subsequent educational careers closely. We also collected information about sources and levels of income and position in the labour market. Special categories were created for those who were unemployed, and for those living on social security, unemployment, disability or rehabilitation benefits.

Statistics

To validate our data set with regard to the consequences of the attrition, we compared the offending rates for our sample with the offending rates in the total cohort of Norwegians born in the same years. The bivariate odds ratio (OR) is defined as $\frac{\pi_1/(1-\pi_1)}{\pi_2/(1-\pi_2)}$, where π_1 is the probability of being charged for sample members and π_2 is the probability in the population, and confidence intervals

(CI) for the odds ratio are calculated in the usual way [39].

In the multivariate analyses, we calculated the association between cannabis use at age 15 and charges in the age period 15–20 years, and also the association between cannabis use at age 20 and charges in the age period 20–27 years applying logistic regression. We analysed the chance of being charged with at least one crime. In the multivariate analyses, first we fitted a model testing the prospective association between cannabis use and crime, while controlling for confounders. The confounders included in the model were chosen for substantive reasons, based on previous research. However, we excluded those variables that were far from significant to avoid overfitting the model. The confounders included in the models are reported in Tables 3 and 4. In the final three models in each table, we first included measures of cannabis, then measures of alcohol intoxication and alcohol problems, and finally measures of other illegal drug use, while comparing the relative fit of the models using the standard log-likelihood statistics [39].

RESULTS**Comparisons with population data**

The crime register revealed that in the total population in Norway, in this age cohort, 24.4% had at least one registered offence. In our data set, the figure was 18.3%. Excluding misdemeanors, there were 11.6% in the total population, compared with 7.8% in our sample.

This gives an OR = 0.70 (95% CI: 0.61–0.81) for all offences and OR = 0.66 (95% CI: 0.54–0.81) for crimes. Thus, our sample had approximately 30% lower odds than the total population of being charged for any offence and 34% lower odds for a serious crime charge, reflecting the attrition over the four follow-ups.

Prevalence of cannabis use and criminal charges

Table 1 shows a low prevalence of cannabis use before age 16, and the bulk of the few cannabis users at this age reported a low frequency of cannabis use (only 14 individuals, or 1.0% of the sample reported using cannabis 11 or more times during the preceding 12 months at age 15). However, at age 20, the picture had changed, and 15.8% reported using cannabis during the preceding 12 months, with 61 individuals or 4.5% reporting its use 11 or more times.

We noted further that charges for crime were more prevalent in the teenage years, when 5.1% had at least one criminal charge over the 5-year span (15–20 years) than in young adulthood, where the figure was 3.5% over

Table 1 Cannabis use and crime in different age groups.

	<i>Total</i>		<i>Males</i>		<i>Females</i>		<i>P</i>
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	
Life-time-ever cannabis use at age 15	63	4.7	27	4.4	36	4.9	
Cannabis use in previous 12 months at age 20 years	214	15.8	123	19.8	91	12.4	*
At least one crime charge, age span 15–20 years	69	5.1	52	8.4	17	2.3	*
At least one crime charge, age span 20–27 years	48	3.5	39	6.3	9	1.2	*

*Differences between males and females $P < 0.001$.

Table 2 Association between frequency of cannabis use last year at ages 15 and 20 years, and subsequent charges for any crime, non-drug-specific crimes only and drug-specific crimes, in the age group 20–27 years.

Charges	Frequency of cannabis use last 12 months at age 20						χ^2	df	P
	Never		1–10 times		11+ times				
	n	%	n	%	n	%			
Any crime charge aged 20–27 years	20	1.8	12	7.8	16	26.2	110.6	(2)	<0.001
Drug-specific charge aged 20–27 years	8	0.7	5	3.3	14	23.0	148.0	(2)	<0.001
Non-drug-specific charge aged 20–27 years	16	1.4	9	5.9	8	13.1	41.2	(2)	<0.001

the 7-year span (20–27 years). There were highly significant gender differences on the crime charge measures ($P < 0.001$).

Associations between cannabis use and subsequent crime

A considerable proportion of the crime charges were related to use, possession, smuggling and distribution of drugs. We calculated the associations between cannabis use and subsequent charges for any crime, for drug-specific crime and for crime not related to drugs. In Table 2, we describe these associations for cannabis use at age 20, and charges in the age span 20–27 years. The sample was classified into three groups, based on their self-reported use of cannabis. The groups range from no use to using 11 or more times during the last 12 months. The table shows that use of cannabis at age 20 was associated with an increased level of all three groups of crime. However, note that the trend was much clearer for drug-specific crimes than for non-drug-specific crimes. Note also that almost one in four of those with cannabis use of 11+ times in the last 12 months at age 20 years was registered for drug-specific crime during the age span 20–27 years.

Cannabis use and later charges, adjusted for confounding factors

A possible explanation for the associations between cannabis use and crime, as reported above, is that they reflect

confounding processes, related to both cannabis use and the development of crime. It is also possible that cannabis users may have a higher probability than others of being arrested for their offences. However, we may also assume that variations in proneness to arrest may also be correlated with observed characteristics. To address these issues, the associations between cannabis and subsequent criminal charges were adjusted for a large number of possible covariate factors based on previous research [4,21,22,40,41] and by fitting logistic regression models to the data. A previous history of registered crime was also included in all our models.

In column 2 in Tables 3 and 4, our dependent variable is *any* criminal charge. In column 3 we eliminated the least serious drug offences—related to use and possession—from the dependent variable. In column 4 we eliminated all drug-specific offences. Finally, in column 5, we investigated the association between cannabis use and subsequent drug-specific crimes.

First, we calculated the associations between life-time-ever cannabis use at age 15 years (yes/no) and subsequent charges for these four groups of crime in the age span 15–20 years. Table 3 shows that use of cannabis was associated significantly with *any* subsequent charge, after adjustment for common confounding factors such as measures of alcohol and illegal drugs (OR 3.0; 95% CI 1.2–7.3). In the next column, we see that this association was not reduced when we excluded the least serious drug offences. However, when all drug-specific crimes were excluded, the association was no longer significant.

Table 3 Associations between life-time-ever cannabis use at 15 years and charges for various groups of crime in the age period 15–20 years, after adjustment for confounding factors: in model 2, adjusted for measures of alcohol intoxication; in model 3, also adjusted for measures of the use of other illegal drugs.¹

	<i>Any crime</i> OR (95% CI)	<i>Use/possession of drugs excluded</i> OR (95% CI)	<i>All drug-specific crimes excluded</i> OR (95% CI)	<i>Drug-specific crime only</i> OR (95% CI)
Model 1				
Cannabis use				
No	1.0	1.0	1.0	1.0
Yes	2.7 (1.2–6.1)	2.6 (1.1–6.4)	1.8 (0.7–4.6)	3.3 (1.1–10.1)
–2LL (df)	425.3 (9)	385.4 (9)	377.5 (9)	179.4 (9)
Model 2				
Cannabis use				
No	1.0	1.0	1.0	1.0
Yes	3.0 (1.3–7.0)	3.0 (1.2–7.7)	2.0 (0.7–5.3)	3.2 (1.0–9.8)
–2LL (df)	423.9 (11)	382.5 (11)	375.3 (11)	179.1 (11)
Model 3				
Cannabis use				
No	1.0	1.0	1.0	1.0
Yes	3.0 (1.2–7.3)	2.8 (1.1–7.5)	2.0 (0.7–5.5)	3.3 (1.0–10.3)
–2LL (df)	423.9 (12)	382.3 (12)	375.2 (12)	179.0 (12)

CI: confidence interval; OR: odds ratio. ¹In the complete models, we also control for parental socio-economic background, parental cultural capital, whether father is living on social welfare, parental monitoring, school grades, conduct problems and previous criminal charges.

Table 4 Associations between level of cannabis use at age 20 years and charges for various groups of crimes in the age period 20–27 years, after adjustment for confounding factors: in model 2, adjusted for measures of alcohol intoxication; in model 3, also adjusted for measures of the use of other illegal drugs.¹

	<i>All crimes</i> OR (95% CI)	<i>Use/possession of drugs excluded</i> OR (95% CI)	<i>All drug-specific crimes excluded</i> OR (95% CI)	<i>Drug-specific crime only</i> OR (95% CI)
Model 1				
Cannabis use				
No	1.0	1.0	1.0	1.0
1–10 times	2.8 (1.2–6.3)	2.7 (1.1–6.2)	2.2 (0.9–5.8)	2.8 (0.8–9.4)
11+ times	6.6 (2.7–15.7)	4.0 (1.6–10.5)	2.2 (0.7–6.7)	16.5 (5.6–48.7)
–2LL (df)	284.1 (9)	258.3 (9)	205.8 (9)	162.5 (9)
Model 2				
Cannabis use				
No	1.0	1.0	1.0	1.0
1–10 times	2.1 (0.9–5.0)	2.0 (0.8–5.0)	1.9 (0.7–5.2)	2.2 (0.6–8.1)
11+ times	5.4 (2.2–13.2)	3.4 (1.3–8.9)	2.0 (0.7–6.1)	14.2 (4.7–42.8)
–2LL (df)	278.7 (10)	253.9 (10)	204.5 (10)	160.9 (10)
Model 3				
Cannabis use				
No	1.0	1.0	1.0	1.0
1–10 times	1.9 (0.8–4.7)	1.6 (0.6–4.2)	1.6 (0.6–4.7)	1.6 (0.4–6.2)
11+ times	3.9 (1.4–10.9)	1.9 (0.6–5.8)	1.4 (0.4–5.2)	6.8 (1.2–12.5)
–2LL (df)	277.2 (11)	249.3 (11)	203.5 (11)	155.7 (11)

CI: confidence interval; OR: odds ratio. ¹In the complete models, we also control for age and gender, proxy for cultural capital in parental home, parental monitoring, level of conduct problems, early adolescent cannabis use, cohabitation status and history and previous criminal charges.

The association between cannabis use and later drug-specific charges remained significant, after control. The inclusion of measures of alcohol or other illegal substances did not improve model fit in any of the models reported in Table 3.

In Table 4, we report the associations between cannabis use at age 20 and charges for crime in the age period 20–27 years. Because of the higher prevalence of cannabis, we were then able to differentiate between sporadic (one to 10 times use in the last 12 months) and non-sporadic use (11 or more times in the last 12 months) of cannabis. Again, we observed significant associations with cannabis use when *any* crime charge was our dependent variable, even after control for confounding variables. In the next column we have excluded use and possession of drugs from our dependent variable, and we see that after control the association with cannabis is no longer significant. This pattern was even more clear in column 4, where all drug use offences were excluded. In the final column we see, however, that the association between cannabis use and subsequent drug-specific charges remained significant, even after control. However, note also that this association was reduced considerably after the introduction of other illegal substances in the model.

In the first model reported in Table 4—where the dependent variable was all types of crime—the inclusion of alcohol measures in addition to cannabis gave improved model fit ($P = 0.021$), while the introduction of other illegal substances did not. In the final model—where the dependent variable was only drug-specific charges—the introduction of alcohol did not improve model fit, whereas inclusion of other illegal substances improved model fit ($P = 0.023$), and the measure of other illegal drugs also gave a significant estimate (OR 3.9; 95% CI 1.2–12.5).

DISCUSSION

We used data gathered over the course of a 13-year population-based longitudinal study to examine the relationship between the use of cannabis and later registered crime. At first glance, there appeared to be a robust association between cannabis use and subsequent criminal involvement, even after extensive control for confounding factors. However, a considerable proportion of crime charges in adolescence and young adulthood are related to use, possession, smuggling and distribution of drugs. When all drug-specific charges were excluded from our dependent variable, the association between cannabis use and later criminal charges was no longer statistically significant. Thus, from our findings there is no evidence that use of cannabis—or any other substances—is associated

with increased risk of subsequent non-drug-specific criminal charges, such as criminal gain or violence.

On the other hand, any use of cannabis during adolescence and more than sporadic use of cannabis in early adulthood seem to be associated with a considerable risk for being charged for drug-specific crimes. As many as one in four of those who at age 20 had used cannabis 11+ times in the previous 12 months received a drug-specific charge during the subsequent 7-year period. This finding echoes findings from a longitudinal study from New Zealand, but here the risk was weaker: 5% of the cannabis users had been arrested or convicted for cannabis use, and only those with more than 400 episodes of reported cannabis use had a risk of 25% for an arrest or conviction [42].

The association between early cannabis use and later drug-specific crimes may, to some degree, be regarded as continuity of behaviour over time. This is obviously so for use and possession of drugs, but may also apply to smuggling and dealing in drugs. We do not have sufficiently detailed information on the seriousness of these crimes, but according to the crime statistics most of these drug crimes are sanctioned with fines and conditional prison sentences. A large proportion of smuggling and dealing is not large-scale, and is related to personal substance abuse [24].

Previous research has suggested that use of alcohol and use of other illegal substances, such as amphetamines, cocaine and opiates, may influence life-course patterns of offending [11,14,16], while previously more moderate associations have been revealed for cannabis [11]. Our study points in another direction: none of these substances seems to play an independent causal role when it comes to non-drug-specific crime during adolescence and young adulthood in a Norwegian context. However, with regard to drug-specific crime, use of cannabis seems to be more important than use of alcohol and other illegal drugs in adolescence. In young adulthood the use of alcohol still does not seem to influence the likelihood of becoming involved in drug-specific crime, whereas use of cannabis and other illegal substances may have an impact.

The study adds to our knowledge about possible links between substance use and crime. There are few population-based longitudinal studies in this area and—to our knowledge—no other population-based study has combined self-reports with register data on crime. Note also that without the detailed differentiation between various types of crime, we would have drawn the conclusion that there is a general association between cannabis use and subsequent criminal involvement. The opportunity to differentiate between different types of crime enabled us to uncover the more complex picture presented here.

We acknowledge some study limitations: most important is the fact that we have disproportionally lost those with the most serious criminal records during the follow-ups, as shown in the attrition analysis. Thus, we may have lost a vulnerable segment of the young adult population for whom use, smuggling and distribution of cannabis may have been a factor in a more general criminal career. Furthermore, even with extensive control for confounding variables, there may be other sources of confounding for which we have not controlled which could confound the association between cannabis use and later drug-specific crime. The data on charges for drug crimes do not contain information on the type of drugs or the seriousness of the crimes, and it would be valuable to know the extent to which these crimes are related to cannabis or harder drugs. Note also that our cannabis exposure measure was crude, with few measurement points. The study would have gained from more detailed information, on an even broader spectrum of possible confounding variables, and with year-by-year assessment of cannabis use.

Cannabis and crime

Even if use of cannabis, in our sample, was not associated with a subsequent general criminal involvement, we did find a strong association with subsequent drug-specific crime. A considerable proportion of cannabis users come into contact with the penal system because of use or possession of drugs, or because of other types of drug-specific crime. Note that we found an association between cannabis use and all kinds of drug crime, not only with use and possession of drugs. This may be due to the complex structure of the cannabis distribution system. The cannabis economy is larger than the economies associated with opiates and cocaine and generates more profit [43]. Stereotypical images of drug distribution point to a multi-layer pyramidal distribution structure, as described in early studies of heroin distribution [44]. However, the cannabis market seems to be more heterogeneous, liquid and informal, with unclear borders between dealers and buyers, often in a so-called barter and gift-giving tradition [45]. Many of the consumers—at all levels of the market—report often obtaining cannabis free [46], but a high proportion of ordinary cannabis users also report purchasing cannabis in such quantities that they qualify as middle-level dealers [45]. Thus, many cannabis users may be socialized gradually into drug distribution networks. A key insight from decades of criminological research is that crime is *learned* [47]. Many cannabis users may be exposed to dealers who provide them with ways of thinking, ideologies and neutralizing techniques [48], as well as practical possibilities to participate in distribution. The present study may be interpreted within

this framework. Furthermore, in the Norwegian context, many of the cannabis users are socialized into the drug distribution system.

Few studies have investigated the effects of cannabis prohibition on users. However, in a review of the available evidence, Lenton argued that a conviction for cannabis use may have a real and negative effect on people's lives, and that such convictions do not seem to deter cannabis use [49]. In a longitudinal study, Fergusson and coworkers reported findings in line with this: arrest or conviction for cannabis use did not reduce the use of cannabis; 95% of those arrested or convicted either increased or continued their use of cannabis at the same level [42].

CONCLUSIONS

The main finding of the study is that the use of cannabis does not seem to represent a risk factor for a general criminal involvement but that it may be associated with a considerable risk of receiving a drug-specific criminal charge. Use of cannabis is illegal in Norway, and the Norwegian regime is more control-orientated compared with countries such as the Netherlands, where other studies in this area have been conducted. In Norway, there are no 'coffee shops' [50] where cannabis can be bought easily. Opponents of the present Norwegian regime argue that the criminalization of cannabis result in stigmatization of the users and also in adolescents and young adults coming into contact with criminal networks. Our findings give some support to such an argument: it is true that there appears to be a link between use of cannabis and involvement in various types of drug-specific crime. Moreover, a surprisingly large proportion of those with a more regular use of cannabis will—sooner or later—be charged for their use and possession of drugs, and many will also be charged for other kinds of drug-specific crime. On the other hand, in the Norwegian context there is little to indicate that use of cannabis represents a stepping-stone to a more general criminal involvement.

Cannabis use is widespread in most western countries. It may be a relief to know that cannabis use does not seem to play an important role in fostering a general involvement in crime. However, the fact that a considerable proportion of adolescents and young adults in Norway may come into contact with the penal system because of their involvement with cannabis must, nevertheless, give rise to concern. There is much to indicate that such penal reactions do not prevent young people continuing with cannabis use [42]; on the contrary, such reactions may have a real, detrimental impact on their lives [49]. The black cannabis economy is huge, and in a Norwegian context this is a cause for concern [20]. Moreover, the

available evidence suggests that removal of the prohibition against possession of cannabis does not increase the use of cannabis [51].

Future research should investigate in more detail crime-related consequences of cannabis use under different legal jurisdictions. However, the present study must be regarded as a new argument for the necessity to debate cannabis laws and the international conventions which regulate this area.

Declarations of interest

None.

Acknowledgement

The study has received financial support from The Research Council of Norway.

References

- Hayatbakhsh M. R., Najman J. M., Jamrozik K., Mamun A. A., Alati R., Bor W. Cannabis and anxiety and depression in young adults: a large prospective study. *J Am Acad Child Adolesc Psychiatry* 2007; **46**: 408–17.
- Moore T. H. M., Zammit S., Lingford-Hughes A. Cannabis use and risk of psychotic or affective mental health outcomes: a systematic review. *Lancet* 2007; **370**: 319–28.
- Fergusson D., Boden J. Cannabis use and later life outcomes. *Addiction* 2008; **103**: 969–76.
- Fergusson D., Horwood J., Swain-Campbell N. Cannabis use and psychosocial adjustment in adolescence and young adulthood. *Addiction* 2002; **97**: 1123–35.
- Patton G., Coffey C., Carlin J., Degenhardt L. Cannabis use and mental health in young people: a cohort study. *BMJ* 2002; **325**: 1195–8.
- Macleod J., Oakes R., Copello A., Crome I. Psychological and social sequelae of cannabis and other illicit drug use by young people: a systematic review of longitudinal, general population studies. *Lancet* 2004; **363**: 1579–88.
- Macleod J., Oakes R., Oppenkowski T., Stokes-Lampard H. How strong is the evidence that illicit drug use by young people is an important cause of psychological or social harm? *Drugs Educ Prev Policy* 2004; **11**: 281–97.
- Hall W., Pacula R. L. *Cannabis Use and Dependence. Public Health and Public Policy*. Cambridge: Cambridge University Press; 2003.
- Pedersen W., Mastekaasa A., Wichstrøm L. Conduct problems and cannabis initiation: a longitudinal normal population study. *Addiction* 2001; **96**: 415–31.
- Brook J. S., Brook D. W., Rosen Z., Rabbitt C. R. Earlier marijuana use and later problem behavior in Colombian youths. *J Am Acad Child Adolesc Psychiatry* 2003; **42**: 485–92.
- Bennett T., Holloway K., Farrington D. The statistical association between drug misuse and crime: a meta-analysis. *Aggress Violent Behav* 2008; **13**: 107–18.
- Dembo R., Washburn M., Wish E., Schmeidler J., Getreu A., Berry E. *et al.* Further examination of the association between heavy marijuana use and crime among youth entering a juvenile detention centre. *J Psychoact Drugs* 1987; **19**: 361–73.
- Graham N., Wish E. Drug use among female arrestees: onset, patterns and relationship to prostitution. *J Drug Issues* 1994; **39**: 143–74.
- Rutter M., Giller H., Hagnell A. *Antisocial Behavior by Young People*. Cambridge, MA: Cambridge University Press; 1998.
- White H. R., Hansell S. The moderating effects of gender and hostility on the alcohol–aggression relationship. *J Res Crime Delinq* 1996; **29**: 430–65.
- Laub J. H., Sampson R. J. *Shared Beginnings, Divergent Lives*. Cambridge, MA: Harvard University Press; 2003.
- Schroeder R. D., Giordano P. C., Cernkovich S. A. Drug use and desistance processes. *Criminology* 2007; **45**: 191–221.
- Solowij N. *Cannabis and Cognitive Functioning*. Cambridge, UK: Cambridge University Press; 1998.
- Solowij N., Michie P. Cannabis and cognitive dysfunction: parallels with endophenotypes of schizophrenia? *J Psychiatry Neurosci* 2007; **32**: 30–52.
- Sandberg S., Pedersen W. *Street Capital. Black Cannabis Dealers in a White Welfare State*. Bristol: Policy Press; 2009.
- Fergusson D., Horwood L. J. Early onset cannabis use and psychosocial adjustment in young adults. *Addiction* 1997; **92**: 279–96.
- Rob M., Reynolds I., Finlayson P. Adolescent marijuana use: risk factors and implications. *Aust NZ J Psychiatry* 1990; **24**: 47–56.
- Statistics Norway. Offences investigated 2005. Published 09.12.2008. Available at: http://www.ssb.no/english/subjects/03/05/lovbrudde_en/ (accessed 28 July 2009).
- Bretteville-Jensen A. L., Sutton M. The income-generating behaviour of injecting drug users in Oslo. *Addiction* 1996; **91**: 63–79.
- Pedersen W. Cannabis use: Subcultural opposition or social marginality? A population-based longitudinal study. *Acta Sociologica* 2009; **52**: 135–48.
- European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). *The State of the Drug Problems in Europe*. Lisbon: EMCDDA; 2006.
- Kirk D. Examining the divergence across self-report and official data sources on inferences about the adolescent life-course on crime. *J Quant Criminol* 2006; **22**: 107–29.
- Strand N., von Soest T. *Young in Norway—Longitudinal. Documentation of Design, Variables and Scales*. Oslo: NOVA; 2006.
- Wichstrøm L. The emergence of gender differences in depressed mood during adolescence: the role of intensified gender socialization. *Dev Psychol* 1999; **35**: 232–45.
- Pedersen W. Childbirth, abortion and subsequent substance use in young women: a population-based longitudinal study. *Addiction* 2007; **102**: 1971–8.
- White H. R., Labouvie E. W. Towards the assessment of adolescent problem drinking. *J Stud Alcohol* 1989; **50**: 30–7.
- American Psychiatric Association (APA). *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edn revised (DSM-III-R). Washington, DC: American Psychiatric Association; 1987.
- Olweus D. Prevalence and incidence in the study of antisocial behavior: definitions and measurements. In: Klein W., editor. *Cross-National Research in Self-Reported Crime and Delinquency*. Dordrecht: Kluwer Academic; 1989, p. 187–201.
- Windle M. A longitudinal study of antisocial behavior in

- early adolescence as predictors of late adolescent substance use: gender and ethnic group differences. *J Abnorm Psychol* 1990; **99**: 86–91.
35. Pedersen W., Wichstrøm L. Patterns of delinquency in Norwegian adolescents. *Br J Criminol* 1995; **35**: 543–62.
 36. International Labour Organization (ILO). *ISCO-88. International Standard Classification of Occupations*. Geneva: ILO; 1990.
 37. Bourdieu P. Three stages of cultural capital. *Actes Rech Sci Soc* 1979; **30**: 1979.
 38. Sarason I. G., Levine H. M., Basham R. B., Sarason B. R. Assessing social support: the social support questionnaire. *J Pers Soc Psychol* 1983; **44**: 127–39.
 39. Agresti A. *An Introduction to Categorical Data Analysis*. New York: John Wiley; 1996.
 40. Pedersen W. Adolescents initiating cannabis use: cultural opposition or poor mental health? *J Adolesc* 1990; **13**: 327–39.
 41. Pedersen W. Does cannabis use lead to depression and suicidal behaviours? A population-based longitudinal study. *Acta Psychiatr Scand* 2008; **118**: 395–403.
 42. Fergusson D., Swain-Campbell N., Horwood J. Arrests and convictions for cannabis related offences in a New Zealand birth cohort. *Drug Alcohol Depend* 2003; **70**: 53–63.
 43. United Nations Office on Drugs and Crime (UNODC). *World Drug Report*. New York: UNODC; 2007.
 44. Preble E., Casey J. 'Taking care of business'—the heroin user's life on the street. *Int J Addict* 1969; **4**: 1–24.
 45. Wilkins C., Sweetsur P. Exploring the structure of the illegal market for cannabis. *Economist* 2006; **154**: 547–62.
 46. Caulkins J. P., Pacula R. L. Marijuana markets: inferences from reports by the household population. *J Drug Issues* 2006; **36**: 173–201.
 47. Lilly J. R., Cullen F. T., Ball R. A. *Criminological Theory. Context and Consequences*. Thousand Oaks, CA: Sage; 2007.
 48. Sykes G., Matza D. Techniques of neutralization: a theory of delinquency. *Am Sociol Rev* 1957; **22**: 664–73.
 49. Lenton S. Cannabis policy and the burden of proof: it is now beyond reasonable doubt that cannabis prohibition is not working. *Drug Alcohol Rev* 2000; **19**: 95–100.
 50. Korf D. Dutch coffee shops and trends in cannabis use. *Addict Behav* 2002; **27**: 851–66.
 51. MacCoun R., Reuter P. Evaluating alternative cannabis regimes. *Br J Psychiatry* 2001; **178**: 123–28.

The Effect of Medical Marijuana Laws on Crime: Evidence from State Panel Data, 1990-2006

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Abstract

Background: Debate has surrounded the legalization of marijuana for medical purposes for decades. Some have argued medical marijuana legalization (MML) poses a threat to public health and safety, perhaps also affecting crime rates. In recent years, some U.S. states have legalized marijuana for medical purposes, reigniting political and public interest in the impact of marijuana legalization on a range of outcomes.

Methods: Relying on U.S. state panel data, we analyzed the association between state MML and state crime rates for all Part I offenses collected by the FBI.

Findings: Results did not indicate a crime exacerbating effect of MML on any of the Part I offenses. Alternatively, state MML may be correlated with a reduction in homicide and assault rates, net of other covariates.

Conclusions: These findings run counter to arguments suggesting the legalization of marijuana for medical purposes poses a danger to public health in terms of exposure to violent crime and property crimes.

Citation: Morris RG, TenEyck M, Barnes JC, Kovandzic TV (2014) The Effect of Medical Marijuana Laws on Crime: Evidence from State Panel Data, 1990-2006. PLoS ONE 9(3): e92816. doi:10.1371/journal.pone.0092816

Editor: Joseph A. Keating, Tulane University School of Public Health and Tropical Medicine, United States of America

Received: November 22, 2013; **Accepted:** February 25, 2014; **Published:** March 26, 2014

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Funding: The authors have no funding or support to report.

Competing Interests: The authors have declared that no competing interests exist.

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Introduction

The social ramifications of marijuana legalization have been hotly debated for at least four decades [1]. Despite a long history of marijuana use for medical purposes, policymakers and in some instances, the scientific community, have been quick to note the potential problematic social outcomes of marijuana legalization [2]. In spite of these political discussions, medical marijuana legalization (MML) has occurred in 20 states and the District of Columbia (between 1996 and the writing of this paper) and its recreational use has now been legalized in Colorado and Washington [3]. An interest in the ramifications of these laws has led to an increase in scholarly activity on the topic [4], [5]. The issue addressed in this article is whether MML has the effect of increasing crime. While there are many mechanisms by which MML might affect crime rates, the most obvious is by increasing the number of marijuana users, which may lead to a broader social acceptance of drug using behaviors and drug users [6]. To the extent that marijuana use serves as a “gateway” to harder drugs such as cocaine and heroin, MML could lead to long-term increases in crime as an ever-growing number of illicit drug users engage in serious predatory crimes to support their habits (but see [7]). But even if MML does not lead to a rise in marijuana use (especially among youth), the laws could still stimulate crime as newly opened medical marijuana dispensaries provide criminals with a highly attractive target with their repository of high quality marijuana and customers carrying large amounts of cash (but see [8]). As a member of the California Chiefs of Police Association

stated, “A disturbing and continuing trend is the increasing number of home invasion robberies and associated violence resulting in the victimization of those cultivating and possessing marijuana ... [D]ispensaries also continue to be targeted based upon the availability of larger quantities of drugs and cash” (see http://californiapolicechiefs.org/wp-content/uploads/2012/02/July_September_2010_Final.pdf). Though anecdotal evidence abounds to support both theses, and a few single-jurisdiction and cross-sectional studies have examined the MML-crime link (e.g., [9]), no single analysis has assessed the overall consequences of medical marijuana laws on crime rates across the United States. This study seeks to inform the debate by providing a comprehensive evaluation of the effects of state MML on state crime rates.

The Positive Correlation between Marijuana Use and Criminal Behavior

Though the gateway hypothesis applies to the progression of drug-using behaviors, there remains the possibility that marijuana use leads to delinquent or criminal behavior via a similar mechanism. A number of studies have specifically examined the relationship between marijuana use and crime [10], [11], [12], [13], [14]. Early studies compared the amount of crimes committed by juveniles whose urine tested positive for marijuana upon entering a detention center and those committed by individuals who tested negative for marijuana. Dembo and associates [15], [16], for instance, found that youths who tested positive for marijuana had a significantly higher number of

referrals to juvenile court for nondrug felonies than those testing negative for marijuana use.

Arseneault and colleagues [17] examined the relationship between marijuana dependence and the risk for violence in a sample of New Zealand adolescents. The authors controlled for gender, socioeconomic status, and many other concurrent disorders and concluded that marijuana dependence was related to a 280 percent increase in the odds of violence. This association was stronger than the individual effects of manic disorder, alcohol dependence, and schizophrenia. In a study using data collected from school-age adolescents in the Netherlands, those who reported marijuana use tended to report more delinquent and aggressive behaviors [18]. This relationship was significant after controlling for variables such as alcohol and tobacco use and the strength of the relationship increased with higher frequency of marijuana use. This study is noteworthy because marijuana use is decriminalized in the Netherlands, thus the relationship is unlikely to be based on the fact that marijuana users have to participate in the illegal market and are therefore at an increased risk for violence. While these studies were cross-sectional and show a correlation between current marijuana use and criminality or violent behaviors, other scholars have examined the link with longitudinal data.

Using multi-wave data, research has shown adolescents who reported marijuana use at age 15 were more likely to report violent involvement at age 19, indicating that marijuana use, particularly during adolescence may impact violent behavior in young adulthood [19]. Similarly, research has shown that frequent marijuana use during adolescence was a strong predictor of being involved in intimate partner violence [5]. Results revealed that consistent marijuana use during adolescence was related to a 108 percent increase in the likelihood of being involved in intimate partner violence in young adulthood and consistent marijuana use was associated with an 85 percent increase in the odds of being the perpetrator of intimate partner violence, independent of alcohol use.

These studies provide evidence to the notion that marijuana use is at a minimum correlated with an increase in violent or aggressive behaviors. What remains unclear is whether these findings imply a causal link between marijuana use and violence or whether the relationship is driven by an uncontrolled variable(s) (i.e., a spurious correlation). Along these lines, it could be argued that the relationship between violence and marijuana use is primarily due to its illegality and thus would not exist in an environment in which marijuana use, at least medicinally, is legalized.

The Negative or Null Correlation between Marijuana Use and Criminal Behavior

Most researchers who have examined the relationship between marijuana use and crime report that these laws do not have an effect on violent crime [20], [21]. Green and associates [20], for instance, concluded that while marijuana use was related to an increase in drug and property crime, it was not related to an increase in violent crime. Pedersen and Skardhamar [21] also found a relationship between marijuana use and subsequent arrest, although once the authors removed all types of drug charges from the models, the relationship was no longer significant. Results revealed no evidence that marijuana use was related to an increase in later non-drug arrest, such as arrests for violent crimes. The authors argued that the association between marijuana use and crime appears to exist because of its illegality. Thus, if the possession and sale of marijuana was legal the relationship between marijuana and crime might disappear.

It has been argued that medicinal marijuana laws may increase crime because the dispensaries and grow houses provide an opportunity for property crime and violent crime to occur, such as burglary and robbery. Kepple and Freisthler [9] examined the relationship between medical marijuana dispensaries and crime and their results suggested that after controlling for a host of ecological variables, no relationship existed between medicinal marijuana dispensaries and property or violent crime. Additional research has shown that medical marijuana dispensaries may actually reduce crime within the immediate vicinity of the dispensaries [8]. This may be due to the security measures implemented by dispensary owners (i.e., having security cameras, having a doorman, and having signs requiring identification). Importantly, medical marijuana dispensaries do not appear to increase crime in their surrounding areas.

In sum, research on the relationship between medicinal marijuana and crime is mixed. Studies have shown that states allowing the use of medical marijuana have higher prevalence rates of marijuana use [13], [14], yet other studies have found that legalized medicinal marijuana does not lead to an increase in its overall use [21], [22]. Research has also suggested that marijuana use is associated with an increase in illicit drug use [23], [19] and an increase in crime [17], [19], [16]. Others, however, have revealed that marijuana is not related to additional illicit drug use [22], [7], [17] or crime [8], [20], [9], [21]. Thus, the available evidence is equivocal and in need of a rigorous evaluation of the MML-crime relationship.

Methods

Data & Measures

Dependent Variables. Data on all seven Part I offenses—homicide, rape, robbery, assault, burglary, larceny, and auto theft—for each state between 1990 and 2006 were obtained from the Federal Bureau of Investigation's Uniform Crime Reporting (UCR) Program, published as *Crime in the United States*. The data were obtained using the “data for analysis” tool on the Bureau of Justice Statistics Web site (<http://www.ojp.usdoj.gov/bjs/dtd.htm>). All data were gathered for each of the 50 U.S. states across the 17 year time span for a total $N = 850$. Values reflect the rate of each crime per 100,000 residents.

Medical Marijuana Legalization (MML). To determine if and when MML occurred within a state, we searched the official legislative website of each US state. Between 1990 and 2006, the following 11 states legalized marijuana for medical use, with the year the law was passed in parentheses: Alaska (1998), California (1996), Colorado (2000), Hawaii (2000), Maine (1999), Montana (2004), Nevada (2000), Oregon (1998), Rhode Island (2006), Vermont (2004), and Washington (1998). We also ran models based on MML “legislation-effective year” rather than “legislation-passed year” and found no substantive differences in the results. The MML effective dates were also gathered from each State's official legislative website. Only 2 states (Connecticut and Colorado) had an MML effective year different than “passed” year, both being only a 1-year difference. While there are many options in modeling the effects of MML adoption on crime, we opted to use a post-law trend variable. The trend variable represents the number of years the law has been in effect with a value of zero for all years before the law was passed, a value of 1 for the year the law was passed, and a value of $1+k$, where k = number of years after the initial passage of the law, for all subsequent years. Unlike the traditional “dummy variable” approach (i.e., 0 = no MML law, 1 = MML law), which posits a once-and-for-all impact on crime, the post-law trend variable

captures any changes in the linear trend of crime that may be observed over time. If opponents of MML are correct that the laws lead to increased marijuana use by teenagers, many of whom are likely to continue illicit hard drug use throughout their adulthood, one might expect a gradual increase in crime over time. Such an effect would be best captured by the post-law trend variable.

Sociodemographic Control Variables. Sociodemographic variables were included in the analysis to aid in controlling for a vast array of other time-varying influences that might be potential confounding factors over the study period. These variables, and their sources, have been described previously [24]. Specifically, they include each state's percent of the civilian labor force unemployed; the total employment rate; percent of the population living below the poverty line; real per-capita income (divided by the Consumer Price Index); the proportion of residents aged 15–24; the proportion of residents aged 25–34; the proportion of residents aged 35–44 years; the per-capita rate of beer consumption [25]; the proportion of residents with at least a bachelor's degree; and the percent of the state's population that lived in a metropolitan area. State-level unemployment data were obtained from the Bureau of Labor Statistics website (www.bls.gov/sae/home). Data on poverty were acquired via the Bureau of the Census website (www.census.gov/hhes/www/poverty). Personal income and real welfare payments data were taken from the Bureau of Economic Analysis website (www.bea.doc.gov/bea/regional/reis). The age variables were obtained directly from the U.S. Bureau of the Census. Data on beer consumption were taken from the Beer Institute website (www.beerstitute.org). The percent of the population with college degrees or higher and the percent of the population living in a metropolitan area are linear interpolations of decennial census data, as reported in various editions of the *Statistical Abstracts of the United States*.

Additional measures included the number of prison inmates per 100,000 residents and the number of police officers per 100,000 residents. The number of prisoners was measured as the number of prisoners sentenced to more than a year in custody as of December 31 per 100,000 residents and was obtained from the Bureau of Justice Statistics website (www.ojp.usdoj.gov/bjs). Data on the total number of police, including civilians, were taken from the Public Employment series prepared by the Bureau of the Census. Louisiana and Mississippi were missing information on this variable for the year 2006, therefore reducing the usable case count by two units. Substantive results were identical when values for this year were imputed with values from the previous year. Summary statistics for these explanatory variables are presented in Table 1.

Analysis Plan

To identify the effect of MML on crime, we use a fixed-effects panel design, exploiting the within state variation introduced by the passage of MML in 11 states over the 17 year observation period. The design allows for the assessment of whether states adopting MML experienced changes in the trend of crime by analyzing within state changes in crime rates over time and comparing those changes to the crime rate trends among states that did not pass an MML law. To carry out this analysis, we estimate fixed-effects ordinary least squares regression models, where the natural log of each crime rate variable (i.e., homicide, rape, robbery, assault, burglary, larceny, and auto theft) is the dependent variable. This model directly accounts for dynamic factors that cause crime to vary from state to state, as well as those stable unmeasured factors that differ between states [26], [27]. In addition, we also include “year fixed-effects,” which capture any national influences on crime that are not captured in any of the

Table 1. Summary Statistics.

	Mean	SD
Dependent Variables (prior to log transformation)		
Homicide Rate	5.778	3.347
Rape Rate	36.774	13.212
Robbery Rate	130.346	91.687
Assault Rate	303.573	161.996
Burglary Rate	845.706	304.654
Larceny Rate	2,727.552	687.953
Auto Theft Rate	406.504	208.103
Independent Variable		
Medical Marijuana Law (Post-law Trend)	.393	1.489
Sociodemographic control variables		
Unemployment rate	5.162	1.393
Employment rate	58,568.89	5,043.444
Poverty rate	12.442	3.638
Real per-capita income	5.193	.844
Proportion persons ages 15 to 24	.142	.011
Proportion persons ages 25 to 34	.145	.017
Proportion persons ages 35 to 44	.156	.011
Beer shipments (31-gallon barrels) per 100k	73,670.89	12,003.72
Percent persons with college degree	23.897	4.903
Percent persons residing in metropolitan area	67.654	20.636
Prisoners per 100k	343.072	144.897
Police officers per 100k	278.473	48.917

Note: Descriptive statistics are for the 1990–2006 period. The data sources are noted in the text.

doi:10.1371/journal.pone.0092816.t001

time-varying explanatory variables. Robust standard errors are clustered at the state level to avoid biased standard errors due to the non-independence of data points over time [28]. Thus, the fixed effects models can be expressed algebraically following the convention set forth by Wooldridge [27] as:

$$\log(\hat{y}_{ijt}) = bi0 + bi1M\ddot{M}Ljt + \dots + bik\ddot{x}jt + \ddot{e}it$$

where:

- the subscripts i , j , and t are used to identify the crime rate variable being used as the dependent variable, the 50 states, and time (1990–2006), respectively;
- $\log(\hat{y}_{ijt})$ = the time-demeaned (see [27]) logged crime rate outcome variable;
- $bi0$ = the crime-specific constant term;
- $bi1M\ddot{M}Ljt$ = the time-demeaned crime-specific average impact of MML on crime rates;
- $+\dots+bik\ddot{x}jt$ = the time-demeaned crime-specific effect of the various control variables, including year dummies, a linear trend variable, and state fixed effects;
- and, $\ddot{e}it$ = the time-demeaned crime-specific error term.

It is important to note that fixed-effects models are not without limitations. While they are well suited to address the issue at hand and account for unobserved time-invariant factors, they are always

vulnerable to time-varying factors that are not accounted for that differ between states with MML and those without. However, we have accounted for the bulk of factors that have been shown associated with state crime rates and our models explain a considerable amount of variation in each outcome. It is also important to acknowledge that fixed-effects models do not account for temporal ordering for time-varying predictors within a given observation period. For example, it is unknown whether states adopted MML after experiencing lower crime rates in a given year(s), however, this is unlikely to be an issue here since policy response to crime rates tend to take time and we account for this via operationalization of MML as an additive effect.

Results

Primary Findings

Before consulting the results from the fixed effects regression models, a series of unconditioned crime rates for each offense type were generated and are presented in Figure 1. Note that two crime rate trends are presented in each panel. One trend—the solid line—shows the crime rate, by year, for states that had *not* passed an MML law. Thus, states that eventually did pass an MML law contribute to the solid line up until the year that they passed the MML law. As expected from the overall crime trend during this time period, the solid line reveals that all states experienced a reduction in each of the seven crimes from 1990 to 2006. Important to note is the trend revealed by the dashed line, which shows the crime rate trends for states *after* passing an MML law. With one exception—forcible rape—states passing MML laws experienced reductions in crime and the rate of reduction appears to be steeper for states passing MML laws as compared to others for several crimes such as homicide, robbery, and aggravated assault. The raw number of homicides, robberies, and aggravated assaults also appear to be lower for states passing MML as compared to other states, especially from 1998–2006. These preliminary results suggest MML may have a crime-reducing effect, but recall that these are unconditional averages, meaning that the impact of the covariates and other factors related to time series trends have not been accounted for in these figures.

The results of the fixed effects analyses are presented in Table 2. It is important to note that a Hausman test was carried out to determine whether the fixed effects model was preferable over the random effects model; the latter model is more parsimonious and, thus, should be preferred when results do not systematically differ across the two approaches. The results of the Hausman tests (with year fixed effects omitted for both equations because they are inestimable in the random effects model) suggested that the fixed effects model was preferred in each of the seven analyses. For reference, the Hausman χ^2 values were 302.61, 23.64, 102.50, 414.94, 58.87, 34.18, and 31.28 for homicide, rape, robbery, assault, burglary, larceny, and auto theft, respectively.

The key results gleaned from the fixed effects analyses are presented in row 1 of Table 2, which reveals the impact of the MML trend variable on crime rates, while controlling for the other time-varying explanatory variables. Two findings worth noting emerged from the different fixed effects regression analyses. First, the impact of MML on crime was negative or not statistically significant in all but one of the models, suggesting the passage of MML *may* have a dampening effect on certain crimes. The second key finding was that the coefficients capturing the impact of MML on homicide and assault were the only two that emerged as statistically significant. Specifically, the results indicate approximately a 2.4 percent reduction in homicide and assault, respectively, for each additional year the law is in effect. Because

log-linear models were estimated, the coefficient must be transformed according to the following formula to generate percentage changes in crime for a one-unit increase in MML: $e^{(b-1)*100}$ [27]. However, it is important to note that the finding for homicide was less variable (i.e., a lower standard error) as compared to assault. One might argue a Bonferroni correction is necessary given the exploratory nature of the study and the multiple models that were analyzed. Once a Bonferroni correction was carried out (i.e., $\alpha/7$), only the effect of MML on homicide remained statistically significant ($.05/7 = .007$). Perhaps the most important finding in Table 2 is the lack of evidence of any increase in robbery or burglary, which are the type of crimes one might expect to gradually increase over time if the MML-crime thesis was correct. Thus, in the end, MML was not found to have a crime enhancing effect for any of the crime types analyzed.

Sensitivity Analyses

The fixed effects models presented above were subjected to a range of sensitivity tests to determine whether the findings were robust to alternative model specifications. First, and as previously noted, data for the two missing cases were imputed using matched case replacement for Louisiana and Mississippi. Importantly, substantive results were identical when this strategy was carried out. A second sensitivity analysis explored the possibility that the effect of MML on crime rates was non-linear. No evidence emerged to support the hypothesis that MML has a non-linear effect on crime rate trends. Third, a related issue concerns whether the MML effect has *both* a trend effect (shown above) *and* a one-time shock effect. We considered this issue by including the MML trend variable (discussed above) along with a dummy variable coded 0 for years when no MML law was present (by state) and coded 1 in years when an MML law had been passed. The findings were practically identical to those shown above: the MML trend variable was negatively related to homicide ($b = -.02$, $p < .10$) and assault ($b = -.02$, $p < .10$). A fourth sensitivity analysis re-estimated the original models (shown above), by weighting each state proportional to its population size. When these weighted fixed effects models were estimated, the substantive findings were somewhat different than those presented above. Specifically, the effect of MML on homicide rates was no longer statistically significant ($b = -.01$, $p = .30$), MML negatively predicted robbery rates ($b = -.02$, $p < .10$), MML negatively predicted assault rates ($b = -.03$, $p < .01$), and MML *positively* predicted auto theft rates ($b = .03$, $p < .05$). While it is common in the crime policy literature to weight observations by resident population to correct for possible heteroskedasticity, this will be the efficient feasible GLS (generalized least squares) procedure only if the heteroskedasticity takes a particular form, i.e. variance proportional to the square of the population. In the present study, the unweighted results produce findings that are substantively consistent with the weighted results, although they differ slightly quantitatively. The most likely explanation for this discrepancy is that the weighted results are driven by a few large population states. For this reason, we present the unweighted results as the main results and the weighted results as part of our numerous robustness checks.

Discussion and Conclusion

The effects of legalized medical marijuana have been passionately debated in recent years. Empirical research on the direct relationship between medical marijuana laws and crime, however, is scant and the consequences of marijuana use on crime remain unknown. Studies have shown that marijuana use was associated with higher prevalence of subsequent illicit drug use [19] and an

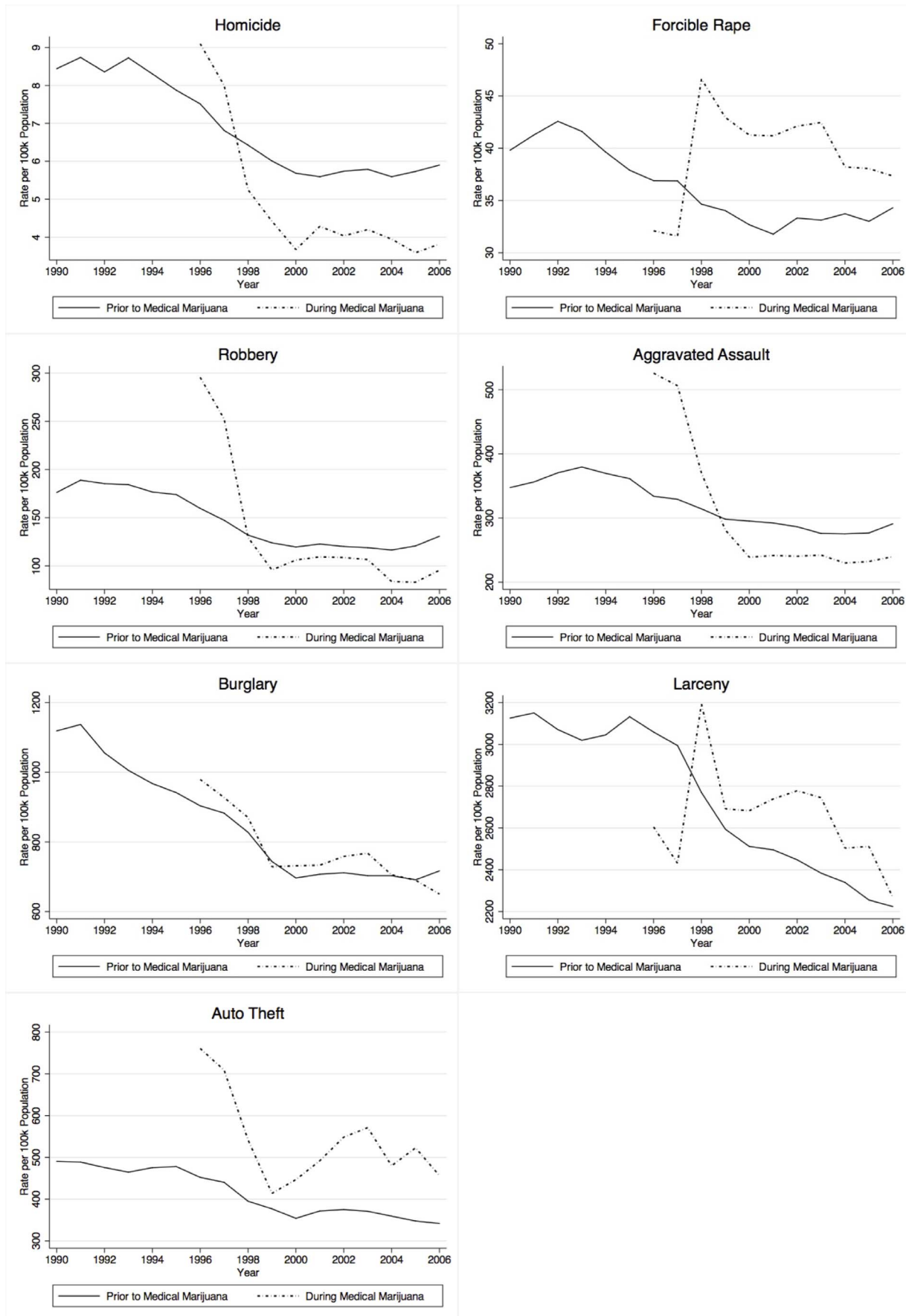


Figure 1. Mean State Crime Rates as a Function of Year, by Medical Marijuana Law (MML). NOTE: Crime rates for states mandating MML after 1996 remained in the “Prior to Medical Marijuana” line until transition to MML.
doi:10.1371/journal.pone.0092816.g001

increased risk of violence [17]. Yet, other studies have found that once additional factors were controlled for, there was no relationship between marijuana use and later serious drug use [7]. Research has also shown that marijuana use is not related to violent crime when measured at the individual-level [20]. Once drug charges are controlled for, Pedersen and Skardhamar [21] reported that the relationship between marijuana and crime was not significantly different from zero. Unfortunately, no study has examined the effect of legalized medical marijuana on state crime rates across the United States. The current study sought to fill this gap by assessing the effect of legalized medicinal marijuana on the seven Part I UCR offenses. The analysis was the first to look at multiple offenses across multiple states and time periods to explore whether MML impacts state crime rates.

The central finding gleaned from the present study was that MML is not predictive of higher crime rates and *may* be related to reductions in rates of homicide and assault. Interestingly, robbery

and burglary rates were unaffected by medicinal marijuana legislation, which runs counter to the claim that dispensaries and grow houses lead to an increase in victimization due to the opportunity structures linked to the amount of drugs and cash that are present. Although, this is in line with prior research suggesting that medical marijuana dispensaries may actually reduce crime in the immediate vicinity [8].

In sum, these findings run counter to arguments suggesting the legalization of marijuana for medical purposes poses a danger to public health in terms of exposure to violent crime and property crimes. To be sure, medical marijuana laws were *not* found to have a crime exacerbating effect on any of the seven crime types. On the contrary, our findings indicated that MML precedes a reduction in homicide and assault. While it is important to remain cautious when interpreting these findings as evidence that MML *reduces* crime, these results do fall in line with recent evidence [29] and they conform to the longstanding notion that marijuana

Table 2. The Impact of Medical Marijuana Laws on Crime Rates.

Variable	Homicide	Rape	Robbery	Assault	Burglary	Larceny	Auto Theft
Medical Marijuana Law (MML)	−0.024*** (0.007)	−0.005 (0.009)	−0.016 (0.010)	−0.024* (0.013)	−0.004 (0.007)	−0.002 (0.004)	0.026 (0.016)
Unemployment rate	0.031** (0.012)	−0.001 (0.014)	0.039** (0.015)	−0.021 (0.022)	0.022** (0.011)	0.005 (0.009)	0.036** (0.017)
Employment rate	1.325 (1.277)	3.672*** (1.156)	3.637** (1.536)	4.249*** (1.383)	0.420 (0.943)	−0.584 (0.747)	−0.069 (1.715)
Poverty rate	−0.008** (0.003)	0.006 (0.004)	0.001 (0.005)	0.001 (0.005)	−0.004 (0.003)	−0.002 (0.002)	−0.007* (0.004)
Per-capita income	−0.013 (0.057)	−0.226*** (0.067)	−0.148** (0.072)	−0.173* (0.100)	−0.194*** (0.048)	−0.099*** (0.036)	−0.137 (0.102)
Proportion aged 15 to 24	3.528 (2.447)	−0.279 (1.681)	−3.591 (3.371)	−3.245 (2.961)	0.676 (1.696)	−0.266 (1.422)	5.279 (3.509)
Proportion aged 25 to 34	−4.250** (1.884)	−0.202 (2.038)	−3.478 (2.920)	−7.492** (3.112)	5.150*** (1.904)	2.729 (1.712)	11.352*** (2.609)
Proportion aged 35 to 44	−1.393 (2.041)	−3.083 (2.319)	−4.008 (3.366)	−13.777*** (4.654)	−1.940 (1.928)	0.193 (1.489)	−3.558 (4.075)
Beer consumption	0.903** (0.399)	0.504* (0.283)	1.261*** (0.442)	0.436 (0.576)	0.857*** (0.291)	0.762*** (0.280)	1.376** (0.580)
Percent college degree	−0.004 (0.011)	0.016 (0.010)	−0.032** (0.012)	−0.012 (0.017)	−0.001 (0.007)	0.005 (0.007)	−0.018 (0.013)
Percent metropolitan	0.015** (0.007)	0.022** (0.008)	0.004 (0.009)	0.004 (0.015)	−0.006 (0.008)	−0.005 (0.006)	−0.009 (0.014)
Prisoners per 100k	−45.675 (33.964)	−20.410 (22.442)	−33.918 (35.013)	41.979 (30.046)	−7.186 (26.127)	9.724 (18.575)	−56.412 (48.726)
Police officers per 100k	−0.001 (0.001)	0.000 (0.001)	−0.002 (0.001)	−0.001* (0.001)	−0.000 (0.001)	0.001 (0.001)	−0.001 (0.002)
R ²	.50	.46	.58	.44	.83	.75	.44

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Note: State fixed-effects and year fixed-effects are included in all estimates but are not shown in the table. The following variables were divided by 100000 in order to produce coefficients that did not require scientific notation to interpret: Employment rate, Beer consumption, and Prisoners per 100k.

doi:10.1371/journal.pone.0092816.t002

legalization may lead to a reduction in alcohol use due to individuals substituting marijuana for alcohol [see generally 29, 30]. Given the relationship between alcohol and violent crime [31], it may turn out that substituting marijuana for alcohol leads to minor reductions in violent crimes that can be detected at the state level. That said, it also remains possible that these associations are statistical artifacts (recall that only the homicide effect holds up when a Bonferroni correction is made).

Given that the current results failed to uncover a crime exacerbating effect attributable to MML, it is important to examine the findings with a critical eye. While we report no positive association between MML and any crime type, this does not *prove* MML has no effect on crime (or even that it reduces crime). It may be the case that an omitted variable, or set of variables, has confounded the associations and masked the true positive effect of MML on crime. If this were the case, such a variable would need to be something that was restricted to the states that have passed MML, it would need to have emerged in close temporal proximity to the passage of MML in all of those states (all of which had different dates of passage for the marijuana law), and it would need to be something that decreased crime to such an extent that it “masked” the true positive effect of MML (i.e., it must be something that has an opposite sign effect between MML [e.g., a positive correlation] and crime [e.g., a negative correlation]). Perhaps the more likely explanation of the current

findings is that MML laws reflect behaviors and attitudes that have been established in the local communities. If these attitudes and behaviors reflect a more tolerant approach to one another’s personal rights, we are unlikely to expect an increase in crime and might even anticipate a slight reduction in personal crimes.

Moreover, the present findings should also be taken in context with the nature of the data at hand. They are based on official arrest records (UCR), which do not account for crimes not reported to the police and do not account for all charges that may underlie an arrest. In any case, this longitudinal assessment of medical marijuana laws on state crime rates suggests that these laws do not appear to have any negative (i.e., crime exacerbating) impact on officially reported criminality during the years in which the laws are in effect, at least when it comes to the types of offending explored here. It is also important to keep in mind that the UCR data used here did not account for juvenile offending, which may or may not be empirically tethered to MML in some form or another; an assessment of which is beyond the scope of this study.

Author Contributions

Analyzed the data: RM JCB. Contributed reagents/materials/analysis tools: TK. Wrote the paper: RM MT JCB TK.

References

- Levinthal CF (2008) *Drugs, society, and criminal justice* (2nd Ed.). Boston: Pearson.
- American Academy of Pediatrics (2004) Legalization of marijuana: Potential impact on youth. *Pediatr* 113: 1825–1826.
- Johnson K, Chebium R (2013) Justice Department won’t challenge state marijuana laws. *USA Today*, Retrieved from: <http://www.usatoday.com/story/news/nation/2013/08/29/justice-medical-marijuana-laws/2727605/>
- O’Brien PK (2013) Medical marijuana and social control: Escaping criminalization and embracing medicalization. *Deviant Behav* 34: 423–443.
- Reingle JM, Staras SAS, Jennings WG, Branchini J, Maldonado-Molina MM (2012) The relationship between marijuana use and intimate partner violence in a nationally representative, longitudinal sample. *J Interpers Violence* 27: 1562–1578.
- Keyes KM, Schulenberg JE, O’Malley PM, Johnston LD, Bachman JG, et al. (2011) The social norms of birth cohorts and adolescent marijuana use in the United States, 1976–2007. *Addict* 106: 1790–1800.
- Cleveland HH, Wiebe RP (2008) Understanding the association between adolescent marijuana use and later serious drug use: Gateway effect of developmental trajectory? *Dev Psychopathol* 20: 615–632.
- Freisthler B, Kepple NJ, Sims R, Martin SE (2013) Evaluating medical marijuana dispensary policies: Spatial methods for the study of environmentally-based interventions. *Am J Community Psychol* 51: 278–288.
- Kepple NJ, Freisthler B (2012) Exploring the ecological association between crime and medical marijuana dispensaries. *J Stud Alcohol Drugs* 73: 523–530.
- Harris AWF, Large MM, Redoblado-Hodge A, Nielssen O, Anderson J, et al. (2010) Clinical and cognitive associations with aggression in the first episode of psychosis. *Aust N Z J Psychiatry* 44: 85–93.
- Moore TM, Stuart GL (2005) A review of the literature on marijuana and interpersonal violence. *Aggress Violent Behav* 10: 171–192.
- Ostrowsky MK (2011) Does marijuana use lead to aggression and violent behavior? *J Drug Educ* 41: 369–389.
- Niveau G, Dang C (2003) Cannabis and violent crime. *Med Sci Law* 43: 115–121.
- Swartout KM, White JW (2010) The relationship between drug use and sexual aggression in men across time. *J Interpers Violence* 25: 1716–1735.
- Dembo R, Washburn M, Wish ED, Schmeidler J, Getreu A, et al. (1987) Further examination of the association between heavy marijuana use and crime among youths entering a juvenile detention center. *J Psychoactive Drugs* 19: 361–373.
- Dembo R, Washburn M, Wish E, Yeung H, Getreu A, et al. (1987) Heavy marijuana use and crime among youths entering a juvenile detention center. *J Psychoactive Drugs* 19: 47–56.
- Arseneault L, Moffitt TE, Caspi A, Taylor PJ, Silva PA (2000) Mental disorders and violence in a total birth cohort. *Arch Gen Psychiatry* 57: 979–986.
- Monshouwer K, Van Dorsselaer S, Verdurmen J, Ter Bogt T, De Graff R, et al. (2006) Cannabis use and mental health in secondary school children. *Br J Psychiatry* 188: 148–153.
- Brady SS, Tschann JM, Pasch LA, Flores E, Ozer EJ (2008) Violence involvement, substance use, and sexual activity among Mexican-American and European-American adolescents. *J Adolesc Health* 43: 285–295.
- Green KM, Doherty EE, Stuart EA, Ensminger ME (2010) Does heavy adolescent marijuana use lead to criminal involvement in adulthood? Evidence from a multiwave longitudinal study of urban African Americans. *Drug Alcohol Depend* 112: 117–125.
- Pedersen W, Skardhamar T (2010) Cannabis and crime: Findings from a longitudinal study. *Addict* 105: 109–118.
- Bureau of Justice Statistics (2008) Deaths in custody reporting program. Retrieved October 29, 2008 from ojp.usdoj.gov/bjs/dcrp/prisonindex.htm.
- DeSimone J (1998) Is marijuana a gateway drug? *East Econ J* 24: 149–164.
- Kovandzic TV, Vieraitis LM, Paquette-Boots D (2009) Does the death penalty save lives? New evidence from state panel data, 1977 to 2006. *Criminol Public Policy* 8: 803–843.
- Scribner R, Cohen D, Kaplan S, Allen SH (1999) Alcohol availability and homicide in New Orleans: Conceptual considerations for small area analysis of the effect of alcohol outlet density. *J Stud Alcohol* 60: 310–316.
- Allison PD (2009) *Fixed effects regression models*. Thousand Oaks, CA: Sage.
- Wooldridge JM (2009) *Introductory econometrics: A modern approach*. Mason, OH: South-Western Cengage Learning.
- Bertrand M, Duflo E, Mullainathan S (2004). How much should we trust differences-in-differences estimates? *Q J Econ* 119: 249–275.
- Anderson DM, Hansen B, Rees DI (2013). Medical marijuana laws, traffic fatalities, and alcohol consumption. *J. of Law Econ*: 333–69.
- DiNardo JE, Lemieux T (2001). Alcohol, marijuana, and American youth: The unintended consequences of government regulation. *J. Health Econ*: 991–1010.
- Boden JM, Fergusson DM, Horwood LJ (2012). Alcohol misuse and violent behavior: Findings from a 30-year longitudinal study. *Drug Alcohol Depend*: 135–41.



Original article

The Impact of State Medical Marijuana Legislation on Adolescent Marijuana Use



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Article history: Received December 17, 2013; Accepted February 25, 2014

Keywords: Drug use; Substance use; Marijuana; Cannabis; Policy; Youth; Adolescents; Public health

A B S T R A C T

Purpose: The state-level legalization of medical marijuana has raised concerns about increased accessibility and appeal of the drug to youth. The objective of this study was to assess the impact of medical marijuana legalization across the United States by comparing trends in adolescent marijuana use between states with and without legalization of medical marijuana.

Methods: The study utilized data from the Youth Risk Behavioral Surveillance Survey between 1991 and 2011. States with a medical marijuana law for which at least two cycles of Youth Risk Behavioral Surveillance data were available before and after the implementation of the law were selected for analysis. Each of these states was paired with a state in geographic proximity that had not implemented the law. Chi-squared analysis was used to compare characteristics between states with and without medical marijuana use policies. A difference-in-difference regression was performed to control for time-invariant factors relating to drug use in each state, isolating the policy effect, and then calculated the marginal probabilities of policy change on the binary dependent variable.

Results: The estimation sample was 11,703,100 students. Across years and states, past-month marijuana use was common (20.9%, 95% confidence interval 20.3–21.4). There were no statistically significant differences in marijuana use before and after policy change for any state pairing. In the regression analysis, we did not find an overall increased probability of marijuana use related to the policy change (marginal probability .007, 95% confidence interval –.007, .02).

Conclusions: This study did not find increases in adolescent marijuana use related to legalization of medical marijuana.

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IMPLICATIONS AND
CONTRIBUTION

This study, which used a difference-in-difference analysis to control for secular changes in drug use, found no observed effect of medical marijuana laws on adolescent marijuana use. This may alleviate concerns about one potential negative effect of state medical marijuana laws.

Marijuana is the most commonly used illegal substance in the United States [1,2], with 42% of U.S. adolescents reporting use of marijuana by 12th grade [3]. Marijuana has a demonstrated

impact on the still-developing adolescent brain. Individuals initiating cannabis use before age 17 have been found to have less cortical grey matter and larger white matter volumes on magnetic resonance imaging and positron emission tomography imaging [4]. These observed differences in brain tissue are consistent with the poor psychosocial outcomes found in individuals who initiated marijuana at a young age. A number of studies have demonstrated decreased memory, learning, attention, and executive functioning in adolescents using marijuana

Conflicts of Interest: None of the authors have conflicts of interest to report.

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that persist even after several weeks of abstinence from use [5–7]. In early adolescence, marijuana may have permanent detrimental effects on cognition [8]. Marijuana has also been linked to schizophrenia and other psychotic disorders among adolescents [9]. Longitudinal cohort studies of adolescents using marijuana found associations between use and later respiratory problems, general malaise, and neurocognitive problems, as well as social problems including lower academic achievement and functioning, welfare dependence, unemployment, low relationship satisfaction, and low life satisfaction [10–12].

Marijuana is classified as a Schedule I drug, and by federal law, the prescription, dispensing, possession, cultivation, and selling of marijuana remain illegal [13]. Nevertheless, to date, 20 U.S. states and the District of Columbia have passed legislation allowing the use of marijuana for medical reasons [14]. There is considerable variability in the medical conditions that qualify for treatment; some states allow conditions to be considered by the public health department on a case-by-case basis. Proponents of the use of marijuana for medical reasons cite relief of multiple conditions, including intractable pain, nausea and vomiting, cachexia due to conditions such as AIDS or cancer-related treatments, and muscle spasm in multiple sclerosis and other chronic neurologic diseases after failure of all other available therapies [1,14]. In contrast, opponents of medical marijuana use raise concerns about downstream effects such as increased recreational drug use and increased crime, especially in neighborhoods where medical marijuana dispensaries are located [15,16]. Among the chief concerns are the fears that it would “encourage widespread youth drug abuse,” [17] that any liberalization of current drug use laws would contradict antidrug messages aimed at youth and counter existing perceptions of marijuana as a harmful substance, and that youth would seek prescriptions for use when it is not clearly indicated [18].

The objective of this study was to further investigate potential increases in marijuana use among youth associated with legalization of medical marijuana. To do this, we examined trends in reported adolescent drug use in a cohort of states before and after state policy change and compared these trends to geographically matched states that had not adopted medical marijuana legislation.

Methods

The Youth Risk Behavioral Surveillance System (YRBS) was developed by the Centers for Disease Control and Prevention (CDC) in 1990 to estimate the prevalence of health risk behaviors among youth and young adults, to assess the change in these behaviors over time, and to examine the co-occurrence of these behaviors [19]. The YRBS uses local and state school-based surveys to monitor six categories of priority health-risk behaviors, including behaviors that contribute to unintentional injuries and violence; tobacco use; and alcohol and other drug use. Individual states are responsible for administering the survey.

Detailed questions regarding substance use are administered to high school students (9th–12th grade). The survey employs a two-stage, cluster sample design to produce representative samples of students across grades in each jurisdiction, with schools selected at random. The probability of school selection is proportional to its enrollment. Participation by students in each sampled class is voluntary and anonymous. A weight is applied to each record to adjust for student nonresponse and the distribution of students by grade, sex, and race/ethnicity in each jurisdiction. The

final weighted estimates, therefore, are representative of all students in grades 9–12 attending schools in each jurisdiction [19].

The YRBS is administered biannually on odd years. States were identified that had legalized medical marijuana and had participated in YRBS for at least two cycles prior to the policy change and at least two cycles after the policy change. For each state, a geographically close comparison state for which YRBS data were also available for at least two cycles prior to and after the policy change was selected; for each state with medical marijuana laws, only one such comparison state was available.

Measures

The primary (dependent) outcome was defined as any 30-day marijuana use (yes/no). YRBS variables of interest to the analysis included student demographics of grade (9th–12th), gender, and race/ethnicity. Categorical variables were created to represent state, year, and whether or not the medical marijuana law was in place in a given year.

Data analysis

Demographics of the students participating in the survey were examined. Univariate (chi-squared) analyses were used to compare the proportions of students in demographic categories (age, race, and gender) and in self-report of 30-day marijuana use (the primary outcome), lifetime marijuana use, 30-day alcohol use, and binge drinking.

A difference-in-difference regression model was developed to isolate the policy effect on marijuana use:

$$Y_{ist} = m(A_s + B_t + cX_{ist} + b_{ist} + \varepsilon_{ist}),$$

where Y_{ist} represents adolescent marijuana use, m is a general function indicating the relationship between the outcome Y and the independent variables, A_s represents a fixed effect for each state, B_t represents a fixed effect for each year, cX_{ist} represents individual level variables (age, gender, race), b_{ist} (the term of interest) is an indicator variable that takes a value of 1 if the medical marijuana policy is present at time t in state s , and 0 otherwise, and ε_{ist} represents a state- and time-specific error term. Models included demographic covariates of race, gender, and grade. Models were developed for each state pairing and then on the combined dataset as a whole. In each case, a state without a medical marijuana policy served as the reference.

Generally, the difference in difference can be considered the average difference in outcome(s) of interest among youth in one state (with the policy change of interest), less the average difference among the comparison group (the state without the policy change). The first difference reflects the change in the primary outcome (drug use) that occurs after the policy implementation. By subtracting the second difference—the change that occurs in the comparison group—secular changes that may have occurred for reasons not related to the policy are excluded from the analysis. Any remaining differences in outcome—the difference in difference—are attributed to the policy change (in this case, the medical marijuana legislation). The difference in difference is a well-established tool in the health services literature [20] and one that is particularly useful for examining the effects of state-level policies [21,22]. The model described above is a modification of the standard difference-in-difference approach, using state and time fixed effects to allow additional flexibility in

the ways in which marijuana use may differ across states and times, independent of the policy timing. Because coefficients for binary dependent variables can be difficult to interpret, we calculated the marginal probabilities (derivative of the mean expected probability) of policy change on 30-day marijuana use for each model and used this as the primary reported outcome. To assess the robustness of the logistic regression, additional analyses were conducted using linear probability models for estimation. Hosmer–Lemeshow tests for survey data (*svylogitof*) were used to test model goodness of fit.

We also performed a number of sensitivity analyses. First, we performed subpopulation analysis, examining outcomes for individual grade categories (grades 9–12), to see whether specific ages were more likely to be susceptible to effects of changes in marijuana law. Second, given the amount of missing data, we performed multiple imputation on data aggregated by year and state. Although we could not recreate individual-level data for entire years in which YRBS data were not available from a state, in this way we were able to create estimates for overall prevalence of marijuana use and proportions of students within race/ethnicity, gender, and grade categories. We then repeated the analysis using linear regression (since only aggregate estimates of prevalence, rather than individual-level data for marijuana use, were available) with the imputed data.

YRBS employs a two-stage cluster sampling design to estimate rates of health-related behaviors among high school students. All analyses were performed using Stata 12.0 (StataCorp LP, College Station, TX). For all analyses, the *svy* commands in Stata were used to account for weights and clustering and obtain accurate point estimates, confidence intervals (CIs), and tests of hypothesis. In addition, to account for the likelihood of similarities of responses within a given year, we added year as an additional stratum [23].

Results

Descriptive statistics

Demographic characteristics of students, stratified by state, are listed in Table 1. Marijuana use was common among the students in the total sample, with lifetime use of 37.3% (95% CI 36.5–38.1) and past-month use of 20.9% (95% CI 20.3–21.4). Overall, states with the medical marijuana law had a significantly higher percentage of students reporting past month marijuana use and a significantly lower percentage of nonwhite students.

Year-by-year state trends

Figure 1 shows comparisons of trends in past 30-day marijuana use in states paired by region.

Difference-in-difference analyses

The results of the difference-in-difference analyses are listed in Table 2. A positive coefficient indicates an increase in the probability of past 30-day marijuana use. Controlling for individual-level covariates, the regression analysis shows that medical marijuana legislation has had no effect on increasing reported past 30-day marijuana use. In the Utah–Nevada comparison and the Idaho–Montana comparison, the state with the

medical marijuana policy (Nevada, enacted in 2000, and Montana, enacted in 2004) demonstrated a *decreased* probability of marijuana use after implementation of the policy. There was no change in the probability of marijuana use in any of the other state pairings or in the combined dataset with all states (marginal probability .007, 95% CI –.007, .02); the latter model provided the narrowest CI. Linear regression provided similar results for all models. The addition of 30-day or binge alcohol to models generated similar results as well but led to poor model fit, likely due to multicollinearity.

In the subanalysis by grade, decreased marginal probabilities for marijuana use in the Utah/Nevada model seem to be predominantly in grades 10 and 12; for the New York/Vermont model, 9th graders demonstrated a decreased marginal probability of marijuana use in the presence of the policy, despite the overall lack of effect of the policy in this state pairing. Otherwise, stratification by grade did not demonstrate any specific subgroup particularly vulnerable to increase in marijuana use following the implementation of medical marijuana laws.

The results from the models using imputed values are listed in Table 3. No state demonstrated a change in reported marijuana use associated with implementation of medical marijuana laws.

Discussion

The CDC's YRBS has been administered for >20 years, allowing examination of the longitudinal effect of states' policies on adolescents. Our study suggests that—at least thus far—the legalization of marijuana for medical purposes has not increased adolescent marijuana use, a finding supported by a growing body of literature. Wall et al. [24] used National Survey on Drug Use and Health data and reported higher prevalence of marijuana use in eight states that had legalized marijuana for medical purposes; however, this study did not control for state-specific trends, and the authors acknowledged that their findings may reflect increased implementation of medical marijuana laws in states where marijuana is more commonly used. Harper et al. [25] replicated and expanded on this study by adding in state fixed effects and found no consistent evidence of an increase in adolescent marijuana use or perceived riskiness of using marijuana. In another study, Lynne-Landsman et al. [23] used a switching replication model (in which states served as a comparison group prior to a law change) across four states and found no evidence for an effect of passage of medical marijuana laws on adolescent marijuana use.

Interestingly, in two state pairings in the current study—Utah/Nevada and Idaho/Montana—the state with the medical marijuana law was estimated to have *decreased* marijuana use after the implementation of the policy. It may be that normalizing marijuana use through medical legalization, as well as associating its use with chronically or even terminally ill populations, makes the use of the drug less appealing to adolescents. Alternatively, it may be that such legislation tends to be passed during times when marijuana use is at a peak in a given state, leading to a natural subsequent fall due to regression to the mean. The answer is beyond the scope of this study but merits further investigation if this finding is true. Notably, in the sensitivity analyses with imputed values for missing years of data, there was no association between implementation of medical marijuana law and reported use in any state pairing, consistent with our findings from the combined data for all states and years available. The possibility remains that the negative

Table 1

Characteristics of the study population, by state pairings, prelegislation

	Gender (% female)	Race/ethnicity (% nonwhite)	Grade	Past 30-day marijuana use	Lifetime marijuana use
States without medical marijuana law					
Idaho	48.6 (47.2–50.1)	11.6 (10.2–13.1)	9th 27.0 (22.2–31.9) 10th 25.9 (22.8–29.1) 11th 24.1 (21.0–27.3) 12th 23.0 (19.9–25.9)	14.0 (12.7–15.4)	29.4 (27.1–31.8)
Montana ^a	48.3 (47.3–49.4)	12.8 (10.8–14.8)	9th 27.1 (24.6–29.7) 10th 25.7 (23.5–27.8) 11th 24.0 (22.0–25.9) 12th 21.7 (19.6–23.9)	22.9 (21.8–24.0)	40.7 (39.2–42.2)
Massachusetts	49.3 (48.1–50.5)	25.6 (23.0–28.3)	9th 28.9 (26.7–31.2) 10th 25.7 (23.5–27.8) 11th 23.7 (21.6–25.8) 12th 22.2 (20.4–24.1)	30.0 (28.7–31.3)	49.5 (48.0–51.0)
Rhode Island ^a	49.3 (47.4–52.2)	24.7 (18.0–31.3)	9th 29.4 (24.4–34.4) 10th 25.5 (22.3–28.8) 11th 23.0 (19.0–27.1) 12th 22.2 (18.7–24.3)	28.4 (26.5–30.3)	44.9 (43.1–46.7)
New Hampshire	49.5 (47.5–51.5)	6.5 (5.6–7.3)	9th 28.4 (23.9–33.0) 10th 25.7 (21.5–29.9) 11th 23.7 (19.7–27.8) 12th 22.1 (18.3–25.9)	24.4 (22.8–26.1)	39.8 (37.8–41.9)
Maine ^a	48.7 (46.1–51.2)	7.4 (6.0–8.7)	9th 30.7 (27.0–34.4) 10th 27.4 (24.4–30.4) 11th 22.0 (19.5–24.5) 12th 19.8 (17.0–22.7)	22.3 (15.4–20.8)	29.9 (26.7–33.1) ^b
New York	49.7 (47.7–51.8)	39.9 (37.0–42.8)	9th 29.5 (27.3–31.7) 10th 26.9 (24.8–28.9) 11th 22.5 (21.1–23.9) 12th 21.1 (19.3–23.0)	22.3 (20.9–23.6)	39.7 (38.0–41.5)
Vermont ^a	48.6 (48.1–49.2)	6.4 (5.3–7.6)	9th 20.9 (19.2–22.6) 10th 21.8 (21.2–22.5) 11th 20.3 (19.7–21.0) 12th 37.7 (35.9–38.0)	26.5 (25.0–27.9)	28.1 (23.6–32.6)
Utah	48.7 (47.1–50.2)	13.2 (11.7–14.7)	9th 25.8 (21.3–30.3) 10th 27.1 (23.9–30.3) 11th 24.4 (21.7–27.2) 12th 22.6 (20.1–25.2)	9.2 (8.1–10.4)	20.9 (19.0–22.7)
Nevada ^a	48.8 (46.4–51.2)	33.4 (31.6–35.2)	9th 28.6 (24.7–32.5) 10th 26.8 (23.8–29.9) 11th 24.1 (21.2–27.0) 12th 20.5 (17.1–23.9)	24.4 (22.8–25.9)	45.4 (43.5–47.4)
Overall without medical marijuana law	49.4 (48.2–50.6)	30.0 (28.3–31.6)	9th 29.3 (27.1–31.5) 10th 26.8 (25.1–28.5) 11th 23.0 (21.4–24.5) 12th 21.0 (19.4–22.6)	21.6 (20.8–22.4)	38.3 (37.2–39.4)
Overall with medical marijuana law ^a	48.8 (48.0–49.5)	19.2 (17.8–20.5)	9th 26.6 (25.0–28.1) 10th 25.1 (23.9–26.3) 11th 23.0 (21.9–24.2) 12th 25.3 (24.0–26.6)	25.0 (24.3–25.7)	42.3 (41.3–43.4)

^a States with medical marijuana law.^b Lifetime marijuana use for Maine only reported in 1 year (1997) of the 2 pre-legislation years.

associations in the main analysis were artifacts of missing data in those state pairings.

Our findings confirm that adolescent substance use continues to be a significant public health issue among youth, with approximately one third of respondents reporting lifetime marijuana use and one fifth reporting ongoing (past month) marijuana use. Reducing marijuana use among adolescents has remained an important U.S. public health goal. In 2004, the American Academy of Pediatrics issued a statement of opposition to the legalization of marijuana for any purpose [26], stating in an associated report that young adolescents were most susceptible to the deterrent effects of drug laws and that “this deterrent effect could disappear or lessen with legalization of marijuana.”

[27] At the same time, the beneficial effects of marijuana for certain medical conditions have gained increasing recognition and acceptance. California legalized medical marijuana in 1996 and has provided a 15-year testing ground for the impact of the policy on youth drug use, finding little definitive evidence of detrimental effect on youth attitudes toward marijuana or actual use [28,29]. In one longitudinal study, attitudes about harmful effects of marijuana decreased among Californian youth surveyed in the year after the legislation; however, this was true in other states surveyed as well, and the reported use of marijuana did not increase correspondingly. This suggests that concerns about “sending the wrong message” may have been overblown. Similarly, the Substance Abuse and Mental Health Services

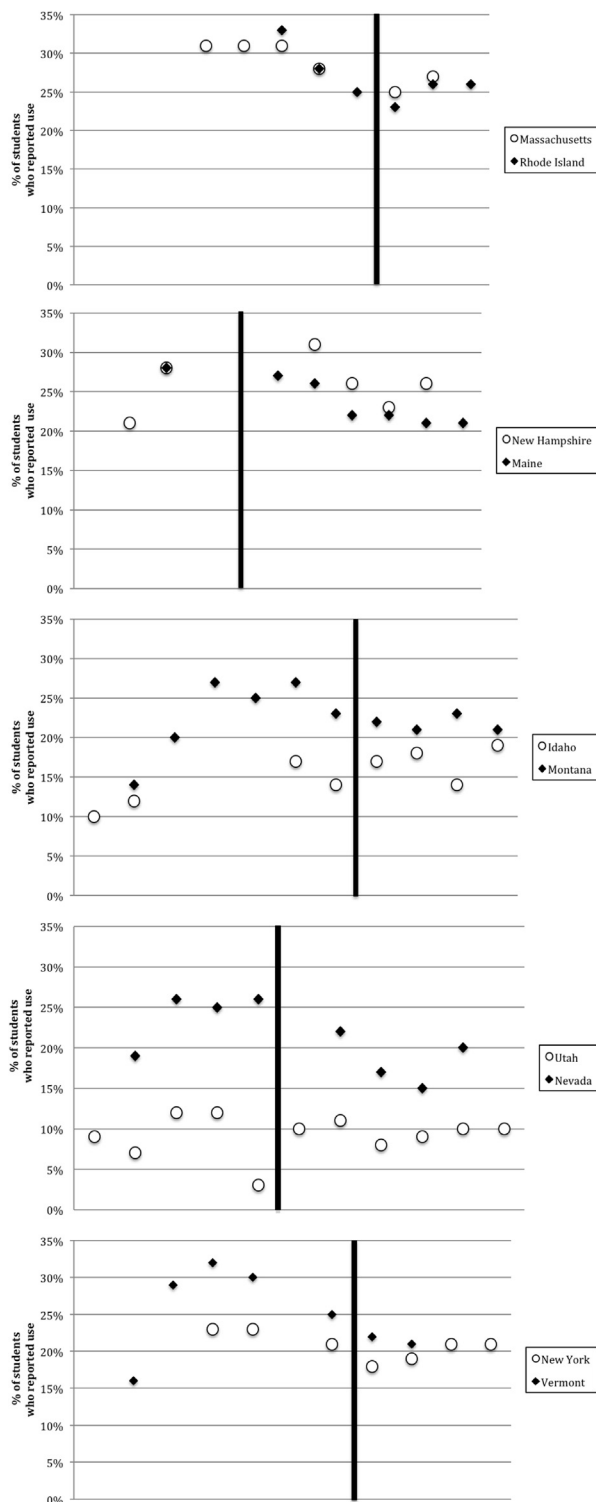


Figure 1. Marijuana use trends in states with (diamond) and without (open circle) medical marijuana laws, paired by region. The solid vertical line indicates the date of medical marijuana legalization.

Administration reported a 200% increase in admissions for marijuana treatment in California between 1992 and 2002 [28]; however, 31 other states at least doubled their admission rates

during the same period, and overall youth marijuana use trends in California have not demonstrated significant increase [29].

Concerns about laws and policy measures that may inadvertently affect youth drug use merit careful consideration. Our study does not show evidence of a clear relationship between legalization of marijuana for medical purposes and youth drug use for any age group, which may provide some reassurance to policymakers who wish to balance compassion for individuals who have been unable to find relief from conventional medical therapies with the safety and well-being of youth. Further research is required to track the trends in marijuana use among adolescents, particularly with respect to different types of marijuana laws and implementation of laws in each state.

This study has several important limitations. As with all survey data, there is the possibility of reporting bias. There may be limited concordance of self-report and objective measures of drug use among adolescents [30]. In particular, with questions relating to substance use, there is the possibility that social desirability effect or fear of consequences led to under-reporting of drug use. The anonymous nature of YRBS, however, minimizes these biases, and the reliability of the YRBS for high-risk behaviors has been demonstrated [31].

The YRBS survey also provides limited information about any single substance; our primary outcome measure, for example, was derived from a single survey item. We do not know how this item performs compared with fully validated, multiple-question substance use instruments. Further, past 30-day use does not capture frequency of use or negative health and social consequences of use that would allow us to distinguish between occasional use and heavy marijuana use. It is possible that policy changes such as the one we examined impact marijuana use among a specific subset of adolescents with particular patterns of drug use and acquisition.

YRBS is voluntary for states, and the success with which it is implemented is variable from year to year. Therefore, some states did not collect data in all consecutive years, or in given years, the data collected were incomplete and did not meet CDC requirements for sampling. As noted, for the state of VT, race was not collected in the first three cycles of that state's participation in YRBS.

Implementation of marijuana policies takes time. Dispensaries must be opened, providers trained, the public made aware, therapeutic relationships developed, processes established for approving registered medical marijuana users, and growth of the program must occur before a medical marijuana program is truly in effect. Any downstream effect on adolescents would be unlikely to occur immediately after a state law is passed. For this reason, we did provide a lead-in period of two data cycles to allow a medical marijuana program to take full effect and to have the potential to impact adolescent marijuana use. Nevertheless, for states in our study that adopted these policies more recently, the full effect on adolescents may not yet have been apparent.

Finally, our analysis has to do with legalization of medical marijuana, not the legalization of marijuana for recreational use. The distinction is important, for with legalization of marijuana for medical reasons, use is regulated by public health departments and made available through a small number of physicians and dispensaries. The risks to adolescents from legalization of marijuana for recreational use at the discretion of the user are surely similar in some ways but different in others, including the extent of availability, the demographic of the users directly affected, and the

Table 2

Logistic regression models for the effect of medical marijuana laws on past-month adolescent marijuana use

Model ^a	Marginal probability ^b
Idaho versus Montana	-.03 (-.06, -.003)
Grade 9	-.02 (-.06, .02)
Grade 10	-.03 (-.07, .02)
Grade 11	.04 (-.01, .09)
Grade 12	-.04 (-.10, .01)
Massachusetts versus Rhode Island	-.01 (-.05, .02)
Grade 9	.005 (-.06, .07)
Grade 10	-.02 (-.08, .05)
Grade 11	-.009 (-.08, .06)
Grade 12	-.04 (-.12, .04)
New Hampshire versus Maine	-.04 (-.09, .01)
Grade 9	-.07 (-.14, .004)
Grade 10	-.05 (-.11, .03)
Grade 11	-.008 (-.11, .10)
Grade 12	-.01 (-.13, .10)
Utah versus Nevada	-.04 (-.06, -.01)
Grade 9	-.01 (-.06, .03)
Grade 10	-.05 (-.09, -.008)
Grade 11	-.03 (-.07, .01)
Grade 12	-.05 (-.10, -.005)
New York versus Vermont	-.02 (-.05, .01)
Grade 9	-.04 (-.08, -.01)
Grade 10	-.02 (-.07, .02)
Grade 11	-.03 (-.07, .02)
Grade 12	-.03 (-.09, .03)
All states ^c	.007 (-.007, .02)
Grade 9	.0006 (-.02, .02)
Grade 10	-.003 (-.02, .02)
Grade 11	.02 (-.003, .05)
Grade 12	.007 (-.02, .03)

^a Models adjust for grade, gender, and race.

^b The mean expected probability of marijuana use, if policy is changed from “not present” to “present.”

^c The “all states” model is the combined data from all states and years included in the study.

resulting change in the social image of marijuana use. This means that the findings of our study should not be used to make generalizations about other types of state-level marijuana laws.

In conclusion, our study of self-reported marijuana use by adolescents in states with a medical marijuana policy compared with a sample of geographically similar states without a policy does not demonstrate increases in marijuana use among high school students that may be attributed to the policies. Future research may examine further longitudinal trends following state policy change and include other states where similar policy changes have occurred.

Table 3

Linear regression models for effect of medical marijuana laws on past-month adolescent marijuana use using imputed data

Model ^a	β coefficient
Idaho versus Montana	-.01 (-.14, .11)
Massachusetts versus Rhode Island	-.05 (-1.13, 1.02)
New Hampshire versus Maine	-.003 (-.55, .55)
Utah versus Nevada	-.05 (-.30, .21)
New York versus Vermont	-.03 (-.25, .20)
All states ^b	.03 (-.007, .07)

^a Models adjust for grade, gender, and race.

^b Combined data from all states and years included in the study.

Acknowledgments

This work was supported by a grant from the Rhode Island Medical Foundation. An early version of this work was presented at the American Public Health Association Annual Meeting, 2010, in Washington DC.

References

- [1] Goodman L, Gilman A, Brunton L, et al. Goodman & Gilman's the pharmacological basis of therapeutics. 11th edition. New York, NY: McGraw Hill; 2006.
- [2] Kasper D, Harrison T. Harrison's principles of internal medicine. 16th edition; 2005. New York, NY.
- [3] Johnston L, O'Malley P, Bachman J, Schulenberg J. Monitoring the future national survey results on drug use, 1975–2009. Bethesda, MD; 2010:10–7584.
- [4] Wilson W, Mathew R, Turkington T, et al. Brain morphological changes and early marijuana use: A magnetic resonance and positron emission tomography study. *J Addict Dis* 2000;19:1–22.
- [5] Jacobus J, Bava S, Cohen-Zion M, et al. Functional consequences of marijuana use in adolescents. *Pharmacol Biochem Behav* 2009;92:559–65.
- [6] Schweinsburg A, Brown S, Tapert S. The influence of marijuana use on neurocognitive functioning in adolescents. *Curr Drug Abuse Rev* 2008;1:99–111.
- [7] Thoma R, Monnig M, Lysne P, et al. Adolescent substance abuse: The effects of alcohol and marijuana on neuropsychological performance. *Alcohol Clin Exp Res* 2010;35:39–46.
- [8] Schneider M. Puberty as a highly vulnerable developmental period for the consequences of cannabis exposure. *Addict Biol* 2008;13:253–63.
- [9] Malone D, Hill M, Rubino T. Adolescent cannabis use and psychosis: Epidemiology and neurodevelopmental models. *Br J Pharmacol* 2010;160:511–22.
- [10] Brook J, Adams R, Balka E, Johnson E. Early adolescent marijuana use: Risks for the transition to young adulthood. *Psychol Med* 2002;32:79–91.
- [11] Fergusson D, Boden J. Cannabis use and later life outcomes. *Addiction* 2008;103:969–76.
- [12] Green K, Doherty E, Stuart E, Ensminger M. Does heavy adolescent marijuana use lead to criminal involvement in adulthood? Evidence from a multiwave longitudinal study of urban African Americans. *Drug Alcohol Depend* 2010;112:117–25.
- [13] Hoffmann DE, Weber E. Medical marijuana and the law. *NEJM* 2010;362:1453–7.
- [14] 20 Legal Medical Marijuana States and DC: Laws, fees and possession limits. Available at: <http://medicalmarijuana.procon.org/view.resource.php?resourceID=000881>. Accessed June 7, 2013.
- [15] Craig T. D.C. Council unanimously backs medical marijuana in preliminary vote. *The Washington Post*; 2010.
- [16] McKinley J. Backers of legal marijuana find silver lining in defeat of California measure. *The New York Times*; 2010.
- [17] Grotenherme F, Russo E. Cannabis and cannabinoids: Pharmacology, toxicology, and therapeutic potential. New York, NY: Haworth Integrative Healing Press; 2002.
- [18] Marijuana use and new concerns about medical marijuana. U.S. Department of Education, higher education Center for alcohol, drug abuse and violence prevention; 2010.
- [19] Centers for Disease Control and Prevention. 1997–2009 Youth Risk Behavior Survey. 2013. Available at: www.cdc.gov/yrbs. Accessed June 1, 2013.
- [20] Goldman H, Frank R, Burnam M, et al. Behavioral health insurance parity for federal employees. *N Engl J Med* 2006;354:378–86.
- [21] Bao Y, Sturm R. The effects of state mental health parity legislation on perceived quality of insurance coverage, perceived access to care, and use of mental health specialty care. *Health Serv Res* 2004;39:1361–77.
- [22] Rosenthal M, Frank R, Li Z, Epstein A. Early experience with pay-for-performance: From concept to practice. *JAMA* 2005;294:1788–93.
- [23] Lynne-Landsman S, Livingston M, Wagenaar A. Effects of state medical marijuana laws on adolescent marijuana use. *Am J Public Health* 2013;103:1500–6.
- [24] Wall MM, Poh E, Cerda M, et al. Adolescent marijuana use from 2002 to 2008: Higher in states with medical marijuana laws, cause still unclear. *Ann Epidemiol* 2011;21:714–6.
- [25] Harper S, Strumpf EC, Kaufman JS. Do medical marijuana laws increase marijuana use? Replication study and extension. *Ann Epidemiol* 2012;22:207–12.

- [26] Joffe A. Legalization of marijuana: Potential impact on youth. *Pediatrics* 2004;113:1825–6.
- [27] Joffe A, Yancy WS. Legalization of marijuana: Potential impact on youth. *Pediatrics* 2004;113:e632–8. Available at: <http://pediatrics.aappublications.org/content/113/6/e632.full.html>.
- [28] Trends in marijuana treatment admissions, by state: 1992–2002. Arlington, VA: Substance Abuse and Mental Health Services Administration, Office of Applied Studies; 2005.
- [29] Wright D. State estimates of substance use from the 2001 national household survey on drug abuse: Volume I. Findings. Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies; 2003.
- [30] Delaney-Black V, Chiodo L, Hannigan J, et al. Just say “I don’t”: Lack of concordance between teen report and biological measures of drug use. *Pediatrics* 2010;126:887–93.
- [31] Brener N, Kann L, McManus T, et al. Reliability of the 1999 youth risk behavior survey questionnaire. *J Adolesc Heal* 2002;31:336–42.

TECHNICAL REPORT

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Legalization of Marijuana: Potential Impact on Youth

ABSTRACT. This technical report provides historical perspectives and comparisons of various approaches to the legal status of marijuana to aid in forming public policy. Information on the impact that decriminalization and legalization of marijuana could have on adolescents, in addition to concerns surrounding medicinal use of marijuana, are also addressed in this report. Recommendations are included in the accompanying policy statement. *Pediatrics* 2004;113:e632–e638. URL: <http://www.pediatrics.org/cgi/content/full/113/6/e632>; *marijuana, legalization, substance abuse, decriminalization*.

ABBREVIATIONS. AAP, American Academy of Pediatrics; IOM, Institute of Medicine.

BACKGROUND

Over the last 40 years, the legal status of marijuana has been debated vigorously. Proponents of policies that would permit individual possession of small amounts of marijuana argue that it is a safe drug and that criminal sanctions against personal use and possession represent at worst excessively harsh and at best unnecessary penalties. Echoing these sentiments, editors of *The Lancet* have concluded that “cannabis per se is not a hazard to society but driving it further underground may well be.”¹ Advocates for legalization also point out that the morbidity, mortality, and economic costs to society associated with alcohol and tobacco use in the United States dwarf those associated with marijuana use.

Those opposing liberalization of current laws counter that marijuana is not a benign drug, especially in light of new psychopharmacologic information demonstrating that marijuana shares many features with other illicit drugs. They also contend that legalization or decriminalization of personal use of marijuana likely would trigger a substantial increase in use, with foreseeable increases in the social, economic, and health costs.

Most recently, the debate has focused on the medical use of marijuana (that is, the use of smoked marijuana to treat a variety of medical conditions). Eight states (Alaska, Arizona, California, Colorado, Maine, Nevada, Oregon, and Washington) have

passed ballot initiatives that provide for medical use of marijuana under certain circumstances; one other state (Hawaii) has enacted state legislation permitting medical marijuana use.² The federal government has opposed vigorously any efforts to permit physicians to prescribe marijuana for medical purposes, an approach characterized by the former editor of the *New England Journal of Medicine* as “misguided, heavy-handed, and inhumane.”³

Controversy regarding marijuana is not limited to the United States. Australia has decriminalized the use of marijuana in some territories, and Canada⁴ as well as Switzerland and other European countries⁵ are reconsidering their approach to marijuana. However, the most widely publicized approach to regulation of marijuana is that of The Netherlands. Under a complex system of “law-on-the-books” and “law-in-action,” Dutch law permits personal use of marijuana but outlaws possession.⁶

Pediatricians, too, are not of one mind in their views regarding the legal status of marijuana. In a periodic survey of fellows of the American Academy of Pediatrics (AAP) conducted in 1995,⁷ only a minority (18%) favored legalization, and 26% believed that possession or sale should be a felony; 31% felt that marijuana should be available by prescription for medical purposes to a certain class of patients, and 24% believed that marijuana should remain illegal but penalties for personal possession should be reduced or eliminated.

Since the periodic survey was conducted, much more has been learned about the psychopharmacologic properties of marijuana. Scientists have demonstrated that the emotional stress caused by withdrawal from marijuana is linked to corticotropin-releasing factor, the same brain chemical that has been linked to anxiety and stress during opiate, alcohol, and cocaine withdrawal.⁸ Others report that tetrahydrocannabinol, the active ingredient in marijuana, stimulates release of dopamine in the mesolimbic area of the brain, the same neurochemical process that reinforces dependence on other addictive drugs.⁹ Current scientific information about marijuana has been summarized in the AAP policy statement “Marijuana: A Continuing Concern for Pediatricians.”¹⁰ Some of the significant neuropharmacologic, cognitive, behavioral, and somatic consequences of acute and long-term marijuana use are well known and include negative effects on short-

The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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term memory, concentration, attention span, motivation, and problem solving, which clearly interfere with learning; adverse effects on coordination, judgment, reaction time, and tracking ability, which contribute substantially to unintentional deaths and injuries among adolescents (especially those associated with motor vehicles); and negative health effects with repeated use similar to effects seen with smoking tobacco. Three recent studies^{11–13} demonstrate an association between marijuana use and the subsequent development of mental health problems; however, a small study of 56 monozygotic cotwins discordant for marijuana use did not find any such associations.¹⁴

DEFINITION OF TERMS

There are 3 general policy perspectives concerning the status of marijuana in the United States: prohibition, decriminalization, and legalization. Prohibition describes current federal policy toward marijuana use, which seeks to minimize or prevent use of marijuana with strong legal sanctions and aggressive interdiction of supply routes. Decriminalization and depenalization (used interchangeably in this report) refer to the elimination, reduction, and/or nonenforcement of penalties for the sale, purchase, or possession of marijuana although such activities remain illegal. Under decriminalization, penalties for use or distribution are at least possible theoretically, and advertising would be banned. Legalization, one step beyond decriminalization, would fundamentally change the status of marijuana in society. It is an acknowledgment that the government has no fundamental interest in an individual's use of a drug, although it may still seek to regulate its sale, distribution, use, and advertisement to safeguard the public's health. Such is the case with alcohol and tobacco. Of the 3 approaches, only the prohibitionist approach has reducing or limiting drug use as its explicit goal.

HISTORICAL PERSPECTIVES ON DRUG POLICIES IN THE UNITED STATES

Important perspectives on how changing the status of marijuana could affect use by adolescents can be gleaned from an examination of this country's experience with drugs over the last 200 years. During the 19th century, opiate drugs were legal and widely available. Opium use was common, especially among middle-class white women.¹⁵ Use of morphine also was extensive, and heroin was marketed as a "sedative for coughs." Cocaine, which routinely was added to patent medicines and beverages, also was legal; it was prized for its local anesthetic effect and its ability to counteract the effects of morphine. The national opiate addiction rate increased from 0.72 per 1000 in 1840 to 4.59 per 1000 in the 1890s, thereafter beginning a sustained decline.^{16(p28)}

Another wave of drug use began in the mid-1960s as enforcement of marijuana laws by police became lax and adolescent and layperson perceptions of the risk of regular use declined. Officials from the US Drug Enforcement Agency expressed the view that the fight against marijuana detracted from the more

important work of combating heroin use.^{16(p174)} Drug incarcerations per 1000 arrests began to drop in 1960 and remained low through 1979. The Carter administration (1977–1981) proposed removing criminal sanctions for possessing small amounts of marijuana.^{16(p175)} In 1975, 6% of high school seniors reported using marijuana daily during the previous 30 days. By 1978, the same year during which perceived risk of regular use of marijuana reached its lowest point ever, 10.7% of high school seniors reported using the drug daily.¹⁷

Drug use in America tends to follow cycles, often with one generation having to relearn the experiences of previous ones. Ninety years after the first cocaine epidemic, cocaine use began to increase in the 1970s and escalated substantially from 1980 to 1995. Because it had been so long since the previous epidemic, cocaine was perceived to be a safe drug. In a chapter on cocaine in the 1980 edition of a prominent textbook of psychiatry, the authors wrote: "If it is used no more than two or three times a week, cocaine creates no serious problems."¹⁸ In 1977, 10% of 18- to 25-year-olds had used cocaine; that proportion doubled to 20% in 1979. By 1985, one third of 18- to 25-year-olds had used cocaine, as had 17.3% of 12th graders.¹⁵ Only with subsequent widespread publicity about the health risks and addictive properties of cocaine and the epidemic of crack cocaine did cocaine use among young people begin to wane.

US AND INTERNATIONAL EXPERIENCES WITH MARIJUANA LEGALIZATION AND DEPENALIZATION

Because to our knowledge no country has completely legalized the sale, possession, and advertising of marijuana, there are no studies that examine the effect of legalization on marijuana use by young people. Hence, we examine data on adolescents' use of marijuana in states and countries that have, to a greater or lesser extent, decriminalized use and possession of this drug.

Analyzing data from the annual Monitoring the Future survey, Johnston et al¹⁹ concluded that decriminalization of marijuana in a number of states from 1975 to 1980 apparently had no effect on high school students' beliefs and attitudes about marijuana or on their use of the drug during those years. In contrast, Chaloupka et al,²⁰ analyzing data from the 1992–1994 Monitoring the Future surveys, found that "youths living in decriminalized states are significantly more likely to report currently using marijuana and may consume more frequently."

There are several possible explanations for these disparate findings. Although the study by Johnston et al did not find any effect of decriminalization, baseline marijuana use was higher in states that changed their laws compared with states that did not, although the subsequent rate of increase in all states was the same. It is possible that the higher baseline rates of use in the states that decriminalized marijuana use may have reflected a more lax or tolerant approach to marijuana use before decriminalization. Hence, decriminalization would not have resulted in any significant lessening of enforcement,

and the observed rate of increase would parallel but not exceed changes in the states that did not alter their laws. Also, because the Monitoring the Future survey is administered in schools, any effect of decriminalization on marijuana use by out-of-school youth (who typically have higher levels of drug use²¹) would not have been reflected.

An additional explanation is provided by a recent analysis of marijuana decriminalization laws in the United States by Pacula et al.²² They found that some states that are viewed as having decriminalized marijuana use have in fact retained a first-time marijuana offense as a criminal offense. In addition, many states that are characterized as not having decriminalized laws pertaining to marijuana use specify first-time marijuana possession offenses as noncriminal. These same authors found that youth living in states that lowered offenses for marijuana possession to below the felony level were more likely to report use of marijuana in the past month.²²

Several territories in Australia have decriminalized use of marijuana. Studies comparing use in these territories with use in those that did not reduce penalties found no appreciable differences in use.^{23,24}

The most widely scrutinized large-scale change in the legal status of marijuana occurred in The Netherlands. Dutch policy regarding decriminalization is very complex. Use of illegal drugs per se is not punishable by law, but possession for use is; drug dealing also is considered a felony.²⁵ Theoretically, one can be imprisoned for up to 1 month for possession of 5 g or less of cannabis, and promotion of marijuana through advertisements is forbidden also.

From 1984 to 1996, the period during which Dutch prosecution of marijuana-related offenses became virtually nonexistent, marijuana use increased consistently and substantially until 1992 while decreasing or remaining stable in other countries.^{26,27} Among 18- to 20-year-olds, the proportion who reported ever having used marijuana increased from 15% to 44%, and the proportion who reported using it within the previous 30 days increased from 8.5% to 18.5%. Use among adolescents in the United States decreased steadily from 1979 to 1992. In Norway, which also forbids the sale of marijuana, use remained constant until 1992 and then increased. Use remained steady or decreased in Catalunya (Spain), Stockholm, Hamburg, and Denmark during this period. These figures strongly suggest that marijuana use was influenced by changes in Dutch policy during this period. However, the United States and Norway (Oslo) also experienced increases in use of marijuana from 1992 to 1996, and thus it is difficult to attribute any change in use among Dutch youth after 1992 to the country's drug policies.

The 1999 European School Survey Project on Alcohol and Drugs, specifically developed to provide data on European drug use comparable with that obtained by the Monitoring the Future surveys, revealed that the proportion of adolescents in The Netherlands who reported ever having used marijuana (28%) was substantially lower than that of 10th graders in the United States (41%). However, the

European survey also indicated that Dutch use was higher than any other European country except Ireland, the United Kingdom, France, and the Czech Republic.²⁸

MEDICAL MARIJUANA

Considerable anecdotal evidence suggests that marijuana may be effective in treating a number of medical conditions. This perspective has been an important force behind efforts to change the legal status of marijuana. Marijuana has been touted as ameliorating chemotherapy-induced nausea, wasting and anorexia associated with AIDS, intraocular pressure in glaucoma, and muscle spasticity arising from such conditions as multiple sclerosis. Two comprehensive reviews evaluating the scientific basis for these claims, one conducted by the Institute of Medicine (IOM) and the other by the American Medical Association, have been published recently.^{29,30} Both reports acknowledge the lack of rigorous data to support the use of smoked marijuana as medicine while calling for additional research into the medical use of cannabinoids, especially those that could be delivered rapidly in a smoke-free manner. The IOM report noted that marijuana smoke delivers "harmful substances" as well as tetrahydrocannabinol to the body and that marijuana "plants cannot be expected to provide a precisely defined drug effect." "For these reasons," the IOM report concluded, "there is very little future in smoked marijuana as a medically approved medication. If there is any future in cannabinoid development, it lies with agents of more certain, not less certain, composition."

POTENTIAL EFFECT OF DECRIMINALIZATION OR LEGALIZATION ON US ADOLESCENTS

Although efforts to legalize marijuana are focused solely on adults (no one is proposing that use or possession of marijuana by adolescents should be legalized), any change in its legal status could nonetheless have an effect on adolescents. Alcohol (illegal for those under 21 years of age) and tobacco products (illegal under 18 years of age) are nonetheless the psychoactive substances most widely abused by adolescents. During 2003, 47.5% of 12th graders reported using alcohol in the past 30 days and 24.4% reported smoking cigarettes in the past 30 days.³¹

Legalization of marijuana could result in advertising campaigns for its use, some of which might be directed toward adolescents. Control measures to prevent advertising to young people, as recent experience demonstrates, may be difficult to implement. As revealed during the course of the Comprehensive Tobacco Settlement negotiations, tobacco companies systematically have marketed their products to young people even while disavowing any efforts to do so. Even after the Comprehensive Tobacco Settlement was implemented (which prohibited any youth-oriented advertising), tobacco companies continued marketing to young people. A recent study noted that cigarette advertising in youth-oriented magazines increased by \$54 million after the Tobacco Master Settlement Agreement.³² Another study showed that advertising of youth brands of ciga-

rettes (defined as those smoked by >5% of 8th, 10th, and 12th graders in 1998) in youth-oriented magazines increased from 1995 to 2000, as did expenditures for adult brands in youth-oriented magazines.³³ The Supreme Court recently struck down several Massachusetts regulations aimed at protecting schoolchildren from tobacco advertising (including bans on tobacco ads within 1000 feet of a school or playground). "The state's interest in preventing underage tobacco use is substantial and even compelling, but it is no less true that the sale and use of tobacco by adults is a legal activity," wrote Justice Sandra Day O'Connor for the majority. She continued, "... tobacco retailers and manufacturers have an interest in conveying truthful information about their products to adults, and adults have a corresponding interest in receiving truthful information about tobacco products."³⁴ Presumably, these same interests in regard to advertising for marijuana products also would be protected.

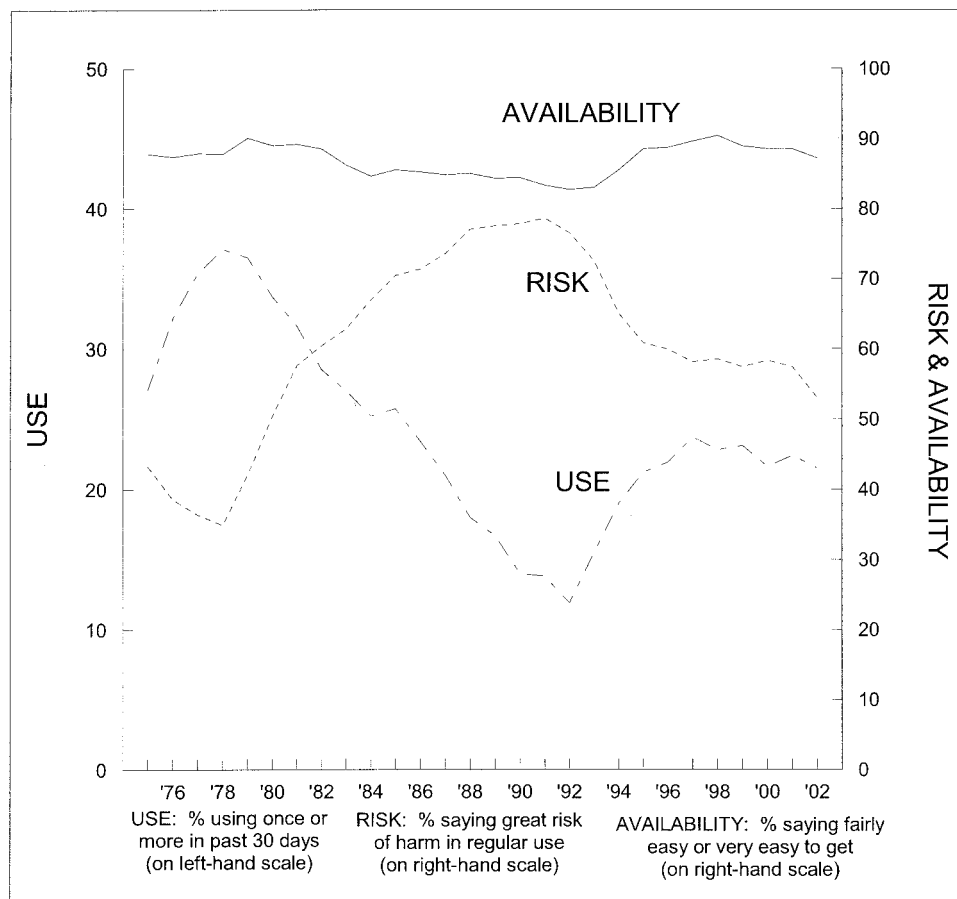
DiFranza³⁵ has demonstrated that both the states and the federal government are poorly enforcing the Synar Amendment, which requires states to control the sale of tobacco products to those younger than 18 years. Legalization of marijuana for adults but not adolescents would necessitate additional law en-

forcement burdens on a system that currently is not meeting its regulatory obligations.

Similarly, the alcoholic-beverage industry continues to portray drinking in terms that clearly appeal to young people. Drinking is associated with being sexy, popular, and fun and as an ideal means to "break the ice" in social settings.³⁶ These portrayals are extremely enticing to adolescents, who are in the process of developing their own identities as well as refining their social skills. One can speculate that distributors of marijuana quickly would recognize the profitability of portraying marijuana in a similar manner (thereby maximizing sales), all the while protesting that their marketing attempts seek only to induce adults to change brands.

How adolescents would perceive a change in the legal status of marijuana, even if only for adults, also is difficult to determine. However, recent studies have shown that prevalence of adolescent marijuana use is inversely proportional to the perceived risk associated with use (Fig 1).³⁷ The proportion of 12th graders who reported using marijuana in the past 30 days peaked in 1978 and again in 1997, exactly the years in which the perceived risk of regular use was at its lowest.

Some research suggests that legal sanctions may



Source: Johnston LD, O'Malley PM, Bachman JG. Monitoring the Future: National Survey Results on Drug Use, 1975-2002. Vol I: Secondary School Students. Bethesda, MD: National Institute on Drug Abuse; 2003

Fig 1. Marijuana: trends in perceived availability, perceived risk of regular use, and prevalence of use in past 30 days for 12th graders

influence the initial decision to use drugs and that this influence diminishes as drug use by individuals progresses.³⁸ If so, it is the youngest adolescents (those who have not yet tried marijuana or are in the experimentation phase) who would be affected most by changes in marijuana laws. Age at first use is, in turn, a risk factor for problem use in the future.³⁹

Moral development in children and adolescents assumes a developmental trajectory. Early adolescents have a concrete approach to morality: laws are obeyed to avoid punishment. As such, young adolescents would be most susceptible to the deterrent effects of drug laws. This deterrent effect could disappear or lessen with legalization of marijuana. Once adolescents gain the ability to think abstractly, challenges to the apparent hypocrisy of "do as I say, not as I do" can be anticipated.

Parental drug use is an important influence on adolescents' drug use.⁴⁰ Recent data indicate that easy household access to illicit substances is associated with greater risk of marijuana use among both younger and older adolescents.⁴¹ Some adults may choose not to use marijuana (however they may feel about the law), because the potential risk of criminal sanctions outweighs any perceived benefit from using the drug. With the demise of legal sanctions against use, some parents may choose to begin using marijuana, acting as an important new source of exposure for their adolescents. Parental use of marijuana in the last year is associated with their adolescent's use during the same period.⁴²

Availability of marijuana, which might increase if the drug were legalized, clearly has been shown to affect adolescents' use. Adolescents who have been offered marijuana are 7 times more likely to use it than are those who have not been offered marijuana. Similarly, those who report that marijuana is easy to get are approximately 2.5 times more likely to use it than those who consider it hard to get.⁴³

Marijuana is cheap and easy to produce; if it were legalized, its price likely would decrease below current levels. Work by Pacula et al⁴⁴ in the United States and Williams⁴⁵ in Australia demonstrates clearly that a decrease in the price of marijuana is associated with a significant increase in the prevalence of use among adolescents.

Some advocates for the legalization of marijuana argue that it is safer than alcohol. They suggest that increased use of marijuana by young people might have a positive effect if some adolescents switched from alcohol to marijuana (a substitution effect). This theory cannot be supported by recent studies on adolescent marijuana and alcohol use that incorporated the price of marijuana into the analysis. These studies conclude that an increase in use of marijuana by adolescents would result in an increased use of alcohol (ie, that the 2 drugs are economic complements).⁴⁶

From a public health perspective, even a small increase in use, whether attributable to increased availability or decreased perception of risk, would have significant ramifications. For example, if only an additional 1% of 15- to 19-year-olds in the United

States began using marijuana, there would be approximately 190 000 new users.⁴⁷

COMPARISONS BETWEEN MARIJUANA, ALCOHOL, AND TOBACCO

Proponents of legalization of marijuana argue that in terms of costs to society, both financial and health-related, alcohol and tobacco cause far more harm than does marijuana. They argue that classifying a relatively benign drug (marijuana) as schedule I and vigorously prosecuting its sale and possession while permitting the legal use of substances that cause far more damage are inconsistent and illogical practices or policies. That alcohol and tobacco cause far more harm in our society than marijuana is undeniable, but it does not follow logically that yet a third addictive psychoactive drug (marijuana) should be legalized. Many of the harms associated with alcohol and tobacco use stem from the widespread acceptability, availability, and use of these substances. Still other harms result from lax enforcement of current laws regulating their use or sale, especially to underage youth. Rather than legalizing marijuana, an equally compelling approach would be vigorously enforcing current regulations regarding sale and use of alcohol and tobacco products to minimize health-related problems attributable to their consumption. Recent examples include lowering the blood alcohol concentration that defines whether an individual is driving while intoxicated to 0.08 mg/dL (0.02 mg/dL for youth), limiting or banning smoking in public places, and banning cigarette advertisements targeted toward young people.

SUMMARY

Several recent studies concerning American adolescents, the Dutch experience with decriminalization (from 1984 to 1992), and the relationship between cheaper marijuana and use by adolescents suggest that decriminalization increases marijuana use by adolescents. Because no country has legalized use of marijuana outright, there are no studies available to evaluate the potential effect of legalization in the United States. Legalization of marijuana could decrease adolescents' perceptions of the risk of use and increase their exposure to this drug. Furthermore, data concerning adolescents' use of the 2 drugs that are legal for adults (alcohol and tobacco) suggest strongly that legalization of marijuana would have a negative effect on youth. Alcohol and tobacco are the drugs most widely abused by adolescents, although their sale to adolescents (younger than 18 years for tobacco and younger than 21 years for alcohol) is illegal. Research demonstrates that manufacturers of alcohol and tobacco market their products to young people, and the recent Supreme Court decision and experience with the Synar Amendment suggest that, if marijuana were legalized, restrictions on the sale and advertising of the substance to young people would prove daunting. Finally, two in-depth reviews of medical marijuana conclude that future research should focus on the medical use of cannabinoids, not smoked marijuana.

Recommendations from the AAP are included in the accompanying policy statement.⁴⁸

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REFERENCES

- Deglamorising cannabis [editorial]. *Lancet*. 1995;346:1241
- National Drug Intelligence Center. *Marijuana. National Drug Threat Assessment 2003*. Johnstown, PA: National Drug Intelligence Center; 2003. Available at: www.usdoj.gov/ndic/pubs/3300/marijuan.htm. Accessed February 4, 2004
- Kassirer JP. Federal foolishness and marijuana. *N Engl J Med*. 1997;336:366–367
- Canada Senate. *Cannabis: Our Position for a Canadian Public Policy. Report of the Senate Special Committee on Illegal Drugs*. Available at: www.medicalmarihuana.ca/pdfiles/senatesummary.pdf. Accessed February 4, 2004
- Katz G. Europe loosens its pot laws. *Roll Stone*. 2002;(899–900):55–57
- Silvis J. Enforcing drug laws in The Netherlands. In: Leuw E, Marshall IH, eds. *Between Prohibition and Legalization. The Dutch Experiment in Drug Policy*. Amsterdam, The Netherlands: Kugler Publications; 1994: 41–58
- American Academy of Pediatrics, Division of Child Health Research. *AAP Periodic Survey of Fellows No. 31: Issues Surrounding Drug Legalization*. Elk Grove Village, IL: American Academy of Pediatrics; 1995
- Rodriguez de Fonseca F, Carrera MR, Navarro M, Koob GF, Weiss F. Activation of corticotropin-releasing factor in the limbic system during cannabinoid withdrawal. *Science*. 1997;276:2050–2054
- Tanda G, Pontieri FE, Di Chiara G. Cannabinoid and heroin activation of mesolimbic dopamine transmission by a common μ_1 opioid receptor mechanism. *Science*. 1997;276:2048–2050
- American Academy of Pediatrics, Committee on Substance Abuse. Marijuana: a continuing concern for pediatricians. *Pediatrics*. 1999;104:982–985
- Patton GC, Coffey C, Carlin JB, Degenhardt L, Lynskey M, Hall W. Cannabis use and mental health in young people: cohort study. *BMJ*. 2002;325:1195–1198
- Zammit S, Allebeck P, Andreasson S, Lundberg I, Lewis G. Self reported cannabis use as a risk factor for schizophrenia in Swedish conscripts of 1969: historical cohort study. *BMJ*. 2002;325:1199–1203
- Arseneault L, Cannon M, Poulton R, Murray R, Caspi A, Moffitt TE. Cannabis use in adolescence and risk for adult psychosis: longitudinal prospective study. *BMJ*. 2002;325:1212–1213
- Eisen SA, Chantarujikong S, Xian X, et al. Does marijuana use have residual effects on self-reported health measures, socio-demographics and quality of life? A monozygotic co-twin control study in men. *Addiction*. 2002;97:1137–1144
- Jonnes J. *Hep-Cats, Narcs, and Pipe Dreams: A History of America's Romance With Illegal Drugs*. New York, NY: Scribner; 1996
- Courtwright DT. *Dark Paradise: A History of Opiate Addiction in America*. Cambridge, MA: Harvard University Press; 2001
- Johnston LD, O'Malley PM, Bachman JG. *Monitoring the Future: National Survey Results on Drug Abuse, 1975–2001. Volume I: Secondary School Students*. Bethesda, MD: National Institute on Drug Abuse, Department of Health and Human Services; 2002. NIH Publication No. 02-5106. Available at: www.monitoringthefuture.org/pubs/monographs/vol1.2001.pdf. Accessed May 13, 2003
- Grinspoon L, Bakalar JB. Drug dependence: nonnarcotic agents. In: Kaplan HL, Freedman AM, Sadock BJ, eds. *Comprehensive Textbook of Psychiatry*. 3rd ed. Baltimore, MD: Williams & Wilkins; 1980:1621
- Johnston LD, O'Malley PM, Bachman JG. *Marijuana Decriminalization: The Impact on Youth 1975–1980. Monitoring the Future Occasional Paper No. 13*. Ann Arbor, MI: Institute for Social Research, University of Michigan; 1981
- Chaloupka FJ, Pacula RL, Farrelly MC, Johnston LD, O'Malley PM. *Do Higher Cigarette Prices Encourage Youth to Use Marijuana?* NBER Working Paper No. w6939. Cambridge, MA: National Bureau of Economic Research; 1999. Available at: www.nber.org/papers/w6939. Accessed May 7, 2003
- Swaim RC, Beauvais F, Chavez EL, Oetting ER. The effect of school dropout rates on estimates of adolescent substance abuse among three racial/ethnic groups. *Am J Public Health*. 1997;87:51–55
- Pacula RL, Chiqui JF, King J. *Marijuana Decriminalization: What Does it Mean in the United States?* Available at: www.impactteen.org/generalarea.PDFs/mjdecriminal.paculaJuly2002.pdf. Accessed January 27, 2004
- Donnelly N, Hall W, Christie P. The effects of partial decriminalisation on cannabis use in South Australia, 1985 to 1993. *Aust J Public Health*. 1995;19:281–287
- McGeorge J, Aitken CK. Effects of cannabis decriminalization in the Australian Capital Territory on university students' pattern of use. *J Drug Issues*. 1997;27:785–793
- Korf DJ. *Dutch Treat: Formal Control and Illicit Drug Use in The Netherlands*. Amsterdam, The Netherlands: Thesis Publishers; 1995
- MacCoun R, Reuter P. Interpreting Dutch cannabis policy: reasoning by analogy in the legalization debate. *Science*. 1997;278:47–52
- MacCoun R, Reuter P. Evaluating alternative cannabis regimes. *Br J Psychiatry*. 2001;178:123–128
- State University of New York at Albany. Press Release February 20, 2001. Available at: <http://monitoringthefuture.org/pubs/espad.pr.pdf>. Accessed December 17, 2003
- Institute of Medicine. Introduction. In: Joy JE, Watson SJ, Benson JA, eds. *Marijuana and Medicine: Assessing the Science Base*. Washington, DC: National Academies Press; 1999:13–31
- American Medical Association. *Medical Marijuana*. Report of the Council on Scientific Affairs (A-01). Chicago, IL: American Medical Association; 2001. Available at: www.ama-assn.org/ama/pub/article/2036-4971.html. Accessed May 7, 2003
- Johnston LD, O'Malley PM, Bachman JG. Table 2: Trends in annual and 30-day prevalence of use of various drugs for eighth, tenth, and twelfth graders. Available at: www.monitoringthefuture.org/data/03data/pr03t2.pdf. Accessed January 27, 2004
- Center for Substance Abuse Research. Cigarette advertisements in youth magazines increased by \$54 million after Tobacco Master Settlement Agreement. In: *CESAR Fax*. Vol. 9. College Park, MD: Center for Substance Abuse Research, University of Maryland; 2000. Available at: www.cesar.umd.edu/cesar/cesarfax/vol9/9-26.pdf. Accessed May 7, 2003
- King C III, Siegel M. The Master Settlement Agreement with the tobacco industry and cigarette advertising in magazines. *N Engl J Med*. 2001;345:504–511
- Lorillard Tobacco Company v Reilly*. 218 F3d 30 (US Supreme Court 2001)
- DiFranza JR. State and federal compliance with the Synar Amendment: federal fiscal year 1998. *Arch Pediatr Adolesc Med*. 2001;155:572–578

36. Austin SB, Rich M. Consumerism: its impact on the health of adolescents. *Adolesc Med.* 2001;12:389–409
37. Johnston LD, O'Malley PM, Bachman JG. *Monitoring the Future National Survey Results on Drug Use, 1975–2002. Volume I: Secondary School Students.* Bethesda, MD: National Institute on Drug Abuse; 2003. NIH Publication No. 03-5375
38. MacCoun RJ. Drugs and the law: a psychological analysis of drug prohibition. *Psychol Bull.* 1993;113:497–512
39. Hawkins JD. Risk and protective factors and their implications for preventive interventions for the health care professional. In: Schydlower M, ed. *Substance Abuse: A Guide for Health Professionals.* 2nd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2002:1–19
40. Hawkins JD, Catalano RF, Miller JY. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychol Bull.* 1992;112:64–105
41. Resnick MD, Bearman PS, Blum RW, et al. Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *JAMA.* 1997;278:823–832
42. Kandel DB, Griesler PC, Lee G, Davies M, Schaffren C. *Parental Influences on Adolescent Marijuana Use and the Baby Boom Generation: Findings From the 1979–1996 Household Surveys on Drug Abuse.* Rockville, MD: Office of Applied Studies, Substance Abuse and Mental Health Services Administration, Department of Health and Human Services; 2001. Available at: www.SAMHSA.gov/OAS/NHSDA/BabyBoom/cover.htm. Accessed May 7, 2003
43. Lane J, Gerstein D, Huang L, Wright D. *Risk and Protective Factors for Adolescent Drug Use: Findings From the 1997 National Household Survey on Drug Abuse.* Rockville, MD: Office of Applied Studies, Substance Abuse and Mental Health Services Administration, Department of Health and Human Services; 2001. Available at: www.samhsa.gov/oas/NHSDA/NAC97/Table_of_Contents.htm. Accessed May 7, 2003
44. Pacula RL, Grossman M, Chaloupka FJ, O'Malley PM, Johnston LD, Farrelly MC. Marijuana and youth. In: Gruber J, ed. *Risky Behavior Among Youths. An Economic Analysis.* Chicago, IL: University of Chicago Press; 2001:271–326
45. Williams J. The effects of price and policy on marijuana use: what can be learned from the Australian experience? *Health Economics* [serial online]. Available at: www3.interscience.wiley.com/cgi-bin/abstract/103520930/START. Accessed May 13, 2003
46. Hall W, Pacula RL. *Cannabis Use and Dependence: Public Health and Public Policy.* Victoria, Australia: Cambridge University Press; 2003
47. Census 2000 supplementary survey profile for United States. Available at: www.census.gov/acs/www/Products/Profiles/Single/2002/ACS/Tabular/010/01000US1.htm. Accessed May 13, 2003
48. American Academy of Pediatrics, Committee on Substance Abuse and Committee on Adolescence. Policy statement: legalization of marijuana: potential impact on youth. *Pediatrics.* 2004;113:1825–1826

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Pediatrics 2004;113:e632

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