NZIER INSIGHT
61-2016

The high cost of (not) stopping people getting high

In this Insight, we bring the techniques of policy analysis to the issue of whether prohibition is the best way to reduce harm from using marijuana. Our conclusion is that a better way of lowering harmful marijuana use would be legalisation, combined with heavy taxation, regulation and education. The result should be less use, considerable fiscal savings to the government and the removal of a valuable source of revenue for criminals.

The New Zealand Treasury has calculated that a change in the legal status of marijuana[1] could reap an additional $150 million in revenue and reduce spending on drug enforcement by around 40% ($180 million).[2] From this, we can conclude that the cost of the current enforcement policy is over $300 million per year.

We ask whether this represents value-for-money and whether there might be a more cost-effective alternative.

What this Insight isn't about

Reviewing drug policy is not for the faint-hearted. Inconsistencies abound and rationales are confounded with disturbing regularity. Over-simplification is common. Rhetoric, anecdote and ideology frequently replace evidence. Views are passionately held.

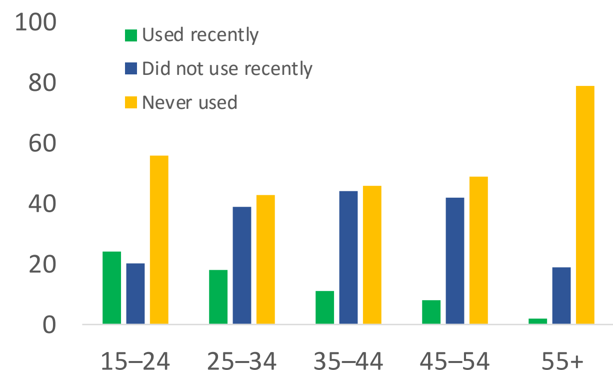
We therefore want to be very clear at the outset that this paper does not discuss the treatment of drugs other than marijuana. Drugs like heroin, cocaine and especially methamphetamine (or P as it is known in New Zealand) are chemically, medically, socially and economically very different to marijuana. They thus require a different set of considerations – parallels should not be drawn.

Marijuana[3] is different for a number of reasons:

- deaths from overdose do not occur[4]
- strength of addiction is very low[5]
- use tends to start early in life or not at all and declines with age[6]
- many of the adverse social effects of marijuana are the result of its legal status, not its chemical properties.

Figure 1 Use declines with age

New Zealand, 2013



Source: Ministry of Health

[1] Marijuana is a drug; cannabis is a plant from which marijuana and other drugs is derived. As this illustrates, the terms used when discussing drugs and drug policy are often a real barrier to understanding. In specialised medical, legal and policy communities, everyday terms can have very specific meanings. There is a real risk of people talking past each other.
To reduce this risk, we have tried to use language that will be clear to all readers. However, there are some aspects of this discussion that do require precise definition. In the Appendix, we have set out a glossary of these terms. Readers might like to consult this glossary before they proceed further.

[2] In July 20016, the Minister for Finance released under the Official Information Act material prepared in 2013 for an internal discussion within Treasury that addressed the question of marijuana regulation. The Minister has made clear that this material is not to be regarded as Treasury advice.

[3] As synthetic cannabinoids or "party pills" are outside the scope of this Insight, we have not considered whether they share these characteristics of marijuana.

[4] British Medical Association (2013), p3. This should not be confused with death due to intoxication from use, e.g. crashing a vehicle while stoned.

[5] British Medical Association (2013), p 208.

[6] Pudney (2010), p 169. Ministry of Health (2015). The decline in use with age is consistent with marijuana not being very addictive.

The differences between marijuana and other drugs suggest that a policy of reducing harm from marijuana might be achieved by different means than those applied to more potent and addictive drugs.

Current policy aims

The current government's National Drugs Policy[7] contains a hierarchy of policies and strategies directed at achieving the over-arching goals of minimising alcohol and other drug-related harm, and promoting and protecting health and wellbeing. To achieve this goal, the policy has four objectives:

- delaying the uptake of alcohol and other drugs (AOD) by young people
- reducing AOD-related illness and injury
- reducing hazardous drinking of alcohol
- shifting attitudes towards AOD.

And finally, there are three strategies directed at achieving these objectives:

- problem limitation – barriers are removed to people accessing and receiving support or treatment for their own or others' AOD use
- demand reduction – people have the knowledge, skill and support to make good decisions about their AOD use
- supply control – access to AOD for harmful use is minimised.

For now, we take those goals, objectives and strategies as given and look at the effectiveness of prohibition in achieving them.

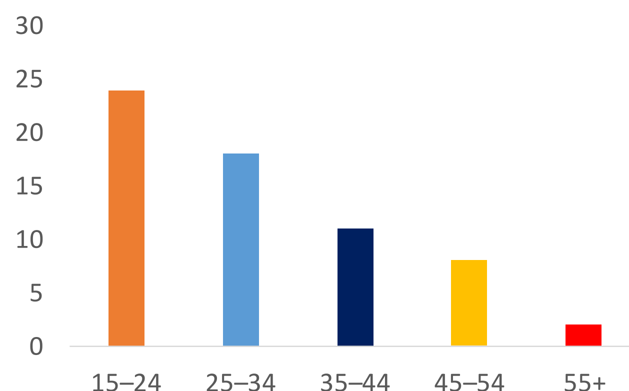
Motivations

Marijuana has been subject to regulation under New Zealand law since 1927,[8] and with the passage of the Narcotics Act 1965, possessing and smoking marijuana became illegal.[9] It is also a serious criminal offence to cultivate or sell marijuana.[10]

Yet despite its illegal status, marijuana use is prevalent. According to Ministry of Health figures, 11% of New Zealanders aged 15 years and over reported using cannabis in the year ended June 2013, with 3.8% reporting that they consumed it at least weekly. 42% of the population reported that they had used marijuana at some time in their life.[11]

Figure 2 Marijuana use is widespread

Percentage of age groups using marijuana in 2013



Source: Ministry of Health

The result is laws that are routinely flouted by large sections of the population, which brings other laws and the wider law enforcement system into disrepute.

The rule of law is important and many studies have shown that countries where laws are respected by the citizenry and enforced justly have higher standards of living than those where laws are allowed to fall into disrepute.[12]

We also want to highlight the unintended, but inevitable, consequences of the criminalisation of behaviour that is seen by a significant portion of the population to be pleasurable and acceptable. Because there is high demand for marijuana, but it is illegal, suppliers, who are by definition criminals, will be able to demand higher prices for the product.

This is what economists call an "economic rent", which represent a transfer from consumers to producers above the economic cost of production.[13]

There are many different sources of marijuana available to users in New Zealand, from home production through to purchase from commercial suppliers. Illegality of a popular good is an invitation to organised crime to enter the market. The New Zealand Police has stated that organised crime is linked to every step of the marijuana supply chain.[14] Buyers and sellers risk victimisation when transacting in a criminal market.[15]

Producers will also probably supply lower quality products than would be likely under a "market" scenario and, of course, the usual protections of consumer and contract law are not available to consumers. Producers will also have to use methods other than recourse to the courts to enforce contractual obligations owed to them.

7 See http://www.health.govt.nz/publication/national-drug-policy-2015-2020

8 For a thorough and insightful review of the legal treatment in New Zealand of drugs in general, see Law Commission (2011).

9 Conviction for possession for personal use or using marijuana currently carries a maximum sentence of a fine not exceeding $500.

10 Imprisonment for up to 8 years.

11 Ministry of Health (2015).

12 For an entertaining discussion, see Olson (1996).

13 Because production and distribution of marijuana are illegal, producers and suppliers tend to use small-scale operations that are harder for law enforcement officers to detect. In doing so, however, they will be giving up opportunities to use scale economies to reduce costs. See Hawken (2013).

14 Organised and Financial Crime Agency New Zealand (2010).

15 Wilkins and Casswell (2002).

All up, the legal status of marijuana means that for those undeterred by the threat of criminal sanction, costs are higher than would be the case if the product were legal.

Recent international trends

Possession of marijuana is illegal in most countries, as a result of its inclusion in various international treaties relating to drugs. A number of governments have, however, recently moved away from a policy of blanket prohibition.

There are two trends. The first is to **regulate the use of marijuana as a medicine**, and allow it to be prescribed to treat disease or improve symptoms, especially as an analgesic. This approach is consistent with the regimes applying to many narcotics which are also highly efficacious medicines (like morphine and codeine).

Medical use of marijuana or preparations containing THC is legal in Austria, Belgium, Canada, Chile, Colombia, the Czech Republic, Finland, Israel, Netherlands, Spain, the UK and some states in the US, although it is illegal under US federal law. New Zealand has an established process for prescribing cannabis-based products.[16]

This approach remains controversial, as the medicinal properties of marijuana, cannabis and THC remain disputed,[17] partly because their status as a narcotic has prevented them from being subject to rigorous clinical analysis. There are also concerns that medical use is simply a pretext for recreational use: users are feigning symptoms in order to escape prosecution for their recreational use.

The second trend has been to **change the legal status of recreational use**. In various countries and regions, depenalisation and decriminalisation have been adopted as alternatives to strict criminalisation.

The US states of Washington, Colorado, Oregon and Alaska,[18] have pursued a more radical approach: legalisation[19] of possession, use and supply of marijuana for purely recreational purposes.[20] All four states have also imposed taxes on sales of marijuana.[21]

An important point is that the people of the four states concerned have taken a view[22] that the aim of the previous policy in those jurisdictions – elimination of recreational use – should not be continued. As a result, a reduction in price was an inevitable, if unexpected, outcome.[23] We are considering a different question: whether the aims of the current New Zealand policy, which includes reduction in use, might be achieved by other means. That said, what has happened in the US provides valuable evidence when considering policy options in New Zealand.

The early evidence from Colorado

At the same time that Colorado voters legalised the production, sale and use of marijuana for personal use, the State Congress enacted laws that require officials to undertake monitoring of the effects of legalisation on a range of measures of well-being. The first report under these laws[24], covering the first two years after legalisation, shows that:

- use by youth was unaffected, and may have even declined
- there has been some increase in health costs due to adverse effects from marijuana, including poisoning of children (mostly from edibles)
- reported use by adults increased; for young adults (18-25), reported use within the last month increased from 21% to 31%, while for those aged over 26, reported usage increased from 5% to 15%[25]

[16] See: http://www.health.govt.nz/our-work/regulation-health-and-disability-system/medicines-control/prescribing-cannabis-based-products

[17] As recently as 11 August 2016, the United States Drug Enforcement Administration, following extensive review by the Food and Drug Administration and the National Institute on Drug Abuse, announced that it had decided that marijuana should continue to be included in Schedule I of the Federal Controlled Substances Act, on the grounds that it has high potential for abuse and no currently acceptable medical use. For details, see the DEA website: https://www.dea.gov/divisions/hq/2016/hq081116.shtml.

[18] Legalisation has come into effect in Washington and Colorado and is pending in Oregon and Alaska.

[19] While the states concerned have legalised marijuana for personal use, possession and use are still federal crimes. Traditionally, federal law enforcement efforts have not been directed at personal use, with state and local police having this responsibility. The US Justice Department has announced that changes in state laws will not result in any change in its traditional focus on large-scale drug production, inter-state trafficking, organised criminal activity and preventing drug use on federal property. However, some aspects of wider federal law do continue to impact on producers in the four states. For example, federal banking regulations prevent sellers of marijuana from depositing their takings in a bank account (on the grounds that it is proceeds from crime). Therefore, it is not accurate to say that using marijuana has been completely "legalised" in Washington, Colorado, Oregon or Alaska.

[20] In both Washington and Colorado, restrictions apply to recreational use and use outside those restrictions remains a serious criminal offence. For example, in Colorado, users have to be over 21, they can only possess one ounce of marijuana, which must be purchased from a licenced seller or grown themselves, and use in public places is illegal.

[21] Colorado imposes a 15% wholesale tax, in addition to the regular state sales tax 10%; Washington has a 37% excise tax; Oregon proposes a 17% tax and Alaska will tax growers at $50 per ounce.

[22] Legalisation in all four states was via popular ballot initiatives, not through government reforms. This has had consequence for the subsequent regulatory regimes with officials in Washington in particular being slow to come up with a regulatory regime to support legalisation.

[23] Initial data from Washington state suggests that changing the legal status of personal use of marijuana in that state reduced retail prices from about $US 25 per gram to about $US 9.30. "So, something interesting happens to weed after it's legal" *Washington Post*, 4 May 2016.

[24] Colorado Department of Public Safety (2016).

[25] As the authors note, the decreasing social stigma brought about by the law change may have altered people's willingness to report marijuana use or marijuana use-related activities or incidents. For example, people attending accident and emergency facilities may now be much more willing to disclose their marijuana use, which could lead to an increase in reporting of marijuana-related accidents that is not associated with any actual increase in use. They therefore warn against reading too much into short-term changes in reported use.

- state revenues were significant and larger than expected
- significant sales were made to tourists travelling to Colorado.[26]

Legalisation has not eliminated the black market in marijuana. Legal suppliers have to seek a license, comply with marijuana-specific as well as general business rules and, of course, pay tax. All of these are costly and some producers (as is the case in every industry, legal or not) may seek to operate outside the law.

A 2014 study for the Colorado Department of Revenue estimated that up to one third of local demand would be met from unregulated sources.[27]

How effective has New Zealand's policy been?

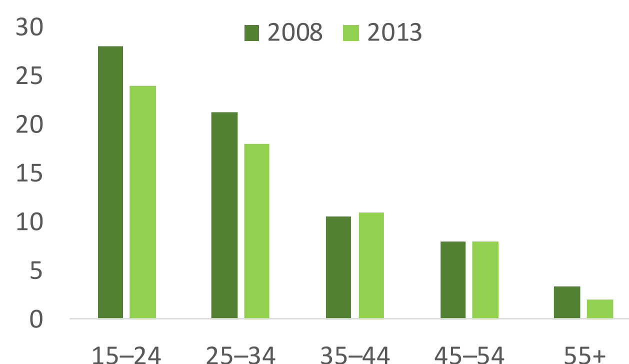
Before assessing the effectiveness of the current policy, we must stress that the current legal status of marijuana is a major impediment to its study. Unlike medicines sold in pharmacies and alcohol and tobacco, there are few official records kept in New Zealand of marijuana production, consumption or price.[28] We must rely on surveys, which are asking people to report illegal activity. These surveys should be used with care.

Given that, it is clear from both the New Zealand-specific evidence and internationally that the illegal status of marijuana has had limited effect in reducing consumption.[29] Latest Ministry of Health data suggests that the prevalence of marijuana use in New Zealand is reasonably stable, findings that have been supported by Massey University researchers.[30]

This is consistent with the international experience, which has found little evidence that drug policy influences the number of drug users.[31]

Figure 3 Use is largely stable

Percentage of age groups using in last year



Source: Ministry of Health

Massey University research also suggests that the retail price of marijuana in New Zealand has been remarkably stable for many years (at about $20 per 1.5 grams), which means the real price has fallen despite the resources devoted to enforcement.

What is the best way to reduce marijuana use?

Traditional public policy analysis involves a process of defining a problem (the difference between a current state and a desired future state), establishing criteria for determining whether a policy will be successful at addressing the problem, identifying options, assessing them against the criteria and then making a recommendation.

In the space available, we cannot present a full policy analysis of marijuana use.[32]

In a nutshell, however, the current state is that the use of marijuana is prohibited under statute and, despite considerable effort directed at enforcing that status, use by New Zealanders remains wide-spread. As a consequence of the illegal status of marijuana, users are not protected by consumer law and risk victimization through dealing with organised criminals, high-cost production techniques are favoured and producers are earning rents.

The desired future state is that marijuana use be reduced, less government money is needed to be spent on enforcement, the rule of law is respected and fewer

---

[26] Examination of sales records in the early months of legalisation suggest that about 40% of state-wide sales were to tourists, and this rose to 90% in traditional mountain tourist locations like Vale. Colorado has always been a tourist destination, and it is unclear whether the sales to visitors are the result of consumers going to Colorado just for the marijuana – "pot tours", which are now advertised on the internet – or tourists who were going to Colorado anyway exercising their new freedoms or simply a recognition that tourists v have always consumed marijuana in Colorado, but are now doing so openly.

[27] Marijuana Policy Group (2014).

[28] One of the interesting by-products of reform in the US is that there is now far more official data available on the uses and effects of marijuana in those states that have changed its legal status. Both the Washington State Liquor and Cannabis Board (http://www.liq.wa.gov/marj/marijuana-2016) and the Colorado Department of Public Health and the Environment (https://www.colorado.gov/marijuana) provide extensive material. Academic researchers are increasingly able to draw on this material in their research.

[29] We need to be careful here, as the data we have from New Zealand simply shows levels of consumption under the current legal policy. It does not test the counterfactual: what would consumption be if the legal status were changed and, importantly, if that change led to the fall in price.

[30] Wilkins et. al. (2015).

[31] Reuter and Stevens (2007), p 10.

[32] This matter has been subject to extensive study elsewhere. See Becker and Murphy (1988), Miron and Zwiebel (1995), Becker, Murphy and Grossman (2004), Pudney (2010), O'Donnel (2014) and Burlando and Motta (2016), and the references they cite.

resources are transferred to criminal producers in the form of economic rents.

Thus, the problems to be solved are that usage remains higher than is desirable, rents are being earned by criminal producers and the community is receiving low value-for-money from spending on enforcement.

We would suggest that a five-pronged approach should be studied as a solution to these problems:

1. legalisation
2. reduce demand using a tax
3. regulation; to ensure that consumers are using a safe, quality product and have recourse to consumer protection laws to enforce their rights
4. education, to ensure that consumers are making informed choices
5. monitoring of use and effects.

One of the consistent findings of economics is that price and quantity demanded are inversely related; an increase in price causes demand to fall. Just how much depends on many factors, including incomes, tastes and relative prices between substitutes. For highly addictive substances like tobacco, seasoned consumers are unlikely to respond much to price increases.[33]

Marijuana is less addictive than tobacco[34] and the evidence in New Zealand is that use declines with age[35]. It is possible, therefore, that users of marijuana may be more responsive to tax-induced increases in price than is the case with tobacco.

Reduction in consumption below current levels would require an increase in the price. As noted above, the current street price of marijuana is comprised of the costs of production (which due to its illegal nature are likely to be higher than would be the case if large-scale production methods were used) and an economic rent earned by suppliers. Under a legalisation with tax approach, the street price would be composed of (lower) costs of production and the tax.

Setting the level of the tax would require knowledge of the costs of production (with the experience in the US being an obvious source of at least illustrative information) and the price level that would be needed to reduce supply to some acceptable level.

The possibility of the existing black market switching to supply untaxed, but otherwise legal, marijuana would, however, place some upper limit on the level of tax that could be charged.

But even if that upper level of tax did not eliminate demand, the new approach would represent an improvement in society's welfare over the status quo (if you give little or no weight to the welfare of criminals, which we don't), since what is not captured as a rent to suppliers would go to the rest of the community via a tax. Funding currently used for enforcement would be available for other high-priority uses.

As we noted above, one by-product of the legal status of marijuana is that it is also exempt from any form of product safety or other consumer-protection legislation. The 11% of New Zealanders using marijuana have little idea what they are smoking, no real way of judging quality in advance and, of course, cannot complain to anyone other than their dealer if they feel ripped off.

State governments in the US where personal use of marijuana is now legal continue in their efforts to ensure that would-be consumers understand what they are doing. For example, Colorado's main government website about marijuana includes the statement "legal does not mean safe".

Early evidence suggests that at least for youth, this message is getting through.

An additional benefit

Legalisation for personal use could also result in a greater willingness of firms to use the available procedures to conduct clinical trials of medical uses of marijuana and cannabis. Conducted under the same ethical and scientific standards that apply to other medicines, there would be a low risk of harm to anyone, but the potential for New Zealand to capture a niche market built on our existing reputation as being a good place to conduct research and commercialise innovations.

The international dimension

Our discussion so far has largely left to one side the issue of New Zealand's obligations under international treaties regarding drugs.[36]

Our analysis of the treaties shows that by requiring a uniform treatment (prohibition) to all drugs, they may be less effective in meeting their primary objective than if they allowed parties to implement differentiated approaches at least in relation to marijuana. That said, the treaties are in place and any move towards legalisation and taxation of marijuana as an alternative to prohibition would require New Zealand to address the treaty issue.

[33] We see this with the tobacco excise in New Zealand, with the government imposing significant increases in tax rates (10% per year, plus annual CPI-indexation, for four years beginning in 2011), which has only induced small reductions in smoking prevalence.

[34] British Medical Association (2013).

[35] Ministry of Health (2015).

[36] New Zealand is party to the three UN treaties covering drugs: The Single Convention on Narcotic Drugs of 1961; The Convention on Psychotropic Substances of 1971 and The United Nations Convention against the Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988. The 1988 Convention obliges parties to criminalise the personal use of marijuana.

We note that other countries, especially Canada, are currently examining their laws applying to the use of marijuana and so there may be an opportunity for New Zealand to work with those countries to promote debate on effective reduction techniques other than prohibition.

Conclusion

Prohibition of marijuana, just like prohibition of alcohol before it, has been a costly failure. Treasury's informal estimate of the cost is over $300 million per year and the benefits to date, in terms of reduction in usage, are modest.

Public policy analysis would suggest that legalisation, combined with a tax set high enough to discourage use, could be more effective.

At the same time, this policy would reduce, if not eliminate, the current transfer of wealth from users of marijuana to producers such as the gangs.

Better designed policies generate a win-win-win: reducing the resources available to gangs, freeing up resources for other priorities and generating additional tax revenues.

The wave of reforms sweeping other countries is providing the evidence about "what works". We suggest New Zealand move sooner rather than later to implement effective policies based on that evidence.

This Insight was written by Peter Wilson, Principal Economist at NZIER, August 2016.

For further information, please contact Peter: peter.wilson@nzier.org.nz or (021) 870928

NZIER | (04) 472 1880 | econ@nzier.org.nz | www.nzier.org.nz

NZIER Insights are short notes designed to stimulate discussion on topical issues or to illustrate frameworks available for analysing economic problems. They are produced by NZIER as part of its self-funded Public Good research programme. NZIER is an independent non-profit organisation, founded in 1958, that uses applied economic analysis to provide business and policy advice to clients in the public and private sectors.

While NZIER will use all reasonable endeavours in undertaking contract research and producing reports to ensure the information is as accurate as practicable, the Institute, its contributors, employees, and Board shall not be liable (whether in contract, tort (including negligence), equity or on any other basis) for any loss or damage sustained by any person relying on such work whatever the cause of such loss or damage.

Glossary

Drug **abuse** occurs when substances are taken in contravention of accepted medical practice. Note that this is not the same as harm.

Addiction is a term of long-standing and variable use. It is not a diagnostic term in the World Health Organisation's *International Classification of Diseases.*[37] Here, we use it to mean prolonged, compulsive use of a psychoactive substance, with associated tolerance (increasing amounts of the substance must be used to gain pleasure or maintain feelings of normality) and withdrawal (adverse symptoms occur if use ceases).

Anaesthesia is the reversible loss of sensation, to allow a patient to undergo an otherwise painful procedure.

Analgesia means the relief of pain and an **analgesic** is a substance that relieves pain.

Cannabis is a plant. *Cannabis sativa* is an annual herbaceous plant in the Cannabis genus, first classified by Carl Linnaeus in 1753. The common image of a "marijuana plant" is a leaf of *Cannabis sativa.*

Two other species of Cannabis, *C. indica*, and *C. ruderalis* also contain THC and other cannabinoids and are the source of a number of recreational and medical drugs.

Cannabis preparations. A large number of psychoactive substances, in the form of powders, resins and oils, can be manufactured from cannabis plants. Common names for these preparations include Kief, Hashish and cannabis oil.

Decriminalisation. Possession and recreational use of a drug is subject to legal sanction, but these offences no longer carry criminal penalties. Offenders are dealt with by a range of civil and administrative measures (for example, fines that do not create a criminal record). Manufacture and supply remain subject to imposed criminal penalties. Also referred to as de jure decriminalisation.

Depenalisation. While it is an offence to possess and use a drug for recreational purposes, criminal penalties are not imposed. Manufacture and supply remain subject to imposed penalties. Also referred to as de facto decriminalisation.

Drug means a psychoactive substance.

Legalisation. Possession and recreational use are not subject to any legal sanction, but regulations can apply (i.e. use in public places is sanctioned; purchase other than from a licenced outlet prohibited). It is not an offence to supply and manufacture drugs if authorised by the regulatory system to do so (i.e. the system that applies to prescription medicines, alcohol and tobacco).

Marijuana[38] is a drug made from the dried flowers and subtending leaves and stems of female *Cannabis sativa* plants.

The precise legal nomenclature used to describe marijuana varies from country to county. In New Zealand, the "cannabis plant", whether fresh, dried or otherwise, is a Class C1 controlled drug under the Misuse of Drugs Act 1975[39]. In the UK, "cannabis", defined as any plant of the genus Cannabis, or any part of any such plant (by whatever name designated) is a Class B drug under that country's Misuse of Drugs Act 1971.

[37] The WHO does, however, define a disease called "substance dependence" and the American Psychiatric *Association's Diagnostic and Statistical Manual (DSM V)* includes "substance use disorder" as a disease.

[38] The original Mexican Spanish form used the letter 'h' (marihuana), while forms using the letter 'j' (marijuana) are an innovation of English, though they later appeared in French and in Spanish, probably due to English influence.

[39] "Cannabis preparations", defined as any preparation containing any tetrahydrocannabinols produced by subjecting cannabis plant material to any kind of processing, are a Class B2 controlled drug in New Zealand. This includes hashish and "hash oil". The penalties for dealing in, possessing or using cannabis preparations are higher than those for dealing in, possessing or using marijuana.

While in the US, "marihuana" is a Schedule I drug under the federal Controlled Substances Act. Internationally, "cannabis and cannabis resin" are included in Schedule I and Schedule IV of the Single Convention on Narcotic Drugs.

Medical drug use means administering a psychoactive substance to a patient to treat disease or improve symptoms. Analgesia and anaesthesia are common medical uses. Many analgesics and anaesthetics are both commonly used in medicine and prohibited for recreational purposes (opiates like morphine and codeine are examples).

Narcotic is an imprecise term. Medically, narcotic often means an opioid[40] analgesic. Many narcotics are used in everyday medical treatment (for example, morphine). Legally, especially in the United States,[41] "narcotic" has come to mean any drug that is prohibited, regardless of its chemical composition. Thus, for example, marijuana and cocaine are classed as "narcotics", even they have very different chemical compositions, physiological effects and origins from opioids.

Prohibition. It is an offence to manufacture, supply possess or use a drug for recreational purposes. Criminal penalties apply and are imposed.

Psychoactive substances change brain function and result in alterations in perception, mood or consciousness.

Recreational drug use is the use of any drug with the primary intention of altering the state of consciousness in order to create positive emotions and feelings.

Synthetic cannabinoids are structurally different from THC but act in similar ways to affect the brain. Prior to the passing of the Psychoactive Substances Act 2013, synthetic cannabinoids and other psychoactive substances that were not controlled drugs in New Zealand and were able to be sold without restriction.

Delta-9 tetrahydrocannabinol (THC) is a psychoactive substance contained in parts of the cannabis plant.

References

Becker, G. and Murphy, K. (1988). A theory of rational abdication. *Journal of Political Economy*, 96(4), pp 675-700.

Becker, G., Murphy, K. and Grossman, M. (2004). The economics theory of illegal goods: the case of drugs. *National Bureau of Economic Research Working Paper No 10976*.

Burlando, A. and Motta, A. (2016). Legalize, tax, and deter: Optimal enforcement policies for corruptible officials. *Journal of Development Economics*, 118, pp 207-215.

British Medical Association Board of Science (2013). *Drugs of dependence: the role of medical professionals.* Retrieved from https://www.bma.org.uk/collective-voice/policy-and-research/public-and-population-health/drugs-of-dependence

Colorado Department of Public Safety (2016) *Marijuana Legalization in Colorado: Early Finding.* A report prepared Pursuant to Senate Bill 13-283. Retrieved from http://cdpsdocs.state.co.us/ors/docs/reports/2016-SB13-283-Rpt.pdf

Hawken, A. (2013) *Economies of Scale in the Production of Cannabis,* Report for the Washington State Liquor and Cannabis Board by BOETC Analysis Corp. Retrieved from http://liq.wa.gov/publications/Marijuana/BOTEC%20reports/5c_Economies_Scale_Production_Cannabis_Oct-22-2013.pdf

Law Commission (2011) *Controlling and Regulating Drugs. A Review of the Misuse of Drugs Act 1975*. Wellington: Law Commission.

Marijuana Policy Group (2014) *Market size and demand for marijuana in Colorado.* Report prepared for the Colorado Department of Revenue.

Ministry of Health (2015) *Cannabis Use 2012/13 New Zealand Health Survey*.

Miron, J. and Zwiebel, J. (1995) The economic case against drug prohibition. *Journal of Economic Perspectives*, 9(4), pp 175-192.

Organised and Financial Crime Agency New Zealand (OFCANZ) (2010) *Organised Crime in New Zealand*. Retrieved from http://www.ofcanz.govt.nz/sites/default/files/Organised-Crime-in-NZ-2010-Public-Version.pdf

Olson, M. (1996). "Distinguished Lecture on Economics in Government: Big Bills Left on the Sidewalk: Why Some Nations Are Rich, and Others Poor." *Journal of Economic Perspectives,* 10(2), pp 3-24.

O'Donnell, K. (2014) The cultural and political economy of drug prohibition. *George Mason University Economics Department Working Paper.*

Pudney, S. *(2010)* Drugs Policy: what should we do about cannabis? *Economic Policy,* January, pp 165-211.

Reuter, P. and Stevens, A. (2007) *An Analysis of UK Drug Policy*. London: UK Drug Policy Commission.

Wilkins, C. and Casswell, S. (2002) The cannabis black market and the case for the legalisation of cannabis in New Zealand. *Social Policy Journal of New Zealand*, 18, pp 31-43.

Wilkins, C., Prasad, J., Wong, K. and Rychert, M. (2015) Recent Trends in Illegal Drug Use in New Zealand, 2006-2014. *Social and Health Research and Evaluation Working Paper*.

[40] An opioid is a substance that acts on receptors in the brain to produce morphine-like effects. Some analgesics, called "opiates" are derived directly from the opium poppy plant (Papaver somniferum) and include morphine and codeine. The wider term "opioid" includes opiates as well as semi-synthetic and synthetic drugs like fentanyl and tramadol.

[41] But note that from 1965 to 1975, drugs in New Zealand were prohibited under the Narcotics Act 1965, which defined any part of the cannabis plant as a "narcotic".