



NZ's cannabis referendum 2020

Some facts and recommendations about the process of cannabis legalisation

NZIER public discussion paper

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Key points

A referendum this year will ask the public whether they support legalising the use of cannabis, accompanied by regulation, education and taxation.

We recommended a similar approach in 2016, after concluding that prohibition of cannabis in New Zealand has been an expensive and failed attempt to reduce harm or use.

To aid public debate on this issue, we have revisited our 2016 work, updated the overseas evidence and assessed the Government's proposal.

The Government's objectives

The Government's proposed legalised cannabis regime has two objectives:

- to minimise the harms associated with use
- to reduce overall use over time.

This approach does not see all use as harmful.

The proposed regulatory regime

The Government is proposing a specific form of market regulation, based on limited consultation.

It has specifically decided that its aim is to limit the development of a commercial market and wants to see the size of the market shrink through time.

The Government plans to limit the size of the commercial cannabis market and see it shrink.

A new regulatory body will have statutory objectives of:

- promoting the wellbeing of New Zealanders
- reducing the harms of cannabis use
- lowering the overall use of cannabis over time.

The Authority will be required to publish a national plan to meet the objectives of the Act and report against its delivery annually.

Overseas experience

Legalisation in overseas countries has proceeded down different paths:

- Uruguay has allowed limited commercial activity, while permitting personal growing and growing clubs.
 - Regulated prices in Uruguay are low

- The has been limited public support for reforms
- Pharmacists have been slow to take up the opportunity to sell cannabis to registered users
- The illicit market has continued to supply most users.
- Canada legalised cannabis at the federal level but left it to the Provinces and Territories to regulate the market.
 - A wide range of approaches to the market have been applied, with government-owned entities selling at the wholesale level and on-line
 - The establishment of retail stores has been slow, but now 45% of Canadians live within 10 kms of a store
 - In the year after legalisation, the number of moderate to low users increased by 2%, but the proportion of heavy users stayed about the same, while somewhat surprisingly, use by those below the legal age may have fallen significantly.
- States in the United States have followed a more laissez-faire approach to regulation.

We have good data from the State of Colorado of what has happened post-legalisation, due to the State legislature requiring regular monitoring and reporting:

- Use is heavily concentrated in those using daily or near daily: 21% of users are in this group, but they consume over 70% of the cannabis sold.
- Use by youth under the legal age may also have fallen, suggesting that the taboo nature of cannabis might be a motivation for use and that under-age users find it more difficult to buy from licit suppliers.
- Total use increased steadily after legalisation, but may have plateaued.
- Prices in the legal market fell significantly, despite the imposition of new state taxes.
- The illicit market seems to have been absorbed into legal market, at least for in-state sales.

In California, the high cost of complying with regulations not specifically targeted at cannabis, like state water and environmental rules has seen a limited conversion of illicit growing to the legal market.

Legalisation can displace the illegal market for cannabis.

The economics of cannabis growing

In order to hide production and boost growth, many illegal growers operate small scale, indoor hydroponic facilities, that have high per-unit costs and can have a high carbon footprint, or operate in remote locations, incurring high transport costs (and emitting greenhouse gases in the processes).

Outdoor growing, using natural light and rain, can have a lower carbon footprint, but can still cause environmental damage.



One of the expected economic benefits of legalisation is that low-cost, high-volume growing can become possible. Encouraging this sort of operation is a key objective of the Canadian Government, as it wanted legalisation to drive-out criminal involvement in cannabis growing, distribution and sale. Uruguay also wanted to remove criminals from the cannabis market.

Taxing cannabis could raise \$490 million in revenue a year.

We estimate that a 25% tax on cannabis, plus GST, could raise about \$490 million per year in annual revenue, once several expected changes to the market happen. If the Government succeeds in reducing use through time, this tax take will also fall.

The Government faces a dilemma:

- Legalisation should eliminate the premium price that illegal suppliers can charge, thus reducing prices and increasing demand.
- Commercial operators will have an incentive and the ability to reduce costs, which if passed on to consumers will also increase demand, while also reducing the tax take (depending on the type of tax imposed).
- Taxation could be used to increase prices, as is the case with tobacco, but this may see more home-growing and a return to the illicit market, thus removing some of the main benefits of legalisation.

There has been limited public debate or discussion of these economic effects

The limited consultation on the Bill, especially the lack of a Select Committee process, means that the public are not being given an opportunity to debate the mechanics of legalisation or suggest alternative regulatory approaches.

If the Government has conducted detailed analysis of the economic effects of its detailed proposals, it has not yet made it public and there will again be a limited opportunity to digest those findings and make any adjustments.

The overseas experience suggests that unintended consequences are common. Therefore, it will be important to have good monitoring and review processes if the new regime is to stay aligned to the policy objectives.

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1 Introduction

New Zealanders will vote in a referendum this year on whether to legalise cannabis.¹ They will be asked whether they approve of a draft Bill that the Government is preparing.²

Our work in 2016 highlighted that legalisation, combined with heavy taxation, regulation and education would be a better way to lower cannabis use than prohibition (Wilson 2016).

This paper is a contribution to the debate on the details of the Bill and the policy underlying it. We update the evidence about overseas experience with legalisation and make some detailed observations on the proposed regulations.

1.1 Legalisation is not policy

Government is proposing a specific type of legalisation with limited consultation. As Mark Kleiman and Jeremy Ziskind note:

“Legalisation” does not specify a policy. Cannabis could be made available for use by adults under a wide variety of conditions: cheap or expensive, offered by for-profit enterprises, by not-for-profits (including consumer co-operatives), as a state monopoly (for production or sales or both), or even on a “grow-your-own” basis. It could be cheap (as it would be in a free market) or expensive (due to taxes or minimum pricing). Marketing efforts could be free or restrained. Users could be “nudged” toward temperate use – for example, through a system of user-set but enforceable periodic purchase limits – or left to their own devices. (Kleiman and Ziskind 2019)

New Zealanders have a few opportunities to make their views on these issues known before the referendum. The Government has yet to disclose much of its detailed thinking on them. Limited economic analysis of the market that will result from the proposed regulation has been made public, if it has been undertaken.

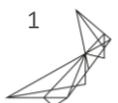
1.2 Some caveats

Like all studies of cannabis legalisation, we do not have complete information. As the Canadian Taskforce on Cannabis Legalisation and Regulation noted:

Ideally, all of our recommendations would be based on clear, well-documented evidence. However, we recognize that cannabis policy, in its many dimensions, lacks comprehensive, high-quality research in many areas. On many issues throughout our discussions and deliberations, we have found that evidence is often non-existent, incomplete or inconclusive. (Task Force on Cannabis Legalization and Regulation 2016)

¹ At time of publication, the Government had made no decisions on whether the election date or the holding of the referendum will be changed as a result of Covid-19.

² This approach is different from the other referendum to be held in conjunction with the election, on the End of Life Choice Act 2019. That Act has been passed into law, but its operative provisions will only come into force if a majority of voters answer affirmatively to the question “Do you support the End of Life Choice Act 2019 coming into force?”. A similar approach was adopted when the MMP voting system was introduced: see Section 2 (Commencement) of the Electoral Act 1993.



There are significant gaps in our knowledge on both the benefits and harms of cannabis use (Royal Society of New Zealand 2019). Over-simplification abounds in a complex and nuanced field. Participants in debates frequently hold their views with considerable passion, even when the evidence supporting their position is weak or non-existent.

1.3 The current status of cannabis in New Zealand

The possession, use, production and supply of cannabis were made illegal in New Zealand in 1927. Industrial hemp growing was prohibited in 1948.

For recreational purposes, processed cannabis (resins and oils, including hashish and hash oil) is a Class B drug and unprocessed cannabis is a Class C drug under the Misuse of Drugs Act (MoDA).

As a Class C drug, the criminal penalties for possession and use of cannabis are at the lower end of the criminal justice scale. The maximum penalty for possession or use is a three-month jail sentence or a fine not exceeding \$500 or both, but there is a statutory presumption against imprisonment.³ For comparison, the maximum penalty for supplying hashish is 14 years imprisonment.

Convictions for possession and use of cannabis and for other charges, like importing and dealing, have been steadily falling in New Zealand.

Table 1 Convictions for cannabis-related offences have been falling

For the year ended 30 June

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Convicted of cannabis offences only	4,007	3,249	2,714	2,472	1,772	1,478	1,380	1,196	1,095	923
Convicted of cannabis possession and/or use only	2,334	1,714	1,316	1,066	744	607	515	452	400	331
Convicted and sentenced to imprisonment for cannabis possession and/or use only	28	25	18	15	10	7	5	5	1	2

Notes

1 The data is for people only convicted of offences relating to cannabis, as opposed to people charged with multiple offences.

Source: Ministry of Justice (2019)

Industrial hemp (products made from cannabis plants, seeds and fruit that have a very low concentration of the main psychoactive component of cannabis, tetrahydrocannabinol

³ Section 7(2)(b) of the Misuse of Drugs Act.

(THC)) can be grown and sold under a licencing regime established by the Misuse of Drugs (Industrial Hemp) Regulations. This regime was introduced in 2006. Little data is publicly available on the extent of this industry.

Regulations under the MoDA have established a medicinal cannabis licensing regime, which came into effect on 1 April 2020. This will allow licence holders to import, cultivate, manufacture, supply and export medicinal cannabis.⁴

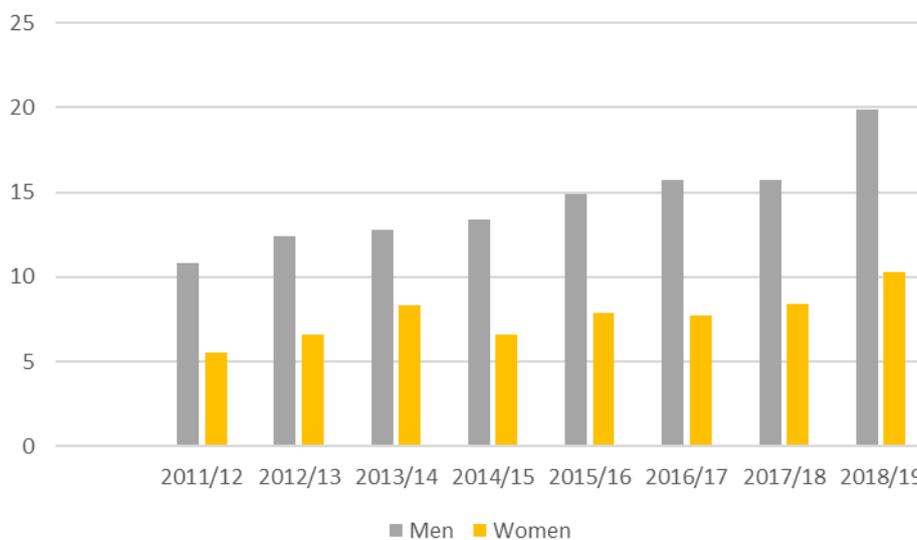
1.4 What are the key features of the current demand for illicit cannabis in New Zealand?

The key features that shape the demand side of the current illicit cannabis market in New Zealand are:

- use is widespread and increasing (see Figure 1)⁵
- strength of addiction is relatively low⁶
- use tends to start early in life or not at all and declines with age (see Figure 2)⁷
- many of the adverse **social** effects of cannabis are the result of its legal status.⁸

Figure 1 Use is widespread and increasing

Percentage of the population reporting cannabis use in the previous 12 months



Source: Ministry of Health (2019)

⁴ Misuse of Drugs (Medicinal Cannabis) Regulations 2019.

⁵ United Nations Office on Drugs and Crime (2019), Fischer and Bullen (2020).

⁶ Board of Science, British Medical Association and Board of Science (2013), United States Drug Enforcement Agency (2016).

⁷ Hango and LaRochelle-Côté (2018), Office of Research and Statistics, Colorado Department of Public Safety (2018), Ministry of Health (2015) and Pudney, Adda, and Boone (2010). The decline in use with age is consistent with cannabis not being very addictive.

⁸ New Zealand Drug Foundation (2019).

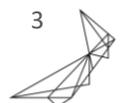
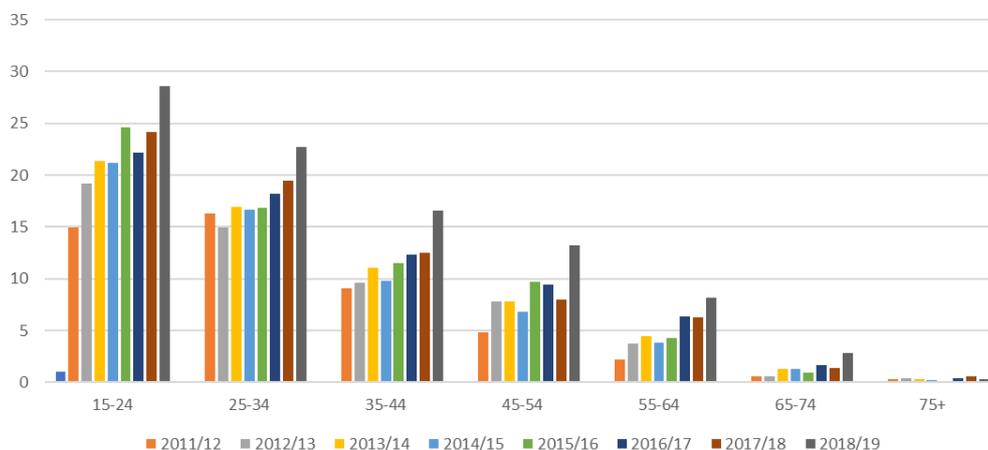


Figure 2 There is a clear decline in use with age within current users

Percentage of age groups reporting cannabis use in the previous 12 months



Source: Ministry of Health (2019)

The Health Promotion Authority’s Health and Lifestyles Survey asks participants if they have consumed cannabis in the last 30 days. This survey provides additional breakdown of users by ethnicity and neighbourhood deprivation, which shows that Māori have a high use rate as do people in more deprived areas.

Table 2 Health and Lifestyles Survey 2018

Group	Total	Male	Female
Total	8.5	12	5.1
Age group (years)			
15-24	20.5	25.1	15.5
25-44	9	14.1	4.1
45-64	4.6	6.7	2.8
65+	3.1	4.2	2
Ethnicity (total)			
Māori	16.2	23.9	9.2
Pacific	7.8	8.4	7.2
Asian	1.9	0.3	3.4
European/Other	9.6	14.1	5.2
Neighbourhood deprivation			
Least (1-3)	6	10.2	1.9
Mid (4-7)	9.7	13.1	6.5
Most (8-10)	9.8	12.9	6.8

Source: Health Promotion Authority (2018)

1.5 The economic effects of this status

Because there is high demand for cannabis, but it is illegal, suppliers can demand higher prices for the product than if it were legal, in part to compensate them for the risks they are taking in supplying the product. This is what economists call an ‘economic rent’, which represents a transfer from consumers to producers above the economic cost of production. How much that rent might be in New Zealand is unclear. As noted above, the risks of incurring a penalty for supplying cannabis using have been reducing.

Other consequences of the illegal status of cannabis are that users are not protected by consumer law, do not have reliable information about the nature or safety of the product they are buying, and risk victimisation through dealing with organised criminals. High-cost production and distribution techniques are favoured (in part to avoid detection).

2 New Zealand policy

The previous government set out its National Drugs Policy in 2015.⁹ That policy contained a hierarchy of components directed at achieving the over-arching goals of minimising alcohol and other drug-related harm, and promoting and protecting health and wellbeing. The policy did not include working to change the legal status of cannabis, a position the New Zealand Government confirmed in documents supporting its statement to the United Nations General Assembly Special Session on the World Drug Problem (UNGASS) in 2016.¹⁰

2.1 A new approach?

The confidence and supply agreement between the Labour Party and the Greens signed after the 2017 election committed the Coalition Government to hold a referendum on legalising the personal use of cannabis at, or by, the 2020 general election.

A non-binding referendum on cannabis legalisation will be held with the 2020 general election on 19 September. The question to be put to voters will be: ‘Do you support the proposed Cannabis Legalisation and Control Bill?’ Because the Government decided not to follow the route of enacting the Bill, with commencement subject to validation at a referendum, the passage of the legislation will be dependent on the next Parliament. We are unsure if detailed Select Committee consideration will follow.

By the time of the referendum, a final draft Bill will have been made public. Based on the initial draft already released by the Government, what New Zealand is being asked to decide on is a detailed regulatory regime based on a specific set of policies.

The Government has started to release material relating to a proposed regulatory regime that will be put to the vote, with a website (<https://www.referendum.govt.nz/cannabis/index.html>) making available:

- the key policy decisions made to date: [here](#)
- an initial draft of the proposed legislation: [here](#)

⁹ See <http://www.health.govt.nz/publication/national-drug-policy-2015-2020>

¹⁰ See New Zealand Government (2016).



- a Cabinet paper and associated minute on the material to be released: [here](#).

Separately, the Government has released a previous Cabinet paper: [here](#).¹¹

The Government has also announced that it will be preparing and making public a range of explanatory material on the Bill.

Some of the policy rationale underlying the draft Bill is contained in the Cabinet papers that have been released. A Regulatory Impact Assessment (RIA), which would normally include details of the policy rationale, alternatives considered and a discussion of the reasons for particular approaches has been prepared by officials, but has not been released.

2.2 The Government’s policy aims

The Government has two primary policy objectives when it comes to cannabis:

- to minimise the harms associated with use
- to reduce overall use over time (Little 2019).

The Cabinet paper that recommended these objectives presents them as separate, rather than suggesting that reducing use is the only way to reduce harm. That is, it acknowledges that not all use is harmful. This was also the view of the Canadian Government when it proposed to legalise adult use of cannabis. It conforms with the current approach taken to alcohol regulation in New Zealand.

These objectives are like those of the previous government, it is just that the methods being proposed to achieve them are different.

2.3 Main provisions of the Bill

The draft Cannabis Legalisation and Control Bill sets out some of the main provisions of the new regulatory regime proposed to be put to the vote. The current draft, however, contains several gaps and placeholders, so a full analysis of the regime is not yet possible. The proposed excise regime is a prime example.

Table 3 contains a summary of the main provisions that have been announced to date. More details are in Appendix A.

Table 3 Main provisions

Provision	Comment
A minimum purchase and use age of 20.	An age over the current age of majority has been selected on health grounds: consumption is said to be particularly harmful for those under 25. However, as noted by Fischer and Bullen (2020), the precise rationale for choosing 20 is unclear.
Maximum amount of public possession	A person over 20 can have up to 14 grams of cannabis on them in public.
Confining use to private homes and licensed premises	Public consumption will continue to be illegal, although enforcement will be via infringement notices, rather than court proceedings.

¹¹ The associated Cabinet minute was not released, but NZIER has obtained a copy under the Official Information Act.

Provision	Comment
Prescribing conditions for personal growing and sharing	A limit of two plants per person (four per household) is proposed. Sharing (as opposed to selling) small amounts (14 grams) between people over 20 will be permitted.
Licensing the whole of the supply chain	The Government is proposing tight controls on the market, including: <ul style="list-style-type: none"> • Limits on importing • Vertical separation – growing, wholesale and retail would be undertaken by separate entities • Controls on the size of the market, including on growing • Requirements on product purity and labelling of THC content.
Restricting marketing and advertising	As with tobacco, advertising will be banned, and restrictions will be placed on the look of retail outlets.

Source: Little (2019)

It is clear from the material released to date that the Government is proposing a regulatory regime directed at a declining recreational cannabis industry. The Cabinet paper proposing the regulatory model in the Bill states:

The following proposal sets out aspects of a regulatory model that emphasises harm minimisation through a government-controlled regulated market for the production, supply and use of recreational cannabis. The size of the market should be limited (ie, a small number of licenced businesses operating in the market) to a level that is adequate for meeting current demand, with a view to reducing demand and thus market size over time.

This approach would see the Government controlling and regulating all parts of the supply chain to ensure that any incentives for competitive commercial measures targeted at increasing demand for cannabis, such as low prices and mass marketing, could not eventuate. (Little 2019)

This is an approach favoured by the New Zealand Drug Foundation (New Zealand Drug Foundation 2019) and the Helen Clark Foundation (Errington, Smith, and Lala 2019).

2.3.1 Medicinal cannabis

Exactly how the detailed regulations proposed in the Cannabis Legalisation and Control Bill will interact with the evolving medicinal cannabis regime is beyond the scope of this paper.

However, we note the Government is deliberately proposing a regime to limit a commercial recreational cannabis market, while one reason for its latest reforms of medicinal cannabis is to promote a commercial medicinal cannabis market. The RIA for the legislation introducing the medicinal cannabis regime, for example, noted that the Ministry of Business, Innovation and Employment had estimated that the scheme would enable a potential domestic market of \$70 million and an export market of up to \$250 million.

3 Recent international trends

Prohibition of cannabis, as set out in a series of United Nations treaties, has been the norm in most countries.¹²

Over time, however, many countries and regions have moved to change the legal status of adult use. In various countries and regions, depenalisation and decriminalisation have been adopted as alternatives to strict criminalisation.¹³

A more radical approach – legalisation of possession, use and supply of cannabis – began in 2012, when voters in the states of Colorado and Washington voted to legalise adult use of cannabis. This approach, which is what New Zealanders are being asked to endorse, has now been followed by two countries and nine other US states.

3.1 Uruguay

In 2013, Uruguay became the first country to legalise possession and use from home cultivation of cannabis. Prior to this, possession of small amounts of cannabis for personal use was legal, but cultivation and supply remained illegal. Removing the paradox of people being able to possess cannabis, but not obtain it, was one of the motivations for this reform (Hudak, Ramsey, and Walsh 2018).

In subsequent reforms, Uruguay started to licence growing clubs in 2014, and since 2018 has allowed supply from a limited number of registered pharmacies, using product cultivated from one of two licenced growers (Cerdá and Kilmer 2017).

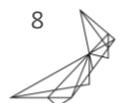
Reform in Uruguay was a top-down exercise, led by the then reforming President Jose Mujica and members of his cabinet (Queirolo et al. 2019). Reforms were not the product of strong popular pressure and the public remains sceptical of legalisation (Hudak, Ramsey, and Walsh 2018).

A further motivation for reform was to reduce the role of illegal actors in the market for cannabis and to separate a legal market for cannabis from an illicit market for other, more harmful drugs, especially *pasta base*, a form of cocaine popular in the region (Bewley-Taylor, Blickman, and Jelsma 2014). However, opposition by pharmacies to selling cannabis was driven, in part, by concerns that illegal sellers would target their stores (Palmer 2016). Fearing action under the anti-drug money provisions of the US PATRIOT Act, banks operating in Uruguay have been reluctant to provide services to registered pharmacies (Jordan 2018).

Uruguay has taken a very controlled, centralised approach to legalisation, in contrast to the approaches taken in other jurisdictions. Part of this may be a long tradition in Uruguay of state control of the alcohol market. From 1931 to 1996, the state-owned *Administración*

¹² The three UN treaties covering drugs are: The Single Convention on Narcotic Drugs of 1954; 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.

¹³ Under a 'decriminalisation' policy, possession and adult 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. 'Depenalisation' means that 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. Depenalisation is also referred to as de facto decriminalisation.



Nacional de Combustiblesm Alcohols y Portland had a monopoly on the distillation of spirits, and still has a strong regulatory role (Bewley-Taylor, Blickman, and Jelsma 2014).

Key regulatory provisions are:

- Individuals wishing to grow cannabis at home must register with the regulatory authority, the Institute for Regulation and Control of Cannabis (IRCCA), can own up to 6 plants, and cannot grow more than 480 grams per year, with any surplus being surrendered to the IRCCA.
- Cannabis clubs must also register, and they can only produce 480 grams per member, with any surplus also being surrendered to the IRCCA.
- Those wishing to purchase cannabis from a pharmacy must also register. Purchase is limited to 10 grams per week (roughly equal to the 480 gram annual limit for home-growing and clubs) and electronic finger-print recognition at point -of-sale is used to confirm identity (Jordan 2018).
- A single individual can only register to use one of the three available sources at any one time.
- The IRCCA sets the price for cannabis sold at pharmacies. As at 1 February 2020, it was 265 Uruguayan pesos for 5 grams of dried flowers (about \$NZ2.20 per gram or \$US39 per ounce, which is much lower than the price in New Zealand or the United States).¹⁴
- The IRCCA regulates the entire industry from seed to sale.
- While commercial cultivation is allowed, registered growers (of which there are only two) contract directly with the IRCCA and can only supply registered pharmacies (Walsh and Ramsey 2015).

Implementation of reforms has been gradual:

- by February 2018, 16 pharmacies were dispensing to 34,696 registered users
- by February 2019, 115 registered cannabis clubs had a total membership of 3,406, and 6,965 persons were registered personal growers (United Nations Office on Drugs and Crime 2019).¹⁵

The United Nations has suggested that legal sales are only a small share of total national consumption, suggesting that the illegal market remains active (United Nations Office on Drugs and Crime 2019). This is supported by research reported in Jordan (2018) that in 2018, only 35,000 out of an estimated 147,000 regular users of cannabis had registered with the IRCCA.

3.2 Canada

In 2018, Canada became the first, and so far, only country to legalise the possession, cultivation and **commercial supply** of cannabis for personal use.

¹⁴ (IRCCA 2020), translated by Google.

¹⁵ To put this in to context, in 2018, Uruguay had a population of 3.4 million (Central Intelligence Agency 2019).



3.2.1 A consultative process

The process used in Canada to legalise cannabis was different from that being used in New Zealand.

The Liberal Party, now lead by Justin Trudeau adopted a policy of legalising cannabis in 2012 (Liberal Party 2013). Following the 2015 federal election, the Government established a taskforce to: “consult and provide advice on the design of a new legislative and regulatory framework for legal access to cannabis, consistent with the Government’s commitment to ‘legalize, regulate, and restrict access’” (Taskforce on Cannabis Legalization and Regulation 2016). The Taskforce undertook consultations based on a discussion paper prepared by the government (Government of Canada 2015).

Noting the experiences with reform in other jurisdictions, the Canadian Government’s discussion paper suggested that a government contemplating legalisation should:

- Identify clear and measurable objectives
- Develop a comprehensive regulatory system that controls product formats; that prevents commercialisation through advertising controls; that prevents use by youth
- Allow for effective implementation by:
 - Taking time needed for an effective launch
 - Developing clear and comprehensive public communications
 - Establishing a strong evidence base and data collection strategy to enable long-term monitoring and adjustments to meet policy objectives; and
 - Undertaking public health education before legalisation begins.

The Taskforce’s final report was issued in November 2016. It recommended a comprehensive framework for legalisation and regulation across five themes: minimising harms of use; establishing a safe and responsible supply chain; enforcing public safety and protection; medical access; and implementation (Health Canada 2017).

The Parliament had available to it a comprehensive report of the Canadian Parliamentary Budget Officer on the fiscal considerations surrounding legalisation, including an analysis of the then illicit market for adult use and the legal market for medicinal cannabis and estimations of the likely revenue that could be raised from taxing the legal adult market (Office of the Parliamentary Budget Officer 2016).

A Bill to implement legalisation was introduced into the federal parliament in April 2017. It was considered by the House of Commons Standing Committee on Health, which called for submissions and held hearings on the Bill.¹⁶ Several separate committees of the Canadian Senate also considered the Bill during its passage through that House and these committees also held public hearings and heard from submitters.¹⁷

In a separate process, Health Canada, the federal department responsible for reform, undertook public consultation on the details of the proposed regulation of the industry.¹⁸ See Health Canada (2017) and Health Canada (2018) for details.

¹⁶ For submissions and the Committee’s report, see: <https://www.ourcommons.ca/Committees/en/HESA/StudyActivity?studyActivityId=9603581>

¹⁷ See: <https://www.sencanada.ca/en/sencaplus/news/cannabis-act/#committees>.

¹⁸ In New Zealand, principal carriage of preparing the legislation rests with the Minister of Justice and his Department.

3.2.2 The main provisions of the legislation

The legislation changing the legal status of cannabis (the Cannabis Act) set out a range of objectives:

- Preventing young people accessing cannabis
- Deterring criminal activity
- Protecting public health and safety by establishing strict product safety and quality rules
- Reducing the burden on the criminal justice system
- Maximising net benefits and minimising undue impact on businesses involved in the new legal market (Shanahan and Cyrenne 2019).

There are notable differences between this approach and that being proposed in New Zealand.

First, the Canadian legislation is neutral on the issue of the extent of use: there is no overarching aim to reduce overall use of cannabis like that proposed in New Zealand. In its discussion paper, the Canadian Government sought input on the objective of minimising **harms from use**, not reducing use per se. It noted that most harms "*appear to occur in high-risk users (e.g., youth) or in conjunction with high-risk use practices (e.g. frequent use; highly potent products; impaired driving)*" (Government of Canada 2015). Related to this, the Act does not establish a regulatory authority charged with developing a plan to reduce use.

Secondly, there is more emphasis in Canada on transforming the cannabis market from illicit to licit. One of the stated objectives of Health Canada in proposing regulations was to enable "*a robust and responsible legal cannabis industry that is capable of outcompeting the entrenched illegal industry*" (Health Canada 2017). To achieve this objective, in part, Health Canada proposed that large-scale growing, packaging and distribution would be facilitated.

The Canadian experience provides interesting insights into the range of regulatory possibilities that exist. The Canadian Government changed national legislation that had previously made possession, production and supply of cannabis illegal. But, consistent with Canada's federal structure, they left it to the Provinces and territories to decide important details of how the legalised 'market' would work.

As shown in Table 4 (over the page), there are some significant differences, especially in wholesale and retail distribution, across provinces and territories.

Table 4 Policies for use vary across Canadian Provinces and Territories

As at August 2018

Regulation	BC	AB	SK	MB	ON	QC	NB	NS	NF	PE	NU	YU	NWT
Wholesale distribution: public only	✓	✓	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Retail distribution:													
• Public						✓	✓	✓		✓	✓	✓	✓
• Private		✓	✓	✓	✓	✓				✓		✓	✓
• On-line (government or private)	G	G	P	P	G	G	G	G	G	G	G	G if no store	G
Stand-alone retailing required	✓	✓	✓	✓	✓	✓	✓	No	✓*	✓			No
Local government may restrict retail/consumption	✓	✓	✓	✓	✓	✓		✓					✓
Plants permitted in home-grow operations	4	4	4	0	4	0**	4	4	4	4	4	4	4
Legal age	19	18	19	19	19	18	19	19	19	19	19	19	19
Max amount of possession in private residence		No limit	30			150							
Consumption													
• Permitted only in private residences				✓			✓		✓	✓		✓	✓
• Prohibited where children frequent	✓	✓	✓	✓	✓							✓	
• Prohibited where tobacco is prohibited	✓	✓	✓	✓	✓	✓		✓		✓#	✓		
Zero tolerance for young, novice, commercial or graduated driving licences	✓				✓			✓					

Notes:

* Co-location allowed with pharmacies.

** Quebec's attempt to ban home-growing has been declared unconstitutional, but this is under appeal.

Only in certain designated areas.

Source: Shanahan and Cyrenne (2019)

3.2.3 Making data available

The Taskforce recommended that more research be undertaken after legalisation and that data be made available. Health Canada has responded, in part, by creating a cannabis research and data portal on their website (<https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/research-data.html>). Statistics Canada also operates a Cannabis Stats Hub: <https://www150.statcan.gc.ca/n1/pub/13-610-x/cannabis-eng.htm>.

3.2.4 What happened after legalisation?

Statistics Canada has published several studies of the early response to legalisation. Some highlights are in Table 5.

Table 5 Highlights of the first year’s operation of the legal market in Canada

Subject	Comment
Total sales	Total legal sales were \$C907 million. Average annual sales per capita were a modest \$C24. British Columbia had the lowest per person sales (\$C10), while the highest was in the Yukon territory (\$C103).
Number of stores	The number of licenced stores has grown rapidly, albeit from a low base considering the size (almost a million square kilometres) and population (36.5 million) of Canada. <ul style="list-style-type: none"> • March 2019: 217 stores nation-wide • May 2019: 285 • July 2019: 407. The largest Province, Ontario (population 14 million), had no stores in March, 20 in May and 24 in July. Alberta (population 4.2 million) has the most stores, with 75 in March, 101 in May and 176 in July.
Distance to a store	By July 2019, 45% of Canadians lived within 10 kms of a store. In Alberta, it was 70%; 33% in Ontario and only 31% in the Yukon Territory.
Online sales	Online sales are permitted in every Province. In Manitoba and Saskatchewan, private firms can operate on-line, while in the rest of Canada, this part of the market is exclusively publicly-owned. 13.3% of total sales since legalisation have been on-line. However, the percentage is falling steadily as more physical stores open. In October 2018, 43.4% of sales were over the Internet, falling to just 5.9% by September 2019.

Source: (Statistics Canada 2019)

Rotermann (2020) reports the results of Statistics Canada’s National Cannabis Survey, which has been operating since February 2018, eight months prior to legalisation. She focuses on what has changed before and after legalisation. Although cautioning that small samples sizes and compressed time frames place some caveats on the results, the study does show some interesting early effects. Some highlights are:

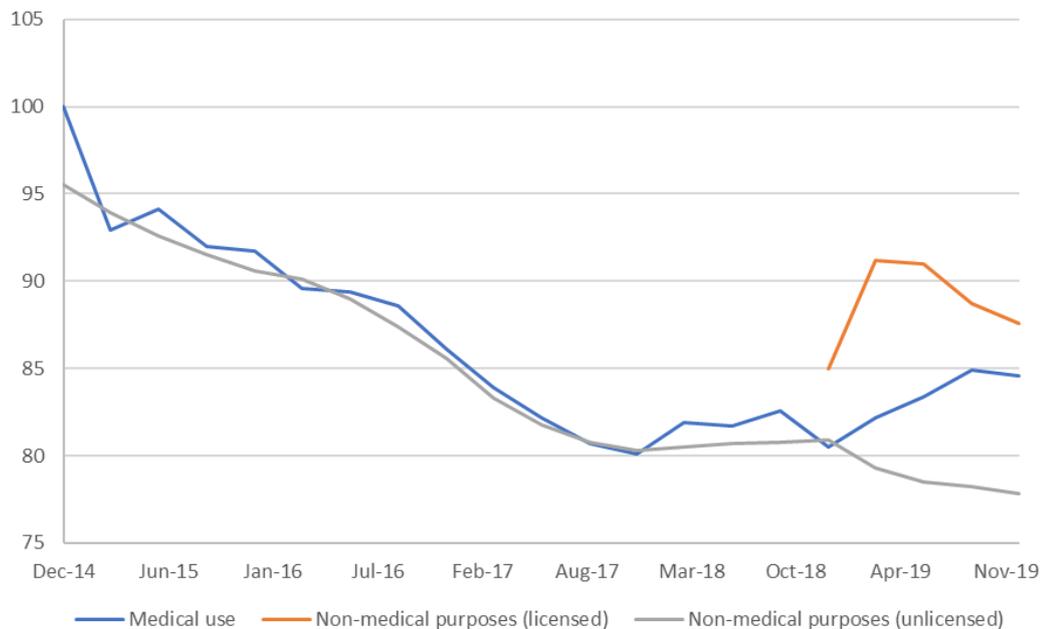
- In the first year after legalisation, national use (defined as use in the past three months) increased from 14.9% of the population to 16.8%.

- The percentage of respondents reporting daily (or near daily) use remained largely unchanged at around 6%.
- 51.7% of adult and medical cannabis users said that they obtained cannabis from illegal sources in the year before legalisation, dropping to 40.1% in the year after.
- The percentage of those aged 15 to 17 reporting use fell from 19.8% to 10.4%.¹⁹

Statistics Canada has also published data on prices, going back some years prior to legalisation. This shows that prices in both the (legal) medicinal market and the illegal market had been falling together, but once legalisation happened, prices in the legal and medical market increased. This might suggest that, at least initially, prices in the legal markets are going to converge and that Canadians value a legal, quality-assured product over an illegal one.

Figure 3 Cannabis prices have been falling generally

Index of prices: 2012 = 100



Source: Statistics Canada (2020)

3.3 The United States

3.3.1 Use and commercial supply

Eleven US states²⁰ have legalised personal adult use and commercial supply.

¹⁹ A similar finding occurred in Colorado, which might suggest that for some young people, it is the illegal (or taboo) nature of the product, not the product itself, that is part of the attraction. Anderson et al. (2019) suggests that difficulty in under-age users buying from legal suppliers is also a factor.

²⁰ Alaska (legalisation became effective in 2014); California (2018); Colorado (2014); Illinois (2020), Maine (2016); Massachusetts (2016); Michigan (2018); Nevada (2017); Oregon (2015); Vermont (2018) and Washington (2012). (National Conference of State Legislatures 2019).

However, possession, use and supply of cannabis continue to be federal crimes in themselves. Some aspects of wider federal law also impact on producers in the states that have changed their laws. For example, federal banking regulations prevent sellers of cannabis from depositing their takings in a bank account (on the grounds that it is proceeds from crime). As we note below, some states are continuing to police the illicit cannabis market, especially crops grown for export to other states. Therefore, it is not accurate to say that using cannabis has been completely legalised in the states concerned.

An important point is that the people of the states concerned have taken a view that the aim of the previous policy in those jurisdictions – elimination of adult use via prohibition – should not be continued.²¹

As noted above, the New Zealand Government’s proposed approach is to continue to seek to reduce harm and use, but to use regulation, taxes and education as the preferred means. That said, what has happened in the US provides valuable evidence when considering policy options in New Zealand.

3.4 Evidence from Colorado

When Colorado voters legalised the production, sale and use of cannabis 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 wellbeing. Two reports have been prepared under this statute: the first report,²² was published in 2016, covering the first two years after legalisation and the second,²³ which added two more years’ data, in 2018.

Given this good source of information, we have focused on the experience in Colorado.

The first report showed that:

- Use by people under the legal age for consumption was unaffected, and may have even declined
- Adverse effects from cannabis, including poisoning of children (mostly from edibles) increased, which led to higher health expenditures
- 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%²⁴
- State revenues were significant and larger than expected (largely due to underestimates of the amount of cannabis consumed by heavy users (Light et al. 2014))

²¹ Vermont and Illinois are the only states in which legalisation occurred via legislative action. Legalisation in the other states was via popular ballot initiatives. 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.

²² Reed (2016).

²³ Reed (2018).

²⁴ 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.

- Significant sales were made to tourists travelling to Colorado.²⁵

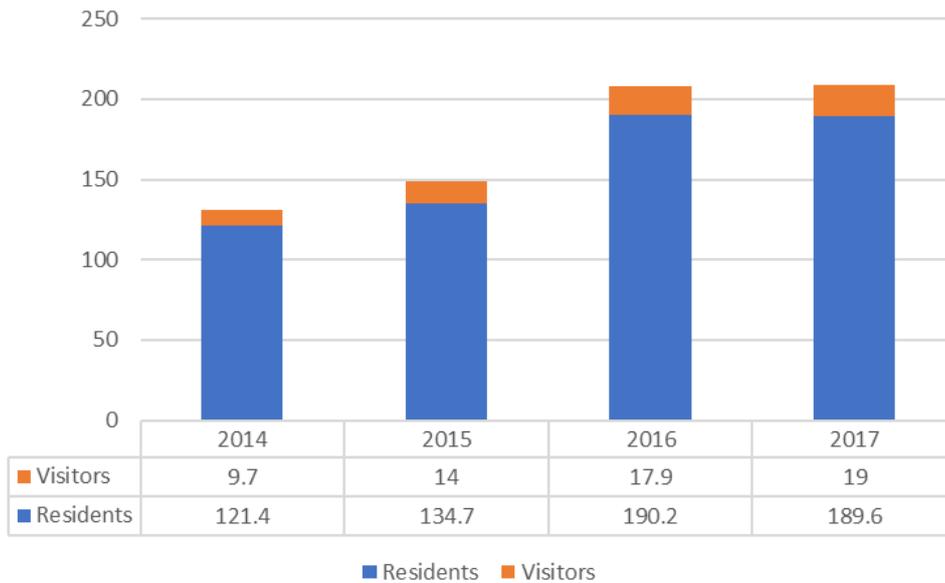
The 2014 report estimated that up to one-third of local demand would be met from unregulated sources.²⁶ An update published in 2018 found that the state’s pre-existing illegal market had in fact been fully absorbed within the legal, regulated and taxed market (Orens et al. 2018).²⁷

Other highlights from the 2018 study are:

- Total visitor and resident consumption grew steadily after legalisation, but may have plateaued (see Figure 4).
- Use showed a clear U-shaped pattern, with most users consuming on less than five days per month, while 22% consumed daily. However, those 22% consumed 71% of the total cannabis sold in the legal market (see Figure 5).
- Prices fell significantly over the four years studied (see Figure 6).

Figure 4 Consumption of legal cannabis has plateaued

Consumption in the legal market, tonnes.



Source: Orens et al. (2018)

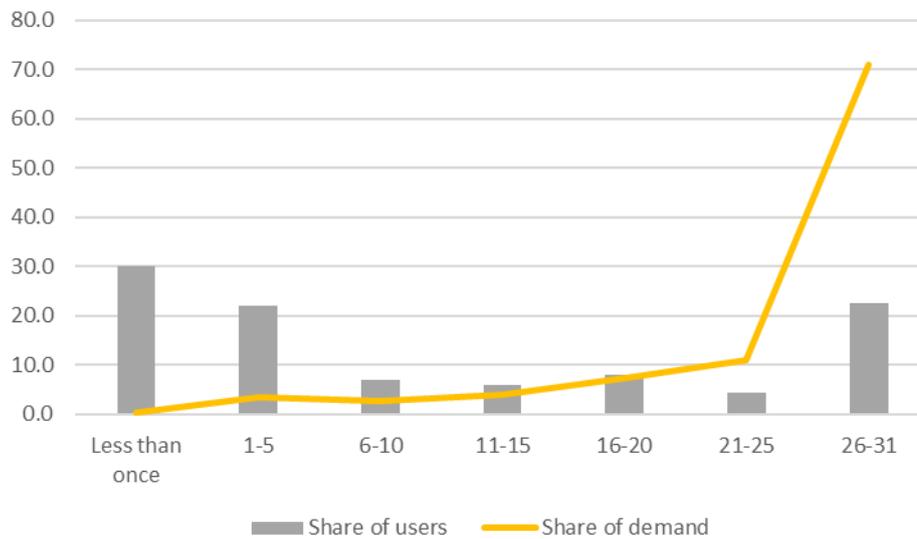
²⁵ Examination of sales records in the early months of legalisation suggest that about 40% of state-wide sales were to tourists, and this rose to 90% in traditional mountain tourist locations like Vail. Colorado has always been a tourist destination, and it is unclear whether the sales to visitors are 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 have always consumed marijuana in Colorado, but are now doing so openly.

²⁶ Light et al. (2014).

²⁷ This result is consistent with the experience in Washington state. Burgard et al. (2019) used analysis of wastewater systems before and after the legalisation of recreational cannabis use in Washington state to measure changes in population usage. Their data suggests that usage doubled after legalisation. Comparing their estimates of use with data on the legal production and sale of cannabis, they concluded that many established users must have switched to using the legal market.

Figure 5 Heavy users dominate consumption

Days per month on which person consumed cannabis, percentage of users and demand

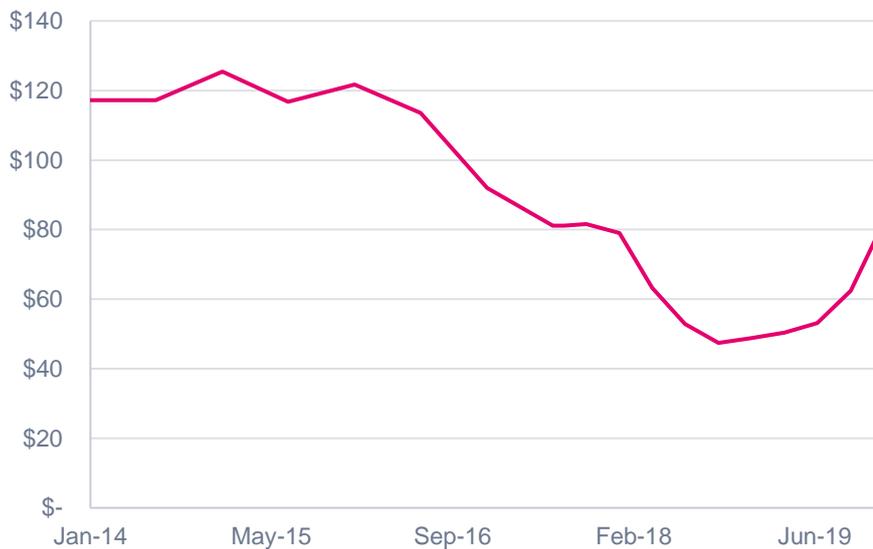


Source: Orens et al. (2018)

Subsequent data from the Colorado Department of Revenue, which tracks average monthly prices, has confirmed this trend, although prices have risen recently.

Figure 6 Prices fell, then rose

\$US per ounce



Source: Colorado Department of Revenue

One of the motivations for legalisation in Colorado was to bring cannabis within the state tax system. Table 6 shows the amount of total revenue raised from cannabis since legalisation. To put this into context, Colorado has a population of about 5.7 million people

and in 2018, its GDP was \$US371 billion. In 2019, total state revenues were about \$US14.6 billion.

Table 6 Revenue raised from cannabis tax in Colorado

\$US

Calendar year	Annual Revenue	Total since February 2014
2014 (Feb–Dec)	\$67,594,323	\$67,597,323
2015	\$130,411,173	\$198,005,496
2016	\$193,604,810	\$391,610,306
2017	\$247,368,473	\$638,978,779
2018	\$266,529,637	\$905,508,416
2019	\$302,458,426	\$1,207,966,842

Source: Colorado Department of Revenue

3.5 Economies of scale

Where production and distribution of marijuana is 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 (Hawken 2014). Again, details of the precise economies of cannabis production are patchy, due to its legal status. As Chouvy (2019) notes, the prohibition approach followed world-wide since the 1930s has suppressed much knowledge of how cannabis is grown. Even in places like the United States, where production has been legalised at the state level, researchers are often reluctant to study cannabis because of the risk to their federal funding (Wilson et al. 2019).

International trade in cannabis is falling and production close to the place of consumption is common (Chouvy 2019). New Zealand, for example, is now thought to import little cannabis. (Wilkins and Sweetsur 2016). In jurisdictions where production has been legalised, it is often a legal requirement that product not be imported.²⁸

Caulkins (2010) has estimated that there are substantial economies of scale possible in the production of cannabis. He tested three scenarios:

- A private, non-commercial 2m x 2m indoor hydroponic setup, growing cannabis under lights
- Devoting a residential house to a commercial operation
- Greenhouse-based commercial growing.

His results are summarised in Table 7.

²⁸ In Canada, for example, cannabis can only be imported for medical or scientific and not recreational purposes. A licence is required (Health Canada 2019).

Table 7 There are economies of scale possible in growing cannabis

Figures converted from imperial to metric

	Private, small scale	Residential area production	Greenhouse commercial
Area cultivated	2.3 m ²	120 m ²	4,046 m ²
Production intensity (kg/m ² /year)	2.05	2.05	1.03
Production (kg)	4.8	247.7	2,074.7
Costs (\$US per kg)			
Materials	\$68	\$22-\$68	\$22-\$68
Lighting	\$34	\$34	\$0-\$11
Labour	In-kind	\$18	\$4.50-\$11
Rent	In-kind	\$13-\$59	\$5.50-\$6.80
Total	\$102 + in-kind labour and rent	\$91-\$181	\$32-\$98

Source: Caulkins (2010)

While the production rate per square metre is lower in the greenhouse than in the other scenarios, lower production costs, especially lighting and labour, more than compensate.

Economists would normally favour production benefiting from economies of scale, if the cost savings are passed on to consumers.

The combined effect of the removal of the economic rents from illegal production and moving to lower-cost production techniques could be a significant fall in prices. This is the experience in those parts of the United States that have legalised cannabis. The Oxford Treatment Centre, an addiction facility in Mississippi, recently undertook a survey of prices in the US, using data from the crowd-sourced website www.priceofweed.com. The results are in Table 8.

The results for the District of Columbia (DC), which has higher prices than nearby Virginia, despite having seemingly less restrictive policy, are it seems, explained in part by the peculiarities of the DC medicinal cannabis market, where supply is limited by regulation to a small number of suppliers, leading to higher prices (Kaplan 2019). This suggests that the legal medicinal cannabis market is setting the price in the illegal market.²⁹

Table 8 Legalisation leads to lower prices

Cost in \$US of one ounce of high-quality cannabis leaf

State	Legal status	Price
District of Columbia	Illegal to purchase, but home production and consumption legal under District law	\$597.88
North Dakota	Legal for medical use	\$338.60

²⁹ This is an example of how regulation in the medicinal and recreational markets for cannabis can interact.

State	Legal status	Price
Virginia	Illegal for all purposes	\$364.89
Oregon	Legal, regulated and taxed	\$210.75
Washington	Legal, regulated and taxed	\$232.90
Colorado	Legal, regulated and taxed	\$241.74

Source: Oxford Treatment Center (2020)

3.6 The carbon footprint of cannabis

Again, due to legal restrictions, much of the industrial world’s recreational cannabis is thought to be grown in small-scale, indoor facilities, using hydroponic techniques and artificial light (Chouvy 2019). In a quest to boost yield, producers often use energy-intensive techniques, including lighting levels 500 times brighter than recommended for reading, frequent air changes, and injection of carbon dioxide (Mills 2012). As Figure 7 (over the page) shows, modern indoor cannabis production requires a significant amount of equipment. The result is a high carbon footprint and other possible environmental effects (Ashworth and Vizuite 2017).

Mills (2012) estimated that producing one kilogram of illicit cannabis in an indoor production facility in California produced 4,000 kg of carbon dioxide. Much of this came from electricity, but distribution by motor vehicle was also a factor (again, this is a product of legal status: small-scale production in out-of-the-way places requires more transport to users). To put this into context, Mills (2012) notes that producing the cannabis in a single cigarette produces the same amount of greenhouse gases as running a 100-watt light bulb for 25 hours.

Around the world, significant amounts of cannabis are grown outdoors, using natural sunlight and rain. Ghosh (2018) estimates that outdoor cannabis creates about 4% of the greenhouse gas emissions of indoor production. However, both Mills (2012) and Wilson et al. (2019) note that outdoor production, especially from illegal facilities, can have high environmental effects, especially relating to water quality. Indeed, the requirement to comply with California environmental quality rules is thought to be one reason why less than 6% of the estimated 50,000 illegal growers of cannabis in that state have registered with the authorities (Bodwitch et al. 2019).

As an intermediate method, some production takes place in greenhouses that are outdoors, that use a combination of natural heat, light and rain, together with injected carbon dioxide, augmented heating and artificial light (Ghosh 2018).

An important local context is the likely impact of the Emission Trading Scheme (ETS) on greenhouse production. NZIER and others have calculated the effect of New Zealand moving to zero net carbon emissions by 2050 on the price of emissions in New Zealand.³⁰

³⁰ See Ballingall and Pumbudi (2018) and especially Chapter 3 of Productivity Commission (2018).

Figure 7 Indoor cannabis production is capital and energy intensive

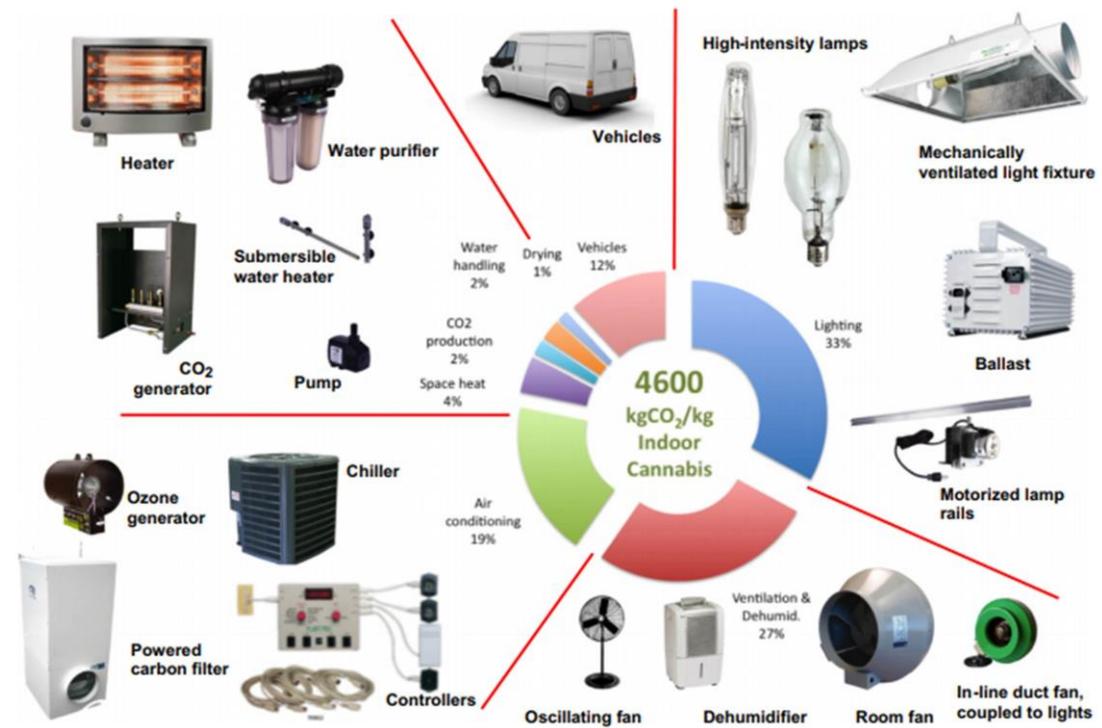


Fig. 1. Carbon footprint of indoor Cannabis production.

Source: Mills (2012)

4 Show me the money

The Government is proposing that a new excise tax apply to cannabis and, like all goods sold in New Zealand, it will become subject to GST.³¹

In 2013, Treasury estimated that legalising cannabis would raise \$150 million in additional revenue annually (English 2016). In a report to the NZ Drug Foundation published in 2018, Sense Partners estimated that bringing cannabis into the formal economy would increase government revenues from a variety of sources by between \$191 million and \$249 million per year (Sense Partners 2018).³²

4.1 The type of tax

The existing excises in New Zealand (on tobacco products, alcohol and fuel) are all imposed on a per volume basis. For tobacco, for example, the excise is currently \$1,469.03 per kilo of tobacco content (New Zealand Customs Service 2019).

Ad valorem taxes (from the Latin ‘according to value’) are taxes like GST that are expressed as a percentage of pre-tax sales price.

³¹ Cannabis currently sold in New Zealand is probably already subject to GST and the income earned from its sale is definitely subject to income tax (Coleman 2013). The degree of compliance is unknown.

³² Sense Partners include in this estimate revenue for a new excise tax, as well as the impact of existing taxes on the sector.

One feature of taxes on a volume basis is that they can act as a de facto price floor. The tax take from a volume-based tax is also likely to be more stable, as it is not affected by price fluctuations.

4.2 Estimating something that doesn't exist

Estimating the amount of revenue that would be raised from any new tax is difficult, even with good data on price, quantity, industry structure and the like. In the case of a tax on cannabis, there is little reliable data on which to base any estimates. We can, however, draw on a number of studies that estimated likely tax takes in a number of jurisdictions, including Canada (Office of the Parliamentary Budget Officer 2016) and Colorado (Light et al. 2014).

The change in legal status could involve several contemporaneous effects:

- The very act of legalisation may induce some people to increase or commence consumption, thus increasing demand above the status quo.
- Legalisation increases access to cannabis, which may increase demand.
- If a legal market removes the economic rents being earned by producers and suppliers, prices should fall.
- Production costs resulting from the illegal nature of production could be lowered (e.g. growing cannabis in out of the way places, guarding crops).
- If buyers are prepared to pay a premium for purchasing a quality-assured and tested product, prices might rise.
- Compliance with other regulations, like the Resource Management Act, which are currently ignored by illegal suppliers, may add costs.
- Depending on the regulatory system, economies of scale may become more widespread.

The experience from overseas is that in time, these effects combine to see pre-tax retail prices fall and consumption increase (Statistics Canada 2019; Orens et al. 2018; Jacobi and Sovinsky 2016). The precise size of the effects is difficult to judge.

Jacobi and Sovinsky (2016) note that there are two different effects of legalisation that need to be considered when estimating demand:

- Legalisation by itself (including increased access) will induce some people to commence use.
- Changes in price will have an impact on how much existing users consume, in terms of both frequency of use and amount used on each occasion.

In a review of the literature on the price responsiveness of cannabis users, Pacula and Lundberg (2014) identified four sub-sets of user and potential users:

- Initiators, who they found to be very sensitive to price changes
- Regular users, who are less sensitive to price
- Heavy users – those using daily or near daily – whose price-responsiveness was low



- Quitters, the opposite of initiators, being users who are thinking of stopping use. While there are a few studies of this group, what evidence there is suggests that price is not a factor in quitting.

We also need to make assumptions about the continued illicit market. Evidence from the US suggests that at least for home consumption, most people move to buying from legal stores (Burgard et al. 2019; Orens et al. 2018). But the speed at which legal producers and retailers can supply the adult market will be a factor in the length of the transition (Hunt and Pacula 2017).

Some of these effects could be quick acting (for example, the increased demand from making consumption legal), while others may take time to work through the market (for example, changed production processes).

4.3 Our preliminary estimates

Using a combination of what data is available in New Zealand and the experiences of US states that have introduced taxes on legalised cannabis, we have undertaken our own preliminary estimates of the revenue that would be raised from an excise tax imposed on legal sales of cannabis.

This estimate is based on all the effects noted above having worked their way through the market, so they can be thought of as estimates of the steady state. We have assumed that all consumption is via the legal, taxed, market.

We have assumed a 25% ad valorem tax, partly because this was the rate adopted in Colorado and partly because it is the rate that Jacobi and Sovinsky (2016) estimate would be sufficient in Australia to keep consumption at pre-legalisation levels.

Putting all of this together, we estimate that a 25% excise tax on legal cannabis would raise about \$250 million in revenue, with a further \$240 million coming from GST.

All up, this gives a total of about \$490 million per year.

4.3.1 Methodology

Our detailed methodology is set out in Appendix B.

Our calculations are based on consumption frequency and prevalence in New Zealand today, with adjustments for the likely initial increase in consumption from legalisation that has been seen overseas. Most of the revenue comes from heavy users.

4.3.2 What might happen in the future?

The Government's policy is to reduce harm and reduce overall use through time. Harm is thought to be related to heavy use, not use per se (Government of Canada 2015).

Therefore, if the Government is successful in reducing harm and overall use, we can expect to see the amount of revenue raised from cannabis fall through time, as it is heavy users who contribute most of the revenue.

Taxing cannabis should not, therefore, be seen as a permanent addition to the overall tax take.

This has implications for how the revenue is spent. It would be prudent for spending to be targeted at activities that will also reduce if the Government succeeds in its policy objectives.

5 Further reading

There is a vast literature on the economics of cannabis and potential changes in its legal status. We found the material in Table 9 particularly useful in preparing this paper. Full bibliographical references to this material, including hyperlinks to publicly available copies, are in the References section below.

Table 9 Useful material

Publication	Comment
Hall et al. (2019) 'Public Health Implications of Legalising the Production and Sale of Cannabis for Medicinal and Recreational Use'	Readable summary of the current state of play. On-line supplementary material provides the details.
Royal Society of New Zealand (2019). 'Cannabis: How It Affects Our Health'	Authoritative statement of the latest research on the health effects of recreational and medicinal cannabis.
New Zealand Drug Foundation (2019) 'Taking control of cannabis: A model for responsible regulation'	Detailed outline of a comprehensive seed-to-sale regulatory model, tailored for New Zealand.
Errington et al. (2019) 'The case for Yes in the 2020 referendum on cannabis'	Report by the Helen Clark Foundation on why a yes vote is appropriate in the referendum.
US National Academies of Sciences, Engineering and Medicine (2017) 'The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research'.	Detailed study of the current research. Has a slight US-centric slant.
Pudney et al. (2010) 'Drugs Policy: What Should We Do about Cannabis?'	Good introduction to the economics of cannabis policy.
Shanahan et al. (2019). 'Cannabis Policies in Canada: How Will We Know Which Is Best?'	Good summary of the Canadian approach to legalisation.
United Nation Office on Drugs and Crime (2019). 'World Drug Report 2019'	Data-rich discussion of supply and demand.
Hudak et al (2018) 'Uruguay's Cannabis Law: Pioneering a New Paradigm'.	Summary of the approach to legalisation followed in Uruguay.
Colorado Department of Revenue reports. https://www.colorado.gov/pacific/enforcement/marijuana-related-reports-studies	The Colorado Department of Revenue has made public several useful reports on the experience of legalisation in that State.



6 Discussion

The Government is proposing to continue the existing policy of reducing use and harm but is proposing to use different means to achieve them. Education, regulation and taxation will be the new approach. Unlike tobacco, but as with alcohol, this approach does not see all use as harmful. Regulation will be undertaken by an Authority statutorily charged with reducing use.

The question to be put to a referendum is about more than whether cannabis use should be legal.

Voters are also being asked to approve a policy that sees harm and use as being separate and that a specific set of regulations should apply and be deliberately set to reduce use through time. There has been little consultation on these details and overseas experience suggests that unintended consequences can arise.

6.1 Will the price be right?

The experience in the United States is that legalisation results in a reduction in the retail price. This is to be expected, since legalisation removes the premium that criminal suppliers can charge and allows more efficient production and distribution techniques to be employed.

While new taxes have been applied to cannabis, the combined effect has still been a significant fall in prices.

Economists would expect such a fall in price to increase demand and this is supported by studies in the United States (Khan, Thompson, and Tremblay 2020; Dragone et al. 2019).

The Canadian experience, which is only based on a year of legal supply, is inconclusive on the effects of legalisation on price and on the relationship between the legal and illegal markets.

If the New Zealand Government wants to see overall use fall, then it might not want to see prices fall sharply.

We would expect a market driven by competitive forces, even one composed of small-scale producers, would lead to lower costs of production and distribution techniques.

As with tobacco, taxes could be steadily increased to dampen demand. However, if the retail price of legal cannabis is too high, people will have the option of growing their own or reverting to an untaxed illicit market. But this would reduce some of the benefits, in terms of product quality and consumer protection, that legalisation is intended to bring.

Being able to adjust regulation in the face of experience will be important.

6.2 Will the illicit market prevail?

Colorado seems to have successfully absorbed the previous illegal market into the new legal regime, at least as far as in-state consumption goes.³³

Evidence from Uruguay suggests that a highly regulated market that does not enjoy popular support can fail to drive out illegal producers.

In Canada, one year after legalisation, commercial suppliers have captured 60% of the market.

Early evidence from California is that the costs of regulation is limiting compliance, especially environmental regulations not specifically targeted at cannabis by previously-illegal, small-scale growers (Bodwitch et al. 2019).

The Government's desire to prevent the development of a large commercial market may have the unintended consequence of an illegal market continuing.

6.3 Many alternatives not considered

The experience with Brexit shows that asking for simple answers to complex questions causes problems. The Government is to be commended, therefore, for setting out a detailed question on cannabis reform, in the form of a draft Bill.

However, the limited consultation on the Bill, especially the lack of a Select Committee process, means that the public are not being given an opportunity to debate the mechanics of legalisation. The Government has made some significant policy decisions without much input from the community.

We are not aware of any detail economic analysis of the proposals having been released.

The Government could address this issue by removing some of the detailed regulation from the primary legislation and either address these issues by secondary legislation (Regulations made by Order-in-Council) or leave these to the Authority to determine through a consultative process.

The Government's approach of putting a very detailed Bill to voters also raises the question of how much weight a future Parliament might place on the Bill having been approved by a referendum when considering changes in the detailed rules.

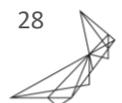
³³ Colorado Public Radio reports that law enforcement activity directed at those exporting illegally to other states continues to be significant (Markus 2019).

7 References

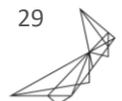
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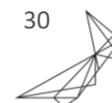
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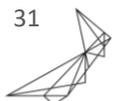


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Appendix A Details of the proposed Cannabis Legalisation and Control Bill

This Appendix contains a summary of the main provisions of the current draft of the Cannabis Legalisation and Control Bill.

Table 10 Main provisions in the draft Bill

Provision	Details	Comment
Regulation		
Cannabis Regulatory Authority	The Bill establishes a new Crown Entity, called the Cannabis Regulatory Authority, which is responsible for the oversight of the supply and use of cannabis.	Details of the make-up, appointment process and governance are pending.
Objectives of the Authority	The Authority has three objectives: <ul style="list-style-type: none"> • promoting the wellbeing of New Zealanders • reducing the harms of cannabis use • lowering the overall use of cannabis over time. 	These provisions clearly set the framework within which the Authority will operate. Its role is to reduce the use of cannabis, not to promote or encourage the development of a commercial industry.
National plan	The Authority must develop and publish a national plan setting out how it will give effect to the objectives of the Act. The new plan must be prepared every five years. The Authority must report annually to the Minister on how it has implemented the national plan and with what outcomes.	The Authority will be required to be proactive in seeking to reduce use and harm, rather than being a neutral, reactive regulator of the sector.
Cannabis Advisory Committee	The legislation also establishes an advisory committee to provide advice to the Authority on preparing the national plan. The Committee will be composed of experts in relevant areas, and will include chief executives from the health, justice, and social sectors (it is unclear whether this means the heads of government departments or a wider group of chief executives).	The Authority will be required to seek and receive expert advice in setting its national plan. Details of the make-up, appointment process and governance are pending.
Personal use		
Age limit	A person must be at least 20 years old to purchase or possess cannabis.	Consumption of alcohol or tobacco is permitted by people of any age (subject to child welfare laws), while restrictions apply to



		the sale of these products to people under the age of 18.
Growing limits	A person may grow not more than 2 cannabis plants for personal consumption on their private premises.	If two or more people live on the one property, the maximum amount that can be grown is 4 plants in aggregate.
Possession limits	A person may have up to 14 grams of dried cannabis (or its equivalent) in their possession in a public place.	<p>Possession of more than 14 grams will be an offence, punishable by either an infringement fee of up to \$200 or a fine imposed by a court of up to \$500.</p> <p>While not yet specified in the Draft Bill, the intention seems to be to follow the example of the Land Transport Act 1998 where infringement notices (e.g. speeding and parking tickets) can be issued without requiring an offender to go to court.</p>
Purchase limits	A person may purchase up to 14 grams of dried cannabis (or its equivalent) per day.	Buying more than 14 grams per day will be an offence, punishable by either an infringement fee of up to \$200 or a fine imposed by a court of up to \$500.
Public consumption	A person must not consume cannabis in a public place or in a vehicle that is in a public place.	<p>Public consumption will be an offence, punishable by either an infringement fee of up to \$200 or a fine imposed by a court of up to \$500.</p> <p>The Bill also provides for the establishment of consumption premises, where consumption is allowed.</p>
Social sharing	Giving another person over 20 up to 14 grams of cannabis without the intention of obtaining a material benefit or avoiding a material detriment will be permitted.	Social sharing is currently an offence under section 7(1)(b) of the Misuse of Drugs Act, with the same penalties as possession. ³⁴
Sale and supply		
Supply to people under 20	Supply of cannabis to a person under age 20 will be an offence.	<p>Under the current Misuse of Drugs Act, "supply" includes distributing and giving, as well as selling. Presumably a similar interpretation will be included in the Bill.</p> <p>Separate penalties will apply to licenced dealers and others. In the case of non-licenced dealers, the penalty will be imprisonment for up to four years or, in the case of a body corporate, a fine not exceeding \$150,000.</p>

³⁴ New Zealand Law Commission (2011).

		<p>The penalty for licenced dealers has not been decided.</p> <p>Currently, the penalty for supply is imprisonment for up to eight years.</p>
Licences	A licence will be required for the retail sale of cannabis.	<p>Selling without a licence to a person over age 20 will be an offence, punishable by imprisonment for a term not exceeding 2 years in the case of a person and in the case of a body corporate, a fine not exceeding \$100,000.</p> <p>Currently, the penalty for selling cannabis to a person over 18 is imprisonment for up to eight years. Under the Sale and Supply of Alcohol Act 2012, the maximum penalty for selling alcohol without a licence is imprisonment for term of 3 months or a fine of not more than \$40,000.</p>
Public health messaging	Point-of-sale and on-package health warning will be required.	The draft Bill largely adopts the wording of the relevant provisions of the Smoke-free Environments Act 1990.
Licensing the whole of the supply chain	The Authority will be responsible for regulating the whole supply chain, from seed to sales.	<p>Few details are provided yet, although the Bill contains several placeholders, suggesting that at least some of the regulations will be in primary legislation.</p> <p>Some provisions adopted from the sale and Supply of Liquor Act have been included in the Bill.</p>
Restricting marketing and advertising.	Advertising, promotion and sponsorship will be prohibited.	The draft Bill largely adopts the wording of the relevant provisions of the Smoke-free Environments Act 1990.

Source: New Zealand Government (2020)

Appendix B Revenue estimates

To estimate the revenue to be raised by new taxes on cannabis, we need to know:

- the type of tax
- the amount consumed
- the price paid
- the extent of the legal (taxed) market.

B.1 Type of tax

We have assumed that, as in several states of the US, an ad valorem tax will apply and, in accordance with usual practice, GST will also apply on the tax inclusive price.

We have assumed a rate of 25%, but this is just for illustrative purposes.

B.2 Quantity

While the Ministry of Health's surveys of drug use provide estimates of the number of users, there is no data available on the amount of cannabis consumed in New Zealand.

We have therefore assumed the pattern and quantities consumed in Colorado apply in New Zealand. This is a pragmatic decision, as we have good data from that state, but it is, we acknowledge, somewhat arbitrary.

B.3 Price

Massey University publishes a regular series that reports the street price of cannabis.

This, however, is only a starting point.

We need to think about whether the illicit market will continue. Will people continue to deal with an (untaxed) illegal supplier or use a taxed and regulated source?

This is a very difficult to calculate, since we have very little data to go by, but experience in the US indicates that legal sales are popular and this suggests that the benefits of being able to buy a product of uniform standard, that has been subject to quality checks and is legal is, in fact, valued, even if the price is somewhat higher. One feature that has been very popular with users is the requirement in Colorado for the strength of marijuana to be independently tested and displayed on the package.

We also must take into account two factors that will affect the price paid in legal stores, which will work to reduce the pre-tax price. Think of these as the effects of legalisation. For our purposes, these effects only apply to legal suppliers: the untaxed price that illegal dealers get will be unchanged.

The first is that legal suppliers will not be able to charge the premium that now goes to illegal suppliers: this will cause prices to fall for legal supply.

Second, because of its illegal nature, much marijuana is grown in small, uncommercial facilities. We discussed the issue of economies of scale in production in Section 1.5



It is possible that New Zealand will seek to limit production to small-size units, and thus deny users the benefits of economies of scale.

Finally, we must estimate how much the changes in selling price will change demand. We have experience from the US to draw on here.

B.4 Methodology

The first step in the methodology is to determine the current number of users in New Zealand.

The results of the latest Ministry of Health’s Annual Health Survey provide a break-down of use by age.

Table 11 Use by age

2018/19

Age range	Percentage reporting using cannabis in the last year
15-24	28.6
25-34	22.7
35-44	16.6
45-54	13.2
55-64	8.2
65-74	2.8
75+	0.3

Notes

- 1 The question asked in the survey is: “In the last 12 months, have you used any of the following drugs for recreational or non-medical purposes, or to get high?” Cannabis is one of the drugs listed.

Source: Ministry of Health (2019)

Statistics NZ publish estimates of the current New Zealand population by age.

Table 12 Population

2018

Age range	Number of people
15-24	653,140
25-34	688,820
35-44	601,300
45-54	638,470
55-64	589,500
65-74	437,990
75+	286,960

Source: Statistics NZ, Infoshare Table DPE056AA

We have used data from Colorado to estimate the annual consumption of cannabis. This data is a mixture of observations pre- and post-legalisation. Evidence from Colorado and Canada both show that consumption increased post-legalisation, although in Canada, the reported increase was in occasional, as opposed to heavy, users.

Orens et al. (2018) note that Colorado has higher than nationally reported rates of use, especially among heavy users. New Zealand also has heavy use (Fischer, Rehm, and Crépault 2016). In particular, use rates by Māori and Pacific peoples are high (Ministry of Health 2019).

We calculated the amount used by reference to the total quantity sold through the recreational cannabis market and the shares of users and use.

Table 13 Usage pattern in Colorado

2017

Frequency of use per month	Share of users	Annual quantity consumed by whole group (tonnes)	Grams per year
Less than once	30.2	0.7	2.4
1-5	22.0	6.4	29.6
6-10	7.0	7.7	78.4
11-15	5.9	10.6	128.4
16-20	8.0	19.6	177.2
21-25	4.3	24.8	490.7
26-31	22.5	160.2	607.9

Notes

- 1 The daily usage figures in Orens et al. (2018) were in turn estimates derived from a number of earlier studies. See Appendix A of their study for the methodology used. They specifically increased reported consumption to account for under-reporting of illegal behaviour.

Source: Orens et al. (2018)

Combining the data in Table 11, Table 12 and Table 13 allows us to calculate estimated usage in New Zealand.

Our estimate of consumption is 111 tonnes.

For completeness, Table 14 shows total use by age range and prevalence of use. Two points stand out. As in other jurisdictions, a significant proportion of consumption is undertaken by heavy users, even though they are a small proportion of all users: 71% of total consumption is by people reporting daily or near daily use. And total consumption declines rapidly by age.

When we go on to consider tax take, this means that most of the tax will be paid by heavy users.

Table 14 Total use

Kilograms per year

	Prevalence (days used per month)							All users
	Less than once	1-5	6-10	11-15	16-20	21-25	26-31	
Age								
15-24	133	1,220	1,028	1,420	2,657	3,955	25,640	36,053
25-34	108	985	831	1,147	2,146	3,194	20,709	29,120
35-44	70	640	539	745	1,394	2,075	13,450	18,913
45-54	60	549	463	639	1,196	1,779	11,536	16,221
55-64	34	307	259	358	670	997	6,464	9,089
65-74	8	77	65	90	168	250	1,620	2,279
75+	1	5	5	6	12	18	115	161
Total	413	3,783	3,190	4,406	8,243	12,268	79,533	111,836

Source: Author's calculations

Massey University data suggests that the current street price of cannabis in New Zealand is about \$NZ 350 per ounce, which equates to about \$12 per gram (Wilkins et al. 2019)

This is the price in the illicit market, meaning it includes any economic rents and the higher costs associated with small-scale production. Evidence from the US is that prices in legal markets are two-thirds that in illegal markets. Early evidence from Canada is that the illicit price continued a downwards price trend after legalisation, while prices in the adult and medicinal market were converging at a higher level. We have, therefore, assumed that the pre-tax legal price in New Zealand will be \$9 per gram.

Placing a 25% excise on this price, and then adding GST at 15% on the excise-inclusive price means that the 'after all tax price' in New Zealand will be \$12.94. This means that the after legalisation, prices paid by consumers will be higher than at present.

Such a price increase will, according to economic theory, induce a fall in consumption. Studies in the US have suggested that the 'price elasticity' of cannabis – the percentage amount demand falls for each one percent increase in price – is between 0.5 and 0.8 (Khan, Thompson, and Tremblay 2020). Using a figure of 0.65, we have calculated that the increase in price will result in a reduction in demand of 5,658,203 grams per year.

Table 15 shows our final calculations of the tax take.



Table 15 Tax take

Per annum

Item	Amount
Total consumption subject to tax	105,764,876
Value of consumption subject to tax	1,368,333,088.33
Excise tax @ 25%	\$250,701,929
GST at 15% on excise-inclusive price	\$242,855,253
Total revenue	\$493,557,182
Tax and GST per gram	\$3.94

Source: Author's calculations

