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Should Canada “Start Low and Go Slow” When It Comes to Cannabis Potency?

Testimony of Beau Kilmer¹
The RAND Corporation²

Before the Standing Committee on Social Affairs, Science, and Technology
Senate of Canada

May 7, 2018

Chairperson Eggleton, Deputy Chairperson Petitcherc, Deputy Chairperson Seidman, and other distinguished members of the Standing Committee on Social Affairs, Science, and Technology, thank you very much for the opportunity to testify before you today. I am a senior policy researcher at the RAND Corporation, where I co-direct the Drug Policy Research Center. I have studied cannabis policy for more than 15 years, and my cannabis research has been published in leading journals, such as *Addiction*, *American Journal of Public Health*, and *New England Journal of Medicine*. In 2016, I co-authored a book on cannabis legalization that was published by Oxford University Press.

Over the past two years, I have been fortunate enough to travel to Canada multiple times to meet with researchers and policymakers about cannabis policy and provide an objective assessment of cannabis legalization in the United States. Today, I will focus my remarks on the issue of cannabis potency. RAND does not have a formal position on cannabis policy, and it does not advocate for or against legislative bills or ballot initiatives. My goal for today is to help inform cannabis policy debates at the federal, provincial, and local levels.

A common warning for those consuming cannabis edibles—especially new users—is to “start low and go slow” to prevent overconsumption of δ -9-tetrahydrocannabinol (THC), the cannabinoid most responsible for intoxication. Today, I would like to raise the question about whether this approach should also be applied when considering the potency of cannabis products

¹ The opinions and conclusions expressed in this testimony are the author’s alone and should not be interpreted as representing those of the RAND Corporation or any of the sponsors of its research.

² The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest.

to be sold in Canada’s nonmedical market should C-45 become law.³ With a “start low and go slow” approach, regulations may start with a smaller range of legal activities and products and a tighter set of rules, allowing regulators and other decisionmakers the option to relax them over time.

The issue of cannabis potency was prominently featured in the final report of Task Force on Cannabis Legalization and Regulation;⁴ however, the original C-45 was largely silent about this, seeming to leave the decisions to the governor in council.⁵ In an amendment to C-45 passed by the House of Commons, edibles and cannabis concentrates are to become legal no later than 12 months following the coming into force of C-45.⁶

The issues surrounding cannabis potency are multifaceted and complex, and I offer four main points to help guide these discussions.

First, we know little about the health consequences—risks and benefits—of many of the cannabis products now sold in medical and nonmedical markets. Many of the health-related studies cited in legalization debates are based on cannabis flower smokers in the 1980s and 1990s, when THC percentages were typically in the single digits.⁷ Times have changed. RAND’s analysis of tens of millions of legal cannabis transactions in Washington State found that of all cannabis flower sales, the average amount of THC is now reported to be more than 20 percent. While edibles received a lot of attention when nonmedical stores opened in the United States in 2014, the fastest-growing segment of the legal market in Washington State is extracts for inhalation (i.e., cannabis concentrates), which accounted for more than 20 percent of sales revenues in June 2017 (Figure 1). The mean THC concentrations for these extracts—which include disposable vape pens, cartridges for vape pens, oils, waxes, and other concentrates—was reported to be more than 65 percent.

³ The potency of a cannabis product is typically associated with the amount of THC in the product, but there are other compounds in the plant, e.g., cannabidiol (CBD), which are believed to influence the effects of THC and thus the user’s overall psychoactive experience.

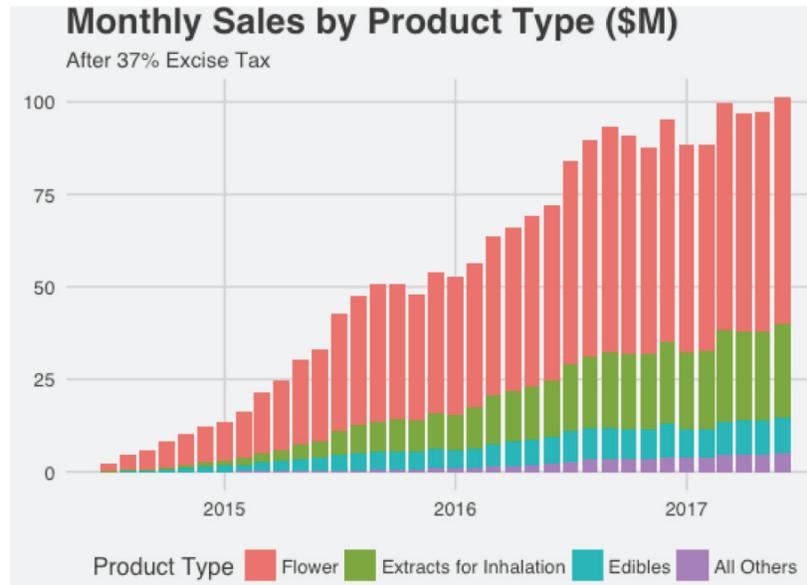
⁴ Jody Wilson-Raybould, Jane Philpott, and Ralph Goodale, *A Framework for the Legalization and Regulation of Cannabis in Canada*, Ottawa: Government of Canada, 2016.

⁵ Bill C-45 states, “The Governor in Council may make regulations for carrying out the purposes and provisions of this Act, including for the administration and enforcement of this Act, and regulations . . . respecting the composition, strength, concentration, potency, purity or quality or any other property of cannabis or any class of cannabis” (House of Commons of Canada, Bill C-45, An Act Respecting Cannabis and to Amend the Controlled Drugs and Substances Act, the Criminal Code and Other Acts, First Session, 42nd Parliament, 64-65-66 Elizabeth II, 2015-2016-2017).

⁶ “As per the amendment adopted by the House of Commons Standing Committee on Health, the Government intends to authorize the legal sale of cannabis edible products and concentrates no later than 12 months following the coming into force of the proposed legislation. By that time, regulations would be made to address the specific risks associated with these types of products” (Government of Canada, “Introduction of the Cannabis Act: Questions and Answers,” webpage, 2018).

⁷ B. Kilmer, “Recreational Cannabis—Minimizing the Health Risks from Legalization,” *New England Journal of Medicine*, Vol. 376, No. 8, 2017, pp. 705–707.

Figure 1. Legal Cannabis Sales in Washington State, July 2014–June 2017 (\$ U.S.)



SOURCE: RAND update of analysis based on R. Smart, J. P. Caulkins, B. Kilmer, S. Davenport, and G. Midgette, “Variation in Cannabis Potency and Prices in a Newly-Legal Market: Evidence from 30 Million Cannabis Sales in Washington State,” *Addiction*, Vol. 112, No. 12, 2017, pp. 2167–2177.

There is a small, but growing, literature on the health consequences on the consumption of higher-potency cannabis flower, sometimes referred to *sinsemilla* or *skunk* (especially in the United Kingdom). A review in *The Lancet Psychiatry* identified a handful of studies that found higher-potency cannabis to be associated with negative mental health outcomes; however, the authors noted that

[o]nly since 2009 have studies differentiated between types of cannabis based on their THC content. However, most of these studies have not measured THC and cannabidiol content directly but have used indirect measures of potency, such as strengths reported in studies of cannabis from police seizures or coffee shops, and have relied on self-report measures.⁸

The authors also found evidence that CBD may attenuate some effects of THC, but argued that more evidence is needed on the consequences of various THC-CBD ratios.⁹

⁸ A. Englund, T. P. Freeman, R. M. Murray, and P. McGuire, “Can We Make Cannabis Safer?” *Lancet Psychiatry*, Vol. 4, No. 8, 2017, pp. 643–648.

⁹ A more recent study, based on a 16-year analysis of the THC concentrations in the most popular varieties of domestic herbal cannabis sold in Dutch coffee shops across the country, found “positive time-dependent associations between changes in cannabis potency and first-time cannabis admissions to drug treatment.” T.P. Freeman, P. van der Pol, W. Kuijpers, J. Wisselink, R. K. Das, S. Rigter, M. van Laar, P. Griffiths, W. Swift, R. Niesink, and M. T. Lynskey, “Changes in Cannabis Potency and First-Time Admissions to Drug Treatment: A 16-Year Study in the Netherlands,” *Psychological Medicine*, 2018, pp. 1–7.

Even less is known about the health consequences of cannabis concentrates. As late as 2015, there was no scientific evidence about *dabbing*,¹⁰ which involves flash vaporization of concentrated cannabis which can exceed 75-percent THC. A 2017 study of college students concluded that butane-hash oil (BHO) use was associated with greater physiological dependence on cannabis, but noted that “longitudinal research is needed to determine if cannabis users with higher levels of physiological dependence seek out BHO and/or if BHO use increases risk for physiological dependence.”¹¹

Vaporizing flower product or cannabis oils in e-cigarette-type devices has a distinct advantage over combusting flower: Smoke is unhealthy because it contains carbon monoxide and other harmful substances. That does not mean vaporization is without risks; much depends on the chemicals used to facilitate the vaporization and create the concentrates, as well as the pesticides used on the plants.¹² A scoping review published in February 2018 concluded there was still “a paucity of rigorous and high-quality data on health outcomes from cannabis (routes of administration), especially in direct and quantifiable comparison,” but did note that “vaporizing cannabis concentrates can result in distinct acute risks (e.g., excessive impairment, injuries).”¹³

Second, we know very little about the extent to which users are titrating their THC consumption. While potency is increasing, that does not necessarily mean that users are getting more intoxicated. For example, if a user typically consumed an entire joint which was 5-percent THC, they could, in principle, stop after smoking only one-third of a joint with a THC level of 15 percent. The scientific literature on THC titration is very small, and I do not know of any studies that have focused on users in Canada or the United States. One Dutch study focused on titration concluded that users of more potent cannabis flower are generally exposed to more THC.¹⁴ A study from the United Kingdom found that users titrate the amount rolled into joints according to concentrations of THC but not CBD.¹⁵

Third, policymakers could temporarily ban certain cannabis products or impose a potency cap on some products until more is known about their health effects, but this would have implications for the illicit market. One option for the federal government is to maintain the

¹⁰ J. M. Stogner and B. L. Miller, “The Dabbing Dilemma: A Call for Research on Butane Hash Oil and Other Alternate Forms of Cannabis Use,” *Substance Abuse*, Vol. 36, No. 4, 2015, pp. 393–395.

¹¹ M. H. Meier, “Associations Between Butane Hash Oil Use and Cannabis-Related Problems,” *Drug and Alcohol Dependence*, Vol. 179, 2017, pp. 25–31.

¹² As with tobacco debates, there are questions about whether vaporization will make cannabis more attractive to youth. For an exchange on this topic, see A. J. Budney, J. D. Sargent, and D. C. Lee, “Vaping Cannabis (Marijuana): Parallel Concerns to Ecigs?” *Addiction*, Vol. 110, No. 11, 2015, pp. 1699–1704, and the subsequent commentaries.

¹³ C. Russell, S. Rueda, R. Room, M. Tyndall, and B. Fischer, “Routes of Administration for Cannabis Use—Basic Prevalence and Related Health Outcomes: A Scoping Review and Synthesis,” *International Journal of Drug Policy*, Vol. 52, 2018, pp. 87–96.

¹⁴ P. van der Pol, N. Liebrechts, T. Brunt, J. van Amsterdam, R. de Graaf, W. van den Brink, and M. van Laar, “Cross-Sectional and Prospective Relation of Cannabis Potency, Dosing and Smoking Behaviour with Cannabis Dependence: An Ecological Study,” *Addiction*, 2014, Vol. 109, pp. 1101–1109.

¹⁵ T. P. Freeman, C. J. Morgan, C. Hindocha, G. Schafer, R.K. Das, and H.V. Curran. “Just Say ‘Know’: How Do Cannabinoid Concentrations Influence Users’ Estimates of Cannabis Potency and the Amount They Roll in Joints?,” *Addiction*, 2014, Vol. 109, pp. 1686–1694.

prohibition on some products or to impose a potency cap on certain products for the nonmedical market (e.g., waxes over a certain concentration of THC). Another option is to impose a sunset clause that would prohibit sales of certain products for a fixed period of time; after the time elapsed, the products would be allowed for sale if no further action was taken.

Even if the federal government allows producers to sell high-potency concentrates, that does not mean provinces and territories are required to sell them or allow their sale as soon as they are available. The government wholesalers could also choose a “wait and see” approach before allowing certain products into the legal, nonmedical market.

If certain products are unavailable, users may look for them in the illicit market, but this is not a certainty. Some users may like the convenience of purchasing regulated products from a store and simply decide not to bother with the hassle of the illicit market for prohibited products that lack quality standards; others may prefer the prohibited unregulated products, running the risk of being caught violating the law. Much will depend on the size of the illicit market after legalization, which will not only be shaped by competition with the nonmedical and medical markets, but also by the amount of enforcement pressure applied to those participating in the illicit market. In jurisdictions that are aggressive about minimizing the size of the illicit market, the law enforcement costs associated with cannabis could actually increase in the short run after legalization.

With legalization, the illicit market will not disappear overnight. The question confronting policymakers is how quickly they want to reduce it. If the only goal is to get rid of the illicit market as quickly as possible, then policymakers should flood the market with minimally regulated products to quickly drive prices down to the point where it will make little sense to sell them in the illicit market. Those who care more about public health will likely want a well-regulated market that prioritizes accurate testing and labeling, even if this keeps prices higher and slows the decline in the size of the illicit market. Ultimately, some people are willing to tolerate continued illicit activity on a smaller scale if it means that certain products are not part of the legal commercial market; others are not. Understanding where people fall on this spectrum can make for much more productive conversations about cannabis policy.

*Fourth, jurisdictions could nudge users to lower-potency cannabis products by charging more per unit of THC for higher-potency products.*¹⁶ In jurisdictions with government control over the wholesale and retail markets, regulators can simply set a higher price per unit of THC for certain products. When price setting is not an option, governments could levy a tax based on THC content that increases along with the amount of THC in the product. This is consistent with the approach recommended in the final report of the Task Force on Cannabis Legalization and Regulation: “Develop strategies to encourage consumption of less potent cannabis, including a price and tax scheme based on potency to discourage purchase of high-potency products.”

¹⁶ R. MacCoun, “California Assembly Bill 390 and the Tax and Regulate Ballot Initiative: What Would Happen if California Legalized Marijuana,” presentation at the fourth annual conference of the International Society for the Study of Drug Policy, 2010; and J. Caulkins, B. Kilmer, M. A. R. Kleiman, R. J. MacCoun, G. Midgette, P. Oglesby, R. L. Pacula, and P. H. Reuter, *Considering Marijuana Legalization: Insights for Vermont and Other Jurisdictions*, Santa Monica, Calif.: RAND Corporation, RR-864, 2015.

Taxing as a function of THC (or any other combination of cannabinoids) is straightforward if the jurisdiction has a rigorous testing and labeling system.¹⁷ In cases when potency testing is based on taking samples from large lots of flower, regulators could require that cannabinoid ranges be published on the labels instead of point estimates, and the tax, for example, could be based on the upper value of the 95-percent confidence interval for THC.¹⁸

If the testing regimes yields inconsistent results or the system can be corrupted, this creates challenges for labeling and levying THC taxes. In this situation, jurisdictions could consider using the company-stated THC level as the base for an alternative minimum tax. As I have noted in other testimony:

Until rigorous methods are developed to test the heterogeneous plant material, the company-stated THC content could be used as a tax. Of course, sellers may try to dodge the tax by falsely understating the THC content. To help reduce gaming, the reported THC could be used as an alternative minimum tax base; that is, it could only apply when the primary tax base (e.g., price or weight) yielded a low tax that was inconsistent with high-stated THC. The tax that would be paid would be the larger of (1) the tax computed using the primary base and (2) the tax computed using the stated THC.¹⁹

In summary, we know little about the health consequences—both the risks and benefits—of many of the cannabis products likely to be sold in nonmedical markets if C-45 becomes law. We also know very little about how the presence of higher-potency products affects THC consumption. Cautious policymakers focused on public health have many options when it comes to potency, ranging from temporary bans on certain products to potency caps to price setting to imposing taxes based on THC content. These options come with advantages and disadvantages that deserve more attention in discussions about cannabis legalization in Canada.

¹⁷ My colleague Pat Oglesby correctly notes that this is a big “if.” Much will depend on who does the testing, what is being tested, how the testing is done, who regulates and tests the testers, and the expected sanction for noncompliance. For more on cannabis taxes, see P. Oglesby, “Laws to Tax Marijuana,” 59 *State Tax Notes* 251-80, January 24, 2011; Center for New Revenue, “Taxing Marijuana Potency—Rose Habib,” webpage, February 17, 2014; Caulkins et al., 2015; J. Caulkins, “A Principled Approach to Taxing Marijuana,” *National Review*, Summer 2017.

¹⁸ This tax could eventually be based on the THC-CBD ratio.

¹⁹ B. Kilmer, *Marijuana Legalization, Government Revenues, and Public Budgets: Ten Factors to Consider*, Santa Monica, Calif.: RAND Corporation, CT-449, 2016. My colleague Mark Kleiman notes that using stated THC as a tax base sets up usefully opposed incentives; e.g., a producer who wants to dodge taxes cannot claim high potency in its marketing.