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Cannabis Research in Times of Legalization: What's on the Agenda

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Table of Contents

Introduction.....	1
Public Health and Harm Reduction Approaches	1
Public Safety and Illegal Market	2
Retail Models and Cannabis Industry Influence	3
Regulation and the Variety of Products	4
Measuring Cannabis Consumption Internationally	5
Progress and Outlook.....	6
References	7



Introduction

Key Points

- An international workshop with recognized cannabis researchers and policy experts from around the world was held online on February 8, 2021.
- The discussions focused on questions and issues related to the production of scientific evidence about the consequences of cannabis legalization and forms of regulation.
- Motives for legalizing or decriminalizing cannabis for recreational use vary according to different contexts and are reflected in different choices about regulatory measures.
- Researchers need to assess public health consequences in relation to product formats.
- There seems to be a tendency among regulators to favour commercial retail models to the neglect of middle-ground options.
- International cooperation among researchers and experts is required to meet the challenges of measuring consumption and implementing regulatory frameworks and legal models.
- Gathering data before and after policy changes is essential in evaluating their impact.
- The use of comparable indicators across jurisdictions is important to ensure that knowledge can be shared across jurisdictions.

After decades of cannabis prohibition, in recent years a small number of countries have legalized cannabis for recreational use and are gaining experience with varying regulatory measures. Policy makers around the world are eagerly looking at preliminary findings from these countries. To promote the exchange of experience and networking among international cannabis experts and researchers, the Department of Political Science at the University of Zurich and the Canadian Centre on Substance Use and Addiction co-organized an online workshop on February 8, 2021, called **Cannabis Research in Times of Legalization: What's on the Agenda**.

After current policy debates in the United States, Uruguay, Canada, the Netherlands and Switzerland were presented by experts from these countries, participants engaged in discussion around five overarching topics. This report summarizes the workshop discussions of those five topics: public health and harm reduction approaches, public safety and illegal markets, retail models and cannabis industry influence, regulation and the variety of products, and measuring cannabis consumption internationally. The discussions concluded with consideration of progress and outlook. Given the limitations of the virtual format and the time available, the intention of the workshop was to begin a dialogue rather than to thoroughly explore all considerations related to cannabis regulation.

Public Health and Harm Reduction Approaches

When cannabis regulations and their potential public health implications were discussed during the workshop, it became clear that the public health implications of cannabis consumption depend on a more nuanced assessment of product format. In the United States, for example, there are few restrictions on the type of products sold in retail stores, which tends to have more negative public



health implications than when only dried cannabis flowers are sold. However, there is often little scientific evidence on the public health impacts of newer cannabis products and means of consumption, including cannabis vaping and its potential for harm reduction.

From the Netherlands, it was reported that the government had long discussed the public health benefits of quality controls, but eventually realized it would be difficult to define concrete goals and specific public health indicators to measure them. Those discussions included setting THC limits for products, but this approach was ultimately rejected due to insufficient scientific evidence. There was also consideration of how legalized cannabis use for non-medical purposes affects the use of other substances. The scientific evidence on this issue is mixed, although it should be noted that heterogeneous populations were studied. When the results are broken down to specific groups, more consistent trends emerge. For example, in the group of people who use in high-risk ways, it is relatively clear that poly-substance use prevails. It is also difficult to transfer findings on the public health consequences of the regulation of other substances such as alcohol. For public health-oriented regulation, some experts highlight the Uruguayan model, which minimizes the influence of the industry but offers consumers a variety of alternatives to the illicit market through pharmacies, self-cultivation and cannabis social clubs. Participants also noted there is little scientific evidence on how contaminants such as pesticides could affect consumer health. While regulators in some countries have set limits on contaminants, the evidence base for these limits is unclear and more research is needed.

Health promotion, education and risk reduction for youth are key elements of a public health approach. Different age restrictions apply in countries with legalization experience and there is also variety at the subnational level. The ideal age for allowing use has not been conclusively determined. While there are no definitive scientific findings, some participants stated that age limits must be consistent with the regulation of alcohol and tobacco. Even with age restrictions, young people are not completely deterred from cannabis consumption as they can obtain the substance on the illegal market or from friends.

Public Safety and Illegal Markets

Participants of the workshop agreed on the need for additional information on the functioning and attractiveness of the illegal market after legalization. In Uruguay, the central aim of legalization has been to respond to growing public insecurity and reduce the leverage of criminal organizations involved in drug trafficking. Research was lacking on the central question of how organized criminal networks react to regulation of the market. Are criminal organizations offering new types of products? Are these higher potency products? Are they targeting new groups? Do these organizations join the legal market or engage in different criminal activities as a result of cannabis legalization? Evidence from Canada points in the direction of products being offered on the illicit market that are not available in licensed retail outlets.

The attraction of the illegal market is important because the proportion of young people among cannabis consumers is significantly higher than for alcohol and tobacco. Individuals restricted by age from legal markets could be pushed to obtain products on the illegal market. Experience from California shows that youth obtain cannabis from adults who buy high-quality products from official dispensaries. The attractiveness of the illegal market depends on how well the legislator succeeds in introducing high quality standards on the legal market, thus ensuring safety and demonstrating advantages to consumers. Quality standards could also have implications for public health. The impact of legalization on the illegal market cannot be conclusively assessed in any of the states with legalization experience. There is a long process before a stable market equilibrium is reached. Some



participants recommended that policy makers at the outset of legislative reforms admit that displacing the illegal market is a long-term process and short-term success is unlikely.

The question of where consumption takes place was also discussed. Decriminalization or legalization approaches have been promoted as a means to protect those who have been disproportionately impacted by prohibition, including people who are marginalized or have a lower socioeconomic status. However, data from the United States indicates that people in these groups are not necessarily being protected. For example, although no longer arrested for possession, these individuals are less likely to have access to safe spaces to consume — that is, privately-owned homes — and so face a greater chance of prosecution for use in public or in rental units. In Uruguay, low-income individuals are less likely to have the skills and access required to navigate the bureaucratic registry system, and points of sale are in upper- and middle-class neighbourhoods that are difficult for them to access. The unequal impact of reforms is seen by some workshop participants as one of the most pressing issues to be resolved. Researchers and policy makers should prioritize the design of regulations to promote equity, particularly for minorities and people with lower socioeconomic status (see Adinoff & Reiman, 2019; Owusu-Bempah & Luscombe, in press). Periodic legislative reviews are a way to ensure that legislation is achieving the desired objectives and they provide the chance to make adjustments as appropriate in response to an evolving market and lessons learned.

Retail Models and Cannabis Industry Influence

The cannabis industry is exerting influence on the regulatory process in several countries. Public authorities must be prepared to recognize and respond to such influence when developing regulations. Participants noted the value of beginning with more stringent regulatory measures because it is easier to relax them over time than to introduce more restrictive regulations later. Experiences with tobacco and alcohol provide lessons about industry strategy and influence. In some countries where legalization is currently being discussed, such as Australia, there is little appetite for commercial models because of the emphasis on public health and safety and the risk of corporate capture of the market. Regardless of the model, the state needs to develop a regulatory infrastructure of agencies or commissions to manage implementation and provide oversight.

The discussion also explored the availability of retail and corporate data. The ability to monitor corporate behaviour is essential to a public health orientation and to preventing or mitigating negative consequences for society. The industry holds a wealth of information, not only on their products, but also on consumer activities. Estimates of consumption patterns made through online self-assessments could be complemented by actual corporate sales figures. However, there is often a lack of mechanisms to obtain transparent and reliable data from the private sector and even from some public retailers. The regulatory approach in Uruguay with strong state involvement was described as a promising approach to limit commercial influence. However, the approach would not easily transfer to other political cultures with less acceptance of this level of state involvement. In Uruguay, citizens are accustomed to a state that is active in social policy areas. Data from Canada on density of retail outlets by province was mentioned to show the potential advantages of strong state involvement. The quantity of retail outlets is higher in provinces with a private retail model than in those with government-operated stores (Statistics Canada, 2019).

Exchanges at the workshop noted the tendency of policy makers to favour commercial regulatory models, despite the availability of a range of policy options (Caulkins & Kilmer, 2016). This tendency can be impacted by the policy context and objectives of regulation, including the degree to which public health is emphasized. Implementing known retail models, such as those for alcohol retail, limits the ability to collect data on and learn from a broader range of options and explore innovative



alternatives. One participant noted that a pilot project in Switzerland will help address this gap by offering cannabis in various sales settings and conducting qualitative research to see which settings constitute a good fit with which types of consumers or consumer needs. By including cannabis social clubs in its regulatory model, Uruguay has implemented a middle-ground option, between private and public sectors. However, it is an open question how quality standards are enforced in the largely autonomous cannabis social clubs. Because of the confidentiality of the data held by the government, it has not been possible to generate scientific knowledge about their operation and impact.

Regulation and the Variety of Products

The fourth topic participants discussed was the need for regulators to take into account different product formats and innovations. Current developments, especially in North America, show that the industry is innovative and is developing and offering new product forms such as edibles, vaporizers and oils. Research needs to broaden beyond that focused on dried flower products to the diverse and increasingly popular range of products available, especially given that dried flower products have a natural potency limit, while processed products can reach extremely high levels of THC and other cannabinoids. The participants also saw significant differences from other substances such as alcohol or tobacco, particularly as regards the therapeutic use of cannabis and the proportion of use among younger age groups. Participants noted the need to ensure that product diversity does not create new cannabis markets by appealing to new consumers.

Another issue raised and debated at the workshop concerned THC percentage, milligram thresholds and caps for cannabis products. It was observed that stricter limits could be introduced at the beginning of the regulatory process, which might then be relaxed at a later stage. Participants noted that THC thresholds could lead to heavy consumers simply consuming several units instead of one or seeking more potent products on the illegal market (Hughes, Ritter, Cowdery, & Phillips, 2014; Hughes, Hulme, & Ritter, 2020). When setting thresholds or caps, objectives such as promoting public health and safety versus reducing the illegal market must be weighed against each other to achieve a workable balance. In Canada, no caps were introduced, with the justification being the importance of discouraging illegal purchases. Nevertheless, pseudo-caps were introduced, such as a maximum of 10 milligrams of THC per unit or dispensed dose. It has also been argued that, from a consumer safety perspective, the absolute level of THC in the product needs to be considered alongside relative characteristics of consumers such as sex and body weight. Consumer education about relevant risk factors is also important in providing opportunities for informed choice.

For legislators, questions arise as to what consequences caps have for a THC-based levying of taxes and how testing procedures for THC levels are to be implemented. In the United States, there seems to be some gaming around measuring the THC content of products. In Canada, there has been a staged approach, in which only dried flower and oils were permitted during the first year of regulation, followed by the introduction of edibles, concentrates and topicals in the second year. Some jurisdictions within Canada have also chosen to impose further restrictions on product format; for example, the province of Quebec prohibits the sale of cannabis vaping products. For the promotion of public health it could make sense to offer such or similar products on the legal market instead of leaving a product segment to the illegal market without quality controls and accompanying measures. There was also a call for legislators to look closely at what caps ultimately mean for the amount of product actually consumed (Pacula, Blanchette, Lira, Smart, & Naimi, 2021).

Expert opinions on vaping vary. Some argued that vaping could be promoted as a healthier alternative to smoking cannabis. However, others objected that such product innovations need to be better understood before they can be recommended as potentially less harmful. Such understanding



is also needed to be able to instruct consumers and, if necessary, guide them toward less harmful alternatives. There is ongoing research in Canada on cannabis vaping (Canadian Institutes of Health Research, 2021). There is more research in Europe on the consequences of consuming different cannabis products than in the United States, where there is generally little research on the latest innovations.

Measuring Cannabis Consumption Internationally

The fifth and last topic discussed at the workshop concerns the measurement of cannabis consumption. Participants agreed that to enable increased comparability more international collaboration is required to develop shared tools to measure consumption behaviour and other aspects of cannabis use. There is a need for tools that measure cannabis use consistently across different contexts. How high prevalence values turn out sometimes depends on how questions are asked and the method of consumption that dominates in a particular region, a factor that can vary greatly internationally (Leventhal, Bae, Kechter, & Barrington-Trimis, 2020; Peters, Bae, Barrington-Trimis, Jarvis, & Leventhal, 2018). The increasing variety of products also makes measurement increasingly challenging. The challenge of developing a questionnaire that can be adapted to specific local contexts, regulatory frameworks and legal models will only be met with international cooperation among researchers and experts. Workshop participants discussed promising examples.

For the International Cannabis Policy Study, researchers developed a standard questionnaire that can measure the effect of cannabis legalization on consumption and identify cultural differences in consumption behaviour (Hammond et al., 2020). The Global Cannabis Cultivation Research Consortium developed a core questionnaire with optional modules that could be added depending on interests and issues in each country (Decorte, Potter, & Bouchard, 2011; Decorte & Potter, 2015). The European Drug Market Survey provides another attempt at consistent measuring of consumed quantities. The survey measured not only the number of units consumed, but also how much cannabis (herbal or resin) was used for a joint, which was determined with the help of photographs. The experience with the European Web Survey on Drugs: Patterns of Use by the European Monitoring Centre for Drugs and Drug Addiction (2020) was also reported. The original survey made no distinction between CBD and THC products, but the distinction was added in 2021 to better capture the different forms of cannabis in use. From France it was reported that teenagers aged 17 and older have been surveyed since 2005, using three indicators: their scores on the cannabis abuse screening test, how they obtain cannabis and their motives for consumption. In some U.S. states where cannabis has been legalized, various medical groups are developing and conducting surveys for patients (Young-Wolff et al., 2019). The questions asked by physicians of their patients might differ from items included in monitoring surveys. Nevertheless, this work could also be fruitful for international surveys.

In discussing measuring tools, participants mentioned that research teams in Europe and the United States have worked with photographs to enable more precise measurement of cannabis use or to better identify the actual consumption and purchases of people who use cannabis. The images allowed a more accurate description of the type and size or amount of the product consumed. In this context, the difficulty of defining a standard dose was raised (Casajuana Kögel et al., 2017; Hindocha, Norberg, & Tomko, 2018; Prince, Conner, & Pearson, 2018). In Switzerland, the advent of CBD made previously reliable measurements based on pictures unreliable and impacted the correlation between intensity and severity of consumption. Measuring tools based on photos are being made available by research teams to government regulatory agencies and other researchers, allowing for some consistency across jurisdictions and over time. Existing checklists and guidelines



that can be helpful in collecting data on consumption prevalence and problematic consumption were also mentioned (Fischer et al., 2017). Participants agreed that continued dialogue to identify mechanisms to improve consistency, reliability and validity of data collection is important, with standardized measuring tools a priority.

Progress and Outlook

Discussion at the workshop revealed that while the goals associated with the legalization of cannabis for non-medical purposes vary by country – including combating the illicit market and promoting public health or public safety as in Uruguay, or reducing justice system impacts and creating economic opportunity as in the United States – some common questions need to be addressed. In all contexts, there is a need for more reliable data and information, both from governments and industry, and for reliable measurement methods and tools that will enable knowledge transfer among varying contexts and over time. The COVID-19 pandemic has also had a significant impact on knowledge acquisition; for example, by changing distribution channels, introducing confounds for trend data or forcing researchers to change data collection strategies.

The workshop was intended to facilitate better networking among researchers across countries and continents and to contribute to the accumulation of reliable scientific knowledge sought by policy makers around the world. General agreement was reached on the idea of constructing international comparative questionnaires as a potential way forward. More specifically, a majority of participants saw an opportunity for future collaboration in developing a common research agenda in which internationally comparable questions on the prevalence of cannabis use might first be developed and then further modular sets of questions added depending on the context.

The Canadian Centre on Substance Use and Addiction and the University of Zurich are exploring approaches to facilitate ongoing dialogue with a focus on the priority topics and opportunities identified by workshop participants. Participants agreed that the opportunity to come together, discuss key topics of interest and learn from different perspectives and expertise added value beyond what could be achieved through the exchange of documents alone.



References

- Adinoff, B., & Reiman, A. (2019). Implementing social justice in the transition from illicit to legal cannabis. *American Journal of Drug and Alcohol Abuse*, 45(6), 673–688.
- Casajuana Kögel, C., Balcells-Olivero, M.M., López-Pelayo, H., Miquel, L., Teixidó, L., Colom, J. ... Gual, A. (2017). The standard joint unit. *Drug and Alcohol Dependence*, 176, 109–116.
- Caulkins, J.P., & Kilmer, B. (2016). Considering marijuana legalization carefully: Insights for other jurisdictions from analysis for Vermont. *Addiction*, 111(12), 2082–2089.
- Canadian Institutes of Health Research. (2021). Funding Decisions Database. Retrieved from <https://webapps.cihr-irsc.gc.ca/decisions/p/main.html?lang=en#fq={!tag=competitioncd}competitioncd%3A202006HEV&sort=namesort%20asc&start=0&rows=20>
- Decorte, T., & Potter, G.R. (2015). The globalisation of cannabis cultivation: A growing challenge. *International Journal of Drug Policy*, 26(3), 221–225.
- Decorte, T., Potter, G.R., & Bouchard, M. (Eds.). (2011). *World wide weed: Global trends in cannabis cultivation and its control*. Farnham, U.K.: Ashgate.
- European Monitoring Centre for Drugs and Drug Addiction. (2020). *European drug report 2020: Trends and developments*. Luxembourg: Publications Office of the European Union.
- Fischer, B., Russell, C., Sabioni, P., van den Brink, W., Le Foll, B., Hall, W., ... Room, R. (2017). Lower-risk cannabis use guidelines: A comprehensive update of evidence and recommendations. *American Journal of Public Health*, 107(8), e1–e12.
- Hammond, D., Goodman, S., Wadsworth, E., Rynard, V., Boudreau, C., & Hall, W. (2020). Evaluating the impacts of cannabis legalization: The International Cannabis Policy Study. *International Journal of Drug Policy*, 77, 102698.
- Hindocha, C., Norberg, M.M., & Tomko, R.L. (2018). Solving the problem of cannabis quantification. *The Lancet Psychiatry*, 5(4), e8.
- Hughes, C., Hulme, S., & Ritter, A. (2020). The relationship between drug price and purity and population level harm. *Trends and Issues in Crime and Criminal Justice*, 598, 1–25.
- Hughes, C., Ritter, A., Cowdery, N., & Phillips, B. (2014). Australian threshold quantities for ‘drug trafficking’: Are they placing drug users at risk of unjustified sanction? *Trends and Issues in Crime and Criminal Justice*, 467, 1–7.
- Leventhal, A.M., Bae, D., Kechter, A., & Barrington-Trimis, J.L. (2020). Psychiatric comorbidity in adolescent use and poly-use of combustible, vaporized, and edible cannabis products. *Journal of Psychiatric Research*, 124, 91–98.
- Owusu-Bempah, A., & Luscombe, A. (in press). Race, cannabis and the Canadian war on drugs: An examination of cannabis arrest data by race in five cities. *International Journal of Drug Policy*: Retrieved from <https://doi.org/10.1016/j.drugpo.2020.102937>
- Pacula, R.L., Blanchette, J.G., Lira, M.C., Smart, R., & Naimi, T.S. (2021). Current U.S. state cannabis sales limits allow large doses for use or diversion. *American Journal of Preventive Medicine*, 60(5), 701–705.



Peters, E.N., Bae, D., Barrington-Trimis, J.L., Jarvis, B.P., & Leventhal, A.M. (2018). Prevalence and sociodemographic correlates of adolescent use and polyuse of combustible, vaporized, and edible cannabis products. *JAMA Network Open*, 1(5), e182765.

Prince, M.A., Conner, B.T., & Pearson, M.R. (2018). Quantifying cannabis: A field study of marijuana quantity estimation. *Psychology of Addictive Behaviors*, 32(4), 426–433.

Statistics Canada. (2019). The retail cannabis market in Canada: A portrait of the first year. Retrieved from <https://www150.statcan.gc.ca/n1/pub/11-621-m/11-621-m2019005-eng.htm>

Young-Wolff, K.C., Sarovar, V., Tucker, L-Y., Avalos, L.A., Alexeeff, S., Conway, A., ... Goler, N. (2019). Trends in marijuana use among pregnant women with and without nausea and vomiting in pregnancy, 2009–2016. *Drug and Alcohol Dependence*, 196, 66–70.