Cannabis & driving research: Lessons from an unlikely teacher

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Abstract

The legalization of Cannabis has important implications for the life of Canadians including community mobility, law enforcement, and injury prevention, among others. In this context, and at the intersection between these dimensions of civic participation and public health, impaired driving emerges as a concern among the general public, and a risk for Canadian drivers and road users. The scientific community and government agencies have recognized a general need to build a body of evidence around cannabis-related research. However, common pitfalls to the generation of timely, suitable, and effective research must be avoided. This commentary presents a reflection on the role research must play in the development of proactive and pre-emptive action and applies it to the field of impaired driving. The latter is achieved by drawing on the example of alcohol-related research as a blueprint on the path to injury prevention in the context of cannabis-impaired driving.

Introduction

On October 17th, 2018, Canada became the second country to enact the legalization of recreational cannabis, joining Uruguay as the only countries with such federal legislation.[1-3] This legislative change has important implications for the life of Canadians beyond access to regulated product, including but not limited to: public health, injury prevention, community mobility, and law enforcement. Canadian provinces must now navigate these and other emerging challenges associated with the enactment of this legislation, a process for which the generation of scientific evidence is paramount. In fact, the federally commissioned 2016 Task Force on Cannabis Legalization and Regulation report states that their recommendations "reflect the fact that the current scientific understanding of cannabis impairment has gaps and that more research and evidence, investments in law enforcement capacity, technology and tools, and comprehensive public education are needed urgently."[4] However, the Canadian scientific community now faces a challenge of its own. The need for evidence and the expertise of multidisciplinary teams across the country constitute an ideal platform for evidence-informed action around cannabis legalization, but only if we can overcome the common pitfalls of siloed and disjointed work, an almost universally perceived barrier to the advancement of effective public health initiatives.[5,6] Furthermore, with legalization, establishing collaborations that leverage resources and expertise requires a proactive and pre-emptive approach to cannabis-related challenges, instead of the reactive care framework that characterizes the Canadian health system.[7]

The critical need for collaborative and proactive cannabis-related research in the Canadian context is heightened by the apparent increase in cannabis consumption since legalization. Through an online survey (n = 1,001 general population; 1,500 past-year cannabis users) conducted from December 13th to 21st, 2018, Resonance Consultancy and Valens Groworks found that: 23% of respondents have used cannabis since legalization; 16% of surveyed established cannabis users have increased their cannabis use in the months after legalization; and 5% of respondents indicated having used cannabis for the first time.[8] This is not surprising given that a careful examination of evidence from American states where legalization is in place indicated Canada should expect an increase in cannabis use, as well as in the incidence of risky behaviours such as driving under the influence of cannabis (DUIC), especially among youth.[9-12] This is concerning given that youth between the ages of 15 and 24, who represent 13% of the driving population, have the highest rates of cannabis use in Canada and account for more than 20% of road traffic fatalities and injuries.[13] Thus, it is necessary to generate contextually relevant data that can guide the development and implementation of feasible and effective interventions, with high levels of uptake and acceptability among those at-risk. Although cannabis legalization in the Canadian context is in its infancy, and although there are several challenges for the development of contextually relevant evidence as outlined, there is an unlikely teacher that has been immersed in the Canadian context for decades, journeying from prohibition to legalization to becoming part of the social and economic fabric of Canadian societies: alcohol. A careful and critical examination of approaches to alcohol and the development of evidence around alcohol-related impairment can serve as a blueprint to avoid repeating the same mistakes, and enhancing our ability to develop a proactive framework to cannabis-impaired driving research and education, in the context of injury prevention.

Cannabis: Implications of a Legalization Approach

In order to fully consider the lessons learned from alcohol and its potential applicability to cannabis, it is necessary to highlight the distinction between legalization and decriminalization that

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characterizes the global landscape of recreational cannabis. Decriminalization approaches, still within a framework of prohibition, attempt to decrease the disproportionate arrests and charges for simple possession by utilizing non-criminal penalties.[14] While cannabis remains illegal under a decriminalization approach, individuals in possession of cannabis less than a pre-established quantity do not face prosecution, and criminal sanctions for the behaviour are removed.[15] In doing so, decriminalization aims to also address the social determinants that have so heavily influenced cannabis possession arrests, namely age, race, and ethnicity, which persist in spite of similar patterns of recreational use across racial and ethnic groups.[14,16,17] Decriminalization is often criticized for failing to address issues resulting from a prohibition framework, including the development of illicit markets and the potential negative health effects of cannabis production without regulatory oversight.[14] In adopting a legalization framework, the Canadian federal government has aligned with a discourse around commitment to public health, by establishing and enforcing strict quality and safety regulations around production, distribution, and sales, as well as programs to support addiction treatment and education.[4] In spite of this goal, criticism of legalization persists given its practical implications for public health and safety. Figure 1 summarizes three of the most wide-spread criticisms facing cannabis legalization in Canada, and uses DUIC as an example to illustrate the risks that these criticisms convey.[15,18-21]

The criticisms can be broadly summarized in three categories: 1) the evidence, with various studies supporting the negative effects of cannabis on physical health (e.g. carcinogenesis and reproductive health) and mental health (e.g. gateway sequence to addiction and increased risk of schizophrenia);[15] 2) potentially rushed implementation, given that provinces must promptly enact regulations to control the market which might result in insufficient time to integrate available evidence or developing consultative and collaborative approaches across stakeholders;[19,22] and 3) insufficient public education, especially among certain demographics such as youth, with individuals aware of legalization but unaware of specific impact on health, or even uses that could still lead to criminal charges.[19,23] A concerning example of these criticisms materializes in DUIC: 1) cannabis is known to increase the risk of motor vehicle collisions (MVCs) and the death rates among vulnerable road users[24-26]; 2) in the absence of a confirmed body of evidence regarding concentration, variability among methods of consumption, and methods to determine cannabis metabolic rates on-road, law enforcement personnel will be making risky judgement calls about whether to lay charges for impaired driving[20,27]; and 3) young drivers are aware of cannabis legalization but express lack of concern regarding DUIC[21] in spite of the fact that they constitute an overrepresented population in MVC fatalities,[28] and that impaired driving remains illegal.[29] Although the criticisms to legalization have practical implications for fitness-to-drive research, and are therefore compelling from the point of view of this commentary, it is important to note that such criticisms may also be influenced by moral narratives around substance use. Daniell Malleck has written extensively on this issue,[30] and has used alcohol as a comparison for how Canadians have developed a morality of health that extends to cannabis use.[31]

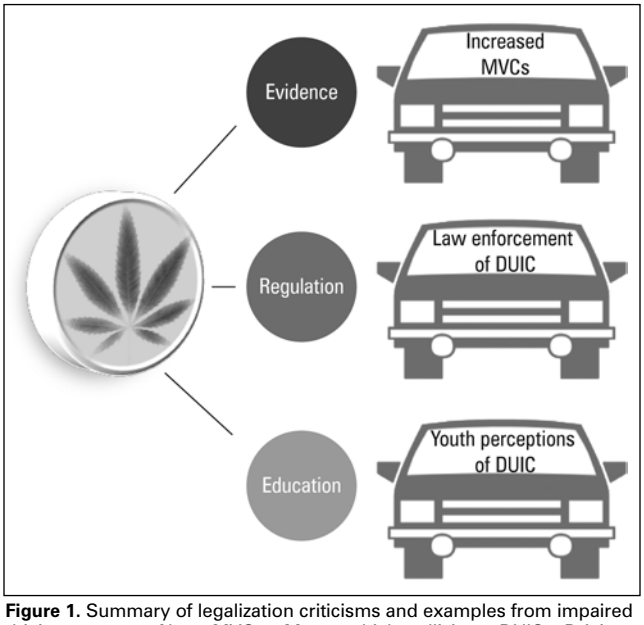

Figure 1. Summary of legalization criticisms and examples from impaired driving concerns. Note: MVCs= Motor vehicle collisions; DUIC= Driving under the influence of cannabis

Alcohol: An Unlikely Teacher

During the early 1900s the Canadian Federal Government required all provinces to pass alcohol prohibition laws in order to assist with the war efforts.[31] These laws, first implemented in Prince Edward Island, were also the result of years of advocacy of the temperance movement, a social and political movement that promoted moderation or abstinence as a way to alleviate social issues including crime.[32] Soon after the war, however, Canadians faced the repeal of prohibition laws and journeyed towards the legalization of alcohol across provinces. By 1948, all Canadian provinces had repealed prohibition laws and alcohol was produced, distributed, and sold across the country.[32] Similar to cannabis legalization, provincial governments were charged with regulating the distribution of alcohol and enacting its regulations, and there was much social debate and expressions of concern and fear.[33] With this backdrop, it would be hard to imagine then that the evidence surrounding alcohol consumption and the ever-evolving efforts for knowledge translation would become strong public health initiatives to prevent inappropriate use, such as drinking and driving.

Since then, much evidence has emerged on the impact of alcohol on human health. This has led to the development of evidence-based guidelines to advise Canadians on the risks of alcohol consumption, and the strategies to minimize negative effects for those who choose to drink. For example, the Canadian Centre on Substance Use and Addiction produced Canada's Low-Risk Drinking Guidelines recommending a maximum of 10 drinks/week for women without exceeding 2/day; and 15 drinks/week for men, without exceeding 3/day.[34]

In the context of impaired driving, the cumulative evidence against the use of alcohol has led to wide-spread public health initiatives and education efforts. Systematic literature reviews conclude that alcohol consumption can negatively impact driving performance.[35,36] Furthermore, recent evidence suggests that promising advances in drinking and driving prevention among youth might be possible through the implementation of short (<5

hrs of contact) interventions.[36] But these initiatives, or the fact that almost every driver in Canada has heard or read in some format that drinking and driving is an extremely risky behavior, did not develop overnight. As described by the Canadian Public Health Association:

> *"for nearly 90 years, government agencies, police services, traffic safety organization, public health and victims groups have been working to end impaired driving… Though significant progress has been made in the fight against impaired driving, particularly in the 1970s and 1980s, there is still much work to be done."*[37]

Where We've Been and Where to Go From Here

Over the last century, multiple stakeholders including researchers, government agencies, and advocacy groups, have contributed collectively to the adoption of evidence-based strategies and initiatives addressing alcohol-impaired driving. The adoption of evidence-informed blood alcohol concentration (BAC) level limits for drivers, increased sanctions for drivers under the influence of alcohol, and increased public attention and education around the dangers and moral implications of alcohol-impaired driving, are among such initiatives.[38] Over the years, especially in the 80s and 90s, such initiatives resulted in significant reductions in alcohol-related fatalities and severe injuries.[38,39] The development of such initiatives, however, did not follow a smooth and prompt linear trajectory from identifying the dangers and concerns to developing and implementing the necessary solutions. For example, developing the necessary evidence on the effectiveness of alcohol-impaired driving reduction strategies required not only disciplinary single component studies, but comprehensive, thorough, multicomponent programs that integrated community mobilization efforts.[40] Such programs have been effective in reducing alcohol-related crashes by addressing access to alcohol, responsible service provision and training, sobriety road checkpoints, public education, law-enforcement, and media advocacy among others.[40] Given their scope, such programs require greater financial and human resources, as well as partnerships across stakeholders. Furthermore, earlier research efforts faced multiple methodological challenges, including: the need for larger samples of individuals, communities, and localities to test the effectiveness of initiatives and interventions; the timing at which different initiatives were launched in different communities, which in turn makes it difficult to assess the effects of specific interventions; a lack of, or difficulty in, accessing detailed information about BAC levels in motor vehicle collision reports; and funding to conduct large scale studies that could consider representative population and environmental conditions.[39,40] As a result, decades of alcohol-related research efforts to overcome such challenges identified the need for: linkages and coalitions that enable coordinated and collaborative approaches to DUI prevention;[41] evidence-informed programs that enhance youth's personal skills and that understand and address the personal, social, and cultural determinants of DUI;[42,43] initiatives that integrate DUI interventions with other road safety initiatives such as other risky behaviors;[44] and a need to consider the effectiveness of DUI education including delivery methods, messaging, and reach.[45,46] Since the beginning of the 21st century, however, progress on the reduction of alcohol-impaired driving fatalities and injuries stagnated and rates have plateaued as a result of multiple factors including but not limited to: public complacency, competing public health and social issues, and the decrease in evidence informed strategies to sustain political and social efforts.[38,47]

Although this commentary does not constitute a systematic review of the literature around alcohol-impaired driving research, the progress made in combating alcohol-impaired driving and the remaining challenges illuminate at least four lessons we can learn from almost nine decades of efforts in this area. Table 1 summarizes four proposed lessons in the path to cannabis-related injury prevention as it relates to alcohol-impaired driving.

Table 1. Lessons learned from alcohol-impaired driving research

1.	We must partner effectively with drivers, driving school instructors, advocacy groups, government agencies, public health units, and victim groups, if we are to develop feasible and effective interventions that are also acceptable and suitable for high-risk populations such as youth. Not doing so can lead us down the path of developing efficacious interventions in the lab that produce little impact on the ground, and do not attend to the specific risk profiles and predictors of impaired driving.
2.	We must develop nation-wide and multidisciplinary research partnerships that leverage the financial, human, and infrastructure resources that enable the study of the effects of cannabis on driving performance. By not doing so, we risk the replication of efforts, limit the validity of our findings, and prolong the knowledge translation timeline.
3.	We must prioritize not only the development of guidelines around what constitutes cannabis-impairment when driving and how to detect it, but also understanding the individual, social, and cultural factors that influence a driver's decision to consume cannabis and drive.
4.	We must develop a body of evidence around the efficacy of education strategies including messaging, delivery method, and content regarding cannabis-impaired driving.

Conclusions

A recent Canadian Automobile Association (CAA) poll revealed that 69% of Canadians are concerned that roads will become more dangerous with cannabis legalization.[48] But legalization is here and we must own the challenge of building a body of evidence around its effects that enables proactive and pre-emptive action. Alcohol reminds us this is not the first time that a substance that sparks debate and controversy has made its way to Canadian regulated markets. However, it took decades to develop the synergies and partnerships required to effect change in the alcohol-impaired driving landscape. In addition, years of intervention research were necessary in order to realize the critical need to understand the determinants of impaired driving, as well as the need to examine educational strategies among other issues. And the work is not complete. We must learn the lessons alcohol can teach us, and move forward into collective dedicated action. The stakes are too high and the cost, human lives, inadmissible.

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