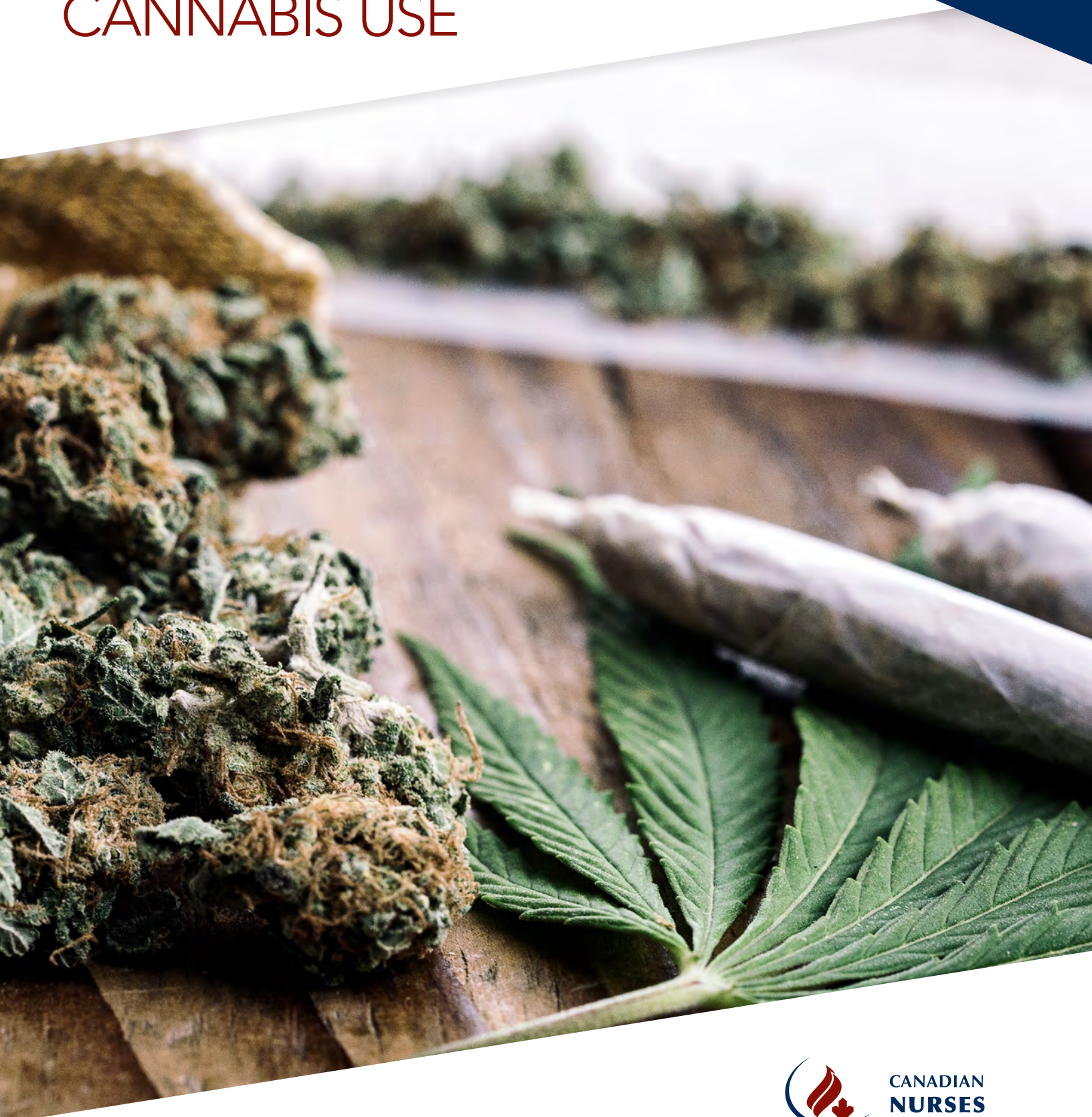


HARM REDUCTION FOR NON-MEDICAL CANNABIS USE



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CNA acknowledges the contribution of Lynda Balneaves, RN, PhD, in the development of this resource.

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Canadian Nurses Association
50 Driveway
Ottawa, Ont. K2P 1E2
CANADA

Tel.: 613-237-2133 or 1-800-361-8404

Fax: 613-237-3520

Website: www.cna-aiic.ca

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ISBN 978-1-55119-443-1

Updated January 2018

Introduction

Canada is moving toward legalizing non-medical cannabis, with the government announcing plans to do so by July 1, 2018. As of the date of this publication, cannabis remains a schedule II drug under the *Controlled Drugs and Substances Act* (CDSA) and, unless otherwise regulated for production and distribution for medical purposes, is still subject to offences under that act (Canada, Department of Justice, 2017).

Legalization is often seen as the best option for addressing the harms of cannabis. It allows for the regulation of quality, dose and potency. Legalization can also minimize social harms and eliminate the costs of prohibition (as part of the law enforcement approach), which could then be used for prevention, education, health and social programs. While legislation alone does not reduce the potential health risks and harms of cannabis,¹ it does provide governments with an opportunity to mitigate those risks.

Added to these advantages is the general agreement among key stakeholders and experts that Canada's current approach of criminalizing cannabis is ineffective, costly and reflects poor public policy. Based on the evidence, a public-health-oriented regulatory framework is recommended for the production, manufacture, distribution, product promotion and sale of cannabis.

As Canada moves toward legalization, it is important that a wide range of stakeholders, including nurses, prepare for the new legislation, consider its public health implications and work to mitigate the harms associated with non-medical cannabis through a harm reduction approach. Such a public health approach seeks to reduce

the adverse health, social and economic consequences of at-risk activities. [It] is part of a comprehensive health-care response to the health and social harms experienced by people who use substances, [which] complements abstinence, prevention and treatment strategies for substance use. [Harm reduction] is most commonly used in relation to public health programming with people who use psychoactive substances, but it can also be applied to programs that address alcohol use, sexual practices, cycling, driving, gaming and others. [It does not require that at-risk practices be discontinued; instead, the focus is] on promoting safety, preventing death and disability, and supporting safer use for the health and safety of all individuals, families and communities. (Canadian Nurses Association [CNA] & Canadian Association of Nurses in AIDS Care [CANAC], 2012, p. 1)

¹ Controlling access by youth is a major challenge of legalization.

The values of harm reduction also align with the primary values in CNA's *Code of Ethics for Registered Nurses* (2017), which guide professional ethical nursing practice:

- ▶ Providing safe, compassionate, competent and ethical care
- ▶ Promoting health and well-being
- ▶ Promoting and respecting informed decision-making
- ▶ Honouring dignity
- ▶ Maintaining privacy and confidentiality
- ▶ Promoting justice
- ▶ Being accountable

Nurses have “a responsibility to provide non-judgmental care to individuals and families affected by substance use, regardless of setting, social class, income, age, gender or ethnicity” (CNA & CANAC, p. 2), and they can influence the development of patient-centred, evidence-informed, organizational and governmental harm reduction policies related to substance use.

Cannabis use in Canada

Cannabis is the most commonly used illicit substance in Canada (Canadian Centre on Substance Use and Addiction² [CCSA], 2014b). Of particular significance are the high use rates among Canadian youth, many of whom start using cannabis in their late elementary school years. While rates have recently decreased, Canada still has the world's highest use rates among youth, with 28 per cent of 11-15 year olds reporting past year use in 2009-2010 (UNICEF, 2013). More recent statistics for Canadians aged 15-19, 20-24, and 25 years and older indicate past year use of 21, 30 and 10 per cent, respectively (Statistics Canada, 2017). In youth, non-medical cannabis use in Canada has a rate 2.5 times higher than adults age 25 and older (Statistics Canada, 2017).

There is a notable shift in public opinion about non-medical cannabis use, which has been accompanied by corresponding changes in Canada's national policies. Yet gaps in evidence remain about its short- and long-term health effects (harms and benefits) (National Academies of Sciences, Engineering, and Medicine [NASEM], 2017). While our understanding of the impact of non-medical cannabis use continues to grow, the link between early or frequent use and greater risk of harm is well established (Beirness,

² Formerly, the Canadian Centre on Substance Abuse.

Kalant, McInnes, Plecas, & Porath-Waller, 2016; Crépault, 2014; Fischer, et al., 2011; George & Vaccarino, 2015; Task Force on Cannabis Legalization and Regulation [TCLR], 2016).³

International regulation of non-medical cannabis

Regulatory options for cannabis fall along a continuum, from criminalization (the current Canadian model) to decriminalization to legalization (CCSA, 2016a).

Criminalization: “The production, distribution and possession of marijuana⁴ are subject to criminal justice sanctions ranging from fines to incarceration [in most countries]. Conviction results in a criminal record” (CCSA, 2014a, p. 2).

Decriminalization: “Non-criminal penalties, for example, civil sanctions such as tickets or fines, replace criminal penalties for personal possession. Individuals charged will not, in most cases, receive a criminal record. Most decriminalization models retain criminal sanctions for larger-scale production and distribution” (CCSA, 2014a, p. 2).

Legalization: “Criminal sanctions are removed”; however, criminal charges and jail sentences are proposed for distributing to youth or engaging them in production. “The substance is generally still subject to regulation that imposes guidelines and restrictions on use, production and distribution, similar to the regulation of alcohol and tobacco” (CCSA, 2014a, p. 2).

Within this continuum, countries employ different approaches. While the criminalization of production, distribution or possession can lead to the death penalty in China, in the U.S. and Canada these actions result in incarceration. Among countries or states that have decriminalized cannabis, the Netherlands uses a formal warning system, Vermont imposes a civil fine and Portugal uses a diversion to treatment approach for non-criminal penalties. Among those with legalized and regulated cannabis, Uruguay allows personal production, Washington state allows personal possession and Colorado allows the commercialization of cannabis (CCSA, 2014a).

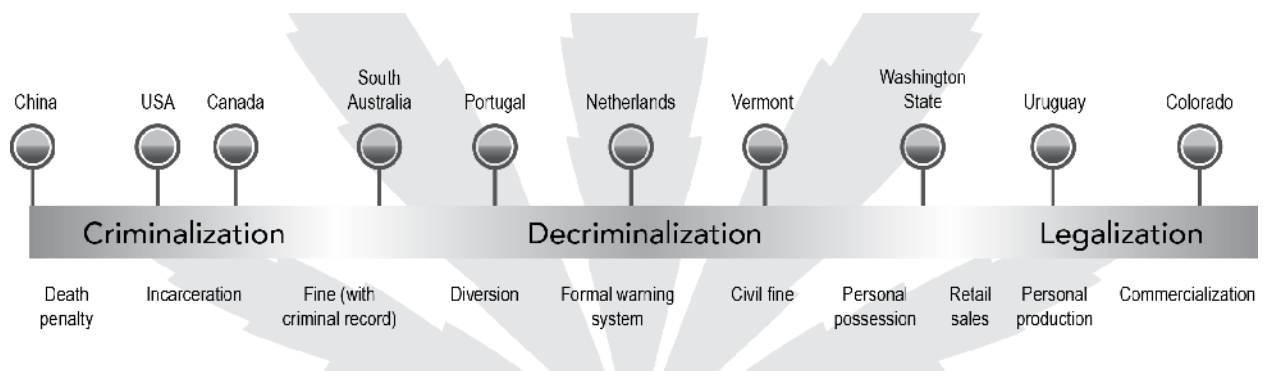
Colorado and Washington have common features in their regulatory approaches, such as a minimum purchase age of 21, a public ban on use, and driving under the influence charges (if drivers register five or more nanograms of active tetrahydrocannabinol [THC] per millilitre of whole blood). However, there are some key differences. Washington bans personal production, whereas Colorado permits up to six plants per household and

³ This link is discussed in greater detail under the following sections: Health effects of non-medical cannabis use; Persons vulnerable to harms of use; and Reducing harms of use.

⁴ In conjunction with the federal government’s decision to move forward with decriminalization, the preferred term for marijuana is now *cannabis*.

sales by licensed retail outlets (CCSA, 2014a). More recently, California, Massachusetts, Maine, Nevada and the District of Columbia have passed measures legalizing non-medical cannabis, though for many of these jurisdictions the measures will not become law until 2018 (Governing, 2017).

The following diagram depicts the regulatory continuum.



Adapted with permission from the Canadian Centre on Substance Use and Addiction (2016a).

Internationally, criminalization is still the dominant model for cannabis policy (CCSA, 2014a). However, a public health approach is becoming a theme in both policy and action, as statements and reports from international organizations show.⁵ In addition, different models of decriminalization have been used in certain countries for decades and, more recently, some U.S. states have legalized cannabis (CCSA, 2014a).

Evidence suggests that a decriminalization approach can reduce some of the adverse social impacts of criminalization (Room et al., 2010). Proponents of decriminalization argue that removing criminal penalties for cannabis possession should result in a reduction in some of these societal harms and costs; for example, by having fewer people involved in the criminal justice system and lowering costs for law enforcement (Crépault, 2014). A criminal record not only limits an individual's ability to travel to certain countries (such as the U.S.), it leads to considerable social harms. Among youth, for instance, a record can be an access barrier to the volunteering often required by school curriculums.⁶ A criminal record can also diminish career opportunities and contribute to poverty and poorer health outcomes (CCSA, 2014b).

⁵ For example, the Vienna Non-Governmental Organization Committee and Scientific Advisory Committee discussed the need for a public health approach to substance use at the 2014 UN Commission on Narcotic Drugs High-Level Review. The Organization of American States agreed with this direction, stipulating that decriminalization should be a key component of this approach (CCSA, 2014a).

⁶ Volunteering is often essential for completing high school, and it provides valuable practical experience for the job market.

There is also minimal evidence that decriminalizing cannabis leads to the increased use of non-medical cannabis or to cannabis use disorder (Crépault, 2014). Yet, one great drawback of prohibition (that continues under decriminalization) is that cannabis remains outside the regulated market. Consequently, users “know little or nothing about its potency or quality. As long as cannabis use is illegal, it is difficult for health care or education professionals to effectively address and help prevent problematic use. The law enforcement focus of prohibition drives cannabis users away from prevention, risk reduction and treatment services” (Crépault, 2014, p. 9).

Regulation of non-medical cannabis in Canada

As noted, the Canadian government plans to legalize non-medical cannabis, effective July 1, 2018. Presently, the CDSA

prohibits and identifies criminal sanctions for the production, possession and trafficking of marijuana as a Schedule II substance. Sanctions range from fines to prison sentences, depending on the nature of the offense. In 2012, the *Safe Streets and Communities Act* introduced mandatory minimum sentences for illegal drug offenses, including marijuana. Mandatory minimums apply if aggravating factors are present, such as trafficking near a school (two-year minimum sentence) or association with a criminal organization (one-year minimum sentence). Offenders can avoid mandatory minimum sentences through completion of an approved treatment program. (CCSA, 2014a, p. 3)

Yet, implementing these cannabis laws has “a significant impact on Canada’s enforcement and criminal justice resources. More than half of the drug crimes reported by police in 2013 were for the possession of marijuana” (CCSA, 2014a, p. 3). Each year, Canada spends more than a billion dollars to enforce cannabis possession laws, arresting about “60,000 Canadians for simple possession, [which is] nearly 3% of all arrests. . . . At least 500,000 Canadians carry a criminal record for this offense” (Crépault, 2014, p. 6).

The policy direction to legalize, regulate and restrict access to non-medical cannabis echoes the previous call of three Canadian parliamentary reports: the Le Dain Commission (1972), the Senate special committee on illegal drugs (2002) and the House of Commons special committee on the non-medical use of drugs (2003). All concluded that “Canada’s current policy approach results in a level of harm due to criminalization that is disproportionate to the harms associated with marijuana use itself” (CCSA, 2014a, p. 2). Other reports, from the Canadian Bar Association (1994), CCSA (1998), the Centre for Addiction and Mental Health (2000), the Fraser Institute (2001), the Canadian Drug Policy Coalition (2013), and the Canadian Public Health Association (2014), similarly conclude that the “criminalization of cannabis use is ineffective, costly, and constitutes poor public policy” (Crépault, 2014, p. 7).

Legalization would remove the social harms and costs of prohibition. It would also eliminate one billion dollars in law enforcement costs (and the harms that arise from the unequal application of those laws), the involvement of cannabis users in the illicit drug market and the restrictions that a criminal record places on opportunities for employment, volunteer work, housing and travel. In a jurisdiction where cannabis production and distribution are legal and properly regulated, criminal involvement related to those activities should shrink significantly, if not disappear altogether.

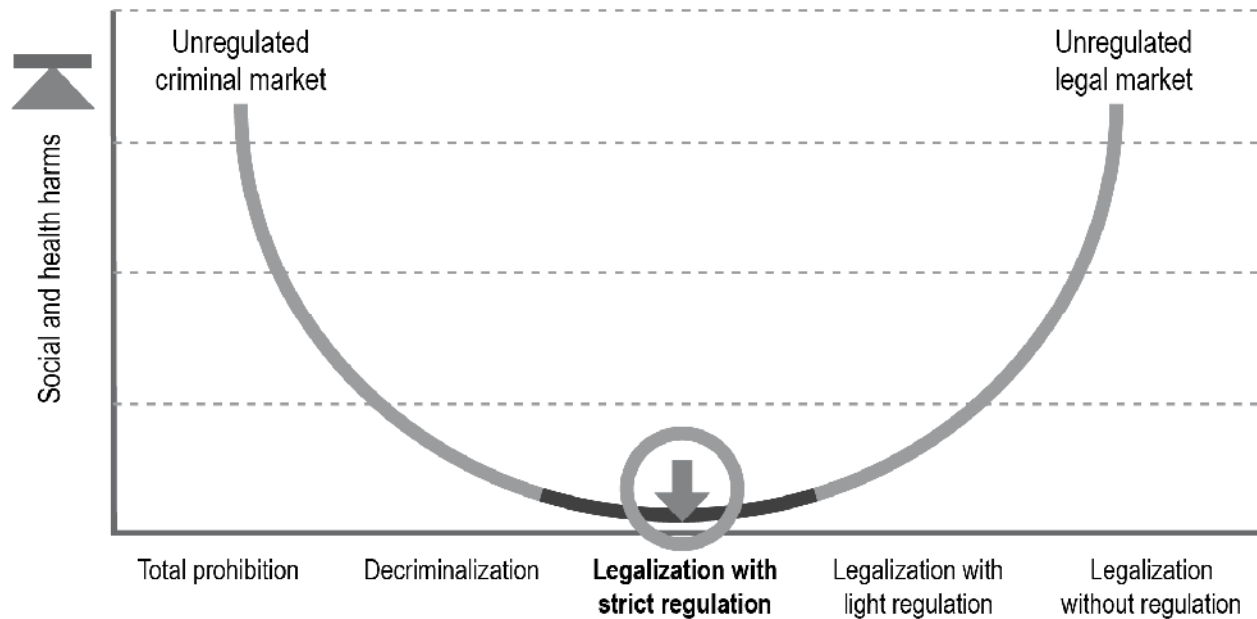
Room et al. (2010) has noted four evidence-based pillars on which the move toward legalization are grounded:

- ▶ Prohibition has not deterred or decreased cannabis use.
- ▶ The risks and harms of cannabis are lower than those of tobacco or alcohol.
- ▶ Cannabis can and should be separated from illicit drug markets, in which users are exposed to other (more dangerous) illicit substances.
- ▶ The resources spent enforcing laws against personal cannabis use can be better allocated elsewhere.

Canada's legal reform of non-medical cannabis provides an opportunity "to implement a public health approach to cannabis that reduces its harms to individuals and society" (Crépault, 2014, p. 7).

Yet, as Crépault notes (2014), legalization itself does not reduce the health risks and harms of cannabis. It simply lets governments regulate cannabis with a view to mitigating those risks — something prohibition or decriminalization cannot do effectively. With legalization, therefore, a fine balance is necessary, since a legal and unregulated (or under-regulated) approach could increase cannabis use and its associated harms. This balance is also essential for ensuring that legalization leads to an overall benefit for public safety and health while protecting those who are vulnerable to cannabis-related harms. According to Apfel (2014), "whether legalization is a net positive or negative for public health and safety largely depends on regulatory decisions and how they are implemented" (p. 1).

The conceptual model presented below illustrates how total prohibition on the one hand and unregulated legalization on the other can result in similarly severe health and social harms.



Adapted with permission from Marks (1991) and Rolles & Murkin (n.d.).

Health effects of non-medical cannabis use⁷

CAMH's *Cannabis Policy Framework* (Crépault, 2014) notes that, for an average adult user, the health risks of non-medical cannabis are significantly lower than those of tobacco and alcohol. Yet, it is important to note that non-medical cannabis use is not without risk.

Existing evidence demonstrates several potential health effects related to non-medical cannabis use, though experts agree that additional research is needed to identify these and to further develop tools and strategies to prevent adverse outcomes (Crépault, 2014; TCLR, 2016; NASEM, 2017).

⁷ This paper focuses solely on the health effects of non-medical cannabis use.

Current research indicates that much of the health-related harms of non-medical cannabis use fall into the following categories:

- ▶ Respiratory effects
- ▶ Cannabis use disorder
- ▶ Mental health issues
- ▶ Cannabis and driving
- ▶ Accidental overdose

Respiratory effects

Substantial evidence shows an association between cannabis smoking and respiratory symptoms, which include coughing, wheezing, shortness of breath on exertion and episodes of chronic bronchitis (McInnis & Plecas, 2016; NASEM, 2017). About half of Canadian adults who have smoked cannabis in the past year smoke tobacco as well. Current research suggests that tobacco smoking is likely the primary cause of (or a strong contributor to) many of these respiratory problems (Fischer et al., 2011). Like tobacco, cannabis smoke contains tar and other known cancer-causing agents. While cannabis smokers tend to smoke less frequently than tobacco smokers, they often hold unfiltered smoke in their lungs for maximum effect, which adds to these risks (Tetrault et al., 2007).

When cannabis is smoked, the toxic by-products of combustion are released and inhaled. Vaporizers appear to hold promise as a way of reducing (though not eliminating) the harms associated with inhalation. Some studies show a reduction in the inhalation of toxins and carcinogens through “vaping,” as compared to the regular smoking of cannabis (Abrams et al., 2007; Hall & Fischer, 2010). The rate of respiratory symptoms (e.g., bronchitis, wheezing, shortness of breath) in persons who used a vaporizer to consume non-medical cannabis was 40 per cent of that reported by cannabis smokers (Hall & Fischer, 2010). Yet, while some may believe vaping to be less-harmful than smoking, more evidence is required to fully support this conclusion (Fischer et al., 2011; TCLR, 2016).

Cannabis use disorder

The DSM-5 defines cannabis use disorder, as “a problematic pattern of cannabis use leading to clinically significant impairment or distress” (Genen, 2017, para. 4). About nine per cent of cannabis users develop this type of dependence⁸ (George & Vaccarino, 2015; Lopez-Quintero et al., 2011). Comparatively speaking, the estimated probability of

⁸ Cannabis use disorder is often referred to as *dependence*.

developing dependence is 68 per cent for nicotine, 23 per cent for alcohol and 21 per cent for cocaine (Lopez-Quintero et al., 2011). People who develop cannabis dependence

may have difficulty quitting or cutting down and may persist in using it despite negative consequences; those who stop suddenly may experience mild withdrawal symptoms including irritability, [anger, aggression], anxiety, upset stomach, loss of appetite [or weight loss], disturbed sleep, [restlessness] and depression. Long-term, frequent users have a higher risk of dependence than occasional users. (Crépault, 2014, p. 4; Genen, 2017)

Mental health issues

Research has identified links between cannabis use and mental health issues. While additional data is needed, some evidence links chronic cannabis use with depression, anxiety and suicidal behaviours (George & Vaccarino, 2015; McInnis & Porath-Waller, 2016). Schizophrenia and psychosis are additional concerns. A systematic meta-analysis (Large, Sharma, Compton, Slade, & Nielssen, 2011) points to a relationship between cannabis use and the earlier onset of psychotic illness. Even occasional use may raise these risks: estimates show that persons using cannabis can increase their risk of psychosis by as much as 40 per cent, compared to non-users (Crépault, 2014). Frequent and early cannabis use is associated with an even higher risk — as much as 50 to 200 per cent higher than non-users — particularly for individuals who have a personal or family history of psychosis (Fischer et al., 2011; McInnis & Porath-Waller, 2016; NASEM, 2017; Volkow, Baler, Compton, & Weiss, 2014). Although not well defined, this risk may also indicate “a possible dose response [where] cannabis with a high concentration of tetrahydrocannabinol (THC), the main psychoactive component of cannabis, puts users at higher risk of mental health problems than low-potency cannabis” (Crépault, 2014, p. 4; McInnis & Porath-Waller, 2016). There is emerging evidence that highlights increased rates of memory impairment, paranoia and cannabis-induced psychosis after use of high-potency cannabis products. Of particular concern are synthetic cannabinoid products, which can contain very high THC concentrations (Fischer et al., 2017). While “the association between cannabis use and mental illness is robust, [it is] not yet well understood, [and] causality has not been determined” (Crépault, 2014, p. 4).

Cannabis and driving

From a public health perspective, drug-impaired driving is one of the most significant harms of cannabis use. Cannabis impairs psychomotor, cognitive and memory performance, which can impair driving and significantly increase the risk of a motor vehicle crash (Beirness & Porath-Waller, 2015; Fischer et al., 2011; McKiernan & Fleming, 2017; NASEM, 2017). While the risk of an accident from cannabis-impaired driving is lower than that of alcohol (Capler, Bilsker, Van Pelt, & MacPherson, 2017; Fischer et al., 2011; Hartman & Huestis, 2013), it remains a very significant concern. The main contribution of cannabis

to Canada's burden of disease and injury is from motor vehicle collisions related to cannabis-impaired driving (Crépault, 2014). The risk of motor vehicle collisions is further increased when cannabis is consumed together with alcohol (Hall, 2015). Despite the statistics, an evidence review from the Canadian Drug Policy Coalition notes that more than 50 per cent of cannabis users believe that driving after use does not increase the risk of accidents (Capler et al., 2017).⁹

Among youth, driving after cannabis use is more prevalent than driving after drinking, and data from Ontario shows that cannabis is the most common (currently) illicit substance used by young drivers (McKiernan & Fleming, 2017). Next to alcohol, cannabis is "the most commonly detected substance among drivers who die in traffic crashes" in Canada (Beirness & Porath-Waller, 2015, p. 1).

Additional data from Ontario notes that approximately "9% of licensed drivers aged 18 to 29 and 10% of those in grades 10 to 12 report having driven within an hour of using cannabis in the past year. Rates of cannabis-impaired driving exceed rates of alcohol-impaired driving for both age groups" (Crépault, 2014, p. 3). The likelihood of driving after cannabis use and of being involved in a motor-vehicle crash attributed to cannabis use are greater among frequent or daily users (Fischer et al., 2011).

While a roadside breath test, similar to what is used to detect alcohol, is not currently available, law enforcement has tools and expertise to detect cannabis-impaired drivers (Beirness & Porath-Waller, 2015; Fischer, et al., 2011). There is much debate about what specific level of cannabis in the blood or oral fluid would indicate likely impairment (Capler et al., 2017; CCSA, 2016b). At the time of writing, there is no "per se" level for cannabis — that is, an amount in the blood or oral fluid after which it would be considered an offence to operate a motorized vehicle. A review of the evidence indicates that more research and better testing methods are required.

Until these methods are developed, determining impairment involves screening at the roadside followed by toxicology testing for confirmation (Capler, et al., 2017). Law enforcement uses the drug and evaluation classification (DEC) program to identify and evaluate behaviours associated with cannabis intoxication, though this type of observational test does not meet minimum standards for sensitivity and specificity (Capler, et al., 2017). Collecting sufficient evidence that would allow for drug-impaired driving charges requires a combination of urine, oral fluid and/or blood testing (Beirness & Porath-Waller, 2015).

⁹ This perception may be higher among youth.

Accidental overdose

A lesser known but important harm of non-medical cannabis use is the increased risk of unintentional overdose injuries. These injuries arise most often after the ingestion of cannabis-infused foods, also known as edibles (NASEM, 2017), which come in many forms, including candies and baked goods such as cookies or brownies.

When inhaling cannabis the desired effect or “high” is almost immediate, peaking after about 30 minutes, and subsiding after 1 to 3.5 hours (MacCoun & Mello, 2015; NASEM, 2017). When cannabis is ingested, it takes longer to produce the desired effect. In some cases it may take from as long as 30 minutes to 2 hours to feel the effect, which may last 5 to 8 hours or longer (NASEM, 2017). Edibles have been linked to the ingestion of excessive amounts of cannabis by users who thought the initial dose was not enough (MacCoun & Mello, 2015; NASEM, 2017).

Accidental overdoses also occur in pediatric populations, frequently resulting in respiratory distress (NASEM, 2017; Wang et al., 2016). Other clinical effects noticed in children presenting after accidental ingestion include drowsiness or lethargy, ataxia, dizziness, agitation, vomiting, tachycardia, dystonia, muscle rigidity, respiratory depression and seizures (Wang, et al., 2016). In these cases, the ingestion often occurs in children who mistake edibles for candy. In one study out of Colorado, “almost half of the patients seen in the children’s hospital in the 2 years after legalization had exposures from non-medical marijuana, suggesting that legalization did affect the incidence of exposures” (Wang et al., 2016, para. 7).

Persons vulnerable to harms of use

Despite the need for additional research, there is general agreement from the existing evidence and expert consensus that potential adverse health effects are concentrated among a limited group of high-risk or vulnerable populations:

- ▶ Youth
- ▶ Pregnant women
- ▶ Persons with a personal or family history of psychosis

Youth

Research indicates that, because the brain is still developing until around age 25, the initiation of cannabis use prior to this age can alter brain structures or areas including those responsible for memory, cognition and executive functioning (Fischer et al., 2011; George & Vaccarino, 2015; McInnis & Porath-Waller, 2016).

Chronic use of cannabis also appears to have different effects on youth than on adults. While significant, lasting problems with cognition, memory and attention can occur with frequent cannabis use among youth, the same response does not appear to be the case for adults. When adults discontinue chronic use, such cognitive deficits can sometimes be reversed. The same may not be true for youths who begin using in early adolescence (George & Vaccarino, 2015; McInnis & Porath-Waller, 2016).

Not only can early cannabis use increase risk for long-term cognitive changes, it is also a risk factor for the development of cannabis use disorder, with greater frequency resulting in greater risk (Fischer et al., 2011; NASEM, 2017).

Pregnant women

Regular cannabis use during pregnancy has been linked to low birth weight and has also been shown to affect children's cognitive functioning, behaviour and mental health (Porath-Waller, 2015; NASEM, 2017). The impact on children's learning ability has been noted at around age three, and it persists into the teenage years (Porath-Waller, 2015). In addition, children exposed to cannabis prenatally are more likely to smoke tobacco and experience substance use and delinquency issues (Porath-Waller, 2015).

Persons with a personal or family history of psychosis

As noted, chronic cannabis use and the early initiation of cannabis use are associated with an increased risk for schizophrenia, psychosis and psychotic symptoms (Fischer et al., 2011; McInnis & Porath-Waller, 2016; NASEM, 2017; Volkow et al., 2014). The relationship between cannabis use and psychosis is much more likely in cannabis users with a pre-existing genetic risk or a personal or family history of psychotic symptoms (Fischer et al., 2011; McInnis & Porath-Waller, 2016).

Reducing harms of use

Unlike other substances with which consumption poses a risk, such as alcohol or tobacco, there is a lack of universally accepted standards to "help guide individuals as they make choices regarding the issues of if, when, where, and how to use cannabis safely" for non-medical purposes (NASEM, 2017, p. 1). Despite this gap, researchers, clinicians, policy-makers and stakeholders recognize a need for focused efforts to decrease harms related to non-medical cannabis use (Crépault, 2014; Fischer et al., 2011; TCLR, 2016).

Legalization is an important step for reducing the harms of non-medical cannabis use. Not only can it decrease social harms associated with criminalization, it can also provide a framework for regulating products and access while diverting potential law enforcement funds toward public-health-focused initiatives such as education, prevention and treatment. Given the evidence — which suggests that the majority of harms specifically occur in

vulnerable or high-risk populations, and that these risk factors are potentially modifiable — education and harm reduction measures should be targeted to these groups to have maximum effect where they are needed.

Various cannabis harm reduction recommendations are emerging that can guide non-medical cannabis education as Canada moves forward with legalization. Fischer et al., (2011 & 2017), for example, developed lower risk cannabis use guidelines, modelled on low-risk drinking guidelines that were available in Canada and internationally. After reviewing current evidence, these cannabis use guidelines were created by identifying ways to reduce harms associated with a number of potentially modifiable factors: frequency of use, early onset of use, driving after use, methods and practices of use, and characteristics of specific populations. The guidelines were updated in 2017 and have been endorsed by a number of organizations, including the Centre for Addiction and Mental Health and the Canadian Public Health Association, as an educational means of reducing high-risk cannabis use and practices. Additional cannabis harm reduction recommendations have been jointly developed by the Centre for Addictions Research of B.C. at the University of Victoria and by Vancouver Coastal Health (2016).

How to lower the health risks of cannabis use

Although abstinence is the only way to completely avoid the health risks of cannabis use, those who do use cannabis can expect to reduce these risks by adopting the following recommendations:

- 1. Delay use until early adulthood.**

Since the risk of dependence is higher when use begins at an earlier age, cannabis use disorder and its related health harms may be reduced or avoided if use is delayed until early adulthood.

- 2. Minimize frequency of use.**

Because the risk of harm increases with the rate of use, avoid frequent, daily or near-daily use.

- 3. Try to stop when use becomes hard to control.**

Frequent users of non-medical cannabis who experience difficulty controlling their use should attempt to stop, with professional help, as necessary.

4. Minimize respiratory complications.

To reduce respiratory complications avoid smoking cannabis with tobacco, refrain from deep inhalation and breath-holding, and consider using a vaporizer rather than smoking.

5. Avoid using amounts that are large or highly concentrated.

Be wary of excessive use or high-potency THC cannabis, including synthetic cannabinoid products. Consider adjusting the dose by using only the amount needed to achieve the desired effect.

6. Refrain from using non-medical cannabis with alcohol.

Mixing non-medical cannabis with alcohol can increase impairment exponentially and can also cause anxiety, nausea, vomiting or fainting.

7. Don't drive while high.

And don't get in a vehicle if the driver is high. Given that the effect of cannabis consumed by inhalation typically peaks after 30 minutes and gradually subsides after 1 to 3.5 hours (though cognitive impairment may last for up to 6 hours), people should not drive for at least 6 hours after use by inhalation (longer after use by ingestion). Wait longer if high-potency products or larger doses were used, if acute impairment persists or if the cannabis was used with other substances (including alcohol).

8. Share with care.

Users should take care to minimize lip contact with joints or implements for smoking or vaporization. Shared items that come in contact with the lips increase the risk of transmitting infections, including meningitis, influenza and other pathogens.

9. Vulnerable groups should abstain from use.

An increased risk for cannabis-related problems can occur in high-risk groups, including pregnant women and individuals with a personal or family history of psychosis. These groups should avoid use altogether.

10. Use caution when ingesting cannabis.

To avoid accidental overdose with cannabis edibles, "start low and go slow." States where cannabis is legal recommend starting with no more than 10 mg of THC and waiting at least two hours before ingesting more (University of

Washington Alcohol and Drug Abuse Institute, 2017). To avoid accidental overdoses with children or pets, store edibles and other cannabis products safely and out of reach (Wang et al., 2014).

These ten recommendations provide a starting place for reducing the harms of non-medical cannabis use as Canada moves forward with legalization. These guidelines should be revisited as new evidence on the harms of non-medical cannabis use become available and the impact of legalization becomes more apparent.

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