

Research paper

Are dispensaries indispensable? Patient experiences of access to cannabis from medical cannabis dispensaries in Canada



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ABSTRACT

Background: In 2001, Canada established a federal program for cannabis for therapeutic purposes (CTP). Medical cannabis dispensaries (dispensaries) are widely accessed as a source of CTP despite storefront sales of cannabis being illegal. The discrepancy between legal status and social practice has fuelled active debate regarding the role of dispensaries. The present study aims to inform this debate by analysing CTP user experiences with different CTP sources, and comparing dispensary users to those accessing CTP from other sources.

Methods: We compared sociodemographic characteristics, health related factors and patterns of cannabis use of 445 respondents, 215 who accessed CTP from dispensaries with 230 who accessed other sources. We compared patients' ratings of CTP sources (dispensaries, Health Canada's supplier, self-production, other producer, friend or acquaintance, street dealer) for *quality and availability of product, safety and efficiency of access, cost, and feeling respected while accessing*.

Results: Patients using dispensaries were older, more likely to have arthritis and HIV/AIDS, and less likely to have mental health conditions than those not using dispensaries. Those accessing dispensaries used larger quantities of cannabis, placed greater value on access to specific strains, and were more likely to have legal authorization for CTP. Dispensaries were rated equally to or more favourably than other sources of CTP for *quality, safety, availability, efficiency and feeling respected*, and less favourably than self-production and other producer for *cost*.

Conclusion: Given the high endorsement of dispensaries by patients, future regulations should consider including dispensaries as a source of CTP and address known barriers to access such as cost and health care provider support. Further research should assess the impact of the addition of licensed producers on the role and perceived value of dispensaries within the Canadian medical cannabis system.

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For over half a century, international regulations have confined almost all cannabis access and distribution to illicit markets. However, the dramatic resurgence of interest in the therapeutic use of cannabis has invigorated debate and innovation related to the provision of cannabis for therapeutic purposes (CTP). Canada was the second country in the world to establish a federal program for CTP distribution, and Canadian CTP users have engaged both legal and illegal avenues for accessing CTP. Of these avenues,

legally prohibited storefront medical cannabis dispensaries (hereafter 'dispensaries') are one of the most widely accessed, and have garnered substantial attention from the public and policymakers. The role of dispensaries has been the subject of active and contentious debate; whereas proponents endorse the provision of a valuable health service and locate dispensaries within a tradition of conscientious civil disobedience, others have protested the illicit nature of these operations (Canadian Association of Medical Cannabis Dispensaries, 2011; Capler, 2010; Koven, 2016; Lucas, 2008). The present study adopts a patient-centred approach to comparing sources of access to CTP, with a focus on the relative status of dispensaries.

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Dispensaries have not been included as an authorized source of CTP in Canada's federal government regulations for medical cannabis to date. Pre-dating Canada's legal CTP program, and modelled after the venues that emerged in the United States following the 1996 passage of a medical cannabis ballot initiative in California, dispensaries have been in operation in select communities throughout Canada since 1997 (Capler, 2010). The primary purpose of dispensaries, also known as compassion clubs, is to provide high quality cannabis to those in medical need. Medical need is typically verified by dispensaries through documented confirmation of a medical condition for which CTP is indicated or a recommendation from a licensed health care provider (Capler & Lucas, 2006).

In 2001, a court ruling confirmed the constitutional right of Canadians to use CTP (*R. v. Parker*, 2000). In response to the ruling, the government of Canada – through the office of Health Canada – published the *Marihuana Medical Access Regulations* (MMAR), which established eligibility criteria and a process for obtaining authorization to possess and access a legal supply of CTP (Government of Canada, 2001). Applications were processed centrally by Health Canada, and successful applicants were presented with three legal options for accessing CTP: self-producing, designating another person to produce on one's behalf, and purchasing cannabis from a single private government-contracted supplier. The MMAR were in effect from July 2001 until April 2014, and were replaced by the *Marihuana for Medical Purpose Regulations* (MMPR) (Government of Canada, 2013), under which the government no longer contracted a single private company and phased out personal and designated production licenses. Instead, authorized Canadians could mail-order cannabis from commercial producers licensed by Health Canada. The regulations stipulated security and production requirements for these licensed producers. Neither the MMAR nor MMPR included dispensaries as a legal option for accessing CTP.

Notwithstanding accelerating growth in the last few years of its tenure, fewer than 5% of the more than 500,000 estimated users of CTP in Canada registered under the MMAR (Adlaf, Begun, & Sawka, 2005), indicating that the majority of Canadian CTP users accessed cannabis without federal approval. Several factors have been proposed to explain the low uptake of the MMAR, and barriers to access under this program have been well characterized (Belle-Isle & Hathaway, 2007; Belle-Isle et al., 2014). Indeed, only 7% of patients authorized under the MMAR accessed CTP exclusively from legal sources, with as many as 80% shown to obtain CTP from dispensaries (Belle-Isle et al., 2014; Walsh et al., 2013). The inadequacies of access under the MMAR, and the MMPR, resulted in several patient-led legal challenges to the program. In one such challenge, the court noted the existence of storefront medical cannabis dispensaries, which had “historically provided a safe source of marijuana to those with the medical need” (*Hitzig v. Canada*, 2003). In another challenge, the court noted that “dispensaries are the heart of cannabis access” (*Allard et al. v. Canada*, 2014). The MMPR were replaced by the *Access to Cannabis for Medical Purposes Regulations* (ACMPR) in August 2016 (Government of Canada, 2016), which reinstated personal and designated production licenses in addition to the licensed producers. Dispensaries were not included as an authorized source of CTP in the ACMPR. Currently, approximately 130,000 patients are registered with one of Canada's 43 licensed producers (Health Canada, 2017).

In 2013, when the MMPR came into effect, there were approximately 40 dispensaries nationwide, serving an estimated 40,000 patients (Canadian Association of Medical Cannabis Dispensaries, 2013). A proliferation of dispensaries in Canada followed, with national estimates from April 2016 indicating over 175 dispensaries in operation, mostly concentrated in larger urban

centres in British Columbia and Ontario (Cain, 2016; Fumano, 2016; Kari, 2016; Reid, 2016; Wilson, 2016). It is estimated that dispensaries are serving between 100,000 and 200,000 patients (Hager, 2015). In the regulatory gap for dispensaries, some dispensaries jointly developed their own self-regulation, including standards of operation and a certification program, to foster best practices and engender support from various stakeholders (Canadian Association of Medical Cannabis Dispensaries, 2014). There is a wide range of dispensary models, and they vary in the quality and types of products and services they provide. While some of these dispensaries focus exclusively on CTP users, others may also cater to non-medical users. The cannabis supplied by dispensaries is unregulated. Despite their illegal status at the federal level, tolerance for dispensaries varies considerably across jurisdictions, and some municipalities have developed licensing systems to regulate these establishments despite the federal prohibition (City of Vancouver, 2015; City of Victoria, 2016). Debate regarding the role of dispensaries has accelerated since the April 2017 introduction by the Canadian government of legislation legalizing and regulating the sale of cannabis for nonmedical use, expected to be implemented in the Summer of 2018 (Bill C-45, 2017). The Bill proposes that the provinces and territories formulate regulations for distribution and retail, which may include storefront dispensaries. Regulations for medical cannabis may be impacted by these new regulations in the future.

The present study was designed to inform the current debate in Canada surrounding the potential role of dispensaries in CTP access. To our knowledge, this study is the first to focus specifically on CTP user experiences of dispensaries, and to compare these experiences with those of accessing CTP from other legal and illegal sources, namely from friends or acquaintances, street dealers, self-production (with or without a license), other producers (with or without a license), and the government contracted producer under the MMAR. These analyses help to characterize patients accessing dispensaries by comparing them to CTP users who access cannabis from other available sources and provide novel information regarding features that distinguish dispensaries from those other sources of access. Given the dearth of empirical research investigating CTP access, and growing interest in regulating cannabis, this study provides historical context for emerging data regarding access to cannabis under new and evolving regulatory frameworks for medical and nonmedical cannabis use in Canada. This study also has the potential to inform policy development in Canada and other nations grappling with similar issues.

Methods

Participants were 445 adults drawn from the Cannabis Access for Medical Purposes Study (CAMPS; for more details of study characteristics see Walsh et al., 2013). Respondents were current users of CTP in 2011–2012 drawn from two samples; a *national* sample ($n = 366$) that completed the questionnaire online and a *local* sample ($n = 79$) that completed the survey in-person at a single British Columbia dispensary. The *local* group consisted of members of the dispensary who were either authorized to possess cannabis through Health Canada or had documented confirmation of a medical condition for which CTP shows therapeutic benefits. This recruitment strategy was selected as it allowed for comparison of the less controlled online *national* condition with the confirmed CTP users queried in-person in the *local* condition. Participants in the *local* group received a \$10 compensation and help from research assistants; participants in the *national* group did not receive financial compensation or assistance. Health Canada authorization to possess cannabis for medical purposes was reported by 30% ($n = 133$). The survey was developed by a team comprising academic researchers, representatives from community-based and

non-governmental organizations, and people who use CTP. The questionnaire consisted of 414 questions that queried demographics, CTP use, medical condition and symptoms for which they were using CTP, communications with health care providers, access to and experiences with CTP, and general indicators of health and well-being. The survey was organized in a hierarchical manner, with skip logic, such that exposure to many items was contingent on prior responses. As a result, the number of recorded responses varied across items. All reported percentages are based on number of responses to given items rather than on the entire sample. Organizations and media that serve people who use CTP assisted with promoting the online survey (e.g., Canadian AIDS Society, Canadian Aboriginal AIDS Network, dispensaries, social media). The study was approved by the Behavioural Research Ethics Board of the University of British Columbia.

We conducted two sets of analyses. In the first, we compared socio-demographic characteristics (i.e., gender, age, ethnicity, income, education), health related factors (i.e., medical condition, health status, relationship with health care provider and Health Canada authorization), and cannabis use patterns (i.e., amount of cannabis used, mode of use, and preferred type of cannabis) of respondents who accessed CTP from dispensaries exclusively or in combination with other sources ($n = 215$, 48%), to those who did not use dispensaries ($n = 230$, 52%). Comparisons were conducted using χ^2 tests for dichotomous variables and ANOVA for continuous analyses. The second set of analyses included respondents who accessed CTP from a dispensary and from at least one other source ($n = 156$) using within-person comparisons of ratings related to dispensaries relative to ratings of other sources of access (i.e., private company under contract with Health Canada, self-production, other producer, friend or acquaintance, street dealer) on a five-point Likert-type scale of their perception of *quality of product and safety of access*, their satisfaction with *availability of product, efficiency of access*, and *cost*, and their level of *feeling respected while accessing*.

Results

Descriptive statistics and comparisons of dispensary users and those not using dispensaries are displayed in Table 1. Respondents

were primarily male, European-Canadian, and ranged in age from 17 to 78 (mean age = 39.3, SD = 13.0). Comparisons identified differences across sociodemographic characteristics, health variables and cannabis use factors. With regard to sociodemographic characteristics, dispensary users were similar to those not using dispensaries with regard to gender ($\chi^2(1) = 0.22$, $p > .05$), ethnicity ($\chi^2(1) = 0.02$, $p > .05$), income ($\chi^2(1) = 3.01$, $p > .05$) and education ($\chi^2(1) = 0.05$, $p > .05$). The only demographic difference we identified was that dispensary users were older than non-dispensary users ($F(1,421) = 25.18$, $p < .01$). Regarding health variables, dispensary users were more likely to report HIV/AIDS ($\chi^2(1) = 11.00$, $p < .01$) and arthritis ($\chi^2(1) = 7.02$, $p < .01$) as the conditions for which they use CTP, whereas respondents who did not use dispensaries were more likely to report using CTP to address mental health conditions ($\chi^2(1) = 27.37$, $p < .01$). Dispensary users were also substantially more likely to have discussed CTP use with a physician ($\chi^2(1) = 75.27$, $p < .01$) and to have obtained Health Canada authorization to use CTP ($\chi^2(1) = 54.46$, $p < .01$). Dispensary users and those not using dispensaries did not differ in self-reported ratings of their health (excellent, very good, good, fair, or poor) ($\chi^2(1) = 0.32$, $p > .05$). With regard to cannabis use, dispensary users were more likely to use larger amounts of cannabis (i.e., >14 g/week) ($\chi^2(1) = 7.62$, $p < .01$), and were also more likely to value access to a specific preferred strain of cannabis ($\chi^2(1) = 5.69$, $p < .05$). Dispensary users were not more likely to value variety of strains ($\chi^2(1) = 3.46$, $p > .05$), nor did they differ from those not using dispensaries on preference for smoking cannabis ($\chi^2(1) = 0.46$, $p > .05$) or oral administration ($\chi^2(1) = 0.74$, $p > .05$).

As shown in Fig. 1, dispensaries were rated as 'good' or 'very good' on all parameters other than cost by close to or above 90% of those who used them. Most respondents who used dispensaries also accessed cannabis from other sources ($n = 156$, 73%). We conducted within-subject analyses that compared continuous scores on a 5-point scale for those who used dispensaries and another source in order to directly compare perceptions of individuals who had accessed via dispensaries and at least one other mode. The most frequently reported other source of access was from a friend ($n = 110$, 51%). Analyses comparing access from dispensaries with access from a friend indicated that access from

Table 1
Demographic, health, and cannabis use characteristics.

	All		Dispensary		Non-Dispensary	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Demographic characteristics</i>						
Mean age	39.3	–	45.5**	–	36.3**	–
Male	294	67%	145	68%	149	66%
European-Canadian	408	92%	198	92%	210	92%
<\$30,000 income	210	48%	110	52%	100	44%
<High school education	188	42%	92	43%	96	42%
<i>Health characteristics</i>						
HIV/AIDS	46	11%	33**	16%	13**	6%
Arthritis	66	15%	42**	20%	24**	11%
Pain – Spinal	53	12%	25	12%	28	13%
Pain – Other	80	18%	38	18%	42	19%
Mood	78	18%	17**	8%	61**	27%
Fair/poor health	146	34%	73	36%	73	33%
Discussed CTP with physician	356	80%	208**	97%	148**	64%
Health Canada authorized	133	30%	100**	47%	33*	14%
<i>Cannabis use</i>						
>14g per day	167	41%	95**	48%	72**	34%
Access preferred strains	321	73%	167*	78%	154*	68%
Access variety of strains	357	81%	181	84%	176	77%
Smoking preferred method	259	59%	121	57%	138	60%
Oral preferred method	108	25%	56	27%	52	23%

Note: Comparisons are for each group versus aggregation of all other groups.

* $p < .05$.

** $p < .01$.

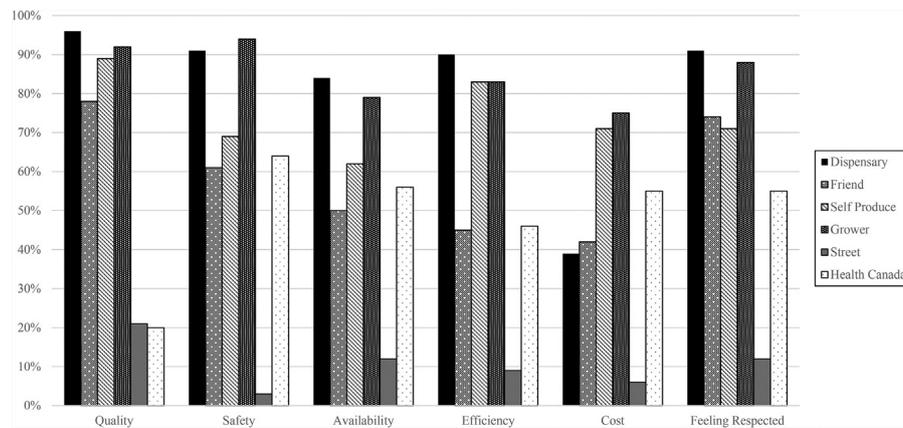


Fig. 1. Percent of respondents reporting “good” or “very good” for Quality, Safety, Availability, Efficiency, Cost, and Feeling Respected for each mode of CTP access (Dispensary, $n = 156$; Friend, $n = 110$; Self-Production, $n = 55$; Other Grower, $n = 48$; Street, $n = 32$; and Health Canada’s supplier, $n = 10$).

dispensaries was perceived to be superior with regard to the majority of parameters: Quality ($F(1,109) = 27.52, p < .01$), Safety ($F(1,108) = 35.84, p < .01$), Availability ($F(1,108) = 32.17, p < .01$), Efficiency ($F(1,108) = 65.05, p < .01$), and Feeling Respected ($F(1,106) = 65.05, p < .01$). Access from a friend was rated as equivalent to dispensaries with regard to Cost ($F(1,108) = 1.52, p > .05$). Self-production was the second most frequently reported other source of access ($n = 55, 26\%$). Self-production was rated as being inferior to dispensary access with regard to Safety ($F(1,55) = 11.93, p < .01$), Availability ($F(1,55) = 10.84, p < .01$), and Feeling Respected ($F(1,55) = 5.45, p = .02$), and was rated more favourably with regard to Cost ($F(1,55) = 35.89, p < .01$). Ratings of self-production were equivalent to dispensary ratings for Quality ($F(1,55) = 2.18, p > .05$) and Efficiency ($F(1,54) = 3.75, p > .05$). Access from other producers was reported by 22% ($n = 48$) of dispensary users and was rated as being equivalent to dispensary access with regard to Quality ($F(1,47) = 0.55, p > .05$), Safety ($F(1,47) = 0.64, p > .05$), Availability ($F(1,47) = 0.06, p > .05$), Efficiency ($F(1,47) = 0.07, p > .05$), and Feeling Respected ($F(1,47) = 0.00, p > .05$). Access from other producers was ranked more favourably with regard to Cost compared to dispensaries ($F(1,47) = 24.35, p < .01$). Access from the street was reported by 15% of those using dispensaries ($n = 32$), and was rated as being inferior to dispensary access across all parameters [Quality ($F(1,32) = 85.71, p < .01$), Safety ($F(1,32) = 142.14, p < .01$), Availability ($F(1,32) = 81.21, p < .01$), Efficiency ($F(1,32) = 119.21, p < .01$), Cost ($F(1,32) = 25.22, p < .05$), Feeling Respected ($F(1,32) = 95.96, p < .01$)]. Access from Health Canada was only reported by 5% of dispensary users ($n = 10$), which limits the value of statistical significance testing to examine differences. Nonetheless, the Quality of Health Canada cannabis was rated as inferior to dispensary cannabis ($F(1,9) = 25.14, p < .01$). Health Canada access was rated statistically equivalent to dispensary access across the remaining parameters [Safety ($F(1,10) = 2.17, p > .05$), Availability ($F(1,8) = 2.17, p > .05$), Efficiency ($F(1,10) = 3.60, p > .05$), Cost ($F(1,10) = 1.68, p > .05$), Feeling Respected ($F(1,10) = 1.54, p > .05$)].

The local sample was drawn from a single dispensary and comprised a substantial portion of those who used dispensaries (37%). To examine the extent to which differences related to dispensary use were due to overrepresentations by clients of this particular dispensary rather than to dispensaries more broadly we conducted a parallel series of analyses that excluded the local sample. Supplementary analyses excluding those in the local condition evinced an equivalent pattern of results, with only two modest divergences. In both cases the smaller sample evinced

relationships that were not evident in the inclusive sample – no relationships identified in the larger sample were absent in the restricted sample. First, in the restricted sample, dispensary users identified access to a variety of strains as being more important than did respondents who did not use dispensaries ($\chi^2(1) = 5.15, p < .05$). Second, in within-subject analyses, participants identified accessing other producer as superior to dispensary with regard to Safety ($F(1,38) = 6.17, p < .05$).

Discussion

We found that those using dispensaries and those not using dispensaries, although similar in many regards, differed on sociodemographic, health and cannabis use factors. Respondents who accessed CTP from dispensaries were older, and were more likely to have discussed CTP use with their health care provider and to have received CTP authorization from Health Canada under the MMAR. Individuals who used dispensaries were also more likely to report using cannabis to address symptoms of HIV/AIDS and arthritis, and less likely to use cannabis to treat mental health conditions. Those accessing dispensaries used greater quantities of cannabis, and placed higher importance on access to a specific preferred strain of cannabis.

Regarding age, respondents who used dispensaries were older than those not using dispensaries, perhaps reflecting that services that these dispensaries provide, such as storefront access and personalized service, may be particularly appealing to older adults. Also, Canadian census data indicate that older adults are the group least likely to use cannabis in a non-medical context (Rotermann & Langlois, 2015), perhaps due to its illegality. As such, dispensaries may be the most easily accessible source for older Canadian adults, given their relative unfamiliarity with and hence poorer access to cannabis from less formal illicit sources, and the more general barriers to obtaining legal authorization (Belle-Isle et al., 2014).

Our finding of higher levels of MMAR authorization and physician communication among dispensary users may reflect common criteria for MMAR authorization and access to dispensaries, both of which require documentation from health care practitioners. Interestingly, it appears that encouraging patient-physician communication regarding the therapeutic use of cannabis may be an unanticipated, and potentially salutary, correlate of the emergence of dispensaries. High levels of MMAR authorization among dispensary users raises the possibility that dispensaries may have encouraged MMAR registration. Despite the exclusion of dispensaries from the MMAR, some individuals may

have registered with the MMAR primarily for the legal protection it afforded them with the intention of accessing the reportedly higher-quality and greater selection provided by dispensaries, many of which accept evidence of MMAR authorization as documentation for registering patients. Further research is required to determine the extent to which this practice continues under the current ACMPR.

A prior analysis conducted with a sample that overlapped with the present sample reported higher levels of CTP-related health care practitioner communication among individuals with HIV/AIDS and arthritis (Belle-Isle et al., 2014). Our findings of greater dispensary use among these groups may be related to such communication. Arthritis and HIV/AIDS were among the first conditions included in the MMAR (Canada Gazette, 2001), and severe arthritis accounted for 65% of those authorized (Arthritis Society, 2015). Individuals with HIV/AIDS were early and active proponents of legal access to CTP in Canada, and as such the use of CTP to address symptoms related to HIV/AIDS may be relatively well recognized by health care providers (Belle-Isle, 2006; Wakeford v. Canada, 1998). In short, HIV/AIDS and arthritis may be conditions for which support from a health care practitioner – and attendant access to dispensaries – is relatively easier to obtain. Conversely, there appear to be more obstacles for obtaining support from health care practitioners for those seeking authorization to use CTP to treat mental health conditions (Belle-Isle et al., 2014), and we found that these individuals were underrepresented among dispensary users. Difficulties obtaining support from health care practitioners for mental health conditions may be a result of the relative dearth of research examining cannabis use for these conditions, and equivocal results. It has been proposed that some strains of cannabis may be beneficial while others may aggravate symptoms, possibly as a result of ratios of the cannabinoids Δ^9 -tetrahydrocannabinol (THC) and cannabidiol (CBD) (Morgan & Curran, 2008; Schubart et al., 2011). Such new evidence may lead to increased health care providers support for this use. Along with the concurrent stigma related to these conditions and to cannabis use (Bottorff et al., 2013; Walsh et al., 2013; Walsh et al., 2017), the blurred boundaries between nonmedical and medicinal cannabis use may also be a deterrent for health care practitioners (Belackova et al., 2014; Ziemianski et al., 2015), perhaps more so for mental health conditions given the psychoactive effects of cannabis, and the recreational use of other substances, such as alcohol, to address symptoms such as anxiety and depression. This is concerning as it suggests that individuals with mental health conditions may have to resort to reportedly lower quality and less safe illicit sources to access CTP (Belackova, Tomkova, & Zabransky, 2016). Future research and physician education that address identified knowledge gaps may result in changes in clinical practice in this regard (Ziemianski et al., 2015), as may changes to health care practitioner requirements in the MMAR and ACMPR.

A larger proportion of dispensary clients considered access to their preferred strain to be important than those not using dispensaries. The differential therapeutic activity of distinct strains of cannabis is an understudied area of substantial scientific interest. Patients have reported that strain type is an important determinant of effectiveness (Walsh et al., 2013; Sexton, Cutter, Finnell, & Mischley, 2016), and those providing CTP, including dispensaries and licensed producers of cannabis under the MMAR and ACMPR, also make distinctions among cannabis strains they provide. Theoretical work on cannabinoid and terpenoid synergy provides a rationale for why some strains may be more effective for specific conditions (Russo, 2011; Russo & Guy, 2006; Sawler et al., 2015); the empirical clinical literature, however, remains largely mute on this topic. One difference between dispensaries and the

other sources we examined is that dispensaries are more likely to consistently offer a variety of cannabis strains. As such, our finding that those who are exposed to such consistency and variety are more likely to value access to a specific strain adds to the literature that highlights the potential importance of strain-level distinctions. Future studies that compare the therapeutic and subjective effects of distinct strains of cannabis are required to clarify this important issue.

The relatively higher quantity of CTP use by dispensary users might be related to ease of access provided by these dispensaries. Alternately, it may be that individuals who require greater quantities of CTP are also more inclined to seek dispensary services, perhaps to supplement other sources. For example, the MMAR encouraged a limit of 5 g per day, which for some patients may be insufficient. Similar limits are encouraged by some dispensaries (Canadian Association of Medical Cannabis Dispensaries, 2014), however other sources may not have purchase limits. Our data do not speak to the extent to which these differences may reflect under-dosing among those who do not use dispensaries or over-consumption by dispensary users. Longitudinal studies are required to inform the nature of this relationship. Such studies are also required to delineate the health consequences of higher quantity cannabis use; indeed, in light of recent literature on substitution effects (Bachhuber, Saloner, Cunningham, & Barry, 2014; Lucas et al., 2016), the estimation of the extent that levels of cannabis use might impact the use of other medications is required to adequately capture the consequences of quantity of CTP use. Our data also do not address possible non-medical use by those accessing different sources, nor different potencies of CTP available from different sources, both of which may affect quantities used.

Most participants who used dispensaries also used other sources. Respondents who accessed cannabis from other sources in addition to dispensaries rated dispensaries equally to or more favourably than those other sources on most of the parameters we assessed. In particular, dispensaries were rated as having superior Quality of cannabis than cannabis from friends, street sources, and Health Canada's supplier, and rated as equivalent in quality to cannabis accessed from self-production and other producers. Equivalence of dispensary quality with self-production and other producers may reflect that these sources are all focused on supplying CTP users. Indeed, although not permitted by the regulations, some producers who were licensed under the MMAR to supply specified individuals, directed their excess production to dispensaries (Lupick, 2015).

With regard to Safety and Availability, dispensaries were rated more favourably than access from friends, the street, or self-production and were equivalent to other producers and Health Canada's supplier. This suggests that third party sources specifically geared toward supplying CTP may address the perceived safety risks associated with accessing from less formal or unknown sources, particularly street sources, and may provide the best assurance of consistent availability. Whereas self-production is also focused on CTP, it may be considered less safe and reliable due to the possible attendant risk of theft or crop failure. In terms of Efficiency of access dispensaries were perceived more favourably than friend and street sources, and equivalent to self-production, designated producers and Health Canada's supplier. This also suggests that sources dedicated to CTP production may be more efficient in supplying CTP users.

The one parameter on which dispensaries received less favourable ratings was Cost. Respondents were less satisfied with the cost of cannabis from street sources, equally satisfied with the cost from friends and Health Canada's supplier, and more satisfied with the cost from self-production and other growers than with the cost from dispensaries. These findings suggest that sources that

are closest to production are able to provide CTP at the lowest cost, whereas those separated from production may incur increasing cost at each level of product transfer. Dispensaries typically purchase CTP from other producers rather than producing their own supply. However, some producers offer lower prices to dispensaries allowing them to pass on the reduced cost to those most in need of support (British Columbia Compassion Club, 2016). Finally, and perhaps unsurprisingly, CTP users felt most *Respected* when accessing CTP from self-production. They felt equally respected by dispensaries, other growers and Health Canada's supplier, and more respected accessing from dispensaries than from street and friend sources. This further suggests the value of specialized services provided by sources dedicated to CTP access. Of note, other growers were rated equally to dispensaries on all dimensions except cost, on which they were rated more favourably. Dispensaries act as intermediaries between CTP users and growers, which is necessary for those who do not have direct access. Although more costly, dispensaries may provide other services valued by clients that were not measured in this study, such as social capital and advocacy (Hathaway & Rossiter, 2007; Lucas, 2009; Penn, 2014). The parameters queried in this study were not defined in the survey, thus responses reflect respondents' perceptions. More detailed queries in future research would provide valuable information.

The limitations present in this study are those that are common to online surveys, including the potential for a single participant to register multiple responses, an unrepresentative sample, and inaccurate responding related to recall problems. These limitations are offset, however, by a relatively large sample, detailed queries of cannabis use and access, and general adherence to standards for reporting Internet-based surveys (Eysenbach, 2004). The lack of physician confirmation of medical conditions was partially offset by verification of diagnosis by the local dispensary as per their requirements, the substantial proportion of sample reporting authorization under the MMAR which also requires verification of diagnosis, as well as the detailed questions regarding medical conditions and reasons for use. Additionally, given low response rates across all parameters for Health Canada access, comparisons involving this source of access should be interpreted with caution. Findings also do not differentiate among dispensaries, which may vary in quality and types of services they provide. Indeed, a large proportion of the sample (17.8%) comes from one dispensary, which may raise questions regarding the generalizability to other dispensaries in BC and other provinces. However, similarity of results from supplementary analyses that excluded respondents from the single dispensary used for the *in person* sample suggest some consistency between the aggregated data from diverse dispensaries and from a single representative dispensary which increases our confidence that the results generalize to dispensaries across Canada. This builds on findings from a prior study of venue-based sampling through medical cannabis dispensaries which found minimal selection and respondent bias among dispensaries and survey respondents, suggesting these venues may be considered to adequately represent the greater population of medical cannabis users (Thomas & Freisthler, 2016). Similarly, since a large proportion of the sample was recruited from a dispensary, this may have led to an artificially inflated positive view of dispensaries especially since people with negative experiences with dispensaries may be less likely to be currently accessing cannabis from dispensaries. Finally, the cannabis distribution program under which these data were collected has been supplanted by a new program with additional options for access, and imminent legalization of nonmedical cannabis use in Canada prognosticates further revisions of the extant program. As such, while our findings do not directly reflect current or likely future situations in Canada,

they nonetheless have value beyond historical documentation of an obsolete system. Specifically, some of the access options at the time of this study remain options in the current medical program, and dispensaries are being considered as an option for nonmedical retail. Additionally, as one of the few nations that have provided large-scale access to medical cannabis, the results of Canada's regulatory experiments may be of interest to an international audience given the prospects for other nations to develop and regulate programs that provide access to cannabis for therapeutic and other purposes, and the dearth of research on different approaches to this controversial task.

Conclusions

This was the first study to date of patients' experience of access to CTP from dispensaries in Canada. We found differences between those who accessed CTP from dispensaries and those who did not access from this source, as well as features that distinguish dispensaries from other sources of access. First, CTP users who are older, have HIV/AIDS and arthritis, value access to specific strains of cannabis, and use greater amounts of cannabis were all overrepresented among dispensary users. As such, excluding dispensaries from current regulations has the potential to disproportionately impact these patients, and should be monitored going forward. Second, dispensary use was associated with greater levels of health care practitioner communication related to CTP, which suggests that dispensaries could potentially be integrated within existing healthcare systems in a way that accommodates patients and care providers. Third, dispensaries were widely used and well rated by respondents. Given this high level of endorsement by patients, future regulations should consider including storefront dispensaries as an authorized source of CTP. Moreover, patients gave highest ratings to dispensaries and other sources that also focus specifically on providing CTP, suggesting that specialized CTP sources may best meet patient needs. Further research is required to estimate the extent to which the addition of the licensed producers in current regulations have altered the role and perceived value of dispensaries within the Canadian medical cannabis system. Fourth, dispensaries were rated less favourably on the parameter of cost than sources of access that have less separation from the production of cannabis (i.e., self-production and other producers), suggesting that those sources are important for maintaining affordable access to CTP. Finally, it appears patient selection of CTP sources is based on a balance of different parameters and circumstances. It is instructive to note that whereas CTP users rated dispensaries equally on most parameters compared with legal sources focused on CTP, dispensary use was more widespread than the use of these other sources. To encourage the use of legal sources, new regulations must address the parameters that impact patient satisfaction as well as known barriers to access. Non-profit cannabis clubs in other jurisdictions play a similar role as intermediaries between cannabis users and growers, as well as provide an alternative to markets focused on profit, such as those established for alcohol and tobacco (Barriuso, 2011; Belackova et al., 2016; Decorte, 2015; Queirolo, Boidi, & Cruz, 2016; Subritzky, Pettigrew, & Lenton, 2016). Future regulations for cannabis access can glean from these other jurisdictions to maintain the benefits of dispensaries currently experienced by patients, while addressing some of the challenges. These findings have implications for medical cannabis policy in Canada, as well as for the potential role of dispensaries under the upcoming new regulated market for the nonmedical use of cannabis, and may also inform other jurisdictions that are developing infrastructure to support access to cannabis.

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References

- Canadian Addiction Survey (CAS): A national survey of Canadians' use of alcohol and other drugs: Prevalence of use and related harms: Detailed report. In E. M. Adlaf, P. Begin, & E. Sawka (Eds.). Ottawa: Canadian Centre on Substance Abuse.
- Allard et al. v. Canada, 280 (FC 2014).
- Arthritis Society (2015). *Medical cannabis: A guide to access*. Retrieved from <http://arthritis.ca/getmedia/99682fb5-3992-4924-895a-d5f03d16f151/Medical-Cannabis-2015-a-Guide-to-Access.pdf>.
- Bachhuber, M. A., Saloner, B., Cunningham, C. O., & Barry, C. L. (2014). Medical cannabis laws and opioid analgesic overdose mortality in the United States, 1999–2010. *JAMA Internal Medicine*, 174(10), 1668–1673.
- Barrioso, A. M. (2011). Cannabis social clubs in Spain: A normalising alternative underway. *Transnational Institute series on legislative reform of drug policies*, nr. 9. Transnational Institute. Retrieved from <https://www.tni.org/files/download/dir9.pdf>.
- Belackova, V., Ritter, A., Shanahan, M., Chalmers, J., Hughes, C., Barratt, M., & Lancaster, K. (2014). *Medicinal cannabis in Australia – Framing the regulatory options*. Sydney: Drug Policy Modelling Program, NDARC, UNSW. Retrieved from https://ndarc.med.unsw.edu.au/sites/default/files/ndarc/resources/DPMP%20Medicinal%20Cannabis%20Paper%2010th%20March%202015_0.pdf.
- Belackova, V., Tomkova, A., & Zabransky, T. (2016). Qualitative research in Spanish cannabis social clubs: "The moment you enter the door, you are minimising the risks". *International Journal of Drug Policy*, 34, 49–57.
- Belle-Isle, L. (2006). *Cannabis as therapy for people living with HIV/AIDS: Our right, our choice*. Ottawa: Canadian AIDS Society.
- Belle-Isle, L., & Hathaway, A. (2007). Barriers to access to medical cannabis for Canadians living with HIV/AIDS. *AIDS Care*, 19(4), 500–506.
- Belle-Isle, L., Walsh, Z., Lucas, P., Callaway, R., Capler, R., Kay, R., & Holtzman, S. (2014). Barrier to access for Canadians who use cannabis for therapeutic purposes. *International Journal of Drug Policy*, 25, 691–699.
- Bill C-45: An act respecting cannabis and to amend the Controlled Drugs and Substances Act, the Criminal Code and other Acts (2017). 1st reading, April 13, 2017, 42nd parliament, 1st session. Ottawa: Public Works and Government Services Canada. Retrieved from <http://www.parl.gc.ca/HousePublications/Publication.aspx?Language=E&Mode=1&DocId=8894959>.
- Bottorff, J. L., Bissell, L. J. L., Balneaves, L. G., Oliffe, J. L., Capler, N. R., & Bux-ton, J. (2013). Perceptions of cannabis as a stigmatized medicine: A qualitative descriptive study. *Harm Reduction Journal*, 10(2) Retrieved from <http://www.harmreductionjournal.com/content/10/1/2>.
- British Columbia Compassion Club Society (2016). *Our cultivators*. Retrieved from <https://thecompassionclub.org/cannabis-dispensary/our-cultivators/>.
- Cain, P. (2016). Pot dispensaries are sprouting up all over Canada. Here's why. *Global News* Retrieved from <http://globalnews.ca/news/2645660/in-canadas-illegal-pot-market-a-legalized-future-takes-shape/>.
- Canada Gazette (2001). *Marihuana Medical Access Regulations: Regulatory impact analysis statement*. 1210. Retrieved from <http://publications.gc.ca/gazette/archives/p1/2001/2001-04-07/pdf/g1-13514.pdf>.
- Canadian Association of Medical Cannabis Dispensaries (2011). *Patients across the country ask Health Canada to recognize medical cannabis dispensaries*. <http://www.cadisensary-acdcm.ca/patients-across-the-country-ask-health-canada-to-recognize-medical-cannabis-dispensaries/> Accessed 24.09.16.
- Canadian Association of Medical Cannabis Dispensaries (2013). *Dispensaries are indispensable: Compassion clubs launch first certification program*. *Canadian Newswire* <http://www.newswire.ca/news-releases/dispensaries-are-indispensable-compassion-clubs-launch-first-certification-program-512613361.html> Accessed September 2016.
- Canadian Association of Medical Cannabis Dispensaries (2014). *Certification standards for medical cannabis dispensaries in Canada*. <http://www.cadisensary-acdcm.ca/wp-content/uploads/2016/07/Second-Edition-CAdispensary-Standards.pdf> Accessed 24.09.16.
- Capler, R. (2010). Canadian compassion clubs. In J. Holland (Ed.), *The pot book: A complete guide to cannabis* (pp. 432–440). Rochester, Vermont: Park Street Press.
- Capler, R., & Lucas, P. (2006). *Guidelines for the community-based distribution of medical cannabis in Canada*. The BC Compassion Club Society and the Vancouver Island Compassion Society.
- City of Vancouver (2015). *Regulation of retail dealers – Medical marijuana-related uses*. Retrieved from <http://council.vancouver.ca/20150428/documents/rr1.pdf>.
- City of Victoria (2016). *New medical cannabis business regulations in effect*. *Media Release* Retrieved from http://www.victoria.ca/assets/City~Hall/Media~Releases/2016/2016Sep23_MR_New%20Medical%20Cannabis%20Business%20Regulations%20in%20Effect.pdf#search=cannabis.
- Decorte, T. (2015). Cannabis social clubs in Belgium: Organizational strengths and weaknesses, and threats to the model. *International Journal of Drug Policy*, 26(2), 122–130.
- Eysenbach, G. (2004). Improving the quality of Web surveys: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *Journal of Medical Internet Research*, 6(3), e34.
- Fumano, D. (2016). High revenues, high expenses: A look at the numbers behind Vancouver's retail pot societies. *Vancouver Sun* Retrieved from <http://vancouver.sun.com/business/local-business/high-revenues-high-expenses-a-look-at-the-numbers-behind-vancouver-retail-pot-societies>.
- Government of Canada (2001). *Marihuana medical access regulations*. *Canada Gazette, Part II*, 135(14)SOR/2001-227.
- Government of Canada (2013). *Marihuana for medical purposes regulations*. *Canada Gazette, Part II*, 147(13)SOR/2013-119.
- Government of Canada (2016). *Access to cannabis for medical purposes regulations*. *Canada Gazette, Part II*, 150(17)SOR/2016-230.
- Hager, M. (2015). Experts predict surge of pot shops across Canada after Trudeau win. *The Globe and Mail* Retrieved from <http://www.theglobeandmail.com/news/british-columbia/experts-predict-a-surge-in-pot-shops-across-canada-after-trudeau-win/article27225385/>.
- Hathaway, A. D., & Rossiter, K. (2007). Medical marijuana, community building, and Canada's compassionate societies 1. *Contemporary Justice Review*, 10(3), 283–296.
- Health Canada (2017). *Market data*. Retrieved from <http://www.hc-sc.gc.ca/dhp-mpps/marihuana/info/market-marche-eng.php>.
- Hitzig v. Canada (2003). *ONCA C39532; C39738; C39740*.
- Kari, S. (2016). Advocates, owners say Toronto pot-shop policing inconsistent. *The Globe and Mail* Retrieved from <http://www.theglobeandmail.com/news/toronto/advocates-owners-say-toronto-pot-shop-policing-inconsistent/article32477915/>.
- Koven, P. (2016). Toronto's marijuana crackdown follows heavy lobbying by legal pot producers. *Financial Post* <http://business.financialpost.com/news/agriculture/torontos-marijuana-crackdown-follows-heavy-lobbying-by-legal-pot-producers> Last updated 20.05.16, Accessed 24.09.16.
- Lucas, P. G. (2008). Regulating compassion: An overview of Canada's federal medical cannabis policy and practice. *Harm Reduction Journal*, 5(1), 5.
- Lucas, P. (2009). Moral regulation and the presumption of guilt in Health Canada's medical cannabis policy and practice. *International Journal of Drug Policy*, 20(4), 296–303.
- Lucas, P., Walsh, Z., Crosby, K., Callaway, R., Belle-Isle, L., Kay, R., . . . & Holtzman, S. (2016). Substituting cannabis for prescription drugs, alcohol and other substances among medical cannabis patients: The impact of contextual factors. *Drug and Alcohol Review*, 35(3), 326–333.
- Lupick, T. (2015). Vancouver marijuana dispensaries reveal how much they're selling and where it's all coming from. *The Georgia Straight*.
- Morgan, C. J., & Curran, H. V. (2008). Effects of cannabidiol on schizophrenia-like symptoms in people who use cannabis. *The British Journal of Psychiatry*, 192(4), 306–307.
- Queirolo, R., Boidi, M. F., & Cruz, J. M. (2016). Cannabis clubs in Uruguay: The challenges of regulation. *International Journal of Drug Policy*, 34, 41–48.
- Penn, R. A. (2014). Establishing expertise: Canadian community-based medical cannabis dispensaries as embodied health movement organisations. *International Journal of Drug Policy*, 25(3), 372–377.
- R. v. Parker (2000). *O.J. No. 2787 (Ont. C.A.)*.
- Reid, M. (2016). 'Cool, interesting' pot ad seen as burning issue in Nanaimo. *Times Colonist* Retrieved from <http://www.timescolonist.com/news/local/cool-interesting-pot-ads-seen-as-burning-issue-in-nanaimo-1.2309732>.
- Rotermann, M., & Langlois, K. (2015). Prevalence and correlates of marijuana use in Canada, 2012. *Health Reports*, 26(4), 10–15.
- Russo, E. B. (2011). Taming THC: Potential cannabis synergy and phytocannabinoid-terpenoid entourage effects. *British Journal of Pharmacology*, 163(7), 1344–1364.
- Russo, E., & Guy, G. W. (2006). A tale of two cannabinoids: The therapeutic rationale for combining tetrahydrocannabinol and cannabidiol. *Medical Hypotheses*, 66(2), 234–246.
- Sawler, J., Stout, J. M., Gardner, K. M., Hudson, D., Vidmar, J., Butler, L., . . . & Myles, S. (2015). The genetic structure of marijuana and hemp. *PLOS ONE*, 10(8), e0133292. <http://dx.doi.org/10.1371/journal.pone.0133292>.
- Schubart, C. D., Sommer, I. E., van Gestel, W. A., Goetgebuuer, R. L., Kahn, R. S., & Boks, M. P. (2011). Cannabis with high cannabidiol content is associated with fewer psychotic experiences. *Schizophrenia Research*, 130(1), 216–221.
- Sexton, M., Cutter, C., Finnell, J., & Mischley, L. (2016). A cross-sectional survey of medical cannabis users: Patters of use and perceived efficacy. *Cannabis and Cannabinoid Research*, 1(1). <http://dx.doi.org/10.1089/can.2016.0007>.
- Subritzky, T., Pettigrew, S., & Lenton, S. (2016). Issues in the implementation and evolution of the commercial recreational cannabis market in Colorado. *International Journal of Drug Policy*, 27, 1–12.
- Thomas, C., & Freisthler, B. (2016). Assessing sample bias among venue-based respondents at medical marijuana dispensaries. *Journal of Psychoactive Drugs*, 48(1), 56–62.

- Wakeford v. Canada (1998). *O.J. No. 3522*. Retrieved from <http://www.johnconroy.com/library/wakeford-orig.pdf>.
- Walsh, Z., Callaway, R., Belle-Isle, L., Capler, R., Kay, R., Lucas, P., & Holtzman, S. (2013). Cannabis for therapeutic purposes: Patient characteristics, access, and reasons for use. *International Journal of Drug Policy*, 24, 511–516.
- Walsh, Z., Gonzalez, R., Crosby, K., Thiessen, M. S., Carroll, C., & Bonn-Miller, M. O. (2017). Medical cannabis and mental health: A guided systematic review. *Clinical Psychology Review*, 51, 15–29.
- Wilson, D. (2016). Green thumbs-up for Victoria's pot dispensary rules. *CBC News* Retrieved from <http://www.cbc.ca/news/canada/british-columbia/victoria-cannabis-dispensary-by-law-marijuana-1.3775259>.
- Ziemianski, D., Capler, R., Tekanoff, R., Lacasse, A., Luconi, F., & Ware, M. A. (2015). Cannabis in medicine: A national educational needs assessment among Canadian physicians. *BMC Medical Education*, 15(1), 1.