



## Cannabis education needs assessment among Canadian physicians-in-training<sup>☆</sup>

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### ABSTRACT

**Background:** Since 1999, the Canadian courts have recognized the rights of patients to access cannabis for therapeutic purposes (CTP). Due to the increasing interest in the use of CTP, competency with the topic among health care providers is essential. As concerns mount around the role of industry involvement in cannabis education, it has become increasingly important for medical schools to provide physicians-in-training balanced evidence regarding the harms and benefits of CTP. In the present study, we surveyed Canadian physicians-in-training regarding their knowledge, experience, attitudes, and barriers surrounding CTP.

**Methods:** Survey questions were adapted from extant physician and nurse practitioner education needs assessments. We invited representatives from all 17 Canadian universities with a Faculty of Medicine to electronically distribute the survey to physicians-in-training.

**Results:** The survey was accessed by 93 physicians-in-training of whom 76 provided responses (46 % female;  $M_{age} = 28$ ,  $SD = 3.03$ ). Physicians-in-training reported receiving significantly less instruction on CTP than they desired. Responses demonstrated differences between *current* and *desired knowledge* across all domains queried. More education was the factor identified as most likely to increase comfort authorizing and discussing CTP with patients.

**Conclusions:** Findings from this study demonstrate an expressed desire for more education surrounding CTP among a self-selected sample of Canadian physicians-in-training. There was a substantial divergence between current and desired levels of knowledge, and the largest gaps related to creating effective treatment plans and understanding the risks and benefits of CTP. Improving the educational opportunities of students will improve standard-of-care for patients.

### 1. Introduction

In 1999, the Canadian judiciary recognized the rights of patients to access cannabis for therapeutic purposes (CTP), and since that time physicians have served as gatekeepers to access for Canadians seeking legal CTP. The most recent of several iterations of the Canadian CTP program is the Access to Cannabis for Medical Purposes Regulations (ACMPR), which authorizes physicians and nurse practitioners (NPs) to provide medical documentation allowing patients to access CTP from government-authorized producers. Records in 2019 indicated that over 340,000 CTP patients were registered under the ACMPR.<sup>1</sup> In contrast to growing patient interest, medical associations and some physicians have expressed reluctance to prescribe CTP, and concerns regarding

their role as gatekeepers.<sup>2</sup>

A perceived lack of familiarity with cannabinoid medicines may contribute to physician concerns. An education needs assessment of Canadian physicians reported that most physicians felt their knowledge of CTP was lacking, and that comfort authorizing CTP might increase with additional education. The report concluded that there was a need for further physician education, particularly in the areas of dosing, treatment planning, the relative risk and benefits of herbal versus pharmaceutical cannabinoids.<sup>3</sup> A subsequent survey of NPs reported similar findings and concluded that CTP education within NP programs should be expanded to address increasing patient interest.<sup>4</sup> Low level of provider knowledge has also been identified in surveys of patients, where perceived physician discomfort with CTP-related communication

*Abbreviations:* CTP, cannabis for therapeutic purposes; ACMPR, Access to Cannabis for Medical Purposes Regulations; NPs, nurse practitioners

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has been identified as a barrier to effective communication between patients and providers.<sup>5</sup>

The knowledge gaps may in part reflect the large proportion of practising health professionals who obtained licensure prior to the 2001 introduction of CTP in Canada, and the concurrent increase in international interest in CTP. As such, modernising medical school curricula might help to address knowledge gaps among future physicians. Contrarily, a recent survey of U.S. medical school curricula suggested that these educational needs currently remain unmet. In a study of 145 curricula, over two-thirds of medical school deans reported that their graduates were “not at all” prepared to prescribe CTP. Further, a quarter indicated that their graduates felt unprepared to answer patient questions regarding CTP.<sup>6</sup> The article concluded that there was a mismatch between CTP laws and the preparation of physicians-in-training to prescribe it. These perceived knowledge gaps transcend medical disciplines. Indeed, a recent article argued that including CTP in PharmD curriculum would reduce stigma towards patients that choose to use CTP and prepare new pharmacists to practice competently.<sup>7</sup>

Despite longstanding federal provisions for CTP access that place physicians in a gate-keeper role, the extent to which physicians-in-training in Canada receive adequate instruction in CTP has not been systematically examined. The present study is the first to evaluate CTP curricula in Canadian medical schools and assess the extent to which physicians-in-training felt prepared to discuss CTP with patients and evaluate the appropriateness of authorizing CTP.

## 2. Materials and methods

Survey questions were adapted from extant physician and nurse practitioner needs assessments.<sup>3,4</sup> The authors obtained a pre-existing survey from Ziemianski and colleagues and reviewed it for relevance in a student sample. Questions specific to physicians-in-training were added (e.g., “Have you ever witnessed a preceptor discuss medical cannabis with a patient?”). The cross-sectional survey included multiple different response formats including, 5-point Likert scale (1: not at all; 5: very strongly), binary responses (yes or no), rank ordering, and open responses. It did not utilize forced responses; therefore, participants could choose which questions they answered. In 2017/2018 we invited representatives (i.e., program administrators and/or program Deans) from accredited undergraduate medical education programs to distribute a survey link (hosted on UBC’s Survey Tool: “Cannabis for therapeutic purposes: An educational needs assessment among Canadian medical students”) to physicians-in-training, defined as those currently enrolled in an undergraduate medical degree program and/or residency. Participants had completed at minimum one year of their medical education. We included 82 % of Canadian institutions (14/17)

that had streamlined processes for accessing students. Email invitations included a summary of the project and an English and/or French survey and consent form which included information regarding the purpose of the study, the principal investigator, and survey length. This study was approved by the Research Ethics Board of The University of British Columbia and conducted in accordance with the ethical principles of the Declaration of Helsinki.

Descriptive statistics were used to examine participants’ knowledge, experiences, barriers, attitudes, preferred educational approaches. Within subject t-tests were used to assess for differences in current and desired knowledge levels. All significance tests were two-tailed and evaluated at the  $p < .05$  level.

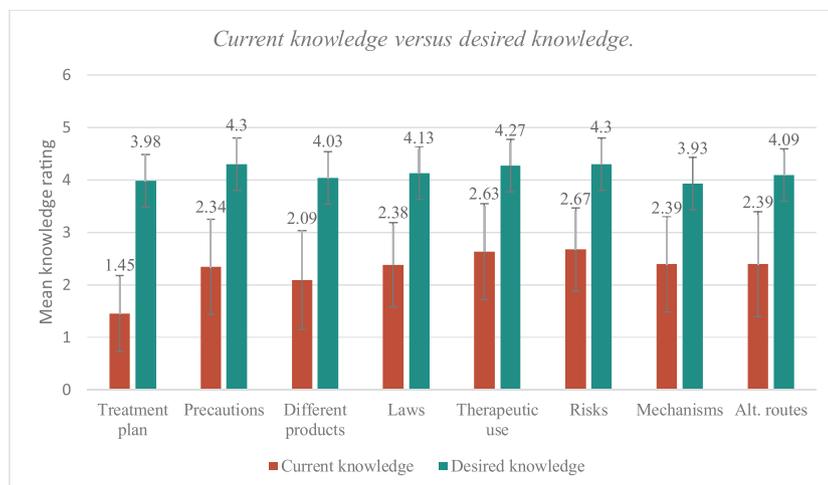
Of the 17 Canadian medical schools contacted, one declined to distribute, nine failed to respond to multiple attempts to contact, three required additional institutional and/or provincial ethics approval, four agreed to distribute the French and English survey through university listservs and via program administrators. It is unclear what percentage of enrollees were on the listservs at each of the four institutions. It was accessed by 93 physicians-in-training of whom 76 provided responses (46 % female;  $M_{age} = 28$ ,  $SD = 3.03$ ). Respondents were from Alberta (1.3 %), British Columbia (46.1 %), Ontario (35.5 %), Yukon (1.3 %), and 15.5 % with missing location. A third of participants (34.2 %) had completed the 3rd year of their medical degree, followed by 21.1 % who had completed 1st and 2nd year, and a small minority that were completing their residency (3.9 %), 15 participants did not indicate a year of study. The majority of respondents (45.9 %) indicated that they intended to practice in Family or Internal Medicine.

### 2.1. Curriculum

Physicians-in-training reported receiving significantly less instruction on CTP than they desired. They reported a desire for approximately 6 h of instruction be dedicated to the topic of CTP and received less than one and a half hours ( $M = 6.16$ ,  $SD = 5.17$  versus  $M = 1.15$ ,  $SD = 2.19$ ;  $t(57) = -8.08$ ,  $p < .05$ ). Among the curricula topics queried by the present study, 40.8 % ( $n = 31$ ) of students reported learning about the *harms of cannabis use*, followed by *therapeutic use of cannabis* (38.3 %;  $n = 29$ ), *emerging research* (31.6 %;  $n = 24$ ), *side-effects* (30.3 %;  $n = 23$ ), *routes of administration* (17.1 %;  $n = 13$ ), and *barriers to prescribing* (17.1 %;  $n = 13$ ).

### 2.2. Knowledge

Responses demonstrated differences between *current* and *desired* knowledge across all domains queried (Fig. 1). *Current* knowledge varied somewhat across domains, but was generally within the low range, the



**Fig. 1.** Note. Treatment plan = “Creating treatment plans (e.g. dosing) for patients using medical cannabis”,  $t(66) = -16.70$ ; Precautions = “Safety, warning signs and precautions for patients using medical cannabis”,  $t(66) = -11.24$ ; Different products = “Similarities and differences between dried cannabis, other forms of cannabis products, and prescription cannabinoid medications”,  $t(66) = -13.40$ ; Laws = “Laws and regulations surrounding the medical use of cannabis”,  $t(66) = -11.97$ ; Therapeutic use = “Potential therapeutic uses for cannabis”,  $t(66) = -11.54$ ; Risks = “Potential risks of using cannabis for medical purposes”,  $t(66) = -10.52$ ; Mechanisms = “Mechanism of action of cannabis (endocannabinoid system)”,  $t(66) = -9.64$ ; Alt. routes = “Alternative (i.e. non-smoked) routes of administration of medical cannabis”,  $t(66) = -8.62$ . All t-tests were significant at  $p < 0.01$ . Error bars = standard deviation.

most widely endorsed area for *poor/very poor current knowledge* was in creating treatment plans (96.1 %; n = 73) and the lowest area of *poor/very poor current knowledge* was alternative routes of administration (34.2 %; n = 16). High levels of *desired knowledge* were also reported; the most widely endorsed area of *desired knowledge* was potential risks (81.6 %; n = 62) and the lowest area was *mechanism of action* (64.5 %; n = 86).

### 2.3. Experiences

Discussing CTP with a patient was reported by 50 % (n = 33) of students, with all reported discussions initiated by patients. Witnessing a preceptor discuss medical cannabis with a patient was reported by 53 % (n = 35), of whom 66 % (n = 23) rated their preceptor as appearing *somewhat* or *very informed* regarding medical cannabis. One in ten preceptors were rated as being *unwilling* to discuss CTP with a patient. Nearly half of respondents (45.5 %; n = 30) discussed medical cannabis with their preceptor and 63.3 % (n = 19) of those discussions were initiated by the student.

### 2.4. Attitudes

Physicians-in-training were asked about the factors influencing their comfort level of the clinical use of CTP. More education was the factor identified as most likely to increase comfort authorizing and discussing CTP with patients. Findings from the present study are presented in [Table 1](#) alongside results from prior research in nurse practitioners<sup>4</sup> and physicians.<sup>3</sup>

## 3. Discussion

The present study is the first to evaluate CTP curriculum among Canadian physicians-in-training. Our findings suggest that more education surrounding CTP among Canadian physicians-in-training will be required to remedy the perceived knowledge gaps reported by practicing physicians. Specifically, the needs identified among physicians-in-training are consistent with those identified by an educational needs assessment of practicing Canadian physicians, with substantial divergence between current and desired levels of knowledge, and the largest gaps related to creating effective treatment planning (e.g., dosing), and risks and benefits of CTP.<sup>3</sup> This apparent lack of progress in physician education is concerning given that patients report relatively lower satisfaction with CTP related communication in comparison with other topics.<sup>5</sup>

Physicians-in-training reported desiring more training than they received under the current curriculum. The discrepancy was substantial; the average amount of training received was less than 25 % of the amount desired, and more than three quarters of trainees reported that further training would be required in order for them to engage comfortably with CTP. However, comparing our findings from students with those of prior studies of physicians<sup>3</sup> indicates that students were

almost twice as likely as physicians to report that they felt they had insufficient knowledge to recommend CTP, which suggests that increased competency may develop once in professional medical practice. Conversely, this contrast could reflect the generally increased sense of sufficiency that might be expected to accompany the transition from medical student to practicing physician. However, notwithstanding the potential increases in perceived competence that may accompany the transition to professional status, it is noteworthy that education-related barriers exceeded structural factors such as insurance coverage or formal certification in determining trainee comfort and as such suggest that educational enhancement may represent the key avenue for facilitating perceived competence related to CTP.

Growing interest in CTP and the legalization of non-medical cannabis use prognosticates increasing pressure on health care providers to develop informed responses to patient queries. Our findings suggest that the perceived knowledge gaps may have practical implications in areas that arise with some regularity in clinical practice. Over half of trainees reported engaging in or witnessing preceptors engaging in patient-initiated discussions of CTP. Although trainees reported some preceptor competence in addressing these discussions, substantial room for improvement was evident. Clinicians in practice reported similarly high levels of patient-initiated CTP discussions (e.g., 79 % in Ziemianski et al., 2015 and 60 % in Balneaves et al., 2017). Taken together, the high incidence of CTP discussions coupled with low-levels of perceived knowledge and comfort on the part of trainees suggests the need for a reconsideration of the place of CTP in physician training and argues for broad renovations of medical school curriculum to provide more extensive coverage of CTP.

The present study has several limitations. Although the completion rate among the students that opened the survey was quite high (81 %), the low overall response rate was likely biased towards desiring more cannabis education in those students that were interested in the topic to open the link. The trend in response rate may reflect a future practice bias among physicians who may prefer to treat with other pharmacotherapies that are covered in more detail in their medical school curriculum.<sup>8</sup> Low response rates have been seen in other studies which question medical students.<sup>9</sup> Moreover, students who responded to a survey regarding CTP may be particularly biased toward responding favourably to opportunities to learn more about CTP when the query is presented without reference to the costs in terms of reduced time for other topics. This may have resulted in inflated levels of positive responses to the query regarding *desired knowledge*. Future research that invites respondents to rank desire for CTP education relative to other topics may provide a better contextualized estimate of desired CTP education. Also, despite attempts to recruit a nationally representative sample of Canadian physicians-in-training, a disproportionate number of responses came from British Columbia and Ontario, with a relatively low response rate from several regions of the country. However, supplementary analyses revealed equivalent results across these provinces. Although one could speculate that the distribution of this survey reflects the acceptance of the topic, British Columbia and Ontario have

**Table 1**  
Factors influencing comfort level of the clinical use of cannabis for therapeutic purposes.

	Present Study	Ziemianski et al., 2015	Balneaves et al., 2018
	<b>% Agree</b>		
I've been approached by a patient or family about CTP.	50 %	79 %	45 %
I feel that I have insufficient knowledge to make recommendations about CTP.	96 %	50 %	64 %
I would feel more comfortable discussing the use of CTP with patients/patient family members if I had more education about it.	82 %	71 %	91 %
I would feel more comfortable authorizing CTP if Health Canada offered me protection from liability.	67 %	62 %	80 %
I would feel more comfortable if health professionals were required to undergo a specific training or licensing program to authorize CTP.	57 %	61 %	85 %
I feel that with more education I would be better able to treat patients using CTP.	76 %	70 %	87 %

Note. CTP = cannabis for therapeutic purposes.

similar rates of cannabis use per capita that hover near the national average.<sup>10</sup> Nonetheless, future research with more comprehensive national coverage would increase confidence in the representativeness of our sample. Our methodology also shares in the limitations that characterize much survey-based research on CTP, including self-selection bias in which respondents with stronger interests in CTP may be over-represented. Our characterization of curricula is based on student reports, and as such may have overlooked CTP-related pedagogical content of which students may have been unaware, and thereby resulted in an underestimation of CTP-related education. Future studies that integrate course materials (e.g. syllabi, test questions) in their assessment might address this limitation. Conversely, reliance on perceived knowledge may have resulted in an underestimation of gaps as students may have unperceived deficits in CTP knowledge.

Establishing standards and benchmarks for CTP competency among physicians and trainees will be required to provide a more robust estimate of the gap between optimal and actual CTP knowledge. Pending the development of such standards the findings of the present study signal a desire among some Canadian medical students for further CTP instruction. The authors recognize that an increase in CTP curriculum will require a careful balancing of existing curricula. Further, the optimal level of competency may vary between specialties and thus establishing additional curriculum may be more crucial to particular specialties (e.g., oncology and pain medicine) than others.

Future studies should examine potential differences between attending physicians and student populations regarding the perceptions of the need for cannabis education, such as desired hours of instruction and breadth of topics covered. International studies that assess students in other nations will clarify the extent to which the perceived mismatch between desired and received training extends to nations with less longstanding CTP programs. Future studies should consider using the same questions used in the present study and the two that preceded it (i.e., Ziemianski et al., 2015 and Balneaves et al., 2018). This will allow for comparison across samples and increase the likelihood that future research can aggregate or meta-analyze the findings. These limitations are balanced by several strengths including a detailed assessment of cannabis attitudes, and direct extension of methodology from physician to trainee samples.

#### 4. Conclusions

We found that like practicing physicians, physicians-in-training are experiencing a mismatch between their knowledge of CTP and the needs of their patients. Trainees are aware of this knowledge gap and are desirous of training to rectify it. Concerns have been raised recently about industry involvement in cannabis education,<sup>11</sup> and although industry initiatives have likely helped to fill the near vacuum in cannabis education, addressing educational gaps should not be the sole purview of industry. Ultimately, revision of medical school curriculum, combined with the development of the evidence base on CTP will be required to comprehensively address this imbalance.<sup>12</sup> Unfortunately, the available clinical practice guidelines and the position taken by the Canadian Medical Association are overly cautious on CTP in ways that not entirely evidence-based. Holding cannabinoid medicines to a different standard than other commonly used medications, in terms of potential side-effects and evidence base, is a missed opportunity to reduce the suffering of patients who might benefit from CTP.<sup>13</sup> In the meantime, comfort and knowledge of CTP among physicians-in-training may be enhanced by opportunities and activities that have proven effective in addressing other gaps<sup>14,15</sup> and might include guest speakers, workshops, and online courses. Cannabis is on the minds of Canadian patients and our training programs must better prepare the next generation of physicians for informed discussion of CTP and health.

#### Author disclosure statement

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#### Authors' contributions

MSP analyzed and interpreted the data and was a major contributor in writing the manuscript. LM was instrumental in study design and data collection. ZW analyzed and interpreted the data and was a major contributor in writing and conceptualizing the manuscript. All authors read and approved the final manuscript.

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#### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ctim.2020.102328>.

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