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The model of care at a leading medical cannabis clinic in Canada

Erin Prosk [a,*], Maria Fernanda Arboleda [a], Lucile Rapin [a], Cynthia El Hage [a], Michael Dworkind [a,b]

[a] Santé Cannabis, Research Department, Canada
[b] McGill University Faculty of Medicine, Canada

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ABSTRACT

Medical cannabis access has been legalized in more than 30 countries worldwide and popularity among patients is increasing rapidly. Cannabinoid-based treatments have been shown to be beneficial for several symptoms such as chemotherapy-induced nausea and vomiting, spasticity, chronic pain, intractable seizures and insomnia, yet high-quality clinical trials are still limited. As millions of patients now have legal access to medical cannabis, little information is available about the development of best clinical practices and an effective medical cannabis clinic model.

A medical cannabis clinic is an innovative and emergent practice model that may be necessary to bridge the gap between patient and healthcare provider interest and existing barriers to the prescription of medical cannabis treatments, such as limited medical education, lack of high-quality clinical research and challenging or evolving regulatory frameworks. In this paper, we describe the model of care and organization of a dedicated medical cannabis clinic operating in Quebec, Canada since 2014. We share the principles of medical cannabis practice, including the structure of its medical and support team, clinic organisation and procedure guidelines. Key clinic statistics and patient demographics are shared with year by year comparison.

Operating since 2014, the clinic has endured a rapidly changing regulatory landscape in Canada, overcoming numerous challenges including medical and social stigma, limited funding, resources and institutional support combined with a high demand for services. To support medical cannabis leaders globally, an important knowledge-sharing is required. The clinic has expanded to a network of four clinic sites across Quebec and offers continuing education and preceptorships to health care providers and trainees as well as research services to both academic and industry partners. The description of the clinic offers guidance on medical cannabis treatment and care and discusses possible solutions to associated challenges. The clinic model of care can be adapted to different healthcare settings and regulatory frameworks; it may assist physicians and health care providers in the development of medical cannabis clinics or the implementation of best practices as medical cannabis access continues to evolve.

1. Background

The therapeutic use of cannabis dates back several thousands of years, however, during the early 20th century a global trend of cannabis prohibition emerged, resulting in an almost 100 year gap in clinical use and research advancement.[1] Therapeutic use among patients has continued despite legal status and recent introduction of medical cannabis regulations in more than 30 countries has permitted millions of patients to legally access medical cannabis and has revived the production of medical cannabis research.

There has been growing evidence of the therapeutic effects of cannabinoid-based treatments in several conditions including chemotherapy-induced nausea and vomiting, chronic pain, drug-resistant epilepsy, spasticity associated to multiple sclerosis and insomnia.[2] Yet access to cannabinoid-based products and clinical knowledge of effective initiation and monitoring is still poor, partly because of a lack of proper integration of healthcare settings or formal medical education. Dedicated medical cannabis facilities can provide

Abbreviations: EMR, electronic medical record; HCP, healthcare professional.

* Corresponding author at: 4150 Ste-Catherine O. Bureau 225, Montréal, QC, H3Z 2Y5, Canada.
E-mail addresses: erin@santecannabis.ca (E. Prosk), mfarboleda@santecannabis.ca (M.F. Arboleda), lrapin@santecannabis.ca (L. Rapin), mdworkind@santecannabis.ca (M. Dworkind).

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innovative care and education, based on and for patient's needs. They may also assist and train physicians in prescribing personalized treatments and navigating through the complex administrative and regulatory framework of medical cannabis. Various settings have been employed over time, from buyer's or compassion clubs to dispensaries to, more recently, private medical clinics. However, there has been virtually no literature on medical cannabis care services which has also increased barriers to the production of evidence-based policies and clinic models.[3,4]

Canada has long been on the frontier of medical cannabis access, with the enactment of legislation in 2001 following a Supreme Court challenge to the Charter of Rights and Freedoms.[5] The regulatory system has evolved over time, most recently with the legalization of non-medical or 'recreational' cannabis under the Cannabis Act in October 2018. However, despite this long history of medical cannabis access, significant medical stigma and persistent barriers to prescription remain. In 2014, approximately 40,000 Canadians were authorized for medical cannabis use, however an estimated 1 million were using cannabis therapeutically via illicit sources.[6,7]

The aim of this article is to present the care model of a successful clinic dedicated to medical cannabis treatments. The key elements related to the clinic organization and the clinical team as well as clinic statistics and critical patients' data are described and discussed in detail. This paper also aims to inform health care providers and other medical cannabis stakeholders on the considerations of effective medical cannabis practice that can be adapted to different clinical settings and various regulatory frameworks.

2. Clinic model of care

2.1. Considerations for model development

The main objective of any medical cannabis treatment is to provide a complementary option to traditional treatments in order to alleviate persistent symptoms and suffering associated with the patient's condition. This is achieved through the following sub-objectives: give the patient a sense of control over their condition; improve the symptoms experienced by each patient; and improve the patient's health-related quality of life with a minimum of treatment related adverse effects. Moreover, as a complementary or adjunctive treatment, medical cannabis treatment must be integrated with primary and speciality care to support best outcomes.

A best clinical practice must start with a comprehensive assessment of the needs of the patient population and the medical community as well as a developed set of principles to provide best patient care.[8] Hence, considerations for the development of a medical cannabis clinic model include:

- Assessment of patient and medical community needs;
- Survey on perceptions and stigma in the medical community;
- Assessment of the regulatory environment for medical cannabis, including federal, provincial or state-level, and municipal legislation;
- Confirmation of healthcare setting: community-based, outpatient or in-patient services;
- Recruitment of personnel and development of area of practice based on expertise and experience of the medical team;
- Identification of administrative requirements and preparation of compliant, efficient methods to meet them;
- Patient eligibility criteria based on clinical team expertise;
- Available cannabinoid-based products and a complete literature review of their potential therapeutic benefits and risks;
- Provision of outreach to the medical and patient community, continuing medical education, identification of community resources and collaboration;
- Development of patient education, advocacy and orientation programs; and
- Confirmation of funding model, opportunities for partnership and both short and long-term revenue strategies.

The medical cannabis clinic model was developed by the co-founding team of medical cannabis advocates, researchers and physicians to meet the needs of patients and the medical community. In early years, the stigma of being classified as a 'pot doctor' required peer support among the medical team and resulted in the establishment of initiatives to support clinic credibility, including rigorous clinical practice guidelines, a strict referral model, and the initiation of a research program to collect real-world evidence about patient treatment outcomes. Maintaining the credibility of medical cannabis treatments and separating myths from realities remains a core function of the clinic as a resource centre for evidence-based medical cannabis information.

Each country may have specific considerations and requirements for a clinic implementation. It may be required to develop specific protocol or reporting for each patient that is prescribed medical cannabis. Developing such protocols in a peer-reviewed environment to meet the needs of common patient diagnoses and symptom expression is important to ensure compliance and clinical efficiency. Different healthcare environments may present challenges as well as sociological impacts; integration with private health insurance providers may be necessary initially to support patients who are unable to pay for clinic visits or medical cannabis treatments.

2.2. Clinical team

A dedicated, attentive and diverse team of experts is a key aspect to medical cannabis care. The clinic has expanded from a small team of five practicing part-time physicians and one medical cannabis educator in one location to a network of four clinics across Quebec and a team of twelve consulting physicians and fifteen nurses as part of a complete staff of fifty employees. The current core clinical team consists of clinic coordinators who supervise research assistants and administrative needs, nurse coordinators and a team of nurses with both research and patient education experience and physicians from various specialities, including family physicians and specialists in pain, palliative care, endocrinology and gastroenterology (Fig. 1). A diverse clinical staff facilitates a strong and dynamic support system for patients who seek medical cannabis treatments. The team provides specific, comprehensive counseling to patients taking into account their individual medical condition, lifestyle and accessibility needs. In the early years of clinic development, medical cannabis advocates or educators played a critical role to support cannabis knowledge transfer and personnel training, bridging medical cannabis and healthcare experiences. To provide sufficient support and education, patients are followed by the same physician, though nursing and education support may rotate, and all notes are documented on an electronic medical record (EMR).

Such a multidisciplinary approach between healthcare professionals provides for personalized, effective and efficient recommendations and the appropriate, supportive follow-up required by most patients, as it occurs in other clinical settings.[9] Peer support among healthcare providers, especially physicians, across various specialities, facilitates support and mentorship within an otherwise stigmatized and controversial treatment.

2.3. Clinic policies and procedures

As a small and focused clinic, operating within Canada's public healthcare system, administrative and financial challenges are common. Medical cannabis assessment and patient education is very time-consuming and accomplishing training and research objectives is similarly resource intensive.

The clinic has developed several important policies and procedures including:

Fig. 1. Graphic of the patient-centred model of care, demonstrating integration with medical community, patient assessment and real-world data collection, education, support and monitoring.

- Clear definition of the roles of each team member, including physicians, nurses, educators, clinic coordinators, and support staff;
- Development of standardized, peer-reviewed procedures to ensure that patient evaluation and education is completed consistently between providers;
- Standardization of patient and inter-clinic communication for referral generation and support from referral to discharge and within each clinic visit;
- Optimal utilization and allocation of resources, including patient rooms, test processing lab, nurse rooms, telemedicine consultation and electronic data capture;
- Inclusion and exclusion criteria for effective and efficient screening, defined as specifically as possible;
- For training support and standardization between physicians and nurses, creation of a detailed treatment protocol presenting cannabis chemovars, products and recommended methods of administration based on patient indication and symptom expression, total daily quantity and dosage instructions for more than 10 medical conditions and symptoms for which treatment with cannabinoid-based medicines is essential. This includes appetite stimulation in patients living with cancer or HIV, anxiety, sleep disorders, depression, chronic cancer and non-cancer pain, fibromyalgia, migraines, recalcitrant seizure control, spasticity, chemotherapy-induced nausea and vomiting, and arthritis.[2,10]
- Preparedness for expected and unexpected situations to support decision-making and the clinic environment of security, professionalism and attentiveness.

The current COVID-19 pandemic crisis confirmed the necessity of these procedures and the requirement for ongoing adaptation. In fact, the clinic has managed to transition clinical care and research operations to be delivered securely by telemedicine while staff worked from home via virtual communication. Initial development as a paper-less clinic with electronic medical records and various support programs facilitated this transition, however, challenges with data collection and appointment efficiency, especially at the initial visit, are ongoing.

2.4. Clinic organization

The clinic model is patient-centred and revolves around four phases of care: referral and eligibility, initial visit, follow-up visits and transfer, discontinuation or discharge. Each period is briefly explained below.

2.4.1. Referral process and eligibility

Referrals can be submitted by any licensed physicians or nurse practitioners from both community and institutional centres and are valid for one year. Self-referrals may also be submitted in limited cases, and require additional medical oversight at screening to ensure sufficient clinical information is available. A customized referral form is recommended in order to emphasize critical information for the screening process, including presence of active cardiac disease, history of substance use disorder, psychotic disorder or schizophrenia, pregnancy or breastfeeding and history of cannabis use (see Additional file 1

for a sample referral form). The medical assessment for eligibility of cannabinoid-based treatments serves to identify a primary objective for treatment, current and previous medication, cannabis history and experience, and examine potential contraindications and risks factors.

2.4.2. Initial clinic visit

The initial clinic visit is an opportunity to meet the patient, confirm eligibility for cannabinoid-based treatments and provide patient education on medical cannabis. Baseline clinical data and validated questionnaires are collected and may be used for further analysis. A complete medical history is obtained by a registered and trained nurse with a focus on factors that will determine treatment recommendations including a patient's previous cannabis experience. Consulting physicians confirm patient eligibility and treatment decisions and determine a follow-up and monitoring schedule according to a clinic-wide protocol. A medical cannabis authorization is written in accordance with federal regulations, the authorization is akin to a prescription in practice. Patient education is led by the nurse and includes discussion of treatment objectives with the patient and family, review and management of treatment expectations, careful explanation of the individualized treatment plan, titration instructions and an original patient daily diary and education booklet that cover all general information. Furthermore, a patient treatment agreement is an indispensable tool to confirm treatment objective and clinical program limitations.[11] Recommendations for the use of safe and consistent products with certified laboratory testing and approval from the authorized regulatory agency is also essential. Following the appointment, a consultation report is sent to referring physicians including the detailed treatment plan, follow-up frequency and any specific recommendations such as monitoring of potential risk factors, adverse effects or the supervised down-titration of pharmaceutical medications.

2.4.3. Follow-up, support and monitoring

Over the years, the clinic has established a clear intervention strategy, determining the frequency and procedure for follow-up appointments and establishing well-defined monitoring tools (Fig. 2). Both scheduled and unscheduled follow-ups occur, the latter delivered by nurses by phone or videoconference. The follow-up visits serve to monitor changes to the patient's health status and to assess treatment adherence, safety and effectiveness. Monitoring of adverse events occurs both at scheduled and unscheduled appointments, and allows for important collection, classification and reporting to pharmacovigilance programs as well as required counseling for patients. Support for patient titration and, if needed, a treatment adjustment such as change in product, dosage, or route of administration takes place during the first couple of follow-up appointments. In most cases, a phone follow-up at one month, or earlier, during the titration phase is highly recommended until a stable dose is achieved.

2.4.4. Transfer, discontinuation or discharge

Patient health outcomes are the central focus of a medical cannabis clinic, thus close follow-up is required at initiation of treatment and during titration phases. Once patient treatment has stabilized, a transfer back to primary or speciality care may be possible if the physician is willing to continue the cannabinoid-based treatment plan. If transfer is not possible, follow-up frequency may be decreased provided patients have sufficient primary care. Since medical cannabis treatment should always be considered as a trial, patients should be prepared for the possible discontinuation of their treatment if sufficient benefit is not observed. Specifically, several criteria have been identified that may interrupt the treatment:

- Lack of effectiveness;
- Adverse effects that cannot be resolved by treatment adjustments;
- Non-compliance with treatment agreement; or
- Social or cost barriers as medical cannabis is not an approved treatment.

3. Real-world data findings

Since its opening in late 2014, the clinic has received more than 13,575 referrals. Findings from the five-year period of 1st April 2015 to 31st March 2020 are discussed due to some data loss in the early months. A waiver of consent for the analysis of patients age and gender was required and approved by McGill University Ethics Committee and Privacy Commissioner (*La commission d'accès à l'information du Quebec)*.

3.1. Clinic performance

Thorough screening for completeness and eligibility of referrals has resulted in the clinic assessment of 9,102 patients during the five-year period. Fig. 3 displays the average number of patient referrals, initial visits and medical cannabis authorizations (prescriptions) per month in each year. A clear increase in clinic volume was observed as well as the effectiveness of the comprehensive screening process to admit eligible patients to the clinic. In overall assessment of the 5-year period, 67 % of patient referrals came to the clinic for an initial appointment and 82 % of those were prescribed medical cannabis (range 77 %–86 %). There are currently 39 % of patients under active treatment. It is of note that due to the wait time for new patients, and decrease in referrals in 2020 due to the COVID-19 pandemic, there are actually more new patients assessed (initial visits) than were referred from January to March 2020.

The wait time for new patients continuously increased over the years from 14 weeks in 2015 to 20 weeks in 2019. The wait time calculated between January and March 2020 was 9 weeks. The COVID-19 pandemic led to decrease in wait time for initial visit during spring 2020 to less than one month by summer 2020.

A total of 54,122 appointments were recorded for 9,102 patients who were assessed and followed at the clinic between April 2015 and March 2020. Follow-ups by nurses were most predominant appointment type accounting for 41 % of total appointments, followed by nurse phone calls (25 %) and initial visits (21 %). It is clear that the clinic model depends on the nursing role, serving a critical need to provide patient education, support and monitoring between physician appointments. Importantly 61 % of clinic appointments are unscheduled follow-ups that are handled independently by the nurses via phone or videoconference and 38 % are clinic appointments at 1- or 3-month intervals with both nurse and physician. The remainder including clinical trial appointments, administrative or physician to physician consultations.

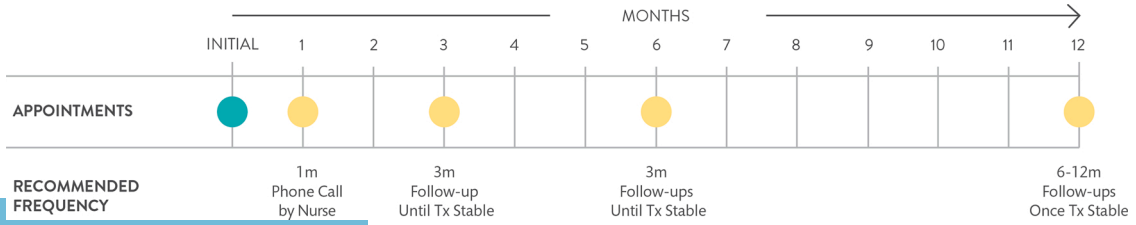

Fig. 2. Graphic of recommended appointment frequency.

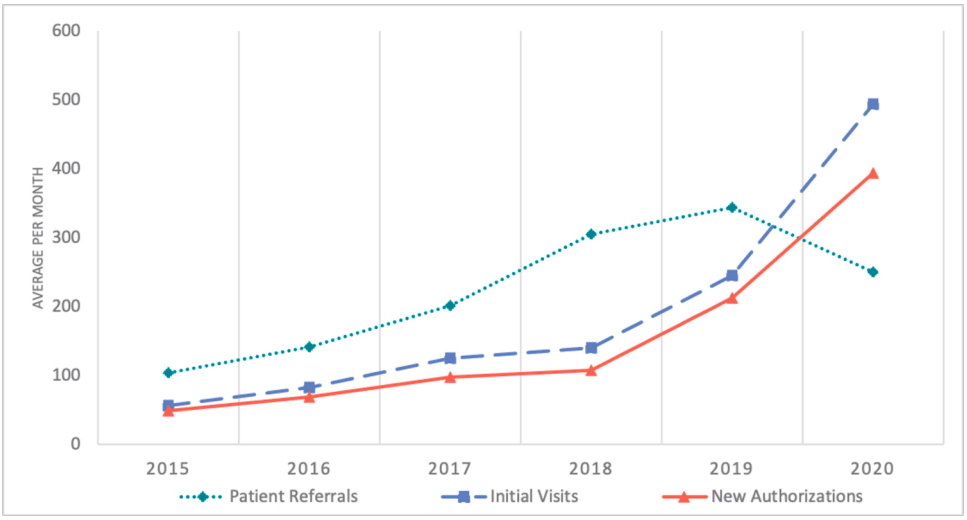

Fig. 3. Screening process and clinic activity described by average number of patient referrals, initial visits and new authorizations for medical cannabis per month. The green dotted line represents the number of referrals received, the dashed blue line the number of initial visits conducted and the solid orange line the number of new medical cannabis authorization completed.

3.2. Patient demographics

In this unique clinical context, patient demographics may be unexpected compared to traditional population studies of cannabis use.

3.2.1. Age

Across the 13,575 referred patients, the average age is 55.7 years old (y.o) (Standard Deviation (SD) = 16.83) with a minimum of 3 and a maximum of 104 years old. Average age slightly increased over time: 53 y.o in 2015 and in 2016, 54.6 y.o. in 2017, 56.4 y.o. in 2018, 57.4 y.o in 2019 and 56.5 y.o in early 2020. The distribution of age by decades is presented in Fig. 4. The average age is similar for the patients who were authorized a medical cannabis treatment (mean = 56.7 y.o, SD = 16.23, min = 3 y.o., max = 104 y.o).

3.2.2. Gender

Overall, 53.4 % of patients referred to the clinic identified as women. Fig. 5 presents the gender distribution of patients referred to the clinic per year. Interestingly the proportion of women was lower in 2015 and 2016, similar to population studies of the gender ratio of cannabis consumers.[12] However, the proportion significantly increased starting in 2017, which was likely due to decreasing stigma as legalization of cannabis in Canada was introduced by the federal government.[13] A decrease in female proportion has been observed in 2020, due to a sudden decrease in referrals and appointments for patients who identify as female, similar to observations at other healthcare points during the COVID19 pandemic.[14]

For the patients who were authorized medical cannabis treatment, the distribution of women and men was even more pronounced. It is notable that male patients were less likely to be excluded during screening or otherwise found to be ineligible for medical cannabis treatment. Overall 56.9 % of women were prescribed medical cannabis. The proportion of women authorized for medical cannabis increased yearly from 41.4 % in 2015 to 63 % in 2019 and reduced to 59.4 % in 2020.

3.3. Source of patient referrals

Altogether 91 % of referrals were received from a healthcare professional (HCP) versus 9% as self-referrals. The more than 3000 referring HCPs are predominantly physicians, with a few referrals from nurse practitioners. Fig. 6 displays the proportion of referrals via a healthcare professional vs. patient self-referral. The increasing proportion of HCP referral each year indicates improved medical community outreach and greater acceptance of medical cannabis among physicians. A decline in referral proportion in 2020 reflects only the first three months of clinical

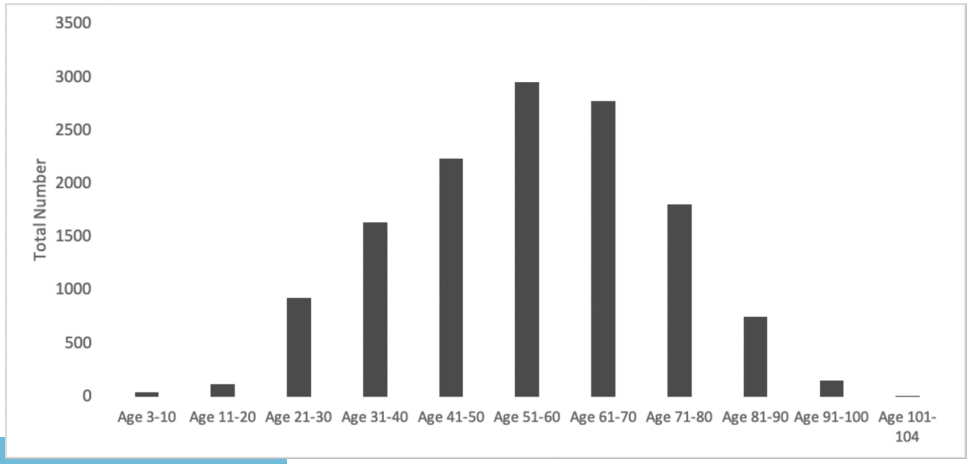

Fig. 4. Frequency of patients referred to the clinic per age group.

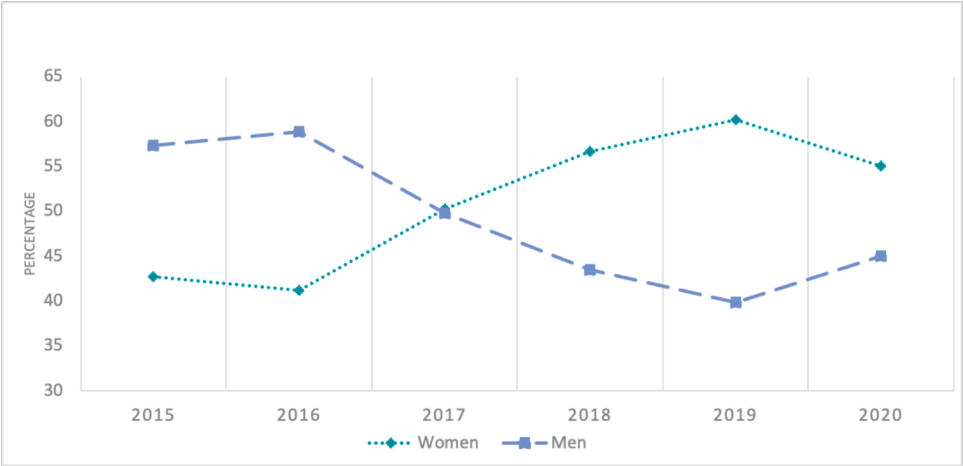

Fig. 5. Gender distribution of patients referred to the clinic per year. The green dotted line represents the percentage of patients who identify as female and the blue dashed line the percentage of male patients.

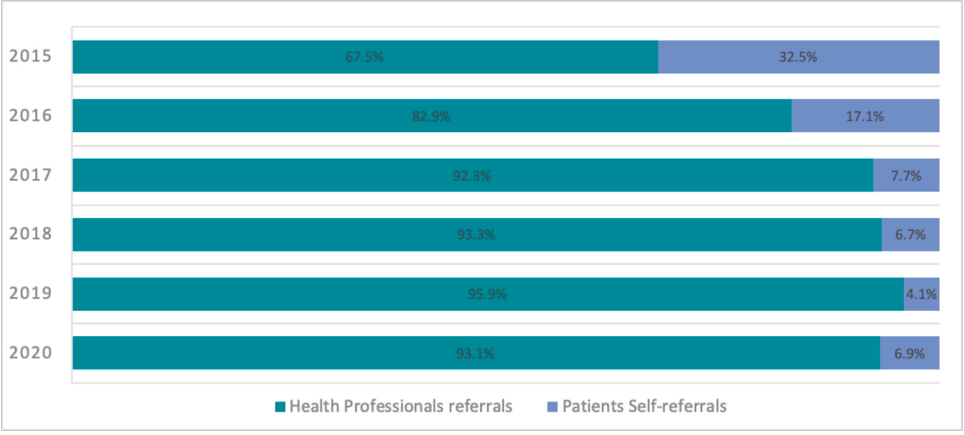

Fig. 6. Source of referrals, proportion of healthcare professionals vs. self-referrals per year.

activities and may also indicate the limited access to referring healthcare professionals during the COVID-19 pandemic. Referring physicians are from a vast multitude of specialties, primarily family physicians (57 %), and also specialists from neurology (5 %), physiatry (3 %), oncology (2 %) and rheumatology (2 %). Other specialties accounted for less than 2 %. Unfortunately, the specialty of healthcare professional was not collected in 22 % of the cases.

4. Discussion

As more countries implement medical cannabis access regulations, the development of dedicated medical cannabis clinics and practices is becoming a common model to address patients' needs and gaps in healthcare professional education and acceptance. A number of studies have examined the characteristics of patients using medical cannabis, yet, to our knowledge, no publications have yet looked at the characteristics of a clinic dedicated to medical cannabis. With less than 20 % of Canadian physicians reporting authorization (prescription) of medical cannabis over the last 20 years, medical cannabis clinics have played a critical role to support patient access.[7,15] The clinic opened in Quebec in 2014, where to-date less than 4 % of physicians have ever authorized medical cannabis.[7,16,17] The clinic's leadership position is maintained by a commitment towards patient advocacy and healthcare professional training as well as its dedication to research and enduring ability to adapt to regulatory changes. The described clinic model offers strengths, challenges and key recommendations for development of dedicated medical cannabis clinics worldwide.

4.1. Strengths

The clinic model has evolved over the years and demonstrates several strengths. Patient access and advocacy remains the core service offering; the model was informed and evolved based on patients' needs in a community setting and a conservative medical community. Notably, legalization of cannabis in October 2018 in Canada brought a significant increase in demand for medical cannabis education and an increase in referrals for patient assessment at the clinic. The experience gained by the clinic, its medical team and partners have supported an ongoing evolution in the medical community. The model of care has been adapted to other clinical settings such as out-patient clinics at hospitals. Additionally, the clinic offers support and expertise to the development of medical cannabis clinics in both community-based and institutional settings creating international impact in other countries with newly developed medical cannabis access regimes.

The clinic has also developed several medical training and education programs for healthcare professionals, trainees and medical students, and currently offers an elective program for medical residents of McGill University. It offers unique on-site and virtual preceptorships for Canadian and international healthcare professionals. Postdoctoral research fellows from Canadian universities have collaborated on short and long-term projects.

Patient advocacy and education may be accelerated in a dedicated

environment, with full-time medical cannabis expert personnel available for support. The clinic hosts patient education events, programs and workshops and publishes a bi-weekly patient newsletters to keep patients up to date with news articles and new clinical trials. Nurses are available for patient and medical community support via phone and email six days per week. These programs receive positive feedback from many patients.

Over the years, the clinic strengthened its patient real-world data collection and opportunities to generate real-world evidence to support medical cannabis practice guidelines and clinical trial development.[18] The patient centricity of the model and the validation of clinical information by HCPs produces high-level evidence in comparison with existing surveys resulting from a conventional model of care.

4.2. Challenges

There are several challenges to working in a focused practice, and many medical cannabis clinics are isolated from the healthcare community. Efforts must be made to encourage a referral from a patient's primary or specialist care team and to provide referral reports back to referring physicians. Regular communication with health ministries, regulators and relevant professional orders is challenging but very important.

The complexity of regulatory environments and required patient education can make medical cannabis care very time-intensive. Thus, it is important to develop as many efficiencies as possible and to leverage funding opportunities from the public and private sector and seek institutional partnerships where possible, to share resources.

Funding may be the most significant challenge in early years, and it is recommended to expand service offering slowly as funding opportunities present. Government funds for research and development, such as Canada's SR&D tax credit program may be accessible under well-designed research frameworks. Private funding must be approached with caution to ensure ethical standards and mitigate conflict of interest. However, compliant, well-designed industry relationships for training and research services have provided critical funding to support the clinic's initiatives.

In the absence of significant funding or in-kind support, a research program may not be possible initially, and may not be the best use of resources as challenges such as missing data, patient compliance and retention are common. However, in recent years, the clinic has found opportunities for the monetization of real-world evidence and has developed to offer services as a cannabis-focused Contract Research Organization. Operation as a clinical trial site may also provide significant funding opportunities, leveraging community relationships and providing a continuation of the objectives to support medical cannabis research and product development.

4.3. Recommendations

Based on its experience in a focused medical practice The clinic proposes several recommendations. Taken together with the model development considerations, they will help for the creation of a medical cannabis clinic.

- Initial model creation centred around the most critical patient and medical community needs: care, advocacy and education;
- Integration of clinical expertise and care with administrative and educational support;
- Close monitoring of evolving legislation and regulations, engagement with experts for support;
- Consideration of part-time positions for healthcare professionals in order to maximize resources;
- Implementation of standardized clinical procedures for all clinic staff, collaboration with the international community to access development support and shared knowledge;
- Development and maintenance of clinic-wide cannabinoid-based treatment protocols[10,19];
- Development of informed, approachable patient-level educational tools, handouts, videos and workshops by utilizing available resources from reputable online sources, or requesting support from trusted, experienced cannabis clinicians and centres who may have developed high-quality documents over time via patient feedback and clinician experience;
- Maintain transparency and transfer of knowledge and education to community and institutional healthcare professionals;
- Tailoring of clinical data collection to support ongoing research opportunities while considering limited resources;
- Commitment to advancing medical cannabis research; and
- Collaborations and partnerships with various stakeholders such as patient and, community-based organizations, medical institutions, private cannabis companies and clinical research sponsors.

4.4. Future directions

There is never a shortage of opportunities for continued development; in its sixth year of operation, the clinic continues to develop new initiatives to meet the needs of patients and the medical community:

- Continued integration of medical cannabis into the healthcare system via advocacy initiatives; from patients to healthcare professionals and the pharmacy;
- Collaboration between the ambulatory and community-based clinical models to study feasibility;
- Strategic partnerships with research institutions, facilitating access to the clinic data by academic researchers, in-kind resource exchanges and knowledge transfer;
- Evolution of clinical care and data collection measures via remote methods given the COVID-19 pandemic and ongoing needs;
- Development of a standardized practice tool to assess Cannabis Use Disorder (CUD) within a medical cannabis patient population;
- Ongoing development of academic training and continuing medical education programs;
- Unique, innovative practical training opportunities via virtual preceptorships and physician mentorship;
- Support for international healthcare providers to adapt the clinic model to international healthcare environments and medical cannabis regulations[10];
- Ongoing assessment of the patient database and a current protocol underway to assess patient satisfaction data in order to inform refinement of the model of care;
- Improvements to prospective, observational data collection to utilize custom, targeted health questionnaires based on patient profile to generate effective real-world evidence; and
- Working to bridge the gap between real-world evidence and development of randomized controlled trials to assess safety and efficacy of medical cannabis products.

5. Conclusions

The need for medical cannabis care and patient education has been well-established, yet with still limited clinical evidence and lack of formal medical training, few practical solutions have been proposed to bridge the gaps. Literature on medical cannabis clinics, resource centres or other facilities is essentially non-existent and practice recommendations are primarily centred on patient evaluation. This paper is the first to describe a clinic dedicated to medical cannabis that has been operating in Canada since 2014. It presents key principles of the model of care, including main elements of the organization and identified challenges and solutions associated with offering medical cannabis care.

The clinic model of care can be adapted to different healthcare settings and regulatory frameworks and may assist physicians and

healthcare professionals in the development of medical cannabis clinics or the implementation of best practices into their practice, as medical cannabis access continues to evolve. In the current, still-controversial, medical cannabis climate and amidst growing patient interest, advocacy, international collaboration and ongoing research are key to reach proactive, solution-focused objectives for the provision of medical cannabis care.

Author statement

All authors made contribution to conception and design, interpretation of data, manuscript writing, and final approval.

Erin Prosk: Conceptualization, Methodology, Validation, Writing-original draft preparation, Reviewing and Editing, Project administration, Final approval.

Maria Fernanda Arboleda: Conceptualization, Reviewing and Editing, Final approval.

Lucile Rapin: Data curation, Formal analysis, Visualization, Validation, Reviewing and Editing, Final approval.

Cynthia El Hage: Review of final version, Final approval.

Michael Dworkind: Review of final version, Final approval.

All authors agreed to be accountable for their own contributions.

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.2021.102740.

References

1 Bridgeman MB, Abazia DT. Medicinal cannabis: history, pharmacology, and implications for the acute care setting. *Pharm Ther*. 2017;42(3):180.

2 Abrams DI. The therapeutic effects of Cannabis and cannabinoids: an update from the National Academies of Sciences, Engineering and Medicine report. *Eur J Intern Med*. 2018;49:7–11.

3 Reiman A. Medical cannabis patients: patient profiles and health care utilization patterns. *Complement Health Pract Rev*. 2016;12(1):31–50.

4 Haug NA, Kieschnick D, Sottile JE, Babson KA, Vandrey R, Bonn-Miller MO. Training and practices of cannabis dispensary staff. *Cannabis Cannabinoid Res*. 2016;1(1):244–251.

5 Beaulieu P, Boulanger A, Desroches J, Clark AJ. Medical cannabis: considerations for the anesthesiologist and pain physician. *Can J Anaesth*. 2016;63(May (5)):608–624.

6 Government of Canada. *Canadian Tobacco Alcohol and Drugs (CTADS): 2013 summary*; 2015 (Accessed 5 April 2021) https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2013-summary.html.

7 Government of Canada. *Canadian Cannabis survey 2020: Summary*; 2021 (Accessed 5 April 2021) https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/research-data/canadian-cannabis-survey-2020-summary.html.

8 Davy C, Bleasel J, Liu H, Tchan M, Ponniah S, Brown A. Effectiveness of chronic care models: opportunities for improving healthcare practice and health outcomes: a systematic review. *BMC Health Serv Res*. 2015;10(May (15)):194.

9 Joypaul S, Kelly FS, King MA. Turning pain into gain: evaluation of a multidisciplinary chronic pain management program in primary care. *Pain Med*. 2019;20(5):925–933, 01.

10 Cyr C, Arboleda MF, Aggarwal SK, et al. Cannabis in palliative care: current challenges and practical recommendations. *Ann Palliat Med*. 2018;7(4):463–477.

11 Wilsey B, Atkinson JH, Marcotte TD, Grant I. The medicinal cannabis treatment agreement: providing information to chronic pain patients through a written document. *Clin J Pain*. 2015;31(Dec. (12)):1087–1096.

12 Carliner H, Mauro P, Brown Q, et al. The widening gender gap in marijuana use prevalence in the U.S. during a period of economic change, 2002–2014. *Drug Alcohol Depend*. 2017;170(January):51–58.

13 Government of Canada Justice Laws Website. *Cannabis regulations (SOR/2018-144)*; 2021 (Accessed 5 April 2021) https://www.canada.ca/en/health-canada/news/2018/06/backgrounder-the-cannabis-act-the-facts.html.

14 Reichelt M, Makovi K, Sargsyan A. The impact of COVID-19 on gender inequality in the labor market and gender-role attitudes. *Eur Soc*. 2021;23(1):S228–S245.

15 Arboleda MF, Prosk E, Cyr C, Gamaoun R, Vigano A. Medical cannabis in supportive cancer care: lessons from Canada. *Support Care Cancer*. 2020;28(7):2999–3001.

16 Government of Canada. *Data on cannabis for medical purposes*; 2020 (Accessed on 5 April 2021) https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/research-data/medical-purpose.html.

17 Le Collège des médecins du Québec. *Médecins actifs seulement Répartition générale*; 2019 (Accessed on 5 April 2021) http://www.cmq.org/statistiques/generalites.aspx?Lang=fr&an=2019.

18 Prosk E, Cyr C, Gamaoun R, El Hage C, Arboleda MF, Vigano A. The CBD craze: making a case for observational clinical data to assess medical cannabis treatment effectiveness. In: *The 30th Annual International Cannabinoid Research Society Symposium on the Cannabinoids*. 2020:04–09 (Cancelled due to COVID-19).

19 MacCallum CA, Russo EB. Practical considerations in medical cannabis administration and dosing. *Eur J Intern Med*. 2018;49:12–19.