

Developing a Curriculum for Addressing the Opioid Crisis: A National Collaborative Process

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ABSTRACT:

BACKGROUND: The burgeoning use of opioids and the lack of attention to the safe prescribing, storage, and disposal of these drugs remains a societal concern. Education plays a critical role in providing a comprehensive response to this crisis by closing the training gaps and empowering the next generation of physicians with the knowledge, skills, and resources needed to diagnose, treat and manage pain and substance use. Curricular Development: The Association of Faculties of Medicine of Canada (AFMC) developed a competency-based, bilingual curriculum for undergraduate medical students to be implemented in all Canadian medical schools. The authors describe the principles and framework for developing a national curriculum. The curriculum design process was situated in the Knowledge to Action theoretical framework. Throughout the development of this curriculum, different stakeholder groups were engaged, and their needs and contexts were considered.

CONCLUSION: The curriculum ensures that consistent information is taught across all medical schools to educate future physicians on pain management, opioid stewardship and substance use disorder.

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Introduction

While prescription drugs are essential to improving the quality of life for millions of people living with acute or chronic pain, use, misuse, addiction, and overdose of these products, especially opioids have become a serious public health concern in North America and has led to a steep increase in opioid-related mortality.¹ Used appropriately, prescription opioids can provide relief to patients and significantly improve their quality of life. However, these therapies have been prescribed in excessive quantities, for inappropriate conditions, and beyond the current evidence-based clinical practice guidelines.² Physicians are the most common prescribers of these drugs and are the primary contact for seeking treatment for pain. Therefore, it is critical for medical students to have a consistent, evidence-informed education that prepares future doctors to safely prescribe opioids and to understand how to engage patients in opioid tapering. Opioid tapering, if pursued too aggressively, can lead to termination of care.³ This, in turn, may cause patients to seek relief from opioid withdrawal symptoms by acceding opioids through the emergency room or through illegal sources.⁴

Only 32% of Canadian medical schools provide formal pain management content in their undergraduate medical education

(UGME) programs.⁵ Additionally, topics related to pain are typically integrated into sessions within other courses, resulting in a more fragmented curriculum. A multidisciplinary, holistic approach to pain management education would be more appropriate to prepare students for clinical practice.^{5,6} The Association of Faculties of Medicine of Canada (AFMC) in collaboration with the Office of Professional Development and Educational Scholarship (OPDES) at Queen's University and a team of content experts and representatives from each of the 17 Canadian medical schools, developed a competency-based, bilingual curriculum for undergraduate medical students to be implemented in all Canadian medical schools.

In this paper, we share our process of curriculum development, including guiding principles and considerations from the creation of this educational program. The full findings from the program evaluation have been submitted as a separate manuscript, and thus we will only be reporting on some preliminary evaluation data in this paper. The purpose of this paper is to describe the development process of the national UGME opioid curriculum. This innovative curriculum provides a model in pain and opioid use management that allows medical schools to augment their existing offerings by



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providing consistent, evidence-informed information on this topic.

Theoretical Framework

Given the scope of the opioid crisis, it is crucial that future and current doctors are provided with evidence-informed resources. As such, the curriculum development process aligned with the principles of knowledge mobilization (ie, getting the right information to the right people, in the right format, at the right time). The Knowledge to Action (KTA) framework^{7,8} was valuable for situating the development of the AFMC curriculum (Figure 1). The KTA framework “is based on a review of more than 30 planned-action theories” (p.10) and it considers: local context and culture, response of stakeholders to anticipated changes, and strategies that change agents can use to facilitate changes in educational practice.⁹ As the KTA framework provided a process for the transfer of research into practice, it informed the gathering of evidence and expertise from multiple sources to inform the creation of an evidence-based curriculum. This educational product will guide the practice of future healthcare practitioners.

This framework incorporated two processes for creating and applying research knowledge in practical settings. For the purposes of this paper, the curriculum development process primarily corresponded to the knowledge creation funnel and first step in the cycle (problem identification through knowledge inquiry and synthesis), as well as tool development and dissemination. The outer part of the framework (monitor knowledge use) was used to monitor and evaluate the pilot program, and will inform the 2-year follow-up evaluation, which will be fully discussed in a future paper.

Within the knowledge creation funnel, the curriculum development process aimed to synthesize existing knowledge to identify relevant information for inclusion within the curriculum and interpreting this knowledge within the context of pain and opioid use management. This knowledge was then integrated into the development of a tool (ie, curriculum) that refined knowledge into a clear and usable format for knowledge users (ie, UGME students). As the funnel became narrower, the knowledge became more targeted and tailored to the user needs. The KTA framework focuses on engagement while the spiral curriculum focuses on development.

Aligning with the KTA framework, the overarching purpose for developing the AFMC Opioid Curriculum was to facilitate the uptake of this content in real-world settings. As such, the research and development team worked together with various stakeholders and subject matter experts (SMEs) throughout the development process to create a curriculum that would be relevant, usable, and sustainable for UGME students. By establishing our knowledge translation goals at the project planning stage and fostering them throughout the research production and translation stages, we were able to systematically link research activities with the translation of new knowledge into

a product to address a complex problem—a curriculum on pain management and opioid use for medical students to address the opioid crisis.⁸ The five principles used to enact the KTA framework include¹⁰: (a) knowing the audience and the issues, (b) identifying credible messengers, (c) creating audience-specific messages and practices, (d) selecting effective methods for conveying messages, and (e) evaluating the product.

Curriculum Development

Principle 1: Knowing the audience and the issues

The purpose of principle one was to identify the main issues and/or gaps that existed in undergraduate pain management and opioid use curricula nationally. In 2017 to 2018, AFMC began laying the groundwork for curriculum development through an environmental scan, which included systematically exploring offerings across all Canadian medical schools as well as conducting a review of literature related to medical education in pain management.¹¹ For the environmental scan, a third party conducted an environmental scan of North American medical schools to identify the extent to which pain management and opioid use disorder was covered within their respective curricula. A full report from the needs assessment can be found on the AFMC website (<https://www.afmc.ca/en/priorities/opioids>). The AFMC then convened three expert panel meetings to review the curricula and teaching currently being provided in UGME, postgraduate medical education (PGME) and continuing professional development (CPD). A follow up survey was then distributed via e-mail to the deans of UGME, PGME, and CPD. In addition to the environmental scan of offerings and follow-up survey, the AFMC also convened expert review meetings to review the accuracy and comprehensiveness of the survey results. The review meetings included more than 30 addiction, substance use disorder, and medical experts from several competency areas (public health, review of pain, pathophysiology of pain and pharmacology of opioids, opioid prescribing, opioid use disorder, and cultural considerations [eg, cultural safety], legalities, and competency maintenance). See Figure 2 for timelines and structure of project.

Principle 2: Identifying credible messengers

This KTA principle was addressed through stakeholder consultations, creating an undergraduate curriculum expert committee, an oversight committee, a transition committee, faculty development working groups, and selecting SMEs. The purpose of this principle was to identify individuals and organizations who were preferred or reliable sources of information relating to pain management and opioid use disorder. Having committee representation of national experts in pain management and opioid use disorder provided credible messengers

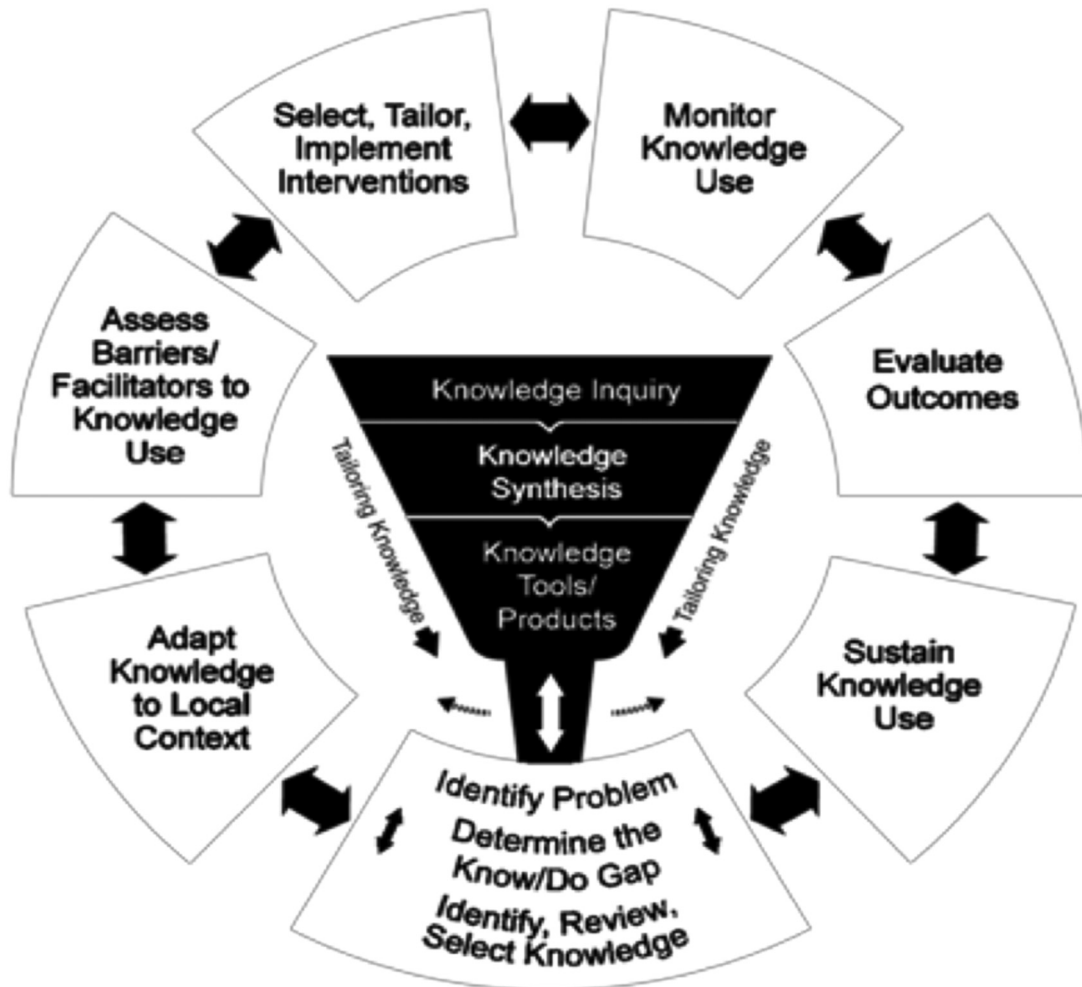


Figure 1. The knowledge to action framework.

who could report back to their respective medical schools. There was some overlap in the various credible messenger groups as some of the SMEs were also on the Curriculum and Faculty Development Committees and some of the students could have participated in the pilot study.

Stakeholder consultations. The AFMC secretariat for the project provided the national level structure for groups of other key stakeholders to meet to provide iterative and ongoing input into the curriculum. A number of consultation meetings were held with partners and stakeholders (eg, students, SMEs, deans, education development specialists, healthcare partners) throughout the curriculum development process. The SMEs and students were consulted at every stage of the process including building consensus on the curriculum, developing and reviewing the content, and validating the French translation of the curriculum. Partners were engaged in several ways with the curriculum development process (eg, providing documents and acting as key informants) to ensure that the content and structure of the curriculum could be delivered in an effective

manner. The methods of engagement were diverse as well, including face-to-face meetings, inviting input through surveys, and virtual meetings. A mid-project summit was held which brought together 40 stakeholders of the project to validate the curriculum framework and decide on next steps.

Creation of the undergraduate curriculum expert committee. The second principle was also addressed through the creation of the Undergraduate Curriculum Expert Committee through the AFMC secretariat. The committee was composed of representatives from the AFMC and curriculum experts in addition and/or pain management as identified by the undergraduate deans of each medical school. Further, this committee was supported by experts in pedagogy and curriculum development, technology, eLearning, evaluation, assessment, and project management. Key aims of this committee were to enhance relationship-building, consistency, and collaboration across all 17 Faculties of Medicine in Canada, and the development of an agreement on the competencies that underpin the opioid curriculum.

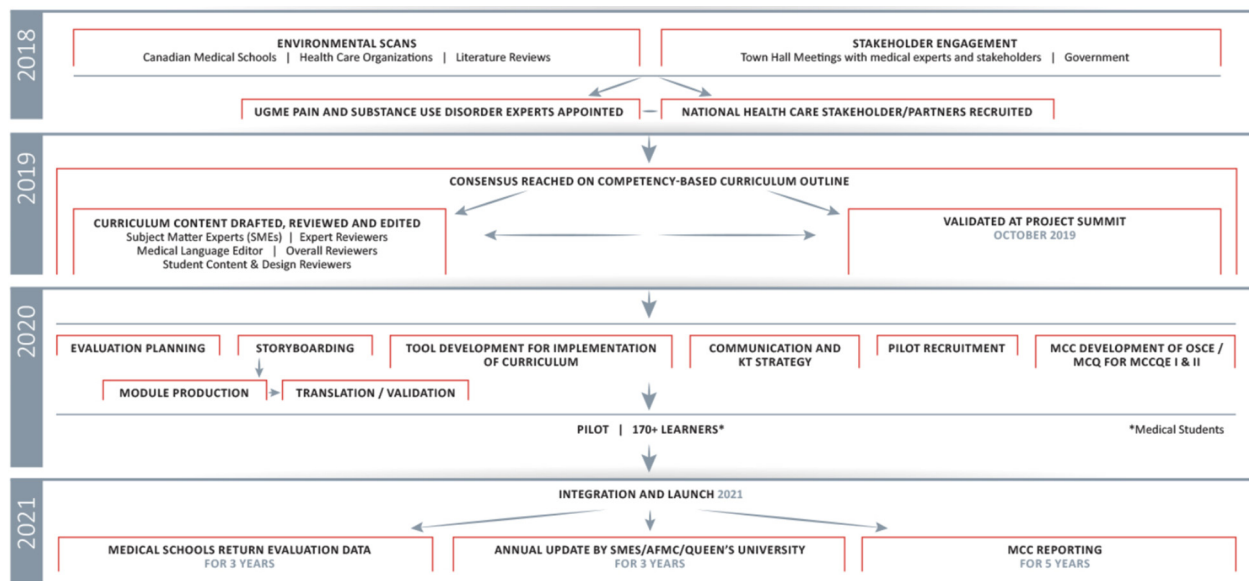


Figure 2. Timelines and structure of the project.

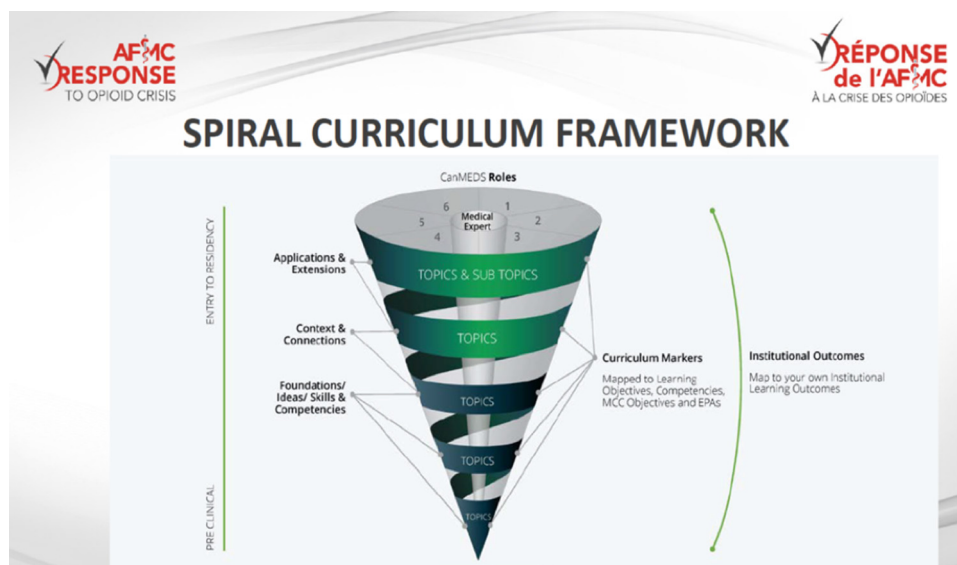


Figure 3. Spiral curriculum framework.

Creation of the oversight committee. The Oversight Committee through the AFMC secretariat included members from 18 organizations, representing pain, and substance use experts, medical students, the Medical Council of Canada (MCC), the various colleges of physicians, UGME Deans, and the Canadian Medical Association. This senior leadership group was established to liaise with key stakeholders and partners, share and implement knowledge products, foster the interorganizational collaborative work that is unique to this project, and promote the need for medical expertise in opioid use disorder and chronic pain. Stakeholders of national healthcare and

student organizations had representation on the Oversight committee.

Creation of the transition advisory committee and faculty development working group. The Transition Advisory Committee's (a subcommittee of the Undergraduate Curriculum Expert Committee) mandate was to provide high level strategic consultation and advice for the national curriculum, and to develop a plan of optimum integration into the undergraduate curriculum and at the transition into PGME. One of the working groups established by the transition committee was

the faculty development group whose role was to foster faculty development in teaching, and assessing pain management and addiction competencies across all disciplines.

Selection of subject matter experts. AFMC secretariat recruited national SMEs who are leaders in education in pain management, opioid prescribing, and opioid use. The SMEs provided content expertise, while the learning activities and assessments were developed in collaboration with educational developers, instructional designers, and multimedia specialists. The curriculum expert committee members were instrumental in identifying key content areas, and in mapping objectives to competencies, topics, and assessments.

Principle 3: Creating audience-specific messages and practices

Information gathered during principles one and two provided us with information about the needs and preferences of medical students, SMEs, and medical schools. This allowed us to create content that reflected the needs of a diverse population of end users.

In order to enhance the relevance of the curriculum to a wide audience of UGME students, the content and structure of the curriculum was drafted, reviewed, and edited by experts from multiple disciplines. Reviewers included SMEs, both English and French speaking, students, patients, Indigenous and cultural educators, equity, diversity and inclusion scholars, medical language editors, and interprofessional practitioners. Feedback from the reviewers helped the project team refine the specific content and structure of the curriculum, including content delivery, activities, and examples. Curricular revisions based on the reviewers’ feedback were then shared at the AFMC Project Summit in October, 2019.

Table 1. This table maps the different models used in the curriculum development process to the purpose for their utilization.

	KTA	FIVE KTA PRINCIPLES	SPIRAL STRUCTURE	ICE
Theoretical underpinning; Inform the content	✓			
Process for collaboration; Committee structures; Outputs		✓		
Curriculum sequencing			✓	
Targeting the content to the appropriate level of difficulty				✓

Principle 4: Selecting effective methods for conveying messages

Curriculum structure: Spiral curriculum. The AFMC Opioid curriculum (Figure 3) was informed by a spiral curricular structure.¹² When Bruner coined the term “spiral curriculum”, he envisioned such a curriculum to be designed around “the great issues, principles and values that a society deems worthy of the continual concern of its members.” (p. 52)¹³ There are four characteristics of a spiral curriculum: (a) it is iterative in nature by offering a structure that encourages topics and constructs to be revisited, (b) it provides increasing levels of sophistication and difficulty, (c) it connects new learning to prior learning, and (d) it has measurable increase in competence. This curricular framework was selected since it enables students to revisit competencies several times throughout the curriculum with increasing complexity. Moreover, this approach encourages reflection on previous learning and experiences, and can facilitate continued learning following the completion of the curriculum. This curricular structure also offers reinforcement, logical sequencing, and flexibility.¹² The spiral curriculum encompassed the ICE framework of learning which includes three components: Ideas, Connections, and Extensions.¹⁴ Ideas are the fundamental, discrete pieces of information that make up the building blocks of learning. Connections are the relationships that students can form among discrete ideas and connecting new concepts to prior knowledge. Extensions constitute creating new learning and applying knowledge to completely new and novel situations. The identified topics of the opioid curriculum were revisited again with the ICE framework in mind to map content that would be suited at each of those three frames of learning and design strategies to scaffold the content in a spiral manner.

Table 1 maps the different models used in the curriculum development process to the purpose for their utilization.

Curriculum content. The curriculum, titled *Best Evidence Training for the New Generation of Canadian Physicians on Pain Management, Opioid Stewardship and Substance Use Disorder*, consisting of 10 online modules (Appendix A), as well as an introductory module, was developed. The learning objectives were mapped to the six CanMEDS roles¹⁵ and subsequently mapped to the MCC objectives and Entrustable Professional Activities (EPAs). In addition, curriculum markers were identified as elements within existing curricula that could offer opportunities to deepen and extend learning. This mapping process fostered individual medical schools’ ability to integrate the competency-based curriculum¹⁶ within each of their own programs, and to extend this curriculum structure to PGME and CPD opportunities.

Module development was facilitated by a team consisting of educational developers, instructional designers, instructional design assistants, graphic designers, navigation and usability experts, videographers, and SMEs. The team ensured that

modules adhered to online learning standards, and Universal Design for Learning principles.¹⁷ The modules created in this initiative are SCORM and Tin Can API compliant, meaning the files can be embedded in any Learning Management System. The curriculum was also translated into French to ensure that all content is accessible for students in both of Canada's official languages. The curriculum consists of interactive online modules that include learning activities and formative and summative assessments. The method of delivery and the integration of the curricula into UGME medical schools is context specific and will be determined by the curriculum leads and instructors at each of the medical schools. Schools can opt to adopt the curriculum as is, or for schools that already have opioid use disorder content they may use the curriculum to supplement their existing content. The curriculum could also be integrated as a blended learning format if schools choose to adopt a flipped classroom approach. The curriculum is available through this website <https://opioids.afmc.ca/> and any individual can view the content at no cost, upon registration.

Targeted messages related to the curriculum were created for students, faculty, and UGME Deans to encourage completion of the modules and integration of the modules into existing medical school curricula. Information related to the project and curriculum development was presented at the Canadian Conference on Medical Education and the Association for Medical Education in Europe to reach a variety of medical educators. Presentations were also conducted at each of the 17 medical schools to respond to questions from students and faculty. A social media campaign was conducted through the AFMC Twitter account to raise awareness of the project.

Principle 5: Evaluating the product

A national recruitment campaign from AFMC using multiple social media channels and each medical school's communications office took place to recruit medical students from all 17 medical schools, including urban and rural, and French speaking and anglophone schools. Over 600 medical students applied through an online application process to participate in the evaluation of the pilot phase of the project.¹⁸ A total of 203 students were selected to participate based on purposive sampling to ensure representation across all 17 medical schools; 170 completed the evaluation over the two-month pilot phase (84% response rate). Most participants were women between the ages of 25 and 34 and in their clerkship stage of training. The core group was purposively selected to ensure there was representation across the medical schools.

Findings from the pilot evaluation indicate that the majority of participants (>70%) 'agreed' or 'strongly agreed' that they were able to meet the learning objectives of the modules, and that they found the program to be valuable, usable and feasible. Participants' perceived confidence regarding their knowledge of

the use of opioids in the management of pain increased by 75% between pre-and post-training. Overall results suggest that there were significant improvements in all domains of the knowledge test at post-training. This was true for both English and French versions of the tests. Commonly referenced strengths of the modules were that the material was clear, relevant and useful for future practice, while some identified weaknesses of the modules included the length and technological issues. We are planning to conduct a 1-year follow-up evaluation investigating the curriculum implementation, and how it has been integrated at different medical schools.

Discussion

Overall, the UGME opioid curriculum represents the product of a collaborative, multidisciplinary partnership. The guiding principles related to stakeholder engagement and curriculum development can be applied to any educational program, thus making the process generalizable to various change initiatives and implementation efforts. In order to help future researchers and practitioners in the development of their own curriculum initiatives, we share some key considerations and lessons learned through this development process.

1. Engage and collaborate with different stakeholder groups. A key feature of the curriculum development process was its collaborative approach. Since the inception of the project, the leadership team aimed to ensure that a diverse range of stakeholders were intricately involved in the development process. As a national organization representing all medical schools in Canada, it was crucial to engage each of the medical schools as a collaborative partner in the development process. For example, AFMC actively engaged the deans of all medical schools throughout this process. This inclusive approach encouraged transparency and trust building and ensured that the curriculum could be adapted to each of the medical schools. Overall, this approach aligns with issue-driven research in which stakeholders are actively engaged with the identification of the key issues, priority setting, and development of the research process and research products.
2. Mindful of stakeholder needs and contexts. Although stakeholders shared a common vision for the development of the curriculum, it is important to recognize that individuals and organizations each had their own unique needs and objectives. As such, it was imperative for the curriculum to acknowledge these distinct needs and find ways for each of the medical schools to adapt the curriculum to their local context. This context-specific approach to curriculum development will allow for the curriculum to align with the national medical education programs, but also offer flexibility to each school to embed their own signature features.

- Find ways to make the hidden curriculum visible. Another strength of this curriculum is that it aligns the messages of the hidden curriculum with the formal curriculum by making opioid use disorder an area of explicit discussion, learning, and assessment. The hidden curriculum, often describing the unintended, unwritten, and implicit values, norms, and perspectives experienced by the students,^{19,20} can have a profound effect on learning. The hidden curriculum can negatively impact learning when it runs parallel to the formal curriculum rather than being explicitly taught and assessed.²¹

Through this curriculum we are focusing on educational practices that are in a sense “hidden” and deliberately teaching those to the students. For example, we are making an intentional effort to address the stigma and prejudice often associated with opioid use and misuse, by narrowing the gap between what is taught to the medical students in formal settings and what students learn in the informal flow of their professional practice. By encouraging self-reflection within curricula, and better integrating concepts of trauma-informed care, and cultural safety, we are preparing students to make proper choices that address the complexities of physician–patient, physician–interprofessional team, and physician–community relationships.²² Finally as hidden curricula and their impact are context-dependant, we are having explicit conversations across organizational levels and medical school programs on how to best operationalize the hidden curriculum.

- Plan for sustainability. In developing this curriculum, all partners reinforced the importance of sustainability. This refers to the curriculum itself as well as the partnerships and engagement facilitated through this development process. Sustainability has been addressed through the creation of the transition committee and through the development of a plan for future curriculum updates. To foster a longitudinal approach, plans are currently in place to build upon and extend this work to the post-graduate medical education and CPD contexts. The program evaluation will also serve to monitor the integration of this curriculum.

Limitations

There are some limitations to the development process. The pilot study included a high number of women participants which may have impacted results. We are presently conducting a 1-year post program implementation evaluation that will address this limitation in future curricular iterations to ensure inclusion of the specific subgroups that are disproportionately impacted by the opioid crisis (eg, BIPOC, LGBTQ2IS+, youth). In addition, while we used purposive sampling to ensure representation from each medical school, pilot participants did self-select by volunteering to participate which may

suggest that they have a greater interest in the content area than their peers.

Conclusions

We describe the development of a national, bilingual curriculum in chronic pain, opioid prescribing, and opioid use disorder. Throughout the development of this curriculum, different stakeholder groups were engaged, and their needs and contexts were considered. The modules within the curriculum were purposefully developed to align with multiple curricular markers including the CanMEDS roles, EPAs and MCC objectives, while also endeavoring to make the hidden curriculum visible. The curriculum was created with sustainability in mind, with the hope of educating medical students for years to come.

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Ethical approval

The research ethics board of the Queen’s University Health Sciences and Affiliated Teaching Hospitals approved this study (file number: 6028511).

Disclaimer

The views expressed in this paper are those of the authors and do not necessarily reflect those of Health Canada.


Informed consent


Not applicable, because this article does not contain any studies with human or animal subjects.


Trial registration


Not applicable, because this article does not contain any clinical trials.

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Supplemental material

Supplemental material for this article is available online.

REFERENCES

- Fischer B, Pang M, Tyndall M. The opioid death crisis in Canada: crucial lessons for public health. *The Lancet Public Health*. 2018;4(2):E81-E82. doi:10.1016/S2468-2667(18)30232-9
- Alexander GC, Frattaroli S, Gielen AC, eds. *The Prescription Opioid Epidemic: An Evidence-Based Approach*. Johns Hopkins Bloomberg School of Public Health;

2015. Accessed August 7, 2020. <https://www.jhsph.edu/research/centers-and-institutes/center-for-drug-safety-and-effectiveness/research/prescription-opioids/>
3. Perez HR, Buonora M, Cunningham CO, et al. Opioid taper is associated with subsequent termination of care: a retrospective cohort study. *J Gen Intern Med.* 2020;35(1):36-42. doi:10.1007/s11606-019-05227-9
 4. Han B, Compton WM, Blanco C, Crane E, Lee J, Jones CM. Prescription opioid use, misuse, and use disorders in U.S. adults: 2015 national survey on drug use and health. *Ann Intern Med.* 2017;167(5):293-301.
 5. Watt-Watson J, McGillion M, Hunter J, et al. A survey of prelicensure pain curricula in health science faculties in Canadian universities. *Pain Res Manag.* 2009;14(6):439-444. doi:10.1155/2009/307932
 6. Mezei L, Murinson BB, Johns Hopkins Pain Curriculum Development Team. Pain education in North American medical schools. *J Pain.* 2011;12(12):1199-1208. doi: 10.1016/j.jpain.2011.06.006
 7. Graham ID, Logan J, Harrison MB, et al. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof.* 2006;26(1):13-24. doi: 10.1002/chp.47
 8. Thomas A, Bussi eres A. Knowledge translation and implementation science in health professions education: time for clarity. *Acad Med.* 2016;91(12):e20. doi:10.1097/ACM.0000000000001441
 9. National Academies of Sciences, Engineering, and Medicine. *Health professions faculty for the future: Proceedings of a workshop.* The National Academies Press; 2021. doi: 10.17226/26041
 10. Ginis KA, Latimer-Cheung A, Corkum S, et al. A case study of a community-university multidisciplinary partnership approach to increasing physical activity participation among people with spinal cord injury. *Transl Behav Med.* 2012;2(4):516-522. doi: 10.1007/s13142-012-0157-0
 11. Verma S, Raegele M. Final report on the AFMC response to the Canadian Opioid Crisis. October 16-17, 2017, Accessed May 10, 2020. <https://www.schulich.uwo.ca/continuingprofessionaldevelopment/docs/Health-Canada-Opioid-Final-Report-AFMC-Nov-2017.pdf>
 12. Harden RM. What is a spiral curriculum? *Med Teach.* 1999;21(2):141-143. doi: 10.1080/01421599979752
 13. Bruner JS. *The Process of Education.* Harvard University Press; 1960.
 14. Fostaty Young S, Wilson RJ. *Assessment and Learning: The ICE Approach.* Portage and Main Press; 2000.
 15. Frank JR, Snell L, Sherbino J. CanMEDS 2015 physician competency framework. Ottawa: Royal College of Physicians and Surgeons of Canada. October 16, 2015, Accessed August 5, 2020. http://canmeds.royalcollege.ca/uploads/en/framework/CanMEDS%202015%20Framework_EN_Reduced.pdf
 16. Royal College of Physicians and Surgeons of Canada. Competence by Design: Canada's model for competency based medical education. 2020, Accessed August 5, 2020. <http://www.royalcollege.ca/rcsite/cbd/competence-by-design-cbd-e>
 17. CAST. Universal Design for Learning Guidelines version 2.2. 2018, Accessed August 5, 2020. <http://udlguidelines.cast.org>
 18. Dalgarno N, Turnidge J, Hastings-Truelove A, et al. Evaluation of the effectiveness of a national pain management and substance use curriculum for undergraduate medical education. *Acad Med.* (Submitted).
 19. Hafferty FW. Beyond curriculum reform: confronting medicine's hidden curriculum. *Acad Med.* 1998;73(4):403-407. doi: 10.1097/00001888-199804000-00013
 20. Mackin R, Baptiste S, Niec A, Kam AJ. The hidden curriculum: a good thing? *Cureus.* 2019;11(12):e6305. doi: 10.7759/cureus.6305
 21. Lawrence C, Mhlaba T, Stewart KA, Moletsane R, Gaede B, Moshabela M. The hidden curricula of medical education: a scoping review. *Acad Med.* 2018;93(4):648-656. doi: 10.1097/ACM.0000000000002004
 22. Hall P, Byszewski A, Sutherland S, Stodel EJ. Developing a sustainable electronic portfolio (ePortfolio) program that fosters reflective practice and incorporates CanMEDS competencies into the undergraduate medical curriculum. *Acad Med.* 2012;87(6):744-751. doi: 10.1097/ACM.0b013e318253dacd10