The Future of Medical Education: A Canadian Environmental Scan

Hodges BD, Albert M, Arweiler D, Akseer S, Bandiera G, Byrne N, Charlin B,

Karazivan P, Kuper A, Maniate J, Millette B, Noyeau E, Parker S, Reeves S.

Abstract

Introduction

One hundred years after the Flexner report remade medical education in North America, many countries are reviewing the purpose and organization of medical education. In Canada, a national study is being undertaken to define important issues and challenges for the future of medical education.

Method

Thirty national key informant interviews were conducted, transcribed and coded to identify key themes. Interview data were triangulated with 34 commissioned literature reviews and a series of national focus groups.

Results

Ten key issues/priorities were identified and used to generate detailed review papers used by the Association of Faculties of Medicine of Canada to create a blueprint for the evolution of medical education. The new priorities have major implications ranging from admissions, curriculum content, educational process and the need to articulate the purpose and responsibilities of medical schools in society.

Discussion

This research provides a case study of how an empirical research approach can be used to identify and validate priorities for changes to medical education at a national level that may be of interest in other countries.

Introduction

One hundred years has passed since the 1910 Flexner report created a new model for medical education in North America. Key elements of the Flexnerian model - locating medical schools in universities; focusing on basic sciences prior to clinical training; giving priority to medical research – still characterize medical education in 2010. Naturally, medical education has evolved and countries around the world are engaged in considering how to best undertake change. This paper provides a case study of the way one country, Canada, is constructing an empirical base on which to build its educational reform strategy. This Canadian data is, of course, most relevant to the context in which it emerged. However, the empirical, qualitative approach employed may be of interest to other countries engaged in rethinking or remaking medical education at a national level. Thus the twin objectives of this paper are to describe the process of conducting an empirical environmental scan at a national level on one hand, and to present the research findings on the other.

The context of medical education in Canada has some important specificities. In a country of 35 million inhabitants, about 2500 students are admitted annually to one of the 17 medical schools after completion of a university degree. Medical education then takes 4 years in most schools (3 years in two schools), and leads to postgraduate residency training in programs located within academic health sciences centres. Undergraduate medical education is accredited by the Liaison Committee on Medical

Education/Committee on the Accreditation of Canadian Medical Schools and post graduate education is accredited by the Royal College of Physicians and Surgeons of Canada (for specialties) and the College of Family Physicians of Canada. While these organizations oversee certification, accreditation and maintenance of competence programs at a national level, each of the 10 provinces and 3 territories in Canada has jurisdiction over health care, education and physician licensure. In Canada, both medical schools and national organizations have fostered a culture of innovation in medical education. For example, the problem-based curricula developed at McMaster University and later l'Université de Sherbrooke and the University of Calgary have been taken up around the world. The Objective Structured Clinical Examinations (OSCEs) created by the Collège des médecins du Québec in collaboration with the four Quebec Faculties of Medicine [1] led to the first national licensure OSCE created by the Medical Council of Canada, which in turn became the model for many certification organizations around the world. The competency framework first developed by the Educating Future Physicians of Ontario project (EFPO) in the 1980's and the more recent version evolved by the Royal College of Physicians and Surgeons of Canada as the Canadian Medical Education Directions for Specialists (CanMEDS) roles are being adopted by many countries.

And yet, for all the change and innovation in medical education, there has been an even more profound evolution of Canadian society. Medical education has not, in some respects, kept pace with the evolution of the societies that it is designed to serve. The Lalonde Report [2] was, for example, one of the first reports in Canada to note a widening gap between Canadian healthcare and education systems, highlighting a problematic lack of focus on prevention and the determinants of health. Health Canada in 2001 called for renewed attention to the importance of social responsibility among medical schools[3],

defined as "the obligation [of medical schools] to direct their education, research and service activities towards addressing the priority health concerns of the community, region and/or nation they have the mandate to serve" [4]. The most recent Romanow report [5] noted problematic gaps in the way health professionals are prepared to work together to meet the needs of Canadians.

Implicit in all of these reports is the idea that the Flexnerian model, while a significant advance when it was released 100 years ago, is not aligned with the needs of 21st Century Canada. In the words of Boelen, "although the educational strategies Flexner proposed in 1910 were daring for the time…they need to be superseded by a more comprehensive set of standards to steer medical schools towards accomplishing their social mandate." [6] Thus in 2007, Health Canada together with the Association of Faculties of Medicine of Canada (AFMC) launched The Future of Medical Education in Canada (FMEC) project. The focus of the first phase would be to examine the future of undergraduate education in Canada, with the intention to examine post-graduate and continuing education in subsequent phases.

The project began with an extensive environmental scan. This paper reports on that phase, presenting results from a series of national key informant interviews; the process of thematic coding and analysis; the supplementation with a series of commissioned literature reviews; and triangulation of themes from the first two sources with a series of national focus groups. The final report provided the AFMC and Health Canada with important themes and issues that were subsequently used to develop consensus priorities at a national level for the FMEC project.

The Commissioning of a National Environmental Scan

Following a national competitive selection process, a team of researchers at the Wilson Centre for Research in Education, University of Toronto and the Centre de pédagogie appliquée aux sciences de la santé (CPASS) de l'Université de Montréal received funding from the AFMC/Health Canada to lead a national environmental scan that would identify important issues relevant to the future of undergraduate medical education in Canada. Key informant interviews were chosen as useful means to gather perspectives on the relevant issues. Simultaneously a series of literature reviews covering broad topics in medical education and its reform was commissioned.

The environmental scan team set three important demarcations on the process of data collection. First, the project would not replicate work already accomplished by previous projects such as Educating Future Physicians of Ontario [7] or the Royal College of Physicians and Surgeons of Canada CanMEDS project [8]. These two projects had already conducted complex and empirically based research that led to the identification of the roles expected of physicians in Canada. Second, though we reviewed work on the future of medical education from other countries, including the United States [9, 10] and UK [11], the Environmental Scan team sought to give priority to challenges specific to the Canadian context. Third, the evolution, needs and challenges of the Canadian health care system itself were addressed in many reports, including those listed above. Thus, while we aimed to embed the spirit of these reports in the environmental scan, we did not aim to replicate these studies of the Canadian healthcare system.

The Environmental Scan was conceptualized like an early 21st century *report card* on medical education, examining in depth how well our medical schools are adapting to societal needs. We focused on identifying:

- Priorities/challenges currently facing medical education

- Innovations which are occurring to address these challenges

- Factors that facilitate or hinder evolution and adaptation of medical education in Canada

Methods

Data collection

We undertook this commission as a research project, as opposed to a strategic planning approach, for several reasons: to undergo ethical review necessary for subsequent publication; to conduct an open, transparent data gathering exercise; to maximize the acceptability to the academic community of data gathered by attending to its reliability and validity; and to enable articulation of different data sets gathered.

To begin, a purposeful sample [12] of medical education stakeholders was constructed. We did not aim for an exhaustive stakeholder sample, nor did we attempt to represent all medical schools in Canada. Rather, purposive sampling based on Boelen's model of social accountability [4] was used to capture as much diversity of opinion as possible. According to Boelen, the social accountability of medical schools entails engaging in a meaningful way with a wide variety of stakeholders (policy makers, communities, health professionals, administrators, etc), whose input should be central to the objectives,

6

conduct and reform of medical education. While we were initially uncertain about how many participants would be required to reach saturation of themes, this began to occur after fewer than 20 interviews. We continued to a total of 30 interviews with the following broad representation: academic leaders (N=6), leaders of health care and trainee institutions and programs (N=7), health and/or education ministry officials (N=3), academic leaders in health professions other than medicine (N=5), and medical professional organizations, journals and members of the public serving to advise medical education organizations (N=9). The AFMC Project Steering Committee requested that the Environmental Scan team not focus on currently serving medical schools deans as this group was to be consulted at a later phase of validation. With that exception, we aimed to diversify the sample in several ways. First, we wished to sample across the geographic diversity of Canada and to conduct interviews in both English and French. One dimension that we considered was the gender distribution of the stakeholder groups in Canada. Most of the stakeholder groups do not approach an even gender split in Canada, however we felt it was important to ensure the representation of women in our scan. In some cases this meant actively seeking woman key informants, recognizing that it would be not be possible to achieve 50% women in the overall sample. We did not set specific targets for other demographic characteristics (age, culture, ethnicity) however we attempted to identify individuals from a wide range of Canadian settings (rural, urban, northern) and of different ages (from students to retirees). See Table 1 for more information.

INSERT TABLE 1 ABOUT HERE

Potential interviewees were contacted by phone or email and those who agreed (all but 3) reviewed the project outline and gave informed consent. Prior to beginning the study, we reflected at length about whether interviewees should be provided anonymity. Many of our participants are highly visible in Canada and it concerned us that we might convey a sense of anonymity that would be hard to sustain, particularly for those who spoke about initiatives or leadership roles that could be identified with them. The AFMC was keen that the full transcripts of interviews be made available as an archive for future research. Thus, after consultation with our Research Ethics Board, the study was approved with non-anonymous interviewing and data presentation. The consent clearly specified that the interview transcripts would be made available in non-anonymous form and included in a public archive. This dimension of the research was highlighted by all interviewers and interviewees were given the opportunity to withdraw at any stage of the project. They were also informed that they would have the opportunity to review, and potentially withdraw the transcript of their interview.

After consent was obtained, an interview lasting approximately an hour was conducted in person or by telephone. The interviewer sought each participant's view regarding "the most important challenges to be met by Canada's Faculties of Medicine, given their social responsibility to train the next generations of MDs". They were asked to identify 3-5 challenges, issues or priorities and for each, any innovations or best practices they were aware of. Finally, they were asked to identify barriers and opportunities in addressing each of the challenges. Interviews were audio-recorded and transcribed. Transcripts were printed and sent to each interviewee so that they could confirm the accuracy and, if desired, remove any material that they were uncomfortable leaving in a public document.

We were aware that the non-anonymous format may have influenced what participants felt able to say, and it is possible that important issues were not articulated. However, we monitored this issue closely and it was the impression of interviewers that participants were frank, forthcoming and gave no indication of providing "socially correct" answers. In fact, in several cases we were very glad of the provision for rereading and approval of transcripts by participants who discussed strongly held, controversial or personal information.

Coding and identification of themes

Interview data were analyzed using a three-phase inductive thematic content analysis technique. The method used was inspired by discourse analysis, though we did not aim, in this study, to delve into complex social processes. The goal of coding was to produce a descriptive set of issues/priorities considered important by participants. First, categories were generated reflecting the various themes expressed by participants with regard to each challenge/issue/problem. Second, each interview was analyzed based on these categories (vertical analysis). Third, the data were examined from a comparative perspective across respondents (transversal analysis). Each transcript was then coded in detail. Codes were developed through iterative reading and organized into a codebook of major and minor headings. One rater coded all transcripts; each requiring approximately one day. During this stage of the project, a second rater independently coded a subset of transcripts and the coding was compared and adjusted to ensure consistency. Once the coding book was finalized a formal validation process was undertaken involving five members of the team. Over two days this diverse group selected several interviews for independent re-coding, and examined the citation extracts for each code. In the case of discrepancies, the group worked toward consensus, creating where necessary new coding

9

categories or adjusting the existing ones. The resulting changes to the coding book and citations were very minor. From the original codebook of 77 pages, less than 5% of citations and codes were altered during the two-day validation process. Throughout the process of interviewing, coding, analysis and synthesis we tried to be reflective about the various perspectives each of us brought to the research (physician, specialist, generalist, administrator, researcher, leader, etc) and engaged continually in discussion with colleagues holding different perspectives.

Results

Initial coding of themes from key informant interviews

Thirty interviews were completed: 22 key informants were male and eight (27%) female; 22 interviews were conducted in English and eight (27%) in French. Informants came from all parts of Canada including Ontario (N=12), Quebec (N=8), the West (N=5) and the East (N=4). There was one American participant (journal editor) and eight leaders representing national Canadian organizations. All participants reviewed and edited their interview transcripts and there were only very minor revisions.

Five over-arching categories emerged: Educational Content, Education Methods, Professional Culture, Innovation and Factors Facilitating Change. Data from interviews were sorted using these five major themes and a set of 3-14 sub-themes was identified for each category. A codebook was created with several example quotes illustrating each of the key categories and sub-categories. While the entire set of codes cannot be shown here, these summary paragraphs highlight some of the most prominent codes for each

theme. While we have noted themes that appear frequently, our goal was to highlight the range of different viewpoints expressed.

Curriculum content and design

One of the largest sets of themes concerned the content of medical education. For example, many noted that intra- and interprofessional collaboration must be better developed in the curriculum because teams increasingly deliver health care. Several noted that a true interprofessional approach necessitates better understanding of, and teaching about, professional hierarchy. A number of participants argued that medical education is too oriented toward specialization, providing a fragmented curriculum that does not respond to public needs for integrated, generalist medical care. Many identified problems of human resource planning, including attention to developing curricula relevant to family medicine as being important. Another perceived need addressed by many informants was public health and population health approaches, both seen as largely underemphasized in Canadian medical curricula. Informants felt that a more holistic approach, taking into account the social, political and economic challenges and social determinants of health was required. Many felt that this could be achieved only if students had a good understanding of healthcare system organization in order to be able to adapt to a system that is substantially evolving. Some noted a discrepancy between training and reforms in the health care system and that this gap would be corrected only with physicians playing active roles both at the level of health care teams and at the level of health care system and policy development.

In terms of the doctor-patient relationship, many noted the importance of ensuring that patients and families truly are at the centre of care, and that technologies and practices

need to evolve to support this model. They stated there is still a need to improve communication with patients who have increasing expectations, and to work harder to provide education in the communities where patients live and work. Some participants noted the need to teach students evidence-based medicine, but noted that education should develop expert judgment and not be reduced to teaching lists and protocols. Several identified the need to focus on student evaluation and self-reflection from the beginning of studies right through into practice, perhaps using a portfolio that would stay with an individual throughout their career.

The place of basic sciences in the curriculum was a preoccupation for many. Some felt that there was an erosion of basic science education, however many underscored the importance of the integration of basic and clinical science. Several stated that what constitutes "basic sciences" needs to be revisited, and that the social sciences have been underemphasized. Many underscored the importance of emphasizing acute and chronic care in the curriculum. Other themes addressed, though less frequently, were training physician scientists, ethics, competencies, experiential knowledge and global health.

Educational method

Another large category of themes related to the organization and delivery of medical education. Many participants noted the need to continue to develop new educational methods such as competency-based approaches and problem-based approaches, which have evolved based on the educational research and the learning styles of a new generation of students. For many, the teacher-student relationship remains the central priority and they argued that pedagogical innovation must not harm this relationship. Some added that this means greater attention to the use of technology and attention to a

perceived generation gap. Student recruitment was a particularly important topic,

primarily in terms of the need to change student selection methods in order to choose

those who will best be able to meet the needs of a socio-demographically diverse

Canadian population and carry out all the roles expected of a physician. Many

emphasized the importance of ensuring that no financial barriers impede access to

medical studies and some observed that the debt accumulated during medical studies

should not push students toward particular specialties that are better remunerated. The

current pre-medical requirements were much discussed, as was the place of interviews in

selection processes, seen by some as problematic.

A number of participants underlined the importance of moving to community settings and

providing more training in rural settings in order to better respond to needs of the

population and noting that new doctors have a tendency to live in the cities similar to

where they undertake their studies. The continuum of medical education was a concern

for many. Participants said that harmonizing the content of undergraduate and post-

graduate training in terms of content and of attitudes transmitted to students is a priority.

Some called for greater curriculum flexibility that would permit students to structure

courses to allow them to flexibly achieve competence in all domains at a variable pace.

Some highlighted the importance of early clinical immersion and some noted simulation

as a promising method requiring further development. Finally, better inter-departmental

collaboration was felt to be a necessary step to facilitate student learning.

Professional Culture

A third major thematic category related to professional culture, something for which

there was widespread concern that change is needed. Most participants talked about the

13

hidden curriculum and its significant effects, particularly on career choice, noting that students are often discouraged from selecting family medicine, for example. Many highlighted the influence of role modeling and spoke of ways educational and medical culture shapes students attitudes and behaviours. Professionalism appeared in most interviews as a priority for medical education and was spoken of in various forms including such variations as altruism and as a public service ethic. Many participants focused on the need to ensure a balance between professional and personal life, and some noted that this would change with the number of hours that doctors work.

Social accountability and social responsibility also appeared as important themes throughout the entire coding manual, touching all dimensions of medical education. Social responsibility included, for the participants, both the individual level and the institutional level. Speaking of the social responsibility of institutions, some noted that universities sometimes have a tendency to emphasize academic roles to a greater extent than broader community leadership or needs of the healthcare system. Some argued that a collective social responsibility of medical schools in Canada should be defined. Finally, it appeared important to many to re-examine the underlying philosophy of medical education given the change from traditional autonomous medicine to collaborative medical practice.

Innovations

The fourth category of themes addressed by participants was innovations identified from their experiences in Canada and internationally. These included educational innovations in both content and pedagogical methods. Many examples of innovations in these areas were given including: interprofessional collaboration, prevention and population health,

14

self-assessment, simulation, early clinical immersion, training for clinician teachers and for clinician-scientists, community exposure and training in rural settings, student recruitment and curriculum flexibility. Participants also spoke about institutional innovation, concerning largely institutional change of medical schools themselves and of their environments, giving examples such as: inter-faculty committees, rural medical schools, partnerships with stakeholders, the federal government and aboriginal communities, among others. Finally, participants spoke of regulatory innovation dealing with, for example, accreditation and continuing education.

Factors facilitating change

The final category of themes addressed by participants was factors facilitating change in medical education. For many, pro-activity of medical education (as opposed to passive reception) is essential. Some noted that changes that might appear drastic would be necessary to respond to the evolving needs of the population. Many argued that change should be accompanied by (and in some cases preceded by) research in medical education to better understand the needs, effective practices and obstacles, from a range of disciplinary perspectives. It was noted that individual schools are not likely to be able to accomplish necessary changes by acting alone and that it is important for faculties of medicine to create deeper partnerships with stakeholders such as governments, other health professionals and community-based organizations. Several argued for the importance of evaluating outcomes and for the creation of new measures to guide change such as new accreditation standards. Many felt that effective change requires faculty development and time and resources dedicated to teaching, particularly in less well funded domains such as family medicine, community medicine, public health and social

sciences. Several argued for the importance of including public representation in curriculum planning, delivery and evaluation.

Some highlighted the role of knowledge translation and sharing at a national level to ensure discussion and generate consensus. Some said that student voice merits more attention and that early training of students in leadership skills would be valuable. Finally, many noted that the institutional culture of each faculty of medicine plays a key role in the ease and rapidity with which changes can be implemented.

Literature reviews

Concurrently with the national key informant interviews, the Environmental Scan team commissioned a series of review papers using an initial list of topics developed jointly by the AMFC project Steering Committee. Thirty key topics were clustered into five overarching domains and 4 and 12 topics were assigned to each "cluster". Two "cluster leaders" then worked with authors from across Canada who wrote the papers. Commissioned literature reviews took two forms: brief summary reviews (where review papers were already known to exist) and "in-depth" reviews where no existing review papers were identified. Drawing upon our prior experience of systematic review work[13] a set of review guidelines were developed to enhance consistency with search processes, analysis and synthesis of materials. The guidelines also ensured that the reviews included a list of innovations, implications, references and an annotated bibliography. As review papers were received, the cluster leaders, the research team, the AFMC Project Steering Committee and in a few cases external experts, reviewed them. As data became available from other project sources additional papers were commissioned, including: Health Inequities, Technology and Medical Education and Primary Care.

A book containing the final version of all literature reviews was published on the AFMC website [14]. The book contains 34 literature review papers – 24 brief reviews and 10 in depth reviews – for a total of 550 pages. Sixty-two authors from all parts of Canada generously gave of their time to produce these reviews, many of which eventually will be edited for publication in peer-reviewed journals. The final cluster structure of papers is: 1. Medical Education and Society; 2. The Purpose, Function and Governance of Medical Schools; 3. Medical Students: Selection, Support and Assessment of Competence; 4. Curriculum Design and Implementation; 5. Contemporary Content Topics. In order to facilitate triangulation of the literature reviews with other data sources, an electronic index of key words was created and the entire collection of papers was made available to the coding team to review prior to final synthesis of major theme and priorities.

Expert panels/focus groups

While the Environmental Scan process was taking place, the AFMC project Steering Committee conducted several expert panels in the form of focus groups. Though not conducted strictly in research format, these panels/focus groups nevertheless provided very significant information. Several members of the Environmental Scan team attended the panels as observers and one member assisted in drafting of the reports. These panel/focus groups included a Young Leaders Forum, a Blue Ribbon Panel and a Data Needs and Access Group. Each is described in more detail on the AFMC website where the reports of each group can be found. [15] Focus group reports highlighted key issues/themes that emerged from the meetings and these were triangulated with other data sources for the final synthesis.

Towards a Synthesis: The Identification of Preliminary Overarching Priorities

The last step of the Environmental Scan was to synthesize a manageable set of overall themes that would serve as a preliminary set of priorities for the AFMC Project Steering Committee to take forward for discussion and validation at a national level. This meant reducing the dozens of themes identified in the interviews to a short list, aligning them with data from the literature reviews and finally triangulating the themes with other sources of project data (expert panels and focus groups).

To accomplish this synthesis, a group of 19 individuals (seven from the Wilson Centre, five from CPASS and seven from the AFMC Steering Committee) spent a full day with the entire corpus of project data. Ahead of the meeting, individuals read the interview codebook and its citations, the literature reviews and the reports of the panels and focus groups. On that day, participants were randomized to one of three groups. Each group worked independently to identify six to 12 themes or issues. Groups were oriented to attend to the most prominent issues or themes visible in the project data and to avoid projecting onto the data any particular personal priorities or perspectives they might bring from their professional roles. We emphasized that the goal of the project was to highlight the range of different viewpoints that emerged and not simply to identify those that were frequently cited. Following the work and a great deal of discussion, each of the three groups presented to the whole group of participants a list of the key issues/priorities they had identified. These three lists were then compared and discussed. There was a greater than 80% overlap of the three lists making it possible to merge them into one final integrated list of draft issues/priorities for medical education in Canada.

The ten draft issues/priorities identified were:

1. Social responsibility and accountability

2. Access to medical education and admissions processes

3. Integration and timing of basic and clinical sciences education

4. Prevention and population health

5. Culture of medicine and the hidden curriculum

6. Community-based education

7. Generalism, with a particular focus on family medicine

8. Interprofessionalism, team-based care and the role of the physician

9. Life-long learning and the continuum of medical education

10. Change management, leadership and innovation

Triangulating the data and creating an evidence base for the ten issues/priorities

The preliminary issues/priorities were used to write ten "issue analysis papers" with a twofold purpose. First, they would provide a strong evidence base as the project moved forward into stages of national consultation and validation. Second, the issue analysis papers allowed for data from various project sources (interviews, review papers, expert focus groups) to be triangulated, to examine the degree to which the issues/priorities were present in different kinds of data.

Our process of triangulation followed a three-stage process. Initially, we extracted all relevant quotes from key informant interviews. Next we added relevant data from the literature reviews using a keyword index developed for the commissioned papers. In some cases the topic of a review paper was consonant with the issue/priority and the whole review was included in the issue analysis paper. In other cases where the topic was

addressed as only one part of a paper, only the relevant sections were included. Finally, sections from the reports of the expert panel/focus groups dealing with the issue/priority were extracted. Table 2 shows the triangulation process and indicates the "weight", or relative presence, of each of the ten issues/priorities in each of the data sources.

INSERT TABLE 2 ABOUT HERE

Quantification/weighing for this table was created differently for each data source. For the interviews it was based first on the number of citations for each issue/priority and second on the number of individuals who raised the topic. For review papers, it consisted first of a count of the number of papers primarily addressing the issue/priority, and second the number of large blocks of text in other papers dealing with the topic. For the expert panel/focus groups and the reports of international visits, the weight given was an approximation of the "presence" of the issue/theme in the final reports from each group/activity as judged by one member of the research team.

Evolution of the priorities: Toward a final consensus document

In early 2009, these issue analysis papers (each 50-75 pages in length) were submitted to the AFMC Project Steering Committee to assist them in leading a national discussion and validation of the ten issues/priorities in order to create a final set of recommendations for the Future of Medical Education in Canada. As well, the complete set of key informant interviews and commissioned literature reviews was transferred to the AFMC. What followed was a series of national meetings, panels and discussions seeking input and validation at many levels through extensive consultation, including with all 17 Canadian medical schools. The final results have been published recently [16]. This document

20

preserves the concept of ten priorities, now refined to reflect new sources of data and feedback gathered during the consensus and validation stage. The final report from the AFMC also includes detailed consideration of mechanisms for change. The final list of priorities and mechanisms for change are shown in Box 1.

INSERT BOX 1 ABOUT HERE

With the completion of the final AFMC Project Steering Committee report, the Environmental Scan team will now edit and publish each of the ten issue analysis papers to provide a comprehensive data base, list of references, innovations and a conceptual analysis of each theme and its evolution throughout the whole of the project to help Canadian medical schools move toward the implementation of the new recommendations. Further, as the project moves into a post-graduate and continuing education phase, these data-rich documents will be useful for the process of validating the issues/priorities at other levels of medical education.

Discussion

In a relatively short time (just over one year), the Environmental Scan project created an extensive and detailed data-base that will help the faculties of medicine of Canada assess their current gaps and challenges and plot a course for change. There is much strength in the approach we used to collect and analyze data during this project and some important cautions and limitations. We hope that a frank discussion of both will help with interpretation of the data, implementation of the final AFMC recommendations and facilitate researchers planning or undertaking similar environmental scans in other countries.

The Environmental Scan began with a set of key informant interviews. The selection of the sample, though based on Boelen's concept of diverse medical school stakeholders, was very small in comparison with the total number of people involved in medical education in Canada. The sample can in no way be seen as a faithful representation of all views. Simply having one representative from each Canadian medical school would have used up over half of the sample. Further, the number of students and patient/community representatives interviewed was relatively limited. However, the purpose of the interviews was not to exhaustively list all views and perspectives, but rather to unearth and to give voice to some of the most important or even urgent issues. In this way we were reassured that we reached "saturation" rather early in the process. It was already the case after the first few interviews – conducted with people from very different parts of Canada, in different languages, and from different worlds (a nurse, a journalist, a former dean, a ministry of health official, a public representative) - that the same themes were emerging. There undoubtedly are issues and themes under-represented or perhaps not represented in the data at all. This is the nature of sampling. However, throughout this project we were struck by the consistency of emergent themes in all data sources. Further, once the data went through a national validation process – a process that added political, organizational and strategic elements to what was largely an empirical sampling process during the Environmental Scan – only relatively minor changes were made.

While the project involved gathering data from many sources, priority was given to the key informant interviews. This was a deliberate decision to give priority to the perspectives, arguments, observations and concerns of those deeply interested in, but not necessarily administering medical education. We wanted to give formal medical

education literature a presence, but recognized that published literature is highly filtered, subject to many layers of selection, editing and power that mean that some topics and authors are more represented than others. Many of the stakeholders in Boelen's groups would not be "audible" in the formal medical education literature. Thus, we decided to give the interviews primacy and to use the literature reviews to broaden and supplement the themes emerging from interviews. We were also attentive to topics that might appear in the literature reviews and not in the interviews, leading us to commission additional review papers. Nevertheless, the reductionism of taking such a large set of interviews papers and reducing them to just 10 issues/priorities necessitated the exclusion of a great deal of information. While the various validation, recoding and triangulation procedures gave us confidence that the final issues/priorities selected do represent some of the most important challenges facing medical education in Canada, we are also aware that there is much "gold" still buried in the data. For this reason, one of the most important follow-up projects for the Environmental Scan team will be the creation of "chapter 11": a paper that presents extracts and analyses of prominent issues and themes that did not make it into the top ten.

A detailed discussion of themes in the data set that did not make the "top ten" is beyond the scope of this paper and must await a careful and detailed analysis. Briefly, the Environmental Scan team has been compiling a list of "orphan" themes that appear frequently and for which we will seek empirical confirmation of significance in the remaining data. Some may not have fully emerged as issues/priorities because of the focus on undergraduate education. A partial list of these includes: technology in medical education and practice, the role of the social sciences in medical education, the role of physicians vis-à-vis other health professionals in health care delivery, medical school

governance models, new methods and systems of assessment, globalization and international health.

An important question is whether this initiative has the breadth and depth to get beyond the Flexner legacy. While it is not yet clear that this initiative will supercede Flexner's model, we have looked very broadly at the purposes and functions of medical education that may position us to meet health needs of our contemporary society. While Flexner was concerned with framing medical education around a concept of evidence and research rigor focused on a circumscribed set of basic sciences, largely with the intent of improving clerkship and clinical training, this project has examined a much broader set of domains including curriculum content and design and the culture of medicine but also the fundamental purpose of medical education. Much remains to be done, and we share these preliminary steps in the hope of stimulating vigorous discussion and meaningful change in medical education in Canada and perhaps also among our colleagues around the world.

Table 1: National Key Informants (roles indicated at the time of interview, 2008)*

1. Marcia Anderson, President, Indigenous Physicians Association of Canada
2. Sue Baptiste, Professor, School of Rehabilitation Science, McMaster University
3. Martin Bernier, Président, Fédération médecins résidents du Québec
4. Jordan Cohen, Director, Student Affairs, Undergraduate Medical Education, University of Calgary
5. Luc Côté, Professeur titulaire, Département de médecine familiale, Directeur, Secteur de la recherche en éducation médicale, Faculté de médecine, Université Laval, Québec
6. Paul Dagg, Member, Network Planning and Advisory Committee, (Interior Health), Tertiary Mental Health Services, Hillside Centre, BC
7. Sister Elizabeth Davis, Public Member, Medical Council of Canada.
8. Jonathan Della Vedova, Vice President Education, Canadian Federation of Medical, Students National Office
9. Kevin W. Eva, Editor-in-Chief, Medical Education (Journal)
10. John Evans, Chair, Board of Directors, MaRS, (Founding Dean of McMaster University, Medical School)
11. Abraham Fuks, Professor, Biomedical Ethics Unit, McGill University (Former Dean, Faculty of Medicine, McGill University from 1995-2006)
12. Francine Girard, Doyenne de la faculté des sciences infirmières de l'Université de Montréal
13. Paul Grand'Maison, Professeur, vice doyen aux études médicales pré doctorales, Université de Sherbrooke
14. Ruth Grier, Former Ontario Minister of Health and Long-Term Care; Current: Member, Toronto Cancer Prevention Coalition Steering Committee
15. Stephen Hwang, Research Scientist, Centre for Research in Inner City Health, St. Michael's Hospital, Toronto, Ontario
16. André Jacques, Directeur, Direction de l'amélioration de l'exercice, Collège de médecins du Québec
17. Steven L. Kanter, Editor-in-Chief, Academic Medicine (Journal)
18. David Levine, Président et directeur général de l'Agence des services de santé et des services sociaux de Montréal
19. Bob Maudsley, Director, Examinations, Research and Evaluation, College of Physicians & Surgeons of Nova Scotia
20. Pierre Moreau, Doyen de la faculté de pharmacie à l'université de Montréal
21. Louise Nasmith, Principal, College of Health Disciplines, University of British Columbia
22. Sioban Nelson, Dean, Faculty of Nursing, University of Toronto
23. Geoffrey R. Norman, Editor-in-Chief, Advances in Health Sciences Education (Journal)
24. Andrew Padmos, CEO, Royal College of Physicians and Surgeons of Canada
25. Aurel Schofield, Directeur et doyen associé, Centre de formation médicale du Nouveau Brunswick
26. Joshua Tepper, Assistant Deputy Minister, Health Human Resources Strategy Division, Ontario Ministry of Health and Long-Term Care
27. Jeff Turnbull, President, College of Physicians & Surgeons of Ontario
28. Wayne Weston, Professor Emeritus, Department of Family Medicine, Schulich School of Medicine and Dentistry
29. Cornelia Weiman, Co-Director, Indigenous Health Research, Development Program, University of Toronto
30. Bud Wildman, Formerly: Ontario Minister of Environment; Responsible for Native Affairs, Current: Member of the Board of the Sault Ste Marie Group Health Centre

*Participants provided written consent for the non-anonymous inclusion of their names and interview data in this study.

Table 2: Frequencies of 10 Priorities in the Original Data Sources

	Key Informants	Literature Reviews	Data Needs and Access Group Report	Young Leaders Forum Report	Blue Ribbon Panel Report	International Visits Reports
1. Social responsibly and accountability	*** 13/30# 16 @	*** 2 pa ^ 16 ref &	**	***	***	***
2. Access to medical education and admissions processes	*** 18/30 36	** 1 pa 3 ref	**	**	**	**
3. Integration and timing of basic and clinical sciences education	** 5/30 7	** 1 pa 2 ref	*	*	*	***
4. Prevention and population health	*** 16/30 36	*** 2 pa 7 ref	***	***	***	**
5. Culture of medicine and the hidden curriculum	** 9/30 14	*** 3 pa 5 ref	*	**	*	**
6. Community-based education	** 9/30 14	*** 4 pa 3 ref	**	**	*	**
7. Generalism, with a particular focus on family medicine	*** 11/30 18	** 1 pa 3 ref	***	**	**	**
8. Interprofessionalism, team-based care and the role of the physician	*** 17/30 35	*** 3 pa 15 ref	**	***	**	**
9. Life-long learning and the continuum of medical education	*** 14/30 28	** 1 pa 6 ref	*	**	*	***
10. Change management, leadership and innovation	** 6/30 13	*** 2 pa 7 ref	**	**	***	*

*** = relative weight/representation of each of the ten issues/priorities in each data set
# = number of key informant who identified this as a priority theme, out of a total of 30 informants
@ = number of citations in the codebook relevant to this theme
^ = number of literature reviews related to this priority of a total of 35 review papers
& = number review papers with a substantial block of text relevant to this priority

Box 1: Ten Final Recommendations and Five Enabling Recommendations [16]

I: Address Individual and Community Needs
II: Enhance Admissions Processes
III: Build on the Scientific Basis of Medicine
IV: Promote Prevention and Public Health
V: Address the Hidden Curriculum
VI: Diversify Learning Contexts
VII: Value Generalism
VIII: Advance Interprofessional and Intraprofessional Practice
IX: Adopt a Competency-Based and Flexible Approach
X: Foster Medical Leadership

Enabling Change
A: Realign Accreditation Standards
B: Build Capacity for Change
C: Increase National Collaboration
D: Improve the Use of Technology
E: Enhance Faculty Development

References

[1]   Grand'Maison P LJ, Rainsberry P, and Brailovsky CA. Large-scale use of an objective, structured clinical examination for licensing family physicians *CMAJ*. 1992;**146**:1735-1740.

[2]   Lalonde M. A new perpective on the health of Canadians. A working document. Ottawa: Government of Canada. . 1974.

[3]   Social accountability: A vision for Canadian medical schools. Health Canada, 2001.

[4]   Boelen C JH. Defining and measuring the social accountability of medical schools. World Health Organization, Geneva, 1995.

[5]   Romanow R. Building on values. The future of health care in Canada. Commission on the future of health care in Canada. . 2002.

[6]   Boelen C. A new paradigm for medical schools a century after Flexner's report. *WHO Bulletin* 2002.

[7]   Neufeld VR MR, Pickering RJ, Turnbull JM, Weston WW, Brown MG, Simpson JC. Educating future physicians for Ontario. *Acad Med*. 1998;**73**:1133-1148.

[8]   Frank JR DD. The CanMEDS initiative: implementing an outcomes-based framework of physician competencies. . *Med Teach*. 2007;**29**:642.

[9]   AAMC. Learning objectives for medical student education--guidelines for medical schools: report I of the Medical School Objectives Project. *Acad Med*. 1999;**74**:13-18.

[10]   *Initiative to Transform Medical Education: Recommendations for change in the system of medical education*. America Medical Association 2007.

[11]   Tomorrow's doctors. General Medical Council 2003.

[12]   Creswell J. *Qualitative inquiry and research design*. Thousand Oaks, California Sage; 1998.

[13]   Reeves S KI, Barr H, Freeth D, Hammick M Twelve tips for undertaking a systematic review. . *Medical Teacher*. 2002;**24**:358-363.

[14]   National Literature Reviews/Revues de littérature nationales. In: santé WCfRiECdpaasdl, ed. Association of Faculties of Medicine of Canada, 2008.

[15]   The Future of Medical Education in Canada. Association of Faculties of Medicine of Canada.

[16]   The Future of Medical Education in Canada: A Collective Vision for MD Education Association of Faculties of Medicine of Canada, 2009.