Canada's New Medical School: The Northern Ontario School of Medicine: Social Accountability Through Distributed Community Engaged Learning

Roger P. Strasser, MBBS, MClSc, Joel H. Lanphear, PhD, William G. McCready, MBBCh, Maureen H. Topps, MBBS, D. Dan Hunt, MD, MBA, and Marie C. Matte, MEd, PhD

Abstract

Like many rural regions around the world, Northern Ontario has a chronic shortage of doctors. Recognizing that medical graduates who have grown up in a rural area are more likely to practice in the rural setting, the Government of Ontario, Canada, decided in 2001 to establish a new medical school in the region with a social accountability mandate to contribute to improving the health of the people and communities of Northern Ontario. The Northern Ontario School of Medicine (NOSM) is a joint initiative of Laurentian University and Lakehead University, which are located 700 miles apart. This paper outlines the development and implementation of NOSM, Canada's first new medical school in more than 30 years. NOSM is a rural distributed community-based medical school which actively seeks to recruit students into its MD program who come from Northern Ontario or from similar northern, rural, remote, Aboriginal, Francophone backgrounds. The holistic, cohesive curriculum for the MD program relies heavily on electronic communications to support distributed community engaged learning. In the classroom and in clinical settings, students explore cases from the perspective of physicians in Northern Ontario. Clinical education takes place in a wide range of community and health service settings, so that the students experience the diversity of communities and cultures in Northern Ontario. NOSM graduates will be skilled physicians ready and able to undertake postgraduate training anywhere, but with a special affinity for and comfort with pursuing postgraduate training and clinical practice in Northern Ontario.

Acad Med. 2009; 84:1459–1464.

The size of Germany and France combined, Northern Ontario is geographically vast (almost 400,000 square miles), yet it has a relatively small population (840,000). Although part of Ontario, the most populous province in Canada, Northern Ontario is a distinct region with different economic and social characteristics from the southern part of the province; 60% of the population lives in rural and remote communities, with a diversity of communities and cultures, most notably Aboriginal and Francophone peoples. Thirty percent of the Northern Ontario population lives in the two larger urban areas of Thunder Bay (120,000) and Sudbury (150,000) located more than 700 miles apart. With mining, forestry, and tourism as the major local industries, there are fluctuations in the economy; however, unemployment rates are usually higher than in the remainder of Ontario and Canada.[1] In addition, morbidity and mortality rates are generally higher than the rest of the province and the nation, particularly arthritic conditions, hypertension, asthma, diabetes, and heart disease.[2,3]

Dr. Strasser is founding dean, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.

Dr. Lanphear is senior associate dean, Undergraduate Medical Education, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.

Dr. McCready is associate dean, Faculty Affairs, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.

Dr. Topps is associate dean, Postgraduate Education, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.

Dr. Hunt is secretary and senior director, LCME, Association of American Medical Colleges, Washington DC, and was previously vice dean for academic activities, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.

Dr. Matte is director, Undergraduate Medical Education, Northern Ontario School of Medicine, Sudbury, Ontario, Canada.

Correspondence should be addressed to Dr. Strasser, Northern Ontario School of Medicine, 935 Ramsey Lake Road, Sudbury, Ontario, Canada, P3E 2C6; telephone: (705) 671-3874; fax: (705) 671-3830; e-mail: (roger.strasser@normed.ca).

A Chronic Shortage of Doctors in Rural Ontario

Like other rural regions of the world, Northern Ontario has a chronic shortage of doctors and other health care providers. There are 18.9 physicians per 10,000 population in Canada overall, whereas for Northern Ontario, the figure is 14.9 physicians for every 10,000 people.[4]

Producing more physicians and expecting the excess to spill over from the cities into rural areas has been shown to be ineffective in solving the rural medical workforce shortage.[5] In fact, there is no single solution to the rural medical workforce shortfall. Improvement does come through a series of linked initiatives, each of which has an incremental effect; together, they add up to substantial change.[6] One key series of initiatives that has been shown to be effective involves rural-based medical education.[7–9]

Studies conducted in a number of different countries have shown that the three factors most strongly associated with entering rural practice are (1) a rural background, (2) positive clinical and educational experiences in rural settings as part of undergraduate medical education, and (3) targeted training for rural practice at the postgraduate level.[10–17] In addition, there is evidence that

academic involvements (teaching and research) are both retention and recruitment factors for physicians.[9,18,19]

In the context of a growing shortage of doctors in Northern Ontario and across the entire province, the Ontario government commissioned a "fact finder report" in 1999 which included a formal recommendation that a medical school be established in Northern Ontario with campuses in the cities of Sudbury and Thunder Bay, which are home to Laurentian University and Lakehead University, respectively.[20] On the basis of this report, the Government of Ontario announced in 2001 its decision to establish a new medical school in Northern Ontario with a social accountability mandate of improving the health of the people and communities of Northern Ontario.

Although Northern Ontario did not possess a medical school at the time of this 2001 decision, the region had participated in educating physicians since the early 1970s because of the Northwestern Ontario Medical Program (NOMP), a unit of the medical school at McMaster University. In northeastern Ontario, medical education initiatives developed through the University of Ottawa, which included undergraduate and postgraduate elective and core rotations similar to those in northwestern Ontario. In the early 1990s, family medicine residency programs were established in northwestern Ontario under the auspices of McMaster University through NOMP and in northeastern Ontario by the Northeastern Ontario Medical Education Corporation in association with the University of Ottawa. Both family medicine residency programs provided community-based medical education using the preceptor model of one-on-one teaching–learning in the clinical setting. In addition, these programs focused on preparing family medicine residents to practice in Northern Ontario and in similar northern, rural and remote areas.

A Social Accountability Mandate and an Educational Philosophy

The World Health Organization defines the "Social Accountability of Medical Schools" as "the obligation to direct their education, research, and service activities towards addressing the priority health concerns of the community, region and the nation that they have a mandate to serve."[21] In 2001, Health Canada, Canada's federal department of health, along with all of the Canadian medical schools, made a joint commitment to social accountability in the publication, *Social Accountability: A Vision for Canadian Medical Schools.*[22] When the Northern Ontario School of Medicine (NOSM) was incorporated in 2002, it became the first medical school in Canada established with a social accountability mandate.

NOSM functions as the Faculty of Medicine of Lakehead University in Thunder Bay and of Laurentian University in Sudbury and is registered as a not-for-profit corporation. As a not-for-profit corporation, NOSM is not in itself an academic body. The Government of Ontario did not give it degree-granting authority. NOSM gains its academic status through the authority of the peak academic governance bodies of the universities known as the senates of the two host universities.

NOSM has campuses more than 700 miles apart in Thunder Bay and Sudbury, and it also has more than 70 teaching and research sites distributed across Northern Ontario. The NOSM model of distributed community engaged learning (DCEL) weaves together several trends in medical education that developed in the latter part of the 20th century including case-based learning in the classroom, community-based medical education for clinical learning, social accountability of medical education, rural-based medical education (including the "preceptor model"), and electronic distance education (flexible learning).[23]

In addition, DCEL involves community engagement through which communities are actively involved in hosting students and contributing to their learning. Community engagement for NOSM is consistent with the school's social accountability mandate and has a particular focus on collaborative relationships with Aboriginal communities and organizations, Francophone communities and organizations, and rural and remote communities, as well as the larger urban areas of Northern Ontario. By definition, NOSM believes that community engagement involves the development of interdependent partnerships whereby the communities are as much a part of the school of medicine as the regional centers, Thunder Bay and Sudbury. These relationships are fostered through the Aboriginal Reference Group, the Francophone Reference Group, local NOSM groups in rural communities, and a vast network of formal affiliation agreements and memoranda of understanding.

NOSM education programs

Physician life cycle. NOSM's education and training activities span the life cycle of a physician in Northern Ontario. This begins with programs that encourage Northern Ontario high school students to see themselves as possible future physicians, to study hard and to achieve the academic requirements to enter university and medical school in Northern Ontario. "Pipeline" initiatives include medical students visiting schools while on placement in Aboriginal communities; science camps led by NOSM students and faculty which make the connection between high school science and health careers, particularly for Aboriginal and Francophone high school students; and special poster sessions for high school students at the NOSM Northern Health Research Conference each year. The NOSM undergraduate medical program has a strong emphasis on learning medicine in the context of Northern Ontario communities. Postgraduate programs provide residency training that is targeted on practicing in Northern Ontario or similar rural/remote areas. Once in practice, the school provides continuing education/professional development to support and maintain Northern Ontario physicians. In addition, graduate studies programs (at the masters and PhD levels) are encouraged in the expectation that at least some of these doctors will choose to pursue academic careers with NOSM.

Curriculum development. The curriculum for the undergraduate medical program was developed through a consultative process which drew on accreditation standards and on curriculum resources from other medical schools. As early as 2000, a Liaison Council for Northern Ontario Rural Medical Education was formed with representation from physicians, faculty, and administrators from Lakehead and Laurentian Universities. The council's

final report set the focus on subsequent curricular development which included

- A rural focus on underserviced populations
- Full accreditation as a standard
- Training and education in the North and in northern communities
- The use of technology to "connect" students throughout the North

In January 2003, a major curriculum workshop was held involving more than 300 participants from all parts of Northern Ontario including academics, physicians, learners, and community members. Workshop participants contributed to a statement of the special characteristics desired for physicians trained in the new northern school. The special characteristics were (1) a passion for living and working in Northern Ontario, (2) a team player, and (3) a sensitivity towards diversity.

From this workshop came a series of next steps for work groups to begin the development of curricular themes and subthemes to support these broad goals. Specific theme coordinators and theme committees developed, and faculty, as they were recruited, became the foundation for developing the content and process of curriculum based on a broad-based blueprint. The blueprint included

1. The five curricular themes (northern and rural health, personal and professional aspects of medical practice, social and population health, foundations of medicine, and clinical skills in health care).
2. The five content areas for medical study including the medical sciences, behavioral sciences, clinical sciences, humanities, and social sciences.
3. A series of integrative curricular threads focused on some of the major health care issues of the North such as addiction, cancer, Aboriginal health, chronic and elderly care, injury, and occupational health.
4. Patient-centered medicine including generalism, interdisciplinary cooperation, integrated models of health care delivery and collaboration, and physicians as teachers.
5. Learner-centered education based on learner needs, active participation, virtual learning environments, and faculty development.
6. An instructional delivery model using facilitated case-based learning in small-group settings; a core objectives-based curriculum; interdisciplinary content, process, and facilitation; learning in community settings; and broad-based connectivity.

Consultative workshops were held with Francophone and Aboriginal people as well as the health care providers in the region. To ensure a holistic cohesive curriculum, there are no conventional courses or clerkship blocks in this curriculum. Instead, the learning objectives are organized across the four years in the five curricular themes. Classroom learning is mostly in small groups complemented by larger group sessions, lab sessions, and clinical learning.

Clinical learning begins at the start of Year 1 of the program with two half-day sessions each week, one with standardized patients in the clinical skills lab, and the other day at community learning sessions in a range of health and welfare settings in Sudbury and Thunder Bay. In addition, all students in pairs have a four-week integrated community experience (ICE) in Aboriginal communities at the end of first year, and two 4-week ICE placements in rural and remote communities with populations under 5,000 during their second year. Approximately one third of the Aboriginal communities are reserves with no road access. During the ICE placements, students continue their small-group learning connected electronically in the virtual learning environment. Training takes place across a vast geographical area, so NOSM relies heavily on broadband communication information technology. Students are provided with a leased laptop computer and have, wherever they are, the same access to information and educational resources as if they were in a large urban teaching hospital.

The third year of the NOSM curriculum is an immersive experience known as the Comprehensive Community Clerkship (CCC). This mandatory longitudinal integrated clerkship involves students living and learning in 12 large rural or small urban communities outside Sudbury and Thunder Bay for the full academic year. The complete NOSM curriculum is shown in Chart 1.

Curriculum management. The creation of three phases in the curriculum (i.e., Phase 1 = Years 1 and 2, Phase 2 = Year 3, and Phase 3 = Year 4) creates an organizational structure that serves to provide coordination of the five curricular themes across all four years of the curriculum. The organizational management is shown in a simplified form in Figure 1. The theme committees, therefore, report to the Undergraduate Medical Education Committee as part of the governance structure via the Phase Committees which oversee the three curriculum phases. Committee members broadly represent faculty as well as students.

Chart 1

The Structure and Delivery of the Northern Ontario School of Medicine's Curriculum

Phase 1: Number of case-based modules		Phase 2: Year 3	Phase 3: Year 4	Residency: Years 5, 6, and beyond
Year 1	Year 2			
101	107	Comprehensive community clerkship (CCC)†	Clerkship ‡ and Electives §	Individual specialty choice
102	108*			
103	109			
104	110*		Licensure examination	
105	111			
106*	Elective §			

* Integrated Community Experience (ICE) in Aboriginal, rural, and remote communities.
† CCC in 12 large rural or small urban communities.
‡ Clinical rotations at regional hospitals in Sudbury and Thunder Bay.
§ Structured learning experiences for credit in medicine or related fields.

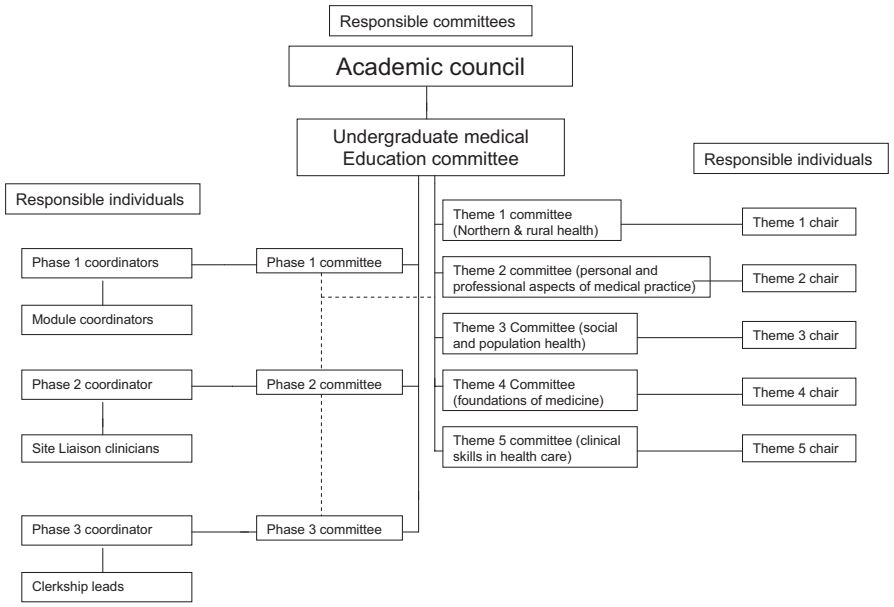

Figure 1 The organizational management of the Northern Ontario School of Medicine's curriculum. Themes signifies courses that continue through the four-year program; Phases means curriculum time components (Phase 1 = Years 1 and 2, Phase 2 = Year 3, Phase 3 = Year 4); Modules means subcomponents of phases (Phase 1 has 11 modules; Phase 2 has 6 modules; Phase 3 has 6 modules); Coordinator is the faculty member responsible for curriculum component; Site Liaison Clinician & Clerkship Lead is the on-site physician lead.

Initial progress

Accreditation. The first challenge for NOSM was to achieve recognition as a medical school through accreditation of its proposed MD program. The Liaison Committee for Medical Education (LCME) works in concert with its Canadian partner, the Committee on Accreditation of Canadian Medical Schools (CACMS). At the time that NOSM applied for accreditation in 2003, there had been only one new medical school created in the United States in the previous 25 years (Florida State University College of Medicine, fully accredited in February 2005),[24] and NOSM was the first new medical school in Canada in more than 30 years. The LCME granted an "initial accreditation" survey visit in March 2004. (The current language used by the LCME would describe this as a "preliminary accreditation" site visit.) The LCME and CACMS review of this survey report was positive, which allowed NOSM to begin recruiting students for its first class. Ongoing accreditation monitoring occurred through a Secretariat Consultation in August 2004, a limited survey in March 2005, a limited survey in September 2006, and a Secretariat Visit in September 2007. A full survey for the final accreditation decision took place in September 2008, and the LCME and CACMS granted full accreditation in February 2009.

Faculty and facilities. During a two-year period (2004 and 2005), NOSM was successful in recruiting research scientists to be faculty members in the medical and human sciences. In addition, more than 700 physicians and other health care providers have joined NOSM as faculty members in the clinical sciences, including physicians who have moved to Northern Ontario to be involved in the school.

With $33 million of funding from the Ontario government, medical school buildings were constructed on time and on budget at both university campuses. These buildings feature high-technology smart classrooms, flexible teaching laboratories, libraries, and research laboratories, as well as meeting rooms and office space.

Faculty development. Preparation for delivery of the NOSM curriculum was facilitated through pilot testing of the case-based learning, ICE, and extensive faculty development. This faculty development involved generic sessions on small-group, large-group, and clinical teaching, as well as specific preparation sessions for each module in Phase 1 and a nine-hour program of faculty development in each Phase 2 CCC community.

Admissions. Consistent with its social accountability mandate, NOSM seeks to reflect the population distribution of Northern Ontario in each medical school class. The selection and admissions process accepts applicants with diverse academic backgrounds in both the sciences and humanities, and favors applicants who meet the academic standards and come from northern, rural, remote, Aboriginal or Francophone backgrounds. The MCAT is not required for admission to NOSM; all applicants with a grade point average (GPA) of 3.0 or above on a 4.0 scale are considered. Each applicant's questionnaire is assessed by two independent raters, and applicants are given a context score that is highest for applicants from Northern Ontario and other targeted backgrounds. Based on the combination of GPA, application score, and context score, the top 400 applicants are invited for interviews. NOSM uses the Multiple Mini Interviews consisting of 10, one-question interviews developed originally by McMaster University.[25]

The 56 medical students representing the inaugural class began their orientation in August 2005 and graduated in May 2009 (Lakehead University campus) and June 2009 (Laurentian University campus). Selected from 2,098 applicants, 80% of these 56 students had lived in Northern Ontario for 10 years or more, with 11% of the class Aboriginal and 18% Francophone. Subsequent entry classes have maintained a similar pattern with around 2,000 applications each year for 56 places. Between 80% and 90% of each class have grown up in Northern Ontario, with almost 50% from rural and remote areas, and continuing substantial inclusion of Aboriginal and Francophone students. The class mean GPA each year has remained approximately 3.7 on a 4-point scale, which indicates that the academic standard of the students is comparable with that of other Canadian medical schools. Subsequently, in 2009, the inaugural class was the only Canadian medical school class for more than 10 years in which all students matched to residency programs in the first round of the national residency match. This result demonstrates that NOSM students compare favorably to students from other schools in Canada.

Student financial aid. For medical students, medical education is both intensive and expensive. The NOSM Bursary Fund was established to provide needs-based student financial aid with the intent that NOSM medical students should not be financially disadvantaged by studying in Northern Ontario. A public fund-raising campaign for the NOSM Bursary Fund held during 2005–2006 was an enormous success. Almost $13 million was raised, including a $5 million contribution from the Northern Ontario Heritage Fund Corporation, which matched individual donations on a dollar-for-dollar basis.

Residency programs. NOSM is working with McMaster University and the University of Ottawa to establish residency programs in Northern Ontario that offer family medicine and the major general specialties. In June 2006, the College of Family Physicians of Canada approved accreditation of the NOSM family medicine residency program. Consequently, the first NOSM family medicine residents completed residency in 2009 with the first MD graduates. Approval has been granted for provision of training for enhanced skills in family medicine including emergency medicine and anesthesia. The Royal College of Physicians and Surgeons of Canada approved accreditation of the NOSM residency programs in community medicine, pediatrics, and general surgery. In the next two years, accreditation will be sought for residency programs in general internal medicine, anesthesiology, orthopedics, psychiatry, and obstetrics–gynecology.

Graduate studies. In addition to successful development of the MD program and residency programs, NOSM has already had an impact on graduate studies in Northern Ontario. NOSM faculty members are supervising graduate students at both universities, and the school has established a partnership with Lakehead University to expand and strengthen the Lakehead master of public health (MPH) program. NOSM students are able to complete a combined MD/MPH program in five years. At Laurentian University, NOSM has supported the establishment of a PhD program in Rural and Northern Health, which accepted its first students in 2006.

Continuing education and professional development. Continuing education and professional development activities for doctors and other health professionals in Northern Ontario have expanded as well. The monthly NOSM Symposium connects health professionals across Northern Ontario by video and Webcast with expert speakers, both national and international. In addition, the Northern Ontario Health Professional Development Calendar, an annual publication, presents an extensive array of courses available to health professionals which are eligible for continuing medical education credits.

Research. In March 2006, the Canadian Health Minister and the Minister for Federal Economic Development Initiative of Northern Ontario, which is the Canadian government economic development agency for Northern Ontario, funded research facilities at both NOSM campuses. NOSM research addresses questions whose answers make a difference to the health of people in Northern Ontario, with particular emphasis on cardiac and respiratory diseases, diabetes, Aboriginal health, primary health care, and bioprospecting in the Boreal Forest. To further research collaboration, NOSM has held annual Northern Health Research Conferences since 2006. These conferences have been successful in bringing together researchers whose research focus is significant health problems in Northern Ontario.

Interprofessional and health sciences education. Consistent with the school's emphasis on interdisciplinary training, the scope of NOSM's education and research programs already reaches beyond medicine. The school has assumed responsibility for a range of undergraduate and postgraduate education activities in Northern Ontario such as physiotherapy, occupational therapy, dietetics, and radiography, and for interprofessional education and professional development for allied health professionals.

Community engagement. Community engagement is another hallmark of the distinctive NOSM model. Development of the MD program curriculum began in January 2003 with a three-day curriculum workshop attended by more than 300 participants drawn from across the sectors in all parts of Northern Ontario. Specific workshops involving Aboriginal people were held in 2003 and 2006, and a symposium on "Francophones and the Northern Ontario School of Medicine" was held in 2005, followed by a second Francophone Symposium in September 2007. In addition, community members are involved with NOSM through the selection and admissions process for the MD program, as standardized patients, and in hosting students during their CCC and ICE placements.

Conclusion

The time was right to establish NOSM. The chronic shortage of doctors in Canada, especially in rural areas such as Northern Ontario, created a public and political focus on increasing the numbers of medical graduates and on the possibility of establishing new medical schools. Although NOSM is still a very new medical school, there are many positive signs of success.

In a very real sense, the NOSM has brought together community groups and organizations from all parts of Northern Ontario, as well as the two universities, hospitals and health services, and physicians and other health care providers across Northern Ontario. This is consistent with the NOSM's social accountability mandate and provides the basis for the delivery of education programs through DCEL.

References

1 Ontario Ministry of Northern Development and Mines. Northern Ontario Overview. Toronto, Canada: Government of Ontario Publications; 2004.
2 Bains N, Dall K, Hay C, Pacey M, Sarkella J, Ward M. Population Health Profile: North East LHIN. Toronto, Canada: Government of Ontario Publications; 2004.
3 Bains N, Dall K, Hay C, Pacey M, Sarkella J, Ward M. Population Health Profile: North West LHIN. Toronto, Canada: Government of Ontario Publications; 2004.
4 Pong RW, Pitblado JR. Geographic Distribution of Physicians in Canada: Beyond How Many and Where. Ottawa, Canada: Canadian Institute for Health Information; 2005.
5 Rosenman SJ, Batman GJ. Trends in general practitioner distribution from 1984 to 1989. Aust J Public Health. 1992;16:84–88.
6 Barer ML, Stoddart GL. Toward integrated medical resource policies for Canada: 8. Geographic distribution of physicians. Can Med Assoc. 1992;147:617–623.

7 Rosenblatt RA, Whitcomb ME, Cullen TJ, Lishner DM, Hart LG. Which medical schools produce rural physicians? JAMA. 1992;268: 1559–1565.

8 Rourke JT, Incitti F, Rourke LL, Kennard M. Keeping family physicians in rural practice. Solutions favoured by rural physicians and family medicine residents. Can Fam Physician. 2003;49:1142–1149.

9 Tesson G, Curran VR, Strasser RP, Pong RW. Adapting medical education to meet the physician recruitment needs of rural and remote regions in Canada, the U.S. and Australia. In: Rotem A, Perfilieva G, Dal Poz MR, Doan BDH, eds. National Health Workforce Assessment of the Past and Agenda for the Future. Paris, France: Centre de Sociologie et de Démographie Médicales; 2006.

10 Glasser M, Hunsaker M, Sweet K, MacDowell M, Meurer M. A comprehensive medical education program response to rural primary care needs. Acad Med. 2008;83:952–961.

11 Rabinowitz H, Diamond J, Markham F, Wortman J. Medical school programs to increase rural physicians supply: A systematic review and projected impact of widespread replication. Acad Med. 2008;83:235–243.

12 Brooks R, Walsh M, Mardon R, Lewis M, Clawson A. The roles of nature and nurture in the recruitment and retention of primary care physicians in rural areas: A review of the literature. Acad Med. 2002;77:790–798.

13 Chan BTB, Degani N, Pong RW, et al. Factors influencing family physicians to enter rural practice: Does rural or urban background make a difference? Can Fam Physician. 2005; 51:1246–1247. Available at: (http://www.cfpc.ca/cfp/2005/sep/vol51-sep-research-5.asp). Accessed October 25, 2006.

14 Dunbabin JS, Levitt L. Rural origin and rural medical exposure: Their impact on the rural and remote medical workforce in Australia. Rural Remote Health. January–June, 2003: 212. Available at: (http://www.rrh.org.au). Accessed October 25, 2006.

15 Easterbrook M, Godwin M, Wilson R, et al. Rural background and clinical rural rotations during medical training: Effect on practice location. CMAJ. 1999;160:1159–1163.

16 Rourke JT, Incitti F, Rourke LL, Kennard M. Relationship between practice location of Ontario family physicians and their rural background or amount of rural medical education experience. Can J Rural Med. 2005; 10:231–239.

17 Wilkinson D, Laven G, Pratt N, Beilby J. Impact of undergraduate and postgraduate rural training, and medical school entry criteria on rural practice among Australian general practitioners: National study of 2,414 doctors. Med Educ. 2003;37:809–814.

18 Curran V, Rourke J. The role of medical education in the recruitment and retention of rural physicians. Med Teach. 2004;26:265–272.

19 Hartley S, Macfarlane F, Gantley M, Murray E. Influence on general practitioners of teaching undergraduates: Qualitative study of London general practitioner teachers. BMJ. 1999;319:1168–1171. Available at: (www.bmj.com). Accessed October 23, 2006.

20 Ontario Ministry of Health and Long-Term Care. Physicians for Ontario: Too Many? Too Few? For 2000 and Beyond. The McKendry Report. Toronto, Canada: Ontario Ministry of Health and Long-Term Care; 1999.

21 Boelen C. Prospects for change in medical education in the twenty-first century. Acad Med. 1995;70(7 suppl):S21–S28.

22 Health Canada. Social Accountability: A Vision for Canadian Medical Schools. Ottawa, Canada: Health Canada; 2001.

23 Strasser R, Strasser S. Distributed community engaged learning: Medical education in the 21st century. Paper presented at: 13th Ottawa International Conference on Clinical Competence; Melbourne, Australia; 2008. Long Paper 516–520.

24 Hurt MM, Harris JO. Founding a new college of medicine at Florida State University. Acad Med. 2005;80:973–979.

25 Eva KW, Rosenfeld J, Reiter HI, Norman GR. An admissions OSCE: The multiple mini-interview. Med Educ. 2004;38:314–326.