

Undergraduate and postgraduate medical education in Canada

Jean D. Gray, MD; John Ruedy, MD

Abstract

AN OVERVIEW OF MEDICAL EDUCATION at both the undergraduate and postgraduate levels in Canadian faculties of medicine is provided. Particular attention is focused on changes that have occurred in the 1990s and their effect on medical students and on educational programs. Also considered are the effects of reductions in the number of entry-level positions for residency training and the changes in educational requirements for licensure on senior medical students.

Résumé

LES AUTEURS PRÉSENTENT UN SURVOL DE L'ÉDUCATION MÉDICALE aux niveaux du premier et des deuxième et troisième cycles dans les facultés de médecine du Canada. Ils accordent une attention particulière aux changements survenus au cours des années 90 et à leurs répercussions sur les étudiants en médecine et les programmes d'éducation. Ils décrivent aussi les effets de la réduction du nombre de postes de formation en résidence au niveau débutant et les changements des exigences de formation imposées aux étudiants en médecine de dernière année en vue de l'obtention du permis d'exercice.

Medical education in Canada is carried out at 16 university-based medical schools, 13 with predominantly English-language instruction and 3 with French. All schools receive their major financial support from government. Unlike the situation in most other countries, however, both undergraduate and postgraduate medical education are the responsibility of the medical school. Because much continuing medical education is also provided by the medical schools, medical education is truly an educational continuum in Canada.

Alberta has 2 medical schools, Quebec 4 and Ontario 5. British Columbia, Manitoba, Saskatchewan, Nova Scotia and Newfoundland each have one medical school. New Brunswick and Prince Edward Island fund both undergraduate and postgraduate positions at medical schools in neighbouring provinces. The schools range in undergraduate class size from 56 students, at Memorial University, to 170 students, at the University of Toronto. Undergraduate enrolment has been reduced by 10% or more since the late 1980s because of government concern about a possible oversupply of physicians in Canada.¹

Undergraduate medical education

Entrance requirements vary somewhat from school to school (Table 1). Although most medical schools require an undergraduate university degree, some will accept a student with 2 years of baccalaureate university-level education.^{4,5} However, that is increasingly rare, and the contemporary anglophone Canadian medical student now tends to be older and better educated than those of the previous generation. Anglophone medical schools except McMaster and Saskatchewan require applicants to complete the Medical College Admissions Test (MCAT) for admission. In 1994, 78% of students offered admission to Canadian medical schools had scores of 26 or more (out of a possible 45) on the 3 numerically scored tests.⁶



Education

Éducation

**From the Faculty of
Medicine, Dalhousie
University, Halifax, NS**

This material was presented at the Inaugural Trilateral Physician Workforce Conference held in Washington Nov. 1-3, 1996.

This article has been peer reviewed.

CMAJ 1998;158:1047-50



Most provinces have some sort of quota system for students who are resident in that province, with remaining entrance positions becoming part of a highly competitive pool. Currently, through special interinstitutional contracts, Alberta, Calgary, Dalhousie, McGill, Memorial and Western accept some foreign medical students who return to their own country for postgraduate training. The Universities of Manitoba and Alberta reserve positions for aboriginal students. In terms of application rate and success rate, and because of the relative size of the relevant medical schools, students from Quebec (especially women) tend to have the best opportunity to enter medical school of those aged 20–24 years, whereas those from British Columbia have the worst.⁶ However, size and location of the medical schools are only 2 factors. New Brunswick students in this age group have the highest rate of application success, even though New Brunswick has neither a medical school nor a particularly large applicant pool.⁶

A substantial change in undergraduate medical education in Canada occurred in the early 1990s as a result of changes in licensure requirements. By 1993, all provinces had increased the postgraduate training requirements from 1 year of a rotating internship to 2 years in an accredited program in family medicine or the completion of specialty training to certification (from 4 to 6 years) by the Royal College of Physicians and Surgeons of Canada.

Students, therefore, no longer have the choice of completing a rotating internship and gaining licensure and thus feel forced to make what may be a lifetime career decision by the end of their third year of medical school. Clinical clerkship experience has been strongly influenced by the need to make an early career choice as students attempt to shape their clerkship in a manner that they perceive will make them most acceptable to the residency training program of their choice.

Until recently, costs of medical education have been very reasonable in Canada. However, since the early 1990s, tuition fees have risen, the costs of credentialing and examinations have increased, malpractice insurance and licensing fees have become higher, and obtaining an appropriate residency training position has become more costly. Although still moderate by US standards, the debt loads of Canadian medical students at graduation are now high (e.g., \$38 000 on average among those graduating from the University of Toronto).^{7,8}

Postgraduate medical education

Since the end of the 1940s, the common path for most medical school graduates was the rotating internship followed by specialty training. Some graduates, upon completing the rotating internship, entered one or more years of locum or more permanent practices in primary

Table 1: Characteristics of Canadian medical schools in 1996

School	No. entering in 1996*	No. graduating in 1996†	Tuition for citizen/LI + other fees, \$*	MCAT required*	Degree on admission; no. of students*			% matched to postgraduate discipline of choice†	Cost of match per student, \$†
					None	Bachelor	Graduate		
Memorial	60‡	54	6250 + 223	Yes	0	56	4	98	1806
Dalhousie	82‡	85	5515 + 267	Yes	7	76	3	91	2164
Laval	113	128	3068 + 35	No	104	17	5	NA	NA
Sherbrooke	88	102	2840 + 286	No	85	4	1	NA	NA
Montreal	144	158	2575 + 76	No	84	71	5	NA	NA
McGill	109‡	137	1845 + 252	Yes	52	63	4	89	1151
Ottawa	84	78	3800 + 197	Yes	20	59	5	81	1652
Queen's	75	72	3733 + 523	Yes	25	42	8	91	1838
Toronto	177	245	4037 + 768	Yes	37	88	48	86	1231
McMaster	100	100	Yr 1 & 2: 5601 Yr 3: 3734 + 341	No	13	57	30	90	1161
Western Ontario	96‡	95	4052 + 690	Yes	18	69	9	91	1437
Manitoba	70 + 4§	78	4786 + 76	Yes	0	68	1	79	1624
Saskatchewan	55	62	4672 + 115	No	37	18	0	90	1488
Alberta	102 + 2§	113	3556 + 718	Yes	27	65	11	87	1557
Calgary	69‡	67	4918 + 368	Yes	12	40	17	85	1945
British Columbia	120	118	3937 + 248	Yes	9	96	15	94	2416

Note: LI = landed immigrant, MCAT = Medical College Admissions Test, NA = not available.

*Source: Association of Canadian Medical Colleges.²

†Source: 1996 data, Canadian Resident Matching Service.³

‡Additional positions currently filled by foreign medical students through contracts.

§Positions available for aboriginal students.



care before re-entering postgraduate training in a specialty program. This provided for a reasonable nucleus of young physicians eager for experience in the community plus, on re-entry, a more mature and confident resident, usually free of debt and certain of career choice. In the last decade, both the way in which Canadian medical students choose their careers and the clinical experience of physicians on entering residency training have changed dramatically.

Residency training in Canada is provided by all of the medical schools. Curriculum, accreditation and evaluation are carried out by the 2 major certifying national colleges. Since the elimination of the rotating internship, the residency training programs accredited by the College of Family Physicians of Canada are the sole path of training for a career in primary care in Canada. Medical students interested in family medicine enter a 2-year community-based training program after completing their medical degree. They must receive training in such basic disciplines as internal medicine, surgery, pediatrics, obstetrics and gynecology, psychiatry and emergency medicine while immersing themselves in ambulatory family medicine experience during the 2 years. Many of the training programs in Canada encourage a period of training in a rural community under appropriate supervision. Near the end of the second year of training, the College of Family Physicians of Canada administers a written and a structured oral examination in either English or French. Satisfactory completion of this examination is one component of the precertification requirements to enter practice as a family practitioner.

All specialty and subspecialty training is accredited by the Royal College of Physicians and Surgeons of Canada. At present, there are 56 accredited specialties in Canada. Residency training is not available for all disciplines at all Canadian medical schools, although programs are universal for the basic disciplines of internal medicine, pediatrics, general surgery, psychiatry, obstetrics and gynecology, pathology and anesthesia. Eighteen specialty training programs allow direct entry after successful completion of medical school; the remainder require at least some training in one of the basic disciplines. Most training programs are 5 years long; internal medicine and pediatrics are 4 years, and neurosurgery and cardiac surgery are 6 years. Subspecialty training programs, based on one or more parent disciplines, are primarily 2 years in duration, although cardiology has recently received approval for a 3-year program.

Recently approved subspecialty programs have been accepted into a new category of accreditation without certification (AWC).⁹ Disciplines in this category must meet very stringent accreditation standards. Evaluation of residents in AWC subspecialties is not done on a national basis, but

rather by the university. Currently 10 disciplines exist in this category: clinical pharmacology, adult and pediatric critical care medicine, maternal-fetal medicine, neonatology, gynecological reproductive endocrinology and infertility, gynecologic oncology, general surgery oncology, colorectal surgery, neuroradiology and pediatric diagnostic radiology. All other specialties and subspecialties have a national certifying examination, coordinated and provided by the Royal College Evaluation Section. Modes of examination vary from discipline to discipline and range from written examinations (including multiple-choice questions or essays, or both) to objective oral structured competency examinations (OSCE). Certification requires successful completion of all examinations as well as detailed in-training evaluation throughout the training period, forwarded from each university to the Royal College.

Graduates of medical school enter residency training by participating in the Canadian Resident Matching Service (CaRMS), which is driven primarily by applicant choices. All 13 English-language medical schools participate in this match. The 3 French-language schools in Quebec provide training positions for their own students. Near the end of the penultimate year of medical school, a catalogue of training opportunities in Canada is made available in print and on the World Wide Web. After considering possible career options and geographic location, students apply through CaRMS to as many Canadian residency training programs as they wish (there is a small fee for each application). Selection committees receive these applications in November and develop a list of potential interviewees. Most interviews occur early in January at considerable cost to the student in time and travel expenses (Table 1). By mid-February the students and the directors of the programs submit their final match lists to CaRMS.

The first iteration of the match is available only to Canadian medical school graduates who have never participated in postgraduate medical education. Results of this match are released in mid-March (usually just before the American match). Any remaining vacant residency positions are then available for a second iteration of the match 2 weeks later. People eligible for this match include those not matched in the first round, physicians re-entering from practice and international medical graduates. Because very few slots are usually vacant for the second iteration, and because most vacancies are in disciplines perceived by students to be less popular, many students are disappointed.

Because the number of residency positions is limited, medical students selecting a training program feel that there will be little opportunity to alter their career path once in training. In addition, it has become very difficult for physicians in practice to return to residency training. This change has left medical students with a sense that



decisions made toward the end of medical school are irrevocable and will shape the remainder of their medical careers. There is some truth to this perception, although glaring mismatches can sometimes be corrected if identified early enough to permit a resident to change programs without loss of credit for the time already spent in training. This relative inflexibility has resulted in small numbers of unhappy and stressed residents at almost every university and in major recruiting problems for such disciplines as pathology that are not popular with graduating medical students but in the past would have easily filled their training quotas with individuals who had some practice experience.

The many changes in training opportunities have produced a residency population in Canada that is well-informed, vocal and involved in all aspects of educational and political decision-making. This group of individuals will clearly play an important role in the evolution of medicine in Canada in the next century.

References

1. Ryten E. Enrollment in program of study leads to the award of the MD degree, Canada, 1995/96. *ACMC Forum* 1996;29:12-8.
2. Ryten E. *Canadian medical education statistics*. Ottawa: Association of Canadian Medical Colleges; 1996. p. 18.
3. Banner S. *Post match survey of medical students graduating 1996*. Ottawa: Canadian Resident Matching Service; 1996.
4. Ryten E. How long did it take the class of 1995 to earn the MD degree? *ACMC Forum* 1995;28:15-9.
5. Ryten E. Educational backgrounds of applicants for admission to Canadian faculties of medicine in 1995/96. *ACMC Forum* 1996;29:1-2.
6. Ryten E. Getting into medical school in the nineties. Who's in? Who's out? *ACMC Forum* 1994;27:13-26.
7. Kassebaum DG, Szenas PL, Schuchert MA. On rising medical student debt: in for a penny, in for a pound. *Acad Med* 1996;71:1124-34.
8. Theodorau ME. The soaring cost of medical education in Ontario: stress, poverty and debt among medical students. *Ont Med Rev* 1996;63:50-2.
9. Gray J, Cassie JM, Des Groseilliers JP. Accreditation without certification: an experiment comes of age. *Ann R Coll Physicians Surg Can* 1995;28:332-4.

Reprint requests to: Dr. Jean D. Gray, Associate Dean, Dalhousie University, Rm. C19, 5849 University Ave., Halifax NS B3H 4H7
