

Medical school strategies to increase recruitment of rural-oriented physicians: the Canadian experience

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The decision of the physician to practise in a rural setting involves a multitude of personal and professional preferences, ideals and values. However, among these many factors, there is little dispute that Canadian medical schools, with the ability to directly influence the career choices of their graduating students, have an important societal responsibility to strive to address the issues facing rural medicine. The aim of this paper is to summarize the evidence for interventions that are feasible and that may be used by Canadian medical schools to increase the number of graduates who will become rurally oriented physicians. We outline several interventions and make recommendations to improve the recruitment of rurally minded medical students and the rural training of all medical students.

La décision du médecin de pratiquer dans un milieu rural repose sur une multitude de préférences, de valeurs et d'idéaux personnels et professionnels. Parmi ces nombreux facteurs, toutefois, il est généralement reconnu que les facultés de médecine du Canada, qui peuvent avoir un effet direct sur le choix de carrière de leurs étudiants finissants, ont une responsabilité sociale importante, soit celle de chercher à s'attaquer aux problèmes qui confrontent la médecine rurale. Ce document vise à résumer les données probantes au sujet d'interventions possibles et que les facultés de médecine du Canada peuvent utiliser pour augmenter le nombre de diplômés qui deviendront des médecins à orientation rurale. Nous décrivons plusieurs interventions et présentons des recommandations afin d'améliorer le recrutement d'étudiants en médecine à orientation rurale, ainsi que la formation en médecine rurale de tous les étudiants en médecine.

INTRODUCTION

Central to any discussion about health care policy in Canada is a consideration of the disparities that exist in the delivery of services. One such major disparity exists in the rural communities of Canada, which is often attributed to a paucity of physicians in these areas. Although this physician shortage is widely recognized in the literature, often publicly debated and addressed through a myriad of programs and incentives, a satisfactory solution appears chronically out of reach for many of the affected communities. The decision of the physician to practise in a rural setting involves a multitude of personal and professional preferences, ideals and values. However, among these many factors, there is little dispute that Canadi-

an medical schools, with the ability to directly influence the career choices of their graduating students, have an important societal responsibility to strive to address the issues facing rural medicine.¹⁻⁴ As such, medical schools across Canada are beginning to consider adjusting their admission policies to recruit applicants with a demonstrated interest in rural medicine, increasing rural exposure during both the preclinical and clinical years and increasing the number of postgraduate training opportunities in rural medicine.^{1,3} The purpose of this paper is to review evidence for interventions that may be used by all Canadian medical schools to increase the number of graduating physicians choosing to practise in rural communities and thus ameliorate deficits to the health of rural populations.

METHODS

Fifty-seven relevant studies were identified by a MEDLINE and PubMed search covering 1966 to 2010. We used the keywords “medical school,” “rural population,” “rural health services,” “physicians,” “recruitment,” “admissions,” “undergraduate training,” “postgraduate training,” “medically underserved area” and “professional practice location.” We determined relevance and subsequent selection based on the title of the article and review of available abstracts. Additional articles were obtained from the reference lists of pertinent systematic reviews, studies and editorials identified in the initial search. We excluded articles that were not printed in English. We searched Canadian government websites (e.g., Statistics Canada and the Canadian Institute for Health Information) for demographic data on rural populations, physician distribution and rural population health status.

We preferred literature based on the experiences of Canadian institutions but also included international studies. Owing to the nature of the interventions evaluated and the general unfeasibility of randomized control trials, discrimination of articles based on type of trial was not a major selection factor. Deficits and limitations are pointed out as relevant.

PHYSICIAN DISTRIBUTION AND RURAL POPULATION HEALTH

Studies on the geographic distribution of physicians in Canada over at least the past decade have consistently reported a shortage in rural areas. Data from 2004 show that 9.4% of Canadian physicians practised in rural communities, serving the 21.1% of the Canadian population that resided in rural areas.⁵ These numbers show little improvement from the 1996 figures, which estimate that 9.8% of Canadian physicians served their respective rural communities, which, at the time, made up 22.2% of the total Canadian population.⁵ The use of the “full-time equivalent” measure, which takes into account practice characteristics of physicians, likely provides a better indication of the geographic maldistribution of physicians compared with early studies that relied on counting absolute numbers of physicians only.^{5,6} Irrespective of these methodological differences, both studies point out a substantial shortage of physicians in rural areas.

The data reported from 2004 show that about 16% of Canadian family physicians and 2.4% of

specialists were located in rural areas.⁵ The especially small number of specialists confers additional challenges to rural medicine, such as the necessity for family physicians to engage and be trained in a broader scope of clinical practice (e.g., emergency medicine, obstetrics and gynecology) and to work longer hours, thus potentially taking away from their family medicine office hours, and also increases job stress.⁷ As well, the lack of specialists practising in a rural area has implications for rural residents in terms of access to care, travel time, distance travelled, potential need for an escort and lost income.⁸⁻¹⁰

Compounding the issue of physician supply in rural areas is a migratory trend of physicians from rural to urban centres that has been consistently reported from 1986 to 2001. This has resulted in a net decrease of 20% of practising rural physicians over this period.¹¹ Rourke² recently reported data from 2001 to 2005 of an average annual emigration of 368 (8%) rural physicians to urban centres, compared with an average annual increase of 241 (0.5%) immigrating urban physicians. Given the evidence of an imbalance between physician–population ratios in rural regions, how has rural population health been affected?

In 2006, the Canadian Institute for Health Information undertook the first intensive pan-Canadian study on the health status of Canadians living in rural regions compared with urban populations.¹² This report concluded that rural populations had a higher overall mortality rate and performed worse on a number of health-related measures compared with their urban counterparts.¹² The distinction was particularly marked in instances of circulatory diseases, injury, occupational injury and suicide.¹² Furthermore, rural residents were more likely to have poorer health-related behaviours (e.g., smoking, poor dietary habits) and higher proportions of their population were of low income and had attained less than secondary education compared with urban populations.¹² Although these data are descriptive in nature and not meant to imply causal relationships, the assertion of many government officials and health care workers alike is that the health status of rural Canadians, although multifactorial, is negatively affected by a disparity in physician services.⁹

ARE MEDICAL STUDENTS A REFLECTION OF CANADIAN DEMOGRAPHICS?

As publicly funded institutions, medical schools in Canada have as part of their mandate the goal of

representing and addressing the needs of the communities that they serve. Similar studies conducted in 1965¹³ and more recently in 2001¹⁴ on the demographics of first-year medical students reveal that this has not been a reality. The more recent survey, though limited by methodological difficulties that resulted in the exclusion of Quebec universities, but with a relatively high overall response rate of 80%, showed that medical students are not representative of the general Canadian population in terms of ethnic background, socio-economic status and rural background.¹⁴ In 2001, only 10.8% of first-year medical students reported a rural background (i.e., had attended high school in a rural setting), although 22% of the Canadian population reported living in a rural area at that time.^{14,15} The study of first-year medical students in 1965 reported a similar underrepresentation of 8.4% medical students with a rural background compared with the 30.4% rural population.¹³ It appears that medical school classes do not include sufficient numbers of students from rural backgrounds to represent the Canadian rural population. The relevance of this to the shortage of rural physicians lies in the characteristics of rural physicians who are currently practising.

CHARACTERISTICS OF RURAL PHYSICIANS: WHY MEDICAL SCHOOLS MATTER

When comparing physicians in rural practice with their urban counterparts, certain characteristics become readily apparent. Rural physicians are 2–4 times more likely to have been brought up or to have spent a substantial amount of time in a rural community and are 2–3 times more likely to have been exposed to rural training in their undergraduate medical curriculum, postgraduate training or both.^{2,16–20} These widely reported associations present medical school administrators with the opportunity to increase the likelihood that a greater proportion of their graduating class will pursue a rural practice. Relating to these characteristics, 3 avenues for interventions that Canadian medical schools can potentially employ should be considered: selection and admissions, undergraduate medical school training and postgraduate training and recruiting. Successful strategies will likely include multiple interventions staggered throughout the cycle of students entering and graduating from medical school and residency programs.²¹

RURAL STUDENTS GETTING INTO MEDICAL SCHOOL

Too few applicants or too few admission offers?

The smaller proportion of matriculating Canadian medical students with a rural background raises questions about the cause of this disparity. Is this because of too few rural applicants to medical school or a bias of the medical school against accepting students from a rural background?

There has been speculation that because of the predominantly urban location of most Canadian medical schools and the composition of their respective admission committees,^{22–24} rural applicants may be at a disadvantage in gaining admittance.²⁴ This concern was recently addressed in a retrospective study on a cohort of 4407 Albertan applicants to medical school over a period of 10 years.²⁴ The investigators found that the number of rural and urban applicants admitted to medical school was proportional to the number of rural and urban students in the applicant pool.²⁴ That said, the total proportion of the applicant pool from rural areas was below the expected proportion based on the rural population of Alberta. This suggests that the lack of rural representation in medical schools may be related to other issues that deter or prevent students from a rural background from progressing to the stage of applying to medical school.²⁴ A similar study focusing on medical school applicants in Ontario also reported fewer rural applicants in the total applicant pool, although rural applicants were equally likely to be admitted and had similar academic qualifications as their urban counterparts.^{17,25}

Although beyond the scope of this paper, the issue of a smaller pool of rural applicants relative to the needs of the rural population suggests the potential for research into factors related to educational opportunity and career counselling that may be at play in the rural setting. A simple, early intervention such as educating rural high school students about a career in medicine may be a helpful strategy.^{3,25} Furthermore, the notion that barriers play a substantial role in limiting educational opportunities in students from rural backgrounds is likely not limited to their premedical education.²⁶ Medical students from rural backgrounds tend to report higher amounts of debt, have greater concern about financing their medical education and have higher levels of financial stress compared with their urban counterparts.²⁶ This is particularly relevant in the face of rising tuition for medical education in Canada.²⁷ A recent study out of

the University of Calgary looked at this mechanism and found students from rural backgrounds to have higher levels of debt at entry to medical school, higher projected levels of debt at the end of medical school and lower mean parental incomes compared with their metropolitan counterparts.²⁸ The authors of this study postulated that with rising tuition costs, the diversity of medical school classes may be affected, and this may increasingly become a barrier for certain groups of students.²⁸

Increasing the numbers

Although there may be socio-economic and educational barriers that deter rural students from pursuing medicine, the role of selective admission for rural applicants remains an acute and viable option for medical schools to increase the number of students from a rural background. Selective admission can be accomplished through screening for rural applicants by simply collecting permanent addresses and addresses during high school and college for each applicant.²⁹ Screening for other factors that appear positively correlated with an interest in rural medicine, including family members currently living in a rural community, an expressed interest in family medicine and having volunteered in a developing nation, may further increase the yield of rural students.^{30,31} Furthermore, in light of rising tuition and higher debt-loads for all medical students — particularly rural medical students — financial incentives and return-of-service agreements have become particularly attractive and effective.³² The benefits, however, did not often persist over the long term in some of the studies examined, which indicates that other interventions may still be necessary.³²

Selective admission strategies have been successfully implemented at several institutions — some with remarkable success — resulting in an increased proportion of students choosing rural-based family medicine.^{3,31,33–36} A striking example is the Physician Shortage Area Program (PSAP) at Jefferson Medical College in Pennsylvania, reported by Rabinowitz and colleagues.³³ The PSAP recruits students who are admitted based on having grown up in a rural setting and who have the intention of practising rural family medicine.³³ Students in this program have advisors in family medicine, perform their family medicine rotation in a rural setting and are expected to complete a residency in family practice.³³ Although the above features are not formally enforced, graduates of the PSAP make up 21% of the rural physician workforce, despite making up

only 1% of the medical school classes.³³ Established in 1974, this program has produced durable results, as measured 22 years later by Rabinowitz and colleagues.³³ However, medical school administrators must keep in mind the possibility that such a selection policy may lower the standards of admission to medical schools.³⁷ The evidence, though generally consisting of the experience of individual institutions changing a single aspect of their admission policy (e.g., screening applicants for evidence of a rural background or implementing financial incentives), suggests that many approaches may be entertained by administrators to increase the likelihood — before even beginning medical training — of students choosing a career in rural medicine.

MEDICAL SCHOOL CURRICULUM

Increasing rural exposure

The role of the medical school curriculum in influencing students to choose rural medicine lies in creating opportunities for exposure to rural community practice, fostering a positive attitude toward family and rural medicine, and ensuring that these experiences are positive learning experiences.^{3,37} These ideas have been shown in the literature to not only reinforce the interest of students who had a prior interest in rural medicine or who have a rural background, but also to potentially influence urban students or students who had not previously considered a career in rural medicine to pursue this field.^{1–3,37–39}

Rural-based educational programs instituted at the University of Alberta report doubling of the number of students partaking in rural rotations and a 4-fold increase in the duration of rural experiences.³⁹ Mandatory rural rotations at Memorial University similarly have been met with favourable results in rural medicine training and recruiting.^{40–42} Aside from mandatory exposure, offering electives in rural medicine that include travel stipends and arranged accommodations may further increase the likelihood of students exploring rural practice.^{43,44} Facilitating and providing incentives may be helpful to encourage students to engage in longer rotations (up to 3–6 weeks) so the student can develop an appreciation for the rural lifestyle and the community.⁴⁵ A longer duration of rotation also allows the student and preceptor to become more familiar with one another and for the preceptor to appropriately delegate clinical experiences for the student's level of training.⁴⁵ Student evaluations of rural primary care clerkship rotations suggest that these experiences positively influence

their perceptions of rural primary care and of the workload demands of rural physicians.⁴⁶

Rural rotations — A comparable education?

Recent data from McMaster University suggest that students who participate in rural training perform at least equally to their urban counterparts in terms of academic and clinical performance.⁴⁷ Clerkship students in this study either participated in the McMaster Community and Rural Education (Mac-CARE) program or the regular urban clerkship program based in Hamilton, Ont. Students in the Mac-CARE program were found to achieve comparable scores on academic evaluations compared with their urban-trained counterparts and performed better in postclerkship Objective Structured Clinical Examinations.⁴⁷ Similar findings of comparable performances have been replicated at other North American centres.^{48,49} This may be explained in part by a higher staff–student ratio in the rural community setting.²¹ Integrating a rural experience into medical training and encouraging positive academic and clinical aspects of rural training may be helpful to students considering such a rotation in the future and can result in increasing numbers of rurally oriented graduates.

SPECIALTY TRAINING IN RURAL MEDICINE

The practice of rural medicine involves a unique skill set, and it is being increasingly recognized that specific training is required.^{10,50} Fewer consulting and technological resources translate into greater demands on the rural physician's time, a wider scope of practice and the need to be proficient in a wider range of procedures.⁵⁰ Indeed, although interest and exposure to rural medicine are definite prerequisites and factors involved in predicting which students will choose to practise in rural settings, appropriate and sufficient opportunity for postgraduate training specific to rural practice is essential.⁵⁰ The impact of the medical school in training physicians dedicated to rural practice becomes especially important in the postgraduate years, particularly with respect to influences on residents in family medicine, who are most likely to subsequently establish a rural practice. Additionally, it should be noted that preliminary data on efforts to involve specialty residency programs in rural practice rotations at the University of Western Ontario have been positive, recruiting 19 graduating specialist residents over 5 years.⁵¹

Location of postgraduate training plays a substantial role in determining where residents choose to practise after graduation. Within the last 5 years alone, Canadian medical education has seen the opening of the Northern Ontario School of Medicine, with its mandate exclusively dedicated to training rural physicians, as demonstrated by its admission policy, geographic location and curriculum focus.^{52,53} Other schools have attempted to follow suit with the creation of satellite schools or campuses in smaller communities such as the University of British Columbia's Northern Medical Program in Prince George,⁵⁴ the University of Sherbrooke's campus in Moncton, NB, and the newly launched Dalhousie Medicine New Brunswick program in Saint John. The New Brunswick programs are innovative not only for their use of satellite campuses, but also for the fact that they require cooperation among 3 provinces. A 10-year Canadian study of graduates from the University of Ottawa's Northern Ontario Family Medicine residency program in Sudbury and McMaster University's Family Medicine Program in Thunder Bay found that two-thirds of person-years of medical practice by graduates of both programs occurred in either northern Ontario or a rural area outside of northern Ontario.⁵⁵ Recruiting efforts at Memorial University of Newfoundland, which provided incentives to medical graduates who chose to stay in the province, reported that more than 50% of students of rural origin who graduated from the university remained in the province.⁴¹ In light of these findings, Canadian residency programs have responded accordingly. Estimates in 2002 of the availability of residency positions in rural family medicine in Canada found that the number of spots across Canada was proportional to the rural population of Canada, with most schools offering specific programs in rural medicine.⁵⁶ However, it was unclear in this study how many of these spots were subsequently filled.⁵⁶

Although the training program and the origin of the trainee are key predictors of rural practice, family and personal factors also play a large role in the decision of graduates.⁵⁷ Resources and job opportunities for spouses and children are cited as particularly relevant and offer still more areas of consideration when creating strategies for recruiting residents and graduates of residency programs in family medicine.^{10,57} Perhaps not surprisingly, survey results of rural physicians and residents identified other factors that may have an impact on the attractiveness of rural practice, such as remuneration for anesthesia and obstetric coverage, time off for continuing education, support for overhead funding, enhanced funding to

support allied health professionals and the placement of a stronger referral and support network.¹⁰

Most Canadian medical schools offer some degree of postgraduate exposure to rural medicine, recognizing the importance of place on physician retention.² Whether these spots are being accepted by Canadian graduates is not clear in the literature and will certainly need to be addressed in the future to delineate where interventions might be best directed. Furthermore, although outside the realm of medical school interventions, personal and practice factors need to be accounted for in designing a successful recruitment strategy.

Box 1 shows a summary of the evidence for interventions that are feasible and that may be used by Canadian medical schools to improve the number of graduates who will become rurally oriented physicians.

LIMITATIONS AND FUTURE DIRECTION

Although there is abundant literature focusing on the recruitment and retention of physicians for rural practice, a large portion of the evidence relies heavily on surveys and questionnaires. This approach lends itself to variable response rates and is subject to nonresponse bias, voluntary bias and recall bias. Prospective (and also retrospective) studies monitoring an intervention (related to admission, clerkship or postgraduate training) that are organized by the medical

Box 1. Summary of recommended interventions by medical schools to increase numbers of rurally oriented physicians

Selection and admission

- Screen for interest and experience in rural medicine, rural origins, family currently living in rural community²⁹
- Return-of-service agreements, bursaries, scholarships and other financial incentives³²
- Education and career counselling coordinated by medical students to increase awareness of a career in medicine among rural high school students²⁵

Medical curriculum

- Integrate rotations in rural family medicine within clerkship years³⁹
- Ensure adequate length of rotations (> 3 weeks)⁴⁵
- Facilitation of rotations with regard to accommodation and travel (with stipends)⁴⁴
- Promote personalized, enhanced clinical training in the rural setting⁴⁰

Postgraduate training

- Establish residency training programs in rural areas⁵⁰
- Improve practice facilities, allied health care teams and referral networks¹⁰
- Consider personalized approach regarding family and practice preferences^{10,57}

school administration itself offer the strongest evidence because of its access to pertinent information such as student files and closer contact and communication with the student body being studied. However, only a minority of medical schools in Canada report on an intervention they have undertaken and the subsequent result. The publication of interventions and outcomes may be related to the importance of rural training as part of their mandate. Regardless, that there exists up to a 10-fold difference among Canadian medical schools in the production of graduates practising in rural areas⁴ suggests the need for further research on a pan-Canadian scale.

CONCLUSION

In addition to summarizing the evidence for interventions, we have also described a mechanism taking place well before the admissions process that may be used as a future intervention: targeting rural students earlier in their academic careers (i.e., high school) such that a career in medicine is presented as an option. Further program development and research is needed to determine whether this will have an effect on rural applicant pools and thus the number of medical students of rural origin. We also highlight the need for pan-Canadian data on types of interventions currently employed and the success had at various institutions. There appears to be a reporting bias among schools that prioritize rural training, because much of the literature on the topic of rural medicine recruitment in Canada is derived from only a handful of Canadian medical schools. In the coming years, results from program research initiatives as well as census data from the graduates of rural-based programs should provide a reliable estimate of the collective interventions of Canadian medical schools.

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