

Who gets into medical school?

Comparison of students from rural and urban backgrounds

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ABSTRACT

OBJECTIVE Being of rural origin is one of the few predictors of whether medical students choose either family or rural practice as a career. This study investigates what proportion of applicants are of rural origin, what their grades are, and whether they are accepted.

DESIGN Mailed survey using the postal codes of Ontario medical school applicants' residences when they attended secondary school to link them to communities. Applicants of rural origin were defined as having attended secondary school while residing in communities with core populations of fewer than 10 000 people.

SETTING Province of Ontario, its six medical schools, and its 1 500 000 rural citizens (13% of the total population).

PARTICIPANTS All 4948 applicants to Ontario medical schools in 2002 and 2003 who had gone to high school in Ontario.

MAIN OUTCOME MEASURES Proportion of rural applicants among all applicants in the given years. Mean grade point averages (GPA) and Medical College Admission Test (MCAT) scores attained by applicants of both urban and rural origin. Proportion of rural students among all students admitted to medical schools.

RESULTS While 13% of the Ontario population is rural, only 7.3% of Ontario applicants to medical school were of rural origin ($P < .001$). On average, the GPAs of applicants of rural and urban origin were identical at 3.42 ($P = .995$ not significant [NS]). The MCAT scores averaged 8.9 for applicants of rural origin and 9.0 for applicants of urban origin ($P = .36$ NS). Applicants of rural origin were admitted to medical school as frequently as applicants of urban origin (1:5.6 vs 1:4.7, $P = .139$ NS).

CONCLUSION Although students of rural origin in Ontario apply to medical school less frequently than students of urban origin do, those that do apply have similar grades to those of urban applicants and are equally likely to be accepted.

EDITOR'S KEY POINTS

- Ontario's population is 13% rural, but only 7.3% of medical school applicants are from rural settings.
- Rural applicants have similar grade point averages and Medical College Admission Test scores to those of their urban counterparts, although this finding is limited by incomplete reporting.
- Rural applicants are accepted into medical schools in the same proportion as urban applicants.

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Health care systems that rely on family physicians are efficient and yield better health outcomes than those that have a large proportion of specialists.^{1,2} Ready access to any health care for vulnerable rural populations often depends on the availability of family physicians. Maintaining or increasing interest in generalism and rural medicine in a culture of increasing specialization is thus a worthy challenge for policy makers. Choosing family practice and choosing a rural practice location are complex decisions of nature and nurture. One factor associated with both choices is whether a person comes from a rural background.

Canadian literature on choosing to practise in rural locations is limited. Easterbrook et al³ found that, among 159 family practice residents at Queen's University in Kingston, Ont, those of rural origin (from areas with less than 10 000 population) were 2.3 times more likely than those from larger communities to choose to practise in rural communities immediately after graduation.

Wright et al⁴ found that, for 136 medical students graduating from McGill University, exposure to role models in a particular clinical field was strongly associated with medical students' choice of clinical field for residency training. American studies indicated, however, that, while a rural family medicine preceptorship was important, medical students of rural origin were four times as likely to choose rural primary care, even in a standard urban curriculum. Rural origin and interest in primary care during the first year of training accounted for 78% of the probability that a graduating student would choose rural primary care.⁵

Wright and colleagues⁶ found that, among first-year medical students in Alberta and British Columbia, students who were older, were concerned about medical lifestyle, and grew up in smaller communities were more interested in family medicine as a career. In their multivariate analysis, interest in family practice increased progressively with

smaller community of origin and was 2.3 times greater for students from communities of less than 50 000 population than for those from larger communities. A survey of 981 Canadian first-year medical students in 2001⁷ found that students of rural origin were underrepresented in comparison with the proportion of Canadians living in rural areas (10.8% vs 22.4%).

Canadian medical schools require university-level courses as prerequisites. Finnie et al showed that, while 34% of men from urban areas and 41% of women from urban areas attended Canadian universities in 1995, only 21% of men from rural areas and 33% of women from rural areas did so.⁸ Frenette showed that having to travel more than 80 km to university reduced postsecondary education participation rates among Canadian rural students in all social and economic strata, but particularly among poorer families.^{9,10} No studies to date have looked at the proportion of students from rural areas among medical school applicants.

Applicants to the five Ontario medical schools use the Ontario Medical School Application Service (OMSAS) whether they apply to only one or to more of the schools. Several research questions can be answered from OMSAS data. Are students from rural Ontario less likely than those of urban origin to apply to Ontario medical schools? Do students from rural areas have lower marks than those from urban areas? Are applicants of rural origin less likely to be successful in getting into medical school?

METHODS

In fall 2000, the OMSAS agreed to ask for the postal codes of the residences where applicants lived when they attended secondary school. These postal codes, for 2002 and 2003 medical school applicants, were linked to community locations that could be categorized as either rural or urban, using Statistics Canada's definition of rural areas and small towns.¹¹ Applicants of rural origin were defined by having attended secondary school while residing in communities with core populations of less than 10 000.

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Because the applicants of rural origin were few, the two intake years, 2002 and 2003, have been pooled for this analysis. Because 84.5% of the students admitted to Ontario's medical schools were from Ontario, our analyses were limited to the 4948 applicants from Ontario. Proportions of applicants of rural and urban origins were determined by linking the postal codes on their application forms with Statistics Canada's geographic data.

For applicants of both rural and urban origin, comparative descriptive statistics were derived for their grade point averages (GPAs) and Medical College Admission Test (MCAT) scores. The relative proportions of applicants of rural and urban origin accepted into Ontario medical schools were also computed. Statistical analysis was done using SPSS software. The study was approved by the Ethics Review Board at the University of Western Ontario in London.

RESULTS

In 2002, 2246 students from Ontario applied to the province's medical schools; in 2003, 2702 applied. All provided postal codes, which allowed us to define them as having rural or urban backgrounds. There were 4588 applicants from urban areas and 360 from rural areas; only 7.3% of the applicants (360 of 4948) were of rural origin.

Grade point averages were available from the OMSAS database for 96% of applicants ($n = 4749$); the proportions of missing GPAs were equally distributed among rural and urban applicants. The MCAT scores required by three of the five Ontario medical schools were available for 43.0% of the rural students and 58.6% of the urban students. On average, the GPAs of applicants of rural and urban origins were identical at 3.42 ($P = .995$) (**Figure 1**). Average GPA for successful applicants (registrants) was 3.72.

There were 505 successful applicants in 2002 and 529 in 2003. Overall, 6.2% of the successful applicants were of rural origin. One in 5.6 applicants of rural origin was admitted compared with one in 4.7 applicants of urban origin ($P = .139$).

DISCUSSION

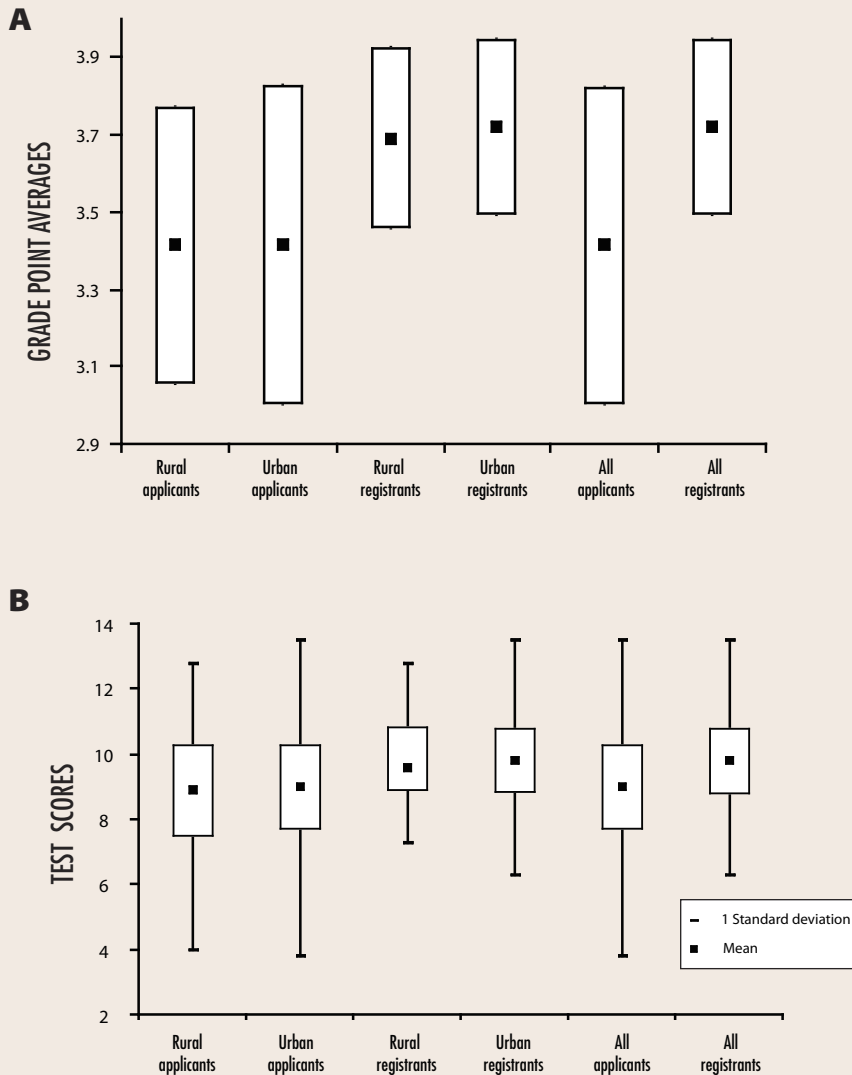
The most important finding of this study is that students of rural origin are only 56% as likely to apply to medical school in Ontario as they would be if they represented the overall rural population of the province. While Ontario is 13% rural, only 7.3% of the Ontario applicants were of rural origin, and they made up only 6.2% of successful applicants. We speculate that this could be due to a lack of role models in rural areas or to financial barriers, or to both. There are, however, no studies to date dealing specifically with Ontario medical school applicants that would confirm these speculations.

There are half as many doctors in Canada's rural regions as there are for comparable urban populations, and hence, very few physicians to model medicine as a career.¹² Rural parents are on average less well educated than urban parents and are less likely to encourage their children to obtain post-secondary education.¹³ People in rural areas are poorer than their urban counterparts¹³ and are thus less likely to be able to support their sons and daughters through long and expensive training programs. This is particularly true when students do not live within commuting distance of a university where they can attain the prerequisites for medical school.^{9,10} Prospective students have to overcome the cultural and financial barriers to leaving home and moving to the city.¹⁴

While data on medical school applicants have not been studied elsewhere in a similar fashion, our findings are consistent with other findings in the literature on the underrepresentation of students of rural origin in medical schools. In 1989 in Australia, 10% of medical students were of rural origin in a country that is 25% rural.¹⁴

More detailed work needs to be done to characterize medical school applicants, both here and in other places, to gain a deeper appreciation of why medical schools receive proportionally fewer applications from students in rural areas than from students in urban areas. Reports from other places indicate encouragingly that it is possible to increase the number of students of rural origin in medical schools to

Figure 1. Means and standard deviations of examination results of Ontario medical school applicants and registrants: A) Grade point averages; B) Medical College Admission Test scores.



a demographically equitable level. In Australia, for example, after some years of struggle, admission criteria were reformed to meet social accountability standards, and specially targeted national bursaries were offered to students of rural origin to reduce potential financial barriers. By 2000, the proportion of students of rural origin had increased to 25% of that country's medical classes.¹⁴

One strategy adopted in Canada to make medical school more accessible to students of rural origin can be found in Quebec. In that province, the four medical schools have started to add 0.5 to the

GPA of applicants from rural and remote Quebec. This and other strategies might have to be explored to increase the proportion of both applicants and successful registrants of rural origin in Ontario's medical schools.

Limitations

Our hypothesis that applicants of rural origin had poorer grades was unsubstantiated. One limitation of this result is the 4% of applicants for whom we have no GPAs. Data were missing primarily on

postgraduate applicants and applicants who had taken a portion of their undergraduate training outside the country. Because applicants of rural and urban origins were equally likely to have missing GPA data, this small amount of missing data is unlikely to skew the analysis.

A more serious limitation is that more rural than urban applicants did not provide MCAT scores. This might simply reflect the fact that MCAT testing is not readily available to rural applicants who could be “home” for the summer when MCATs are usually written, but the reason might be more complex. Students who do not write the MCAT examinations, or who do but do not do well, might choose to apply only to schools that do not require MCAT scores (at the time of the study, in Ontario, these were McMaster University in Hamilton and the University of Ottawa). Thus, MCAT data should be treated with caution.

Conclusion

Students of rural origin are much less likely than their urban counterparts to apply to medical school. Once they do apply, their grades are comparable, and they appear to be accepted just as often as students from urban backgrounds. ❁

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Contributors

Dr Hutten-Czapski, principal investigator, designed the study, wrote the grant application, drafted the manuscript, and approved the final version submitted.

Dr Pitblado acquired and analyzed the data, revised the manuscript for intellectual content, and approved the version submitted. **Dr Rourke** contributed substantially to study design, revised the manuscript for intellectual content, and approved the final version submitted.

Competing interests

None declared

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