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Perceptions of medical school among high school students in southwestern Ontario

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Introduction: Canadian medical students are more likely to come from urban and high-income areas and to have well-educated, professional parents. Physicians who grew up in rural areas are more likely to serve in rural and lower-income areas. We identify perceptions held by rural high school students regarding the affordability and attainability of a medical education.
Methods: We distributed a survey to high school students who attended the MedQUEST Health Career Exploration Program in southwestern Ontario. The survey assessed socioeconomic background and perceived barriers to a medical education (including affordability as well as encouragement and discouragement from others).
Results: Of the 119 attendees, 106 (89.1%) completed the survey. Of the students who were interested in becoming physicians, most expected to fund their medical education through scholarships (56 [69.1%]), parental support (50 [61.7%]) or student employment (45 [55.6%]). However, less than half of all respondents (48 [45.3%]) provided reasonably correct estimates for annual medical tuition fees. If at least 1 parent had a postsecondary education, respondents were less likely to cite affordability as a barrier to attending medical school (p = 0.05).
Conclusion: Although students interested in obtaining a medical education cited affordability as a potential barrier, many were not aware of the actual cost of attending medical school. We found an association between perceived affordability of medical school and parents' level of education. To define this relation further, research is needed to collect more accurate data on family income. Students may benefit from more information about funding opportunities for medical school.

Introduction : Au Canada, les étudiants en médecine sont plus susceptibles de provenir de régions urbaines à revenus élevés et d'avoir des parents qui sont des professionnels instruits. Les médecins qui ont grandi dans des régions rurales sont plus susceptibles de travailler dans des régions rurales et à plus faible revenus. Nous avons relevé les perceptions des élèves de niveau secondaire en milieu rural face à l'accessibilité des études de médecine, y compris en termes de coût.
Méthodes : Nous avons distribué un sondage à des élèves du secondaire qui ont assisté au programme MedQUEST d'exploration des carrières en santé dans le Sud-Ouest de l'Ontario. Les questionnaires évaluaient la situation socio-économique et les obstacles perçus à l'endroit de la formation en médecine (y compris le coût et l'encouragement ou la dissuasion par autrui).
Résultats : Parmi les 119 participants, 106 (89,1 %) ont répondu au sondage. La plupart des étudiants intéressés à devenir médecins ont dit s'attendre à financer leurs études de médecine au moyen de bourses (56 [69,1 %]), d'une aide de leurs parents (50 [61,7 %]) ou d'un emploi d'étudiant (45 [55,6 %]). Toutefois, moins de la moitié de tous les répondants (48 [45,3 %]) ont donné une estimation raisonnablement exacte des frais de scolarité annuels des programmes de médecine. Si un des deux parents avait fait des études post-secondaires, les répondants étaient moins susceptibles de mentionner le coût comme obstacle à des études de médecine (p = 0,05).
Conclusion : Même si les étudiants intéressés par les études de médecine ont cité le coût

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comme obstacle potentiel, beaucoup ignoraient le coût réel des études de médecine. Nous avons découvert un lien entre le coût perçu des études de médecine et le niveau d'instruction des parents. Pour préciser ce lien davantage, une recherche s'impose afin de recueillir des données plus précise sur le revenu des foyers. Les étudiants gagneraient à être mieux renseignés au sujet des bourses offertes aux étudiants en médecine.

INTRODUCTION

It has been well described that medical students in Canada differ substantially from the general population: they are more likely to come from urban and high-income areas and have well-educated, professional parents.[1–3] In recent years, there has been an intense focus on strategies to recruit and retain rural physicians; the recruitment of rural students into medical school has been a mainstay of several such strategies.[4–15] Programs aiming to increase the quota of students from rural areas studying medicine have dichotomized students into categories of "rural" or "nonrural." However, these programs have neglected the complex interplay between rurality and socioeconomic status.

A 2001 study found that 29.1% of Canadian medical students came from a household with an income greater than $120 000, which applies to only 4.9% of Canadian households.[1] Additionally, 39.0% of medical students' fathers had a master's or doctoral degree, as compared with 6.6% of the age-matched Canadian male population.[1] Evidently, medical students do not represent the economic composition of the general population.[2,16,17] We are not aware of published research that dissects the socioeconomic status of medical students specifically from rural areas.

Kwong and colleagues[2] observed an increase in self-reported family income in students entering medical school in 2000 compared with those in 1997. This finding was thought to be associated with the large increases in tuition fees implemented over this period. Rising tuition fees, high application costs and travel expenses may all be prohibitive factors to students from rural or low-income areas. Additionally, participation in extracurricular activities, often looked for in medical schools' rigorous admission criteria, may be precluded by the need of a job. These factors are likely exacerbated by misinformation or lack of awareness about financial aid.[18,19] It is also possible that applicants themselves are preselecting. A study conducted in the United Kingdom found that students with a lower socioeconomic background greatly underestimated their chances of admission.[20] Students may perceive barriers to medical education that influence their choice to even consider a career in this field.[17,21,22]

The distance to the closest postsecondary institution further compounds the effect of socioeconomic status. Frenette[23] has shown that the farther a student lives from a university, the more likely family income will affect the decision to attend university. Specifically, students living within 40 km of a university are 1.9 times more likely to attend university if they are from an upper-income family compared with those from a lower-income family. When the distance to a university is increased to greater than 80 km, students from upper-income families are 5.6 times more likely to attend university than students from lower-income families.

We must identify influences that encourage or discourage students from considering a career in medicine, both to ensure equal access to education and to aid in establishing a firm place for underrepresented groups in medical school and health care.[4,20,21] We address the existing gap in the literature regarding perceptions of medical education among Canadian high school students in rural areas. We included in our study perceptions about the costs of obtaining a medical education and how these influence students' perceptions of affordability.

METHODS

We developed written, closed-ended survey questions based on a literature review and consultation with experts. Questions in the survey targeted the following areas: socioeconomic status, perceived barriers to attending medical school, and affordability and financial aid. We used education level of parents as a proxy for socioeconomic status.

The target population was a convenience sample of high school students who took part in the MedQUEST Health Career Exploration Program during the summer of 2010. MedQUEST is a 5-day program in which high school students learn hands-on medical skills and have the opportunity to interact

with medical students and health care professionals. The program takes place in 6 rural or medically underserviced communities in southwestern Ontario. Surveys were distributed to students on the first day of the program, before they had the opportunity to interact with the medical students or health care professionals.

We entered the anonymous data into a Statistical Package for the Social Sciences program. Analysis of the data included calculating frequencies and using cross-tabulation with the χ^2 test (95% confidence interval) to determine differences in the datasets.

RESULTS

Of the 119 students in attendance at the 6 MedQUEST locations, 106 completed the survey, for a response rate of 89.1% (Table 1). This included 11 (10.4%) students in grade 10, 42 (39.6%) students in grade 11 and 52 (49.1%) students in grade 12. The distance of each site from the closest medical school is shown in Table 1. Of the respondents, 93 (87.7%) planned to go to university after graduation from high school; no respondents planned to go directly into the workforce. Ninety (84.9%) had an average above 80% in the last completed year of school and 81 (76.4%) were interested in becoming a physician.

Table 2 shows the breakdown of parents' education. Most parents (156 [76.1%]) had completed postsecondary education at the college level or higher. In addition, 27 (25.5%) respondents had at least 1 parent who worked in an allied health profession or related career. Respondents' interest in a career as a physician did not differ significantly, regardless of their parents' level of education ($p = 0.5$) or parental occupation in a health care career ($p = 0.8$), as shown in Table 3.

Participants' estimates about the cost of medical school tuition per year in Ontario ranged from $5000 to $50 000. Less than half of participants (48 [45.3%]) estimated within a reasonably correct range ($15 000–$22 000 per year), and 33 (31.1%) were unsure about tuition costs. Knowledge of tuition costs did not vary with parents' education level ($p = 0.2$) or career in health care ($p = 0.4$).

Of the 81 students interested in becoming a physician, 57 (70.4%) participants felt that they would "definitely get in" or had a "good chance of getting in" when asked about their perceived chance of getting accepted into medical school. Of factors preventing these respondents from going to medical school, competitiveness of applicant pool (54

Table 1. Response rates of 119 high school students who took part in the MedQUEST Health Career Exploration Program and distance to closest medical school, by location

Location	No. (%) of respondents	Distance to closest medical school, km
Chatham-Kent County (Chatham)	16/19 (84.2)	84.7
Essex County (Leamington)	21/24 (87.5)	54.0
Huron-Perth County (Seaforth)	21/25 (84.0)	75.9
Middlesex County (Chippewa First Nation)	7/8 (87.5)	29.0
Oxford County (Mount Elgin)	13/13 (100.0)	66.0
Sarnia-Lambton County (Sarnia)	28/30 (93.3)	95.7

Table 2. Parents' highest completed level of education, as reported by respondents

Education	No. (%) of parents, $n = 205$
Did not complete high school	15 (7.3)
High school diploma	34 (16.6)
College diploma	74 (36.1)
Undergraduate degree	53 (25.9)
Graduate degree	19 (9.3)
Professional degree*	10 (4.9)

*For example, Doctor of Medicine, Doctor of Pharmacy, Bachelor of Laws.

Table 3. Interest in medicine and accurate knowledge of tuition costs among 106 high school students, by education and career of parents

Education and career of parents	No. (%) of respondents		
	Total	Interest in medicine	Knowledge of tuition
Postsecondary education			
Neither parent	14 (13.2)	9 (64.3)	4 (28.6)
One parent	27 (25.5)	21 (77.8)	12 (44.4)
Both parents	65 (61.3)	51 (78.5)	32 (49.2)
Career in health care			
Neither parent	71 (67.0)	54 (76.1)	32 (45.1)
One or both parents	27 (25.5)	21 (77.8)	13 (48.1)

[66.7%]), low grades (40 [49.4%]) and affordability (31 [38.3%]) were reported most often. Table 4 shows the education level of parents and anticipated barriers to attending medical school among all respondents. As a percentage of total respondents, affordability was more likely to be cited as a barrier to attending medical school if neither of the respondent's parents had a postsecondary education. Five (6.2%) participants reported that they did not feel they would "fit in" with classmates in medical school.

Responses about expected sources of funding for postsecondary education are summarized in Table 5. There was no difference in how participants anticipated funding an undergraduate education versus a medical education. The education level of parents significantly affected how respondents expected to fund their education.

DISCUSSION

By the age of 14–17 years, the Canadian high school students who participated in our study were already forming perceptions about entry into medical school. Three-quarters of participants reported interest in becoming a physician, years before the task of applying to medical school was upon them. However, we found that misconceptions or uncertainty regarding the cost of a medical education were common among our respondents. These misconceptions may affect the perceived affordability and attainability of a medical education. Thus, to prevent self-selection out of medicine owing to fear about affordability, information about costs and financial aid programs should be promoted to high school students.

It remains to be seen whether the association between education level of parents and perceived affordability of medical school was because of low education levels or an associated low income. Part of the Ontario Student Assistance Program's (OSAP's) mission is to ensure that medical education is accessible to all students across Ontario.[24] However, a substantial proportion of students reported being unsure as to how they would fund their education. Relatively few participants expected to pay for their education using OSAP or bank loans, although this program is heavily used by medical and undergraduate students.[1,25] About half of students graduating from Canadian undergraduate programs in 2005 relied on government or non-government student loans.[24] Data regarding loans in medical school are not currently available. However, it is likely that the proportion of students using loan programs such as OSAP will only increase because of cumulative educational costs and higher tuition fees.[25] Therefore, it must be determined

Table 4. Education of parents and anticipated barriers to attending medical school

Barrier	No. (%) of respondents;* postsecondary education of parents: Neither parent, *n* = 9	One or both parents, *n* = 92	OR (95% CI)
Competiveness of applicant pool	4 (44.4)	50 (54.3)	0.35 (0.09–1.43)
Low grades	5 (55.6)	35 (38.0)	1.32 (0.33–5.32)
Affordability	8 (88.9)	23 (25.0)	17.04 (2.01–144.4)
Won't fit in with peers	2 (22.2)	3 (3.3)	6.57 (0.93–46.2)

CI = confidence interval; OR = odds ratio.
*Values are missing for 5 respondents.

Table 5. Education of parents and anticipated sources of funding for postsecondary education

Funding*	No. (%) of respondents; postsecondary education of parents: Neither parent, *n* = 14	One or both parents, *n* = 92	OR (95% CI)
Scholarship	11 (78.6)	68 (73.9)	1.24 (0.33–5.03)
Parental support	3 (21.4)	64 (69.6)	0.12 (0.03–0.46)
Student employment	7 (50.0)	48 (52.2)	0.92 (0.30–2.82)
Bank loan	6 (42.9)	35 (38.0)	1.22 (0.39–3.82)
OSAP	7 (50.0)	24 (26.1)	2.83 (0.90–8.91)
Unsure	4 (28.6)	6 (6.5)	5.73 (1.38–23.8)

CI = confidence interval; OR = odds ratio; OSAP = Ontario Student Assistance Program.
*Respondents could select all applicable sources of financial support.

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CJRM seeks to promote research into rural health issues, promote the health of rural and remote communities, support and inform rural practitioners, provide a forum for debate and discussion of rural medicine, provide practical clinical information to rural practitioners and influence rural health policy by publishing articles that inform decision-makers.

Material in the following categories will be considered for publication.

- Original articles: research studies, case reports and literature reviews of rural medicine (3500 words or less, not including references)
- Commentary: editorials, regional reviews and opinion pieces (1500 words or less)
- Clinical articles: practical articles relevant to rural practice. Illustrations and photos are encouraged (2000 words or less)
- Off Call articles: a grab-bag of material of general interest to rural doctors (e.g., travel, musings on rural living, essays) (1500 words or less).
- Cover: artwork with a rural theme

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whether affordability of medical school as a perceived barrier is because of a lack of information on available support or a true lack of resources.

Limitations

A major limitation in this study is that a substantial sample bias may be in place. The results may not be representative of high school students in general, because participants in MedQUEST have a preexisting interest in health occupations and many already view medicine as a possible career option. The program's prerequisite of good academic standing may introduce socioeconomic advantage as a confounding factor, because students from lower income brackets tend to exhibit lower academic achievements.[17] Therefore, barriers that may prevent students from applying to medical school may also prevent them from attending the MedQUEST program.

Respondents to our study were not representative of the general population. Based on data from the 2006 census report, 26.0% of the age-matched (35–64 yr) population in Canada had an education consisting of at least an undergraduate university degree compared with 77.4% of parents of our study's participants.[26] Students enrolled in MedQUEST were more likely to come from families with higher levels of education and health-related occupations. Interestingly, this is a similar skew to what is seen in medical school classes,[1] which may indicate that a self-selection process of students who view medical school as an option could begin at an even earlier age than high school.

An additional limitation is the need for more accurate proxies of socioeconomic status. A large income range may exist even within subsets based on education and type of career.

CONCLUSION AND FUTURE DIRECTION

There are many factors that may affect perceptions of medical education among high school students. We have shown that students' perceptions about their ability to pursue a career in medicine begin at least as early as the 11th and 12th grades, and perhaps earlier. Education and occupation of parents played important roles in influencing these students' views of the availability of a career in medicine. These findings are relevant to future endeavours that work to ensure access to care in rural and underserviced communities (such as those represented by the MedQUEST locations).

We must identify, and take appropriate steps to alleviate, the barriers that cause students to believe that medical school is out of their reach, financially or otherwise. To define these relations further, future research is required that targets a more representative population of students and collects more accurate data on family income. By identifying impressions regarding medical school in a specific population, this study has laid groundwork for future initiatives to dissipate misconceptions surrounding medical education.

Competing interests: None declared.

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were also more likely to practise in a rural area if older, male and in a relationship with someone who was also interested in living in a rural area. Importantly, an Australian study showed that medical graduates were likely to practise in a rural area if they had a partner with a rural background.[48] These students were also thought to have an appreciation for the rural atmosphere.[48]

b. Elective experiences

Because of the underrepresentation of rural student applicants, medical school programs are currently promoting rural medical practice. This often involves the provision of core and elective rural rotations. The balance between a student's positive and negative rural elective experiences has been repeatedly shown to influence a medical graduate's decision to practise in a rural area (Box 3[9,10,19,37,39,49–56]).

These findings highlight the importance of placing students in rural settings where practices (and practitioners) are closely linked with academic program activities.[57] Although rural elective placements may be more agreeable to students who come from a rural background, the medical school must nevertheless consider aspects beyond the clinical realm.[58]

c. Career aspirations

A longitudinal survey analysis conducted by med-

Box 2. Factors before medical school that affect future rural recruitment and retention

Canada

- Completion of high school in a rural area[38]*
- Decreased proportion of rural students applying to medical school[42,43]†

Australia

- Completion of high school in a rural area[39]*
- Living in a rural community for at least 6 years during childhood[40,41]
- Decreased proportion of rural students applying to medical school[13,44]‡

*Canada and Australia have acted on this factor by having family medicine residents speak to high school students in rural communities in an effort to generate interest among students.[42]
†Students with a rural background are not disadvantaged relative to students with an urban background when applying for entry to medical school. The decreased proportion of rural students applying to medical school is likely because of financial reasons.[45]
‡Some progressive medical schools in Australia are making an effort to narrow the gap between medical school applicants with urban and rural backgrounds by adjusting an applicant's grade 12 entry score requirements to account for the rural student's "context score," which measures the degree of rurality and/or remoteness of the student's upbringing.

Box 3. Positive and negative predictors of graduates practising in a rural area

Positive

- Completion of undergraduate rotations in family medicine[49]
- Completion of family medicine electives in rural regions[49]
- The rural elective was perceived to be a positive experience by the medical student[49]
- Completion of satisfactory electives in rural areas combined with having a personal and family rural background[10,19,39,52,53]
- Exposure to appropriate rural elective terms[54]
- Completion of elective terms in which clinicians acted as good role models[54]
- Gaining an understanding of the needs of people living in rural areas[54]

Negative

- Noting a lack of collegial support among rural general practices[50,51]
- Lack of opportunity to take vacations for personal reasons or continuing medical education[50,51]
- Undesirable on-call arrangements[50,51]
- The misconception that rural practitioners are less qualified than urban specialists[50,51]
- Unsatisfactory rural elective experiences[37]
- Desire for a metropolitan lifestyle[37]
- Having a partner who wants to live and work in a metropolitan environment[37]
- Small rural hospital setting with underdeveloped infrastructure[9,55]
- Elective experiences in which clinicians were reluctant to allow students to partake in procedural work[9,55]
- Inadequate accommodation facilities[9,55]
- Few social and recreational activities to enjoy[56]
- Perceived difficulty in being accepted by the local community[56]
- Remaining located far from family and friends over an extended period[56]

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