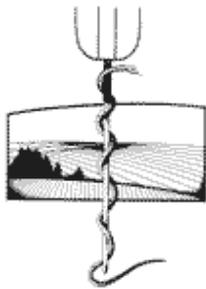
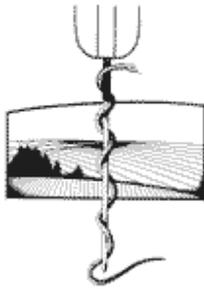


Admission of Rural Origin Students to Medical School:
RECOMMENDED STRATEGIES

MAY, 2004



SOCIETY OF RURAL PHYSICIANS OF CANADA
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Society of Rural Physicians of Canada
Société de la médecine rurale du Canada
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***About the
Society of Rural
Physicians of
Canada***

The Society of Rural Physicians of Canada (SRPC) is the national voice of Canadian rural physicians. Founded in 1992, the SRPC's mission is to provide leadership for rural physicians and to promote sustainable conditions and equitable health care for rural communities.

On behalf of its members and the Canadian public, SRPC performs a wide variety of functions, such as developing and advocating health delivery mechanisms, supporting rural doctors and communities in crisis, promoting and delivering continuing rural medical education, encouraging and facilitating research into rural health issues, and fostering communication among rural physicians and other groups with an interest in rural health care.

The SRPC is a voluntary professional organization representing over 1,900 of Canada's rural physicians and comprising 5 regional divisions spanning the country.

“Nous soignons les régions- We care for the country”

Admission of Rural Origin Students to Medical School: Recommended Strategies

Society of Rural Physicians of Canada Policy Paper
[Approved by SRPC Council - April 2004]

See also Summary Article for: CMAJ 2005; 172(1): 4-7
"Strategies to Increase Enrolment of Students of Rural Origin in Medical
School"

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Executive Summary

This report presents education, funding and admissions process recommended strategies to increase the number of rural origin students in Canadian medical schools.

Goal:

A fair and equitable number of rural origin students admitted to Canadian medical schools

Rationale:

Canada has a serious shortage of rural doctors that has a direct impact on the difficult task of providing health care to rural Canadians. The two most important factors associated with a physician's choice of rural practice location are rural background and rural medical training. In Canada, however, compared with their urban counterparts, very few rural origin students get admitted to medical school. Increasing the number of rural origin medical students needs to be an important component of Canada's strategy to increase the number of rural doctors to provide a fair and equitable distribution of the medical workforce throughout Canada.

Context:

1. Rural health care is difficult to provide
2. Shortage of rural doctors in Canada
3. Rural origin students more likely to choose rural practice than urban background students
4. Rural origin students severely under-represented in medical school in Canada
5. Rural origin students are educationally disadvantaged
 - a. Lower parental education status and lower community education status
 - b. Less academic and extracurricular opportunities
 - c. Distance and cost access disadvantage for attending university
6. Rural origin students are economically disadvantaged
 - a. Lower parental incomes
 - b. Higher debt load on entry to medical school
7. Rural origin students face admissions process disadvantage
 - a. Most medical school admission committees have no rural members
 - b. Most medical schools do not have a policy or strategy for rural admissions
8. Positive change is possible. The number of rural origin students in Australia increased from 10% in 1989 to 25% in 2000 as a result of policy and funding changes.

Recommended Strategies

1. EDUCATION INITIATIVES

Objectives:

To increase the number of rural high school graduates who go on to university programs with an interest in medicine as a possible career

To increase the number of rural-origin university students who are interested in a career in medicine and able to meet the entrance requirements to medical school

Recommended Strategies:

1.1. Rural High School Education

- 1.1.1.** University-high school outreach program to students and guidance counselors involving medical students and local physicians
- 1.1.2.** University-high school in-reach education opportunities for rural students to attend science and health-related summer programs

1.2. University Education

- 1.2.1.** Introduce rural components into Health Sciences courses and programs
- 1.2.2.** Establish pre-med rural student clubs and mentoring system
- 1.2.3.** Establish counseling and support system for rural students
- 1.2.4.** Provide pre-med summer school programs for rural students

2. FUNDING SUPPORT

Objective:

To reduce the financial barriers for rural origin students enrolling and completing medical school

Recommended Strategies:

- 1.1** Fund rural education initiatives
- 1.2** Major scholarships for rural origin students
- 1.3** Medical school tuition relief for rural-origin students
- 1.4** Financial need-based bursaries for medical students

3. ADMISSIONS PROCESS CHANGE

Objective:

To admit a fair and equitable number of rural origin students to medical school

Recommended Strategies:

- 2.1** Rural physicians and rural community members on admission committees
- 3.2** Rural physicians and rural people as interviewers
- 3.3** Ensure rural origin students are not disadvantaged by the admissions process
- 3.4** Rural adjustment factor
- 2.5** Rural targets

Preamble

The Society of Rural Physicians of Canada (SRPC) recognizes the importance of educating doctors for rural practice. Part of this includes ensuring the admission of a fair and equitable number of students of rural origin as they are the most likely to ultimately choose rural practice as a career. In 2002 national data was published that revealed that rural origin students are seriously under-represented in Canadian medical schools.

This prompted the formation of a national task force to address this issue. A large number of physicians volunteered to become involved in the project, such that a core national committee was made, as well as a larger interest group. As well as the input of the committee and the interest group, three focus group sessions have been held: at CFPC Family Medicine Forum 2002 in Montreal in November 2002 that led to the establishment of this group, the SRPC Annual Rural and Remote Conference in Kelowna in April 2003, and the CFPC Family Medicine Forum in Calgary in October, 2003. Over 100 submissions have been received from individuals and groups including the Canadian Federation of Medical Students (CFMS) Executive Committee, the SRPC National Student Committee, and the CFPC Section of Teachers Executive. A survey of Canadian medical school associate deans for admissions was also conducted to determine the current status of rural admission initiatives and strategies.

In presenting these recommendations, the SRPC hopes that policies, strategies, initiatives and funding can be implemented to increase the number of rural origin medical students to a fair and equitable level and thus ultimately result in more students graduating who will choose a career in rural practice.

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Approved April 14, 2004 by the Society of Rural Physicians of Canada Council

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Context and Comments

“Universities [should] work with professional associations, governments and rural communities to determine the barriers that prevent rural students from entering the profession, and take appropriate action to eliminate or reduce these barriers.” (Canadian Medical Association 2000)

“...increasing the number of physicians who grew up in rural areas is not only the most effective way to increase the number of rural physicians, but any policy that does not include this may be unsuccessful.” (Rabinowitz 1999)

1. Rural health care is difficult to provide

Comment: Canada, with 10 million square kilometers, is the second largest country in the world but has a population of only 30 million people. Depending on the definition of rural used, between 21 and 38% of Canadians live in rural areas. (Appendix 1) The geographic realities of time and distance combined with limited or distant specialist and high-tech resources makes providing rural health care a difficult challenge. An adequate number of well trained rural doctors is essential for the provision of accessible quality rural health care.

2. Shortage of rural doctors in Canada

Comment: Canada is facing a shortage of rural doctors, both family physicians and specialists (Romanow2003,Health Canada2004). Using the StatsCanada definition of rural and small town, currently 22% of the population of Canada is rural, and 17% of family doctors and 3% of specialists. The family doctor to population ratio in rural Canada in 2002 was 1:1201 compared to 1:981 for Canada as a whole, or put another way, 1175 rural family doctors are needed to bring the family doctor to population ratio up to the same level as Canada overall. This does not include the needs of rural communities that are within the commuting zone of urban centres. In 2002, only 75 of the 711 family medicine training program graduates from 2000 entered rural practice. (Buske 2003) The developing overall family physician shortage in Canada will only make the situation worse.

3. Rural origin students more likely to choose rural practice and family practice than urban background students

Comment: Studies in Canada and in other countries indicate that rural physicians are up to 5 times more likely than their urban counterparts to have a rural background.(Rourke 2004, Brooks 2003, Laven 2003, Wilkinson 2003, Rabinowitz 2001, Easterbrook 1999, Fryer 1997, Canadian Medical Association 1992, Strasser 1992, Stratton 1991, Rabinowitz 1988, Carter 1987) Recent Canadian studies found that 1/3 of rural physicians came from a rural background. (Rourke in press, Chan submitted)

Canadian clerkship students from a rural background were significantly more likely than their urban-raised peers to indicate they planned to do rural locums and practice in a rural community (Woloschuk 2002). This student cohort was followed into practice and of those completing family medicine residency training, those with rural background were 2.5 times more likely to be engaged in rural practice than their urban-raised peers. (Woloschuk 2004) Upon entry, Canadian medical students from smaller communities are also more likely than those from large urban communities to indicate a preference for family practice as a

career choice. (Scott 2004, Woloschuk 2002, Wright 2004) This is important in the context of the dramatic decline (44% in 1992 to 25% in 2003) in the number of graduating medical students choosing family medicine residencies and Canada's increasing shortage of family physicians (Banner 2004). Rural origin family medicine residents in Ontario were found to be 5 times more likely to indicate their intention to practice in a rural location than their metropolitan counterparts. (Rourke in press, Incitti 2004)

Although rural background has the most powerful impact on eventual rural practice, because most medical students are from an urban background, a significant portion of rural doctors do and will need to come from an urban background. Longer rural medicine learning experiences in medical school and postgraduate family medicine training are associated with significantly greater numbers of residents indicating rural practice as a career choice and both rural and urban origin doctors in rural practice. (Incitti 2004, Rourke in press) "Rural educational experiences during training have a significantly stronger influence on urban-raised physicians than rural-raised physicians." (Chan submitted) More detailed discussion of Canadian medical education for rural practice can be found in "Postgraduate education for rural family practice: Vision and recommendations for the new millennium", a report by the CFPC Working Group on Postgraduate Education for Rural Family Practice (Working Group on Postgraduate Education 1999) which was endorsed by SRPC and CFPC, as well as subsequent journal articles.

This monograph will focus on admission and preadmission initiatives related to rural origin medical students.

4. Rural origin students severely under-represented in medical school in Canada

Comment: Rural origin students are under-represented in medical schools in Canada. Nationally, only 10.8% of the medical students lived in rural areas at high school graduation as compared to 22.4% of the population. (Dhalla 2002) In the 2003 survey of medical school admission associate deans for this task force, no Canadian medical school reported has as high a percentage of rural origin medical students as the provincial rural population. National data on applicants including grade point averages and offers is not available, but Ontario data suggests that fewer rural students than their urban counterparts apply to medical school and even those who do apply, with similar grade point averages and MCAT scores to their urban counterparts, fewer rural students are accepted. (Hutten-Czapski in press)

5. Rural origin students are educationally disadvantaged

a. Lower parental education status and lower community education status

Comment: Dhalla (Dhalla 2002) found that medical students were most likely to have parents who were more highly educated, and particularly parents who were doctors. This is a significant factor for rural students as people living in rural communities have much lower education status than their urban counterparts. (Appendix 1) This can result in less parental and community role models and encouragement and even acceptance of higher education including medical school.

b. Less academic and extracurricular opportunities

Comment: Many rural high schools can provide neither the breadth nor depth of academic programs or enrichment activities that are available to urban high school students. In particular, the opportunity to participate at a provincial or national level is often significantly less for rural students. This is not only a direct educational disadvantage, but can also be a disadvantage when a rural student's CV is comparatively assessed without a rural appreciation. Rurality also presents a technology disadvantage: "Rural individuals...within each age class...within each income class...within each educational attainment class, are less likely to own a computer or to be connected to the Internet." (Appendix 1)

c. Distance and cost access disadvantage for attending university

Comment: Rural students do not have the option of attending university in their home town, but by necessity have to travel away from home to attend university. This is another factor that contributes to the smaller number of rural origin students attending university than their urban counterparts. (Appendix 1) This geographic barrier is extreme for Canada's most isolated rural people such as those in Nunavut, the Northwest Territories, the Yukon, and remote parts of many provinces. This includes many Aboriginal Canadians who face additional language and cultural barriers.

6. Rural origin students are economically disadvantaged

- a. Lower parental incomes**
- b. Higher debt load on entry to medical school**

Comment: Medical students are more likely to come from families with high incomes. (Dhalla 2002) Rural families are significantly poorer than their urban counterparts (Appendix 1) and the high cost of medical education is a higher perceived and real barrier for more rural students than their urban counterparts. Rural students don't have the option of getting an undergraduate degree in their home town. This results in additional costs for accommodation and other living expenses that are not necessary for urban students who are able to get their undergraduate degree in their home city. Rural students in medical school have a higher debt load and increased financial anxiety compared to their urban counterparts.

7. Rural origin students face admissions process disadvantage

Comment: The medical school admission process may be unintentionally biased and difficult for rural medical students. (See comments under 4.)

- a. Most medical school admission committees are composed of entirely urban members**

Comment: In the 2003 survey, of Canadian medical school admission associate deans, only 3 indicated they had a rural physician on their schools admission committee. It is difficult to develop policies that take the rural admission issues into account if there is not rural representation on the admission committee. Similarly, the heavy preponderance of urban interviewers at most medical schools may result in an unintentional urban selection bias as it may be that "medical school admission committee members tend to give high ratings to those students whose backgrounds, values and orientation are similar to their own" (Urbina C 1994)

- b. Most medical schools do not have a policy or strategy for rural admissions**

Comment: In the 2003 survey, of Canadian medical school admission associate deans, only 3 indicated their schools had a specific policy or strategy for admission of rural origin students. Given Canada's continuing worsening shortage of rural physicians, this reflects an unfortunate lack of attention to the lack of equity in numbers of rural background students being admitted to medical school as well as a lack of attention to issues that can directly impact on career choice relevant to the needs of society. Moreover, the trend to higher and higher GPAs, MCAT scores and rapidly rising tuition fees may put admission to medical school beyond the reach of all but a very few Canadian rural origin students.

8. Positive change is possible

- a. **The number of rural origin students in Australia increased from 10% in 1989 to 25% in 2000 as a result of policy changes and funding support**

Comment: This change in Australia has come about from a whole series of initiatives including bursaries, scholarships and admission policy changes including new reserved rural origin spots. (Dunbabin 2003)

In the United States, "more than 60% of responding medical schools offered extra consideration at some point in the admissions process to candidates likely to enter primary care and rural applicants were frequently listed as one of these groups." Moreover, at one representative medical school there would be a "marked reduction [to less than half] in the proportion of rural applicants offered admission interviews if additional consideration and score adjustment were not applied." (Basco 2002)

Recommended Strategies and Rationale

Medical schools will need to take the lead and work with universities, governments and other stakeholders to develop, coordinate, and support programs to achieve the goal: **A fair and equitable number of rural origin students admitted to Canadian medical schools”.**

1. EDUCATION INITIATIVES

Objectives:

To increase the number of rural high school graduates who go on to university programs with an interest in medicine as a possible career

To increase the number of rural-origin university students who are interested in a career in medicine and able to meet the entrance requirements to medical school

Recommended Strategies:

1.1. Rural High School Education

1.1.1. University-high school outreach program to students and guidance counsellors involving medical students and local physicians

Rationale: Local physicians can be powerful mentors and role models to encourage rural students to go on to higher education including medical school. More medical schools are sending medical students to rural communities for parts of their education. Medical students can share their stories of why they chose medicine, the steps they took to get into medical school and answer questions from the perspective of someone not that much older. Medical students can be particularly powerful role models in their home communities, giving other students something tangible to aspire to. The Canadian Federation of Medical Students’ Outreach Program (CROP) is an excellent student-led initiative that needs more medical school support to be sustainable and more successful.

1.1.2. University-high school education opportunities for rural students to attend science and health-related summer programs

Rationale: Rural high school students often lack the opportunities to access the enrichment activities that can turn on students to a career in science and health. A few medical schools and the larger university science faculties have taken a leadership role in providing exciting summer enrichment activities, particularly for rural high school students.

1.2. University Education

1.2.1. Introduce rural components into Health Sciences courses and programs

Rationale: An increasing number of students are enrolling in health sciences programs at universities in Canada often as their premed degree. Some universities have successfully introduced rural components into their programs and courses that not only include the rural health context, but provide opportunities for students to do rural-related projects that may include rural community involvement. This highlights rural health as an important issue and generates student academic interest and involvement.

1.2.2. Establish pre-med rural student clubs and mentoring system

Rationale: Student interest, when shared and supported by mentors, can be infectious and become a very positive factor in increasing student interest and applications.

1.2.3 Establish counseling and support system for rural students

Rationale: This is particularly important for some rural students as rural students do not have the option, as urban students do, of attending university in their own home town, and for some the transition from rural to urban and the distance away from their usual family and support structures can be very challenging. In addition, course and career counseling can be particularly important in helping with the bewildering choices they face, often combined with a lack of adequate counseling from their own rural high schools.

1.1.4 Provide "Premed" summer school programs for rural students

Rationale: A variety of summer programs could be set up for rural origin university students who have an interest in medicine as a career. This could be as short as an overview weekend or a month or more that could include experiential learning. Students would learn about the complicated but doable journey to become doctors - from premed preparation and admissions process to the medical school experience and costs, to residency training, licensure and practice.

1.1.5 Provide medical school application preparation assistance

Rationale: Providing information and help sessions on medical school applications, MCATs and interview skills could help rural medical school applicants.

2. FUNDING SUPPORT

Objective:

To reduce the financial barriers for rural origin students enrolling and completing medical school

Recommended Strategies:

2.1 Fund rural education initiatives

Rationale: The recommendations listed under “Education Initiatives” will need specific funding in order to be successfully implemented. In addition to program development and implementation costs, funding should be provided to reduce the travel and accommodation and other cost barriers for rural students to attend.

2.2 Major scholarships for rural origin students

Rationale: A major increase in scholarships for rural origin students is needed to offset the perception and reality for many rural students that medical school is just too expensive. This will require a significant funding commitment by government similar to that in Australia. (Dunbabin 2003) In addition, community and private donors can play an important role in supporting students from their own areas who pursue higher education, including medical school.

2.3 Medical school tuition relief for rural-origin students

Rationale: Appropriately funded and timed return of service agreements could both benefit rural origin students and encourage rural practice. Unfortunately, some of the tuition relief programs so far demand a commitment to a return-of-service that is difficult for students to make early in medical school before they’ve had the opportunity to see the full variety of career possibilities. Return of service agreements have not been highly rated by residents or practising doctors (Rourke 2003) possibly because the relatively large return required for small amount of financial support and the requirement to commit to a career choice too early in the medical education cycle.

2.4 Financial need-based bursaries for medical students

Rationale: Financial need-based bursaries at medical schools are important overall and could be particularly important for many rural-origin students as rural family income in Canada is significantly lower than urban family income. In addition, costs are higher for rural origin students who do not have the opportunity of living at home while attending medical school in their home community.

3. ADMISSIONS PROCESS CHANGES

Objective: To admit a fair and equitable number of rural origin students to medical school

Recommended Strategies:

2.1 Rural physicians and rural community members on admission committees

Rationale: Every medical school in Canada serves a large population which includes rural communities. This should necessitate the inclusion of rural physicians and community members to help shape the admissions policy and process.

3.2 Rural physicians and rural people as interviewers

Rationale: There is an increasing positive trend of admissions interviewers reflecting community diversity. This should be extended to include a fair number of rural physicians and rural community

members as part of the admissions examiners. This may require some compensation to reduce the travel and accommodation cost barriers.

3.3 Ensure rural origin students are not disadvantaged by the admissions process

Rationale: All admission committees should apply a “rural lens” to the admissions process. This should include examining what is looked for at every stage: screening, scoring, essay questions and interviews to ensure there are no unintentional barriers to rural origin students. In fact, “rural” could be regarded as one of the positive or desirable candidate attributes to be considered in the selection process.

2.4 Rural adjustment factor

Rationale: A rural bonus or adjustment factor should be used to offset rural student education and other disadvantages and help correct the under-representation of rural origin students in Canadian medical schools. Medical schools that use grade point averages and MCAT cut-offs to narrow the applicant pool may need to apply a rural bonus or adjustment factor to grade point averages and MCATS. This could ensure a fair and equitable number of rural candidates are included in the groups that go on to further assessment steps, including the interview phase. Grade point and MCAT adjustments and other bonuses are already used successfully by a number of Canadian medical schools for special groups of applicants. One province (Quebec) has instituted a rural bonus based on location of high school attended. In one Quebec medical school for example, 7 additional rural students were offered a position in September 2003 due to the rural bonus, and 4 of them chose that school. (Frenette J) Similar policies could be implemented by medical schools or provinces across Canada. It may be best to focus on where the candidate lived during their adolescent or high school years as these are the most important formative years. (See Appendix 1) Bonuses or adjustments should be temporary measures while inequities are being addressed.

2.5 Rural targets

Rationale: The regional, provincial and national rural population and the need for rural physicians presents a compelling national and provincial interest for setting fair and equitable targets for admission of rural origin students to Canadian medical schools. In other countries, increased funding and increased medical school class size has been tied by governments to rural origin student support and admissions. In Canada, medical school social responsibility values of fairness and equity combined with the need for more rural doctors should lead to implementation of strategies to increase admission of rural origin students to Canada’s medical schools. Broader educational initiatives at high school and university as well as government and foundation funding for rural scholarships and bursaries will also be needed to reach the target of a fair and equitable number of rural origin medical students.

Appendix 1

Statistics Canada and Other Data

A) Definition of Rural

Du Plessis, V., Beshiri, R., Bollman, D., Clemenson, H. "Definitions of Rural", Rural and Small Town Canada Analysis Bulletin series Vol. 3, No. 3 (November 2001). Statistics Canada Catalogue no. 21-006-XIE

Statistics Canada provides 6 definitions of rural which include from 22.1% to 38.2% of Canadians as rural (1996 census).

Statistics Canada comments:

If we were to recommend one definition as a starting point or benchmark for understanding Canada's rural population, it would be the **rural and small town** definition. This is the population living in towns and municipalities outside the commuting zone of larger urban centres (i.e. outside the commuting zone of centres with population of 10,000 or more).

By that definition 6,169,008 or 21% are rural (2001 Census). See **Table 1** for provincial breakdown and **Table 2** for demographic information. Note that this Statistics Canada definition includes the smallest percentage of Canadians as rural because it excludes people living rural communities within the commuting zone of larger urban centres. See also Rourke (1997), Leduc (1997), and Pong (2001).

B) Definitions of Rural Origin

As with rural, there are many ways to define rural origin or rural background students. (Pong, Rourke) These vary from where one was born to parent's mailing address. Some universities use the "permanent" address given as a proxy. This is prone to misuse and misinterpretation. **It may be best to focus on where the candidate lived during their adolescent or high school years as these are the most important formative years.**

Dhalla et al (2002) defined rural origin as "lived in a rural area at high school graduation".

The Ontario Medical School Application Service (OMSAS) 2002 definition was "Adolescent years spent in communities less than 10,000."

Rourke et al (in press) defined rural origin as students who "lived in a rural area during their high school years".

Easterbrook et al (1999) defined rural as "any community with a population less than 10,000". Hometown was defined as "the community in which the physician spent the greater part of his or her childhood".

Note: All of these definitions have a larger base than the Statistics Canada "Rural and Small Town Canada" rural definition. For example, using communities <10,000, approximately 30% of Canadians are rural. (Statistics Canada 1997)

Although it is more restrictive, the Rural and Small Town (RST) definition is very useful as it only includes rural Canadians who are outside of the commuting zone of larger urban centres. This ties in with the finding that considerably fewer students from outside of the commuting distance to universities actually go to university.

C) Rural Demographic Factors:

i. University Education Gap

Frenette, Marc (2002). Too far to go on? Distance to school and university participation. Statistics Canada, Analytical Studies Research Paper Series, 11F0019MIE2002191. Catalogue no. 11F0019MIE-No. 191.

Rural Canadians are poorer and less well educated than their urban counterparts (**Table 2**). In addition, distance adds a further disadvantage.

After controlling for family income, parental education, and other factors associated with university participation, students who live more than 80 km from a university are only 58% as likely to attend university as students who live within 40 km from a university. (**Table 3A**) In general, university participation is greater among students from upper income families, students with at least one parent with a university degree, and females; however, the extent to which these students have an advantage in university participation is highly dependent on distance to school. (**Tables 3B, 3C**) After controlling for income, students with a university-educated parent are just as deterred by distance as students without a university-educated parent are.

For Canada as a whole, 20% of Canadian students live out-of-commuting distance (80km or more).

The university participation gap between students living within and out-of-commuting distance is considerably larger than the participation gap that exists between urban and rural dwelling students (20% of urban dwelling students attend, while 17% of rural dwelling students attend). The difference is largely explained by the fact that many students in small urban areas are not served by a university at all...while some students in rural areas are actually close to a university.

In summary, rural Canadian students are significantly disadvantaged when it comes to 3 important measurable factors associated with university attendance: economic, parental education, and distance. These disadvantages can be enormous barriers to medical school entry and are reflected in the much smaller proportion of rural students compared with urban students who do get into medical school.

ii. Internet Technology Gap

Singh, V. (2004) "Factors associated with household internet use". Rural and Small Town Bulletin series, Vol. 5, No. 1, Statistics Canada Catalogue No. 21-006-XIE and website: <http://www.statcan.ca/english/freepub/21-006-XIE/21-006-XIE2003001.pdf> (accessed 2004 December 23)

"Living in rural parts of Canada itself appears to be an independent constraint on household Internet use, according to a new study." "New developments in ICT, such as the growth of Internet use, has been portrayed as an innovative medium of information that provides new opportunities to Canadians in rural and remote areas. However, recent studies have shown that fewer rural Canadians were using the Internet compared to urban Canadians. Our research indicates that although factors such as an older population with lower educational attainment and lower income tend to constrain Internet use by rural Canadians, *rurality* appears to be an independent constraint on Internet use.

This new study, the first to hold these three factors constant, found that the concept of "rurality" itself was an independent constraint on Internet use. In other words, (young) age, (high) income and (high) education did not overcome the negative influence of living outside (the 15 most populous) urban

centres....Overall, Internet use was higher among higher income households and those with higher levels of educational attainment. However, living outside these urban centres reduced the use of the Internet within each income and education group, even among higher income households and those with higher levels of education."

See also McLaren, L. "Information and communication technologies in rural Canada". Rural and Small Town Bulletin series, Vol. 3, No. 5, Statistics Canada Catalogue No. 21-006-XIE and website: <http://www.statcan.ca/english/freepub/21-006-XIE/21-006-XIE01005.pdf> (accessed 2004 December 23)

"Rurality matters when considering computer ownership and Internet connectivity."
 "...within each age class...within each income class...within each educational attainment class, rural individuals are less likely to own a computer or to be connected to the Internet."

Table 1

Province	Total Population (2001)	Rural and Small Town (2001)	Rural & Small Town As % of Province (2001)	Rural & Small Town As % of Canadian RST Total (2001)
Newfoundland & Labrador	512,930	306,924	59.8	5.0
Prince Edward Island	135,294	60,736	44.9	1.0
Nova Scotia	908,007	333,311	36.7	5.4
New Brunswick	729,498	348,329	47.7	5.6
Québec	7,237,479	1,555,026	21.5	25.2
Ontario	11,410,046	1,484,097	13.0	24.1
Manitoba	1,119,583	373,399	33.4	6.1
Saskatchewan	978,933	413,711	42.3	6.7
Alberta	2,974,807	730,471	24.6	11.8
British Columbia	3,907,738	538,703	13.8	8.7
Yukon	28,674	7,269	25.4	0.1
Northwest Territories	37,360	20,819	55.7	0.3
Nunavut	26,745	26,745	100.0	0.4
CANADA	30,007,094	6,168,008	20.6	100.0

Statistics Canada. 2001 Census of Population (www.statcan.ca)

Specifically, Rural and Small Town (RST) refers to the non-CMA/CA population, where a CMA is a census metropolitan area and a CA is a census agglomeration. A CMA has an urban core population of 100,000 and over, a CA has an urban core population of 10,000 to 99,999. CMAs and CAs include all neighbouring municipalities where 50 percent or more of the workforce commutes to the urban core.

Of note, half of all rural Canadians live in Quebec and Ontario (25.2% and 24.1% respectively), even though most people in Quebec, Ontario, and British Columbia are urban.

Table 2

List of Indicators (1996)	Rural & Small Town	Canada Total
Average Income of economic families (dollars)	47,002	55,986
Percent of Persons, ages 25-54, with some post-secondary education	51.1	61.8

Data Source: Du Plessis, V., Beshiri, R., Bollman, DI, Clemenson, H. Rural and Small Town Canada Analysis Bulletin, Vol. 3, No. 3, Statistics Canada Catalogue no. 21-006-XIE. Appendix Table A2. Indicator levels by definition of "rural" for Canada's private household population, 1996.

Note: Of those with "some post-secondary education", rural people were much less likely to have completed a university degree.

Table 3A University and non-University Post-secondary Participation by Distance to Nearest University †

Distance	University	Non-University Post-secondary
0-40km	22.7	20.5
-80km	15.4	28.6
80 km +	11.1	28.2
Urban	19.7	22.6
Rural	16.8	27.5

Table 3B University Participation by Income Tier and Distance to School †

Income Tier	% Attending	Distance	Proportion
Top	26.7	0-40 km	31.4
		40-80 km	17.6
		80 km +	18.4
Middle	18.0	0-40 km	20.4
		40-80 km	18.4
		80 km +	10.4
Bottom	9.4	0-40 km	12.2
		40-80 km	*5.0
		80 km +	*3.1

*Estimate should be viewed with caution due to small numbers.

Table 3C

University Participation by Parental Education and Distance to School †

Parent with a Degree	% Attending	Distance	Proportion Attending
Yes	39.2	0-40 km	43.2
		40-80 km	31.0*
		80 km +	25.8*
No	15.5	0-40 km	18.2
		40-80 km	12.9
		80 km +	9.4

*Estimate should be viewed with caution due to small numbers.

† **Data Source:** Frenette, Marc (2002). Too far to go on?: Distance to school and university participation. Statistics Canada, Analytical Studies Research Paper Series, 11F0019MIE2002191. Catalogue no. 11F0019MIE – No. 191.

Select References

- Banner, S. (2004) Canadian Residency Matching Service (CaRMS):PGY-1 2003. **Match Report**. Available: www.carms.ca/stats/pgy-1_2003/page10_table9.htm (accessed 2004 July 19).
- Basco, W.T., Jr., Gilbert, G.E., Blue, A.V. (2002) Determining the consequences for rural applicants when additional consideration is discontinued in a medical school admission process. **Academic Medicine**, 77, pp. S20-S22.
- Basco, W.T., Jr., Gilbert, G.E., Chessman, A.W., Blue, A.V. (2000) The ability of a medical school admission process to predict clinical performance and patients' satisfaction. **Academic Medicine**, 75, pp. 743-746.
- Boulger, J.G. (1991) Family medicine education and rural health: a response to present and future needs. **Journal of Rural Health**, 7, pp. 105-115.
- Bowman, R.C. (2003) Origins and locations of recent family medicine residency graduates. <http://www.ruralmedicaleducation.org/origins.htm> (accessed 2004 December 23)
- Brooks, R.G., Mardon, R., Clawson, A. (2003) The rural physician workforce in Florida: a survey of US- and foreign-born primary care physicians. **Journal of Rural Health**, 19(4), p. 484-491.
- Brazeau, N. (1990) The Upper Peninsula Program: a successful model for increasing primary care physicians in rural areas. *Family Medicine*, 22, pp. 350-555.
- Buckley, M.R., Norris, A.C., Wiese, D.S. (2000) A brief history of the selection interview: may the next 100 years be more fruitful. **Journal of Management History**, 6, pp. 113-129.
- Buske, L. [2003] Personal communication – CMA physicians data bank.
- Canadian Medical Association. (2000) CMA policy: Rural and remote practice issues. **CMAJ**, 163(8), pp. 1047-1050.
- Canadian Medical Association: Report of the Advisory Panel on the Provision of Medical Services in Underserved Regions. CMA, Ottawa. 1992.
- Carter, R.G. (1987) The relation between personal characteristics of physicians and practice location in Manitoba. **Canadian Medical Association Journal** 136, pp. 366-368.
- Chan, B.T.B, Degani, N., Crichton, T., Pong, R.W., Rourke, J., Goertzen, J., . McCready, B. [Submitted for peer review] Factors influencing family physicians with rural and urban backgrounds into rural practice.
- Cohen, J.J. Our compact with tomorrow's doctors. AAMC President's address – Facing the future. <http://www.aamc.org/newsroom/pressrel/2001/011104a.htm> (accessed 2004 December 23)
- Coulehan, J., Williams, P.C. (2001) Vanquishing virtue: the impact of medical education. **Academic Medicine** 76(6), pp. 598-605.
- Curran, V., Rourke, J. (2004) The role of medical education in the recruitment and retention of rural physicians. **Medical Education**, in press.
- Dhalla, I.A., et al. (2002) Characteristics of first-year students in Canadian medical schools. **Canadian Medical Association Journal**, 166, pp. 1029-1035.

- du Plessis, V., Beshiri, R., Bollman, D., Clemenson, H. (2001) Definitions of rural. **Rural and Small Town Canada Analysis Bulletin**, 3(3). Statistics Canada Catalogue no. 21-006-XIE.
- du Plessis, V., Beshiri, R., Bollman, D., Clemenson, H. (2002). Definitions of "rural". **Agriculture and Rural Working Paper series**. Working paper no. 61. Catalogue no. 21-601-MIE – no. 061.
- Dunbabin, J., Levitt, L. (2003) Rural origin and rural medical exposure: their impact on the rural and remote medical workforce in Australia. **Rural and Remote Health** 25 June. <http://rrh.deakin.edu.au> (accessed 2004 December 23)
- Durey, A., McNamara, B., Larson, A. (2003) Towards a health career for rural and remote students: cultural and structural barriers influencing choices. **Australian Journal of Rural Health**, 11, pp. 145-150.
- Durkin, S.R., Bascomb, A., Turnbull, D., Marley, J. Rural origin medical students: how do they cope with the medical school environment? (2003) **Australian Journal of Rural Health**, 11, pp.89-95.
- Easterbrook, M. et al. (1999) Rural background and clinical rotations during medical training: effect on practice location, **Canadian Medical Association Journal**, 160, pp. 1159-1163.
- Ferguson, E., James, D., Madeley, L. (2002) Factors associated with success in medical school: systematic review of the literature. **BMJ**, 324, pp. 952-957.
- Ferguson, E., James, D., O'Hehir, F., Sanders, A. (2003) Pilot study of the roles of personality, references, and personal statements in relation to performance over the five years of a medical degree. **BMJ**, 326, pp. 429-431.
- Frenette, J. [2003] Personal communication.
- Frenette, Marc (2002). Too far to go on? Distance to school and university participation. Statistics Canada, Analytical Studies Research Paper Series, 11F0019MIE2002191. Catalogue no. 11F0019MIE-No. 191.
- Fryer, G.E., Jr., Stine, C., Vojir, C., Miller, M. (1997) Predictors and profiles of rural versus urban family practice. **Family Medicine**, 29(2), pp. 115-118.
- Gilbert, G.E., Basco, Jr W.T., Blue, A.V., O'Sullivan, P.S. (2002) Predictive validity of the medical college admissions test writing sample for the United States Medical Licensing Examination Steps 1 and 2. **Advances in Health Sciences Education**, 7, pp. 191-200.
- Gilbert, G.E., Blue, A.V., Basco, W.T., Jr. (2003) The effect of undergraduate GPA selectivity adjustment on pre-interview ranking of rural medical school applicants. **Journal of Rural Health**, 19(2), pp. 101-104.
- Gill, D., Tonks, J. (1996). Paddock to campus: rural high school and medical undergraduate programs in South Australia. **Australian Journal of Rural Health**, 4, pp. 111-116
- Hays, R.B., Bower, A.J. (2001) Modifying academic ranking of rural and remote medical school applicants. **Medical Journal of Australia**, 174, pp. 371-372.
- Health Canada (2004). Health Human Resources: Balancing supply and demand. **Health Policy Research Bulletin**: Issue 8. ISSN 1496-466 X. Available at <http://www.hc-sc.gc.ca/iacb-dgiac/arad-draa/english/rmdd/bulletin/ehuman.html>. (accessed 2004 December 23)

Heaney, S. (2003) Overcoming the 3ms!: Marks – MONEY – MOTIVATION: How can more secondary students from rural and remote areas be encouraged to choose a career in rural and remote health care? http://www.nswrdn.com.au/RDN_Papers/Rural_Origin.pdf (accessed 2004 December 23)

Heath, C., Stoddart, C., Green, H. (2002) Parental background of Otago medical students. The New Zealand Medical Journal, 115(1165) www.nzma.org.nz/journal/115-1165/237/

Hutten-Czapski, P., Pitblado, R., Rourke, J. Who gets into Medical School. Ontario rural-urban comparisons. Canadian Family Physician. (in press)

Hutten-Czapski, P., Thurber, D.A. Who makes Canada's rural doctors? (2002) **Canadian Journal of Rural Medicine**, 7(2), pp. 95-100.

Incitti, F., Rourke, J.T.B., Kennard, M., Rourke, L.L. [Submitted for peer review 2004] Family medicine residents' intent to do rural practice: rural background, gender, and education factors.

Johnson, K.G., Houghton, P.B. (1975). An outreach program for a rural medical school. **Journal of Medical Education**, 50, pp. 38-45.

Kassebaum, D.G., Szenas, P.L. (1993) Rural sources of medical students, and graduates' choice of rural practice. **Academic Medicine** 68(3), pp. 232-236.

Kondo, D.G., Judd, V.E. (2000) Demographic characteristics of US medical school admission committees. **JAMA**, 284, pp. 1111-1113.

Kreiter, C.D., Stansfield, B., James, P.A., Solow, C. (2003) A model for diversity in admissions: a review of issues and methods and an experimental approach. **Teaching and Learning in Medicine**, 15(2), pp. 116-122.

Kulatunga-Moruzi, C., Norman, G.R. (2002) Validity of admissions measures in predicting performance outcomes: the contribution of cognitive and non-cognitive dimensions. **Teaching and Learning in Medicine**, 14, pp. 34-42.

Kulatunga-Moruzi, C., Norman, G.R. (2002) Validity of admission measures in predicting performance outcomes: a comparison of those who were and were not accepted at McMaster. **Teaching and Learning in Medicine**, 14, pp. 43-48.

Kwong, J.C. et al. (2002) Effects of rising tuition fees on medical school class composition and financial outlook. **Canadian Medical Association Journal**; 166, pp. 1023-1028.

Lampert, P.H. (1991) The secret of success. **Minnesota Medicine**, 74, pp. 13-18.

Laven, G.A., Beilby, J.J., Wilkinson, D., McElroy, H.J. (2003) Factors associated with rural practice among Australian-trained general practitioners. **Medical Journal of Australia** 179(2), pp. 75-79.

Leduc, E. (1997) Defining rurality: a General Practice Rurality Index for Canada. **Canadian Journal of Rural Medicine**, 2 pp. 125-131.

Looney, S.W., Blondell, R.D., Gagel, J.R., Pentecost, M.W.J. (1998) Which medical school applicants will become generalists or rural-based physicians? **Journal of the Kentucky Medical Association** 96(5), pp. 189-193.

Magnus, J.H., Tollan, A. (1993) Rural doctor recruitment: does medical education in rural districts recruit doctors to rural areas? **Medical Education**, 27 pp. 250-255.

Marcotte, G. (2003) Personal communication. Permission to use data analysis from Ontario Medical School Application Services (Division of Ontario Universities Application Services).

McLaren, L. (2002) Information and communication technologies in rural Canada. **Rural and small town Canada analysis bulletin** 3(5). Statistics Canada Catalogue no. 21-006-XIE.

Owen, J.A., Hayden, G.F., Connors, A.F. (2002) Can medical school admission committee members predict which applicants will choose primary care careers? **Academic Medicine**, 77, pp. 344-349.

Pong, R.W., Pitblado, J.R. (2001) Don't take "geography" for granted! Some methodological issues in measuring geographic distribution of physicians. **Canadian Journal of Rural Medicine**, 6 pp. 103-112.

Rabinowitz, H.K. (1999) The role of the medical school admission process in the production of generalist physicians. **Academic Medicine**, 74, 1 Suppl., pp. S39-S44.

Rabinowitz, H.K. (1993) Recruitment, retention, and follow up of graduates of a program to increase the number of family physicians in rural and underserved areas. **New England Journal of Medicine**, 328 pp. 934-939.

Rabinowitz, H.K. (1988) Relationship between US medical school admission policy and graduates entering family practice. **Family Practice**, 5(2), pp. 1442-1444.

Rabinowitz, H.K., Diamond, J.J., Hojat, M., Hazelwood, C.E. (1999) Demographic, educational and economic factors related to recruitment and retention of physicians in rural Pennsylvania. **Journal of Rural Health**, 15 pp. 212-128.

Rabinowitz, H.K., Diamond, J.J., Markham, F.W., Paynter, N.P. (2001) Critical factors for designing programs to increase the supply and retention of rural primary care physicians. **JAMA**. 286, pp. 1041-1048.

Romanow, RJ (2003) Commission on the Future of Health Care in Canada. Building on Values: **The Future of Health Care in Canada-Final Report**. November 2002. Catalogue Number CP32-85/2002 E-IN. Available at www.hc-sc.gc.ca/english/care/romanow (accessed 2004 July 22)

Rosenblatt, R.A., et al. (1992) Which medical schools produce rural physicians? **JAMA**, 268, pp. 142-444.

Rourke, J. (2001) Rural practice in Canada. In: Geyman, J.P., Norris, T.E., Hart, L.G., editors. **Textbook of Rural Medicine**. New York: McGraw-Hill, pp. 395-409.

Rourke, J. (1997) In search of a definition of "rural." **Canadian Journal of Rural Medicine**, 2, pp. 113-115.

Rourke, J. (1993) Politics of rural health care: recruitment and retention of physicians. **CMAJ**, 148(8), pp. 1281-1284.

Rourke, J.T.B., Incitti, F., Rourke, L.L., Kennard, M. The relationship between practice location of family physicians in Ontario and rural background and rural medical education. **Canadian Journal of Rural Medicine**, (in press)

Rourke, J.T.B., Incitti, F., Rourke, L.L., Kennard, M. (2003). Keeping family physicians in rural practice: solutions favoured by rural physicians and family medicine residents. **Canadian Family Physician**, 49, pp. 1142-1149.

- Rourke, J., Newbery, P., Topps, D. (2000) Training an adequate number of rural family physicians. (Editorial) **Canadian Family Physician**, 46, pp. 1245-1248.
- Scott, I. [2003]. Presentation at College of Family Physicians of Canada Family Medicine Forum, Calgary and personal communication re study of first year medical students at 3 Canadian medical schools.
- Searle, J., McHarg, J. (2003) Selection for medical school: just pick the right students and the rest is easy! **Medical Education**, 37, pp. 458-463.
- Shortt, S.E.D., Green, M.E., Keresztes, C. (2003) The decline of family practice as a career in Ontario: a discussion paper on interventions to enhance recruitment and retention. Centre for Health Services and Policy Research, Queen's University, Kingston, Ontario.
- Shortt, S.E.D., Green, M.E., Keresztes, C. (2003) Appendix to The decline of family practice as a career in Ontario: a discussion paper on interventions to enhance recruitment and retention. Centre for Health Services and Policy Research, Queen's University, Kingston, Ontario.
- Singh, V. (2004) Factors associated with household Internet use. **Rural and small town Canada Analysis Bulletin**, 5(1). Statistics Canada Catalogue no. 21-0006-XIE. <http://www.statcan.ca/english/freepub/21-006-XIE/21-006-XIE2003001.pdf> (accessed 2004 December 23)
- Statistics Canada. A National Overview. Ottawa: Industry Canada, 1997. 1996 Census of Canada. Catalogue number 93-357XPB. Table 17.)
- Statistics Canada. 2001 Census of Population. www.statscan.ca .
- Strasser, R.P. (1992) Attitudes of Victorian rural GPs to country practice and training. **Australian Family Physician**, 21, pp. 808-812.
- Strasser, R.P. (2001) Training for rural practice: lessons from Australia. **Canadian Family Physician**, 47, pp. 2196-2198.
- Stratton, T.D., Geller, J.M., Ludtke, R.L., Fichenscher, K.M. (1991) Effects of an expanded medical curriculum on the number of graduates practicing in a rural state. **Academic Medicine**, 66, pp.101-105.
- Topps, D., Rourke, J., Newbery, P. (2003) Wanted: trainees for rural practice. **Australian Journal of Rural Health**, 11; pp. 96-98.
- Urbina, C., Hickey, MN., McHarney-Brown, C., Duban, S., Kaufman, A. (1994) Innovative generalist programs: academic health care centers respond to the shortage of generalist physicians. **Journal of General Internal Medicine**, 9(Supplement 1), pp, S81-S89.
- VanSusteren, T.J., et al. (2000) Do interviews really play an important role in the medical school selection decision? **Teaching in Learning in Medicine**, 11, pp. 66-74.
- Ward, A., Kamien, MI, Lopez, D. (2004) Medical career choice and practice location: early factors predicting course completions, career choice and practice locations. **Medical Education**, 38, pp. 239-248.
- Wilkinson, D., Laven, G., Pratt, N., Beilby, J. (2003) Impact of undergraduate and postgraduate rural training, and medical school entry criteria on rural practice among Australian general practitioners: a national study of 2414 doctors. **Medical Education**, 37, pp. 809-814.

Woloschuk, W., Tarrant, M. (2004) Do rural background students engage in rural family practice more so than their urban raised peers? **Medical Education** 38:259-261

Woloschuk, W., Tarrant, M. (2002) Does a rural educational experience influence students' likelihood of rural practice? Impact of student background and gender. **Medical Education**, 36, pp. 241-247.

Working Group on Postgraduate Education, Rourke, J. chair (1999) Postgraduate education for rural family practice: vision and recommendations for the new millennium. **Canadian Family Physician**, 45, pp. 2698-2704.

Wright, B.S., Scott, I., Woloschuk, W., Brenneis F. (2004) Career choice of new medical students at three Canadian universities: family medicine versus specialty medicine. **Canadian Medical Association Journal**;170:1920-1924.