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Recruitment and retention of general practitioners in rural Canada and Australia: a review of the literature

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Introduction: Both Canada and Australia are facing severe shortages of primary health workers, and these shortages are exacerbated in rural and remote communities. This literature review highlights similarities and explores the factors that serve to attract and retain family practitioners in underserved regions of Canada and Australia.
Methods: We used MEDLINE on OvidSP to review the literature between Jan. 1, 2000, and June 30, 2012. We excluded sources if the primary objective did not consider recruitment or retention of general practitioners.
Results: We found a total of 114 sources, 28 of which were excluded, leaving 86 sources for review. We organized results according to 5 life stages of family physicians in rural practice and graded the literature according to the strength of the methodology and the relevance of the findings. We chronologically categorized Canadian and Australian literature that discussed recruitment and retention of family practitioners into rural practice.
Conclusion: Various factors that pertain to each life stage of a family physician have been shown to positively correlate with the eventual decision to commence and remain practising in rural areas. Training programs should be better structured to attract candidates who are more likely to enter rural practice. Policy-makers should be mindful of these findings, because improvements in retention will deliver large financial savings.

Introduction : Le Canada et l'Australie font tous deux face à de graves pénuries de travailleurs en soins de santé primaires, pénuries qui sont exacerbées dans les communautés rurales éloignées. La recension des écrits met en évidence des similitudes et explore les facteurs qui servent à attirer et à fidéliser des médecins de famille dans les régions mal desservies du Canada et de l'Australie.
Méthodes : Nous avons utilisé MEDLINE sur OvidSP pour revoir les documents publiés entre le 1 janvier 2000 et le 30 juin 2012. Nous avons exclu les sources si leur objectif principal ne tenait pas compte du recrutement et du maintien en poste d'omnipraticiens.
Résultats : Nous avons trouvé au total 114 sources et nous en avons exclu 28, ce qui laissait 86 sources à analyser. Nous avons organisé les résultats en fonction de 5 stades de la vie des médecins de famille en milieu rural et nous avons coté les documents en fonction de la force de leur méthodologie et de la pertinence des constatations. Nous avons classé par ordre chronologique les communications canadiennes et australiennes où il était question de recrutement et de maintien en poste de médecins de famille en pratique rurale.
Conclusion : Il y a une association positive démontrée entre divers facteurs liés au stade de la vie des médecins de famille et la décision éventuelle de commencer à pratiquer en région rurale et d'y demeurer. Il faudrait mieux structurer les programmes de formation pour attirer des candidats plus susceptibles de se lancer en pratique rurale. Les stratèges devraient tenir compte de ces constatations parce qu'une meilleure fidélisation des médecins produira d'importantes réductions des dépenses.

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ical school deans across Australia and New Zealand found that most medical graduates gravitate to metropolitan-based hospitals to complete internships, with few students choosing regional centres.[59] Furthermore, the creation of a model led the authors to suggest that medical students are most likely to practise in rural areas if they leave medical school with the following attributes: intentions of becoming a generalist, ample rural elective experiences and bonded scholarship agreement (i.e., the medical student accepts an offer for medical school enrolment in exchange for an undertaking to practise in an underserved region for a designated period). Conversely, the model predicted the opposite if students intended to specialize or if they were financially supported by their parents.

These findings are consistent with those of Veitch and colleagues,[60] who found that students were more likely to complete an internship in a regionally based hospital if they had substantial and meaningful rural elective exposure throughout the entire medical school program. This was even more likely if the student was from a nonmetropolitan area.[60]

A qualitative study revealed that some Canadian students were often interested in family medicine even before the start of undergraduate medical studies.[61] Coming from communities where practitioners were highly regarded and actively involved in community life was thought to be a factor contributing to this finding.

∂. Community-based medical education

Abundant data show the importance of matching medical students to rural placements where they are likely to have a positive experience, irrespective of whether the student is from a rural area. However, equally important is the medical school's clerkship program as a whole and how this may influence a student's decision to practise in a rural area. Many of the rural clinical schools, including Canada's Northern Ontario School of Medicine and Australia's Flinders School of Medicine and James Cook University School of Medicine and Dentistry, all share the same socially accountable mission of providing a medical school curriculum that considers the health needs of the surrounding community.[1,62] In these programs, the final 2 years of clinical education are integrated in the rural/regional setting, as opposed to the traditional model, in which the core rotations of the various specialties are completed in large, metropolitan-based tertiary care centres. These programs are thought to be successful because of their use of facilities based in rural areas, with committed and motivated preceptors, while remaining linked to the academic activities provided by the medical school. Furthermore, these programs ensure that students are placed in communities where they are likely to encounter clinical presentations that match core curriculum learning requirements.[63–65] Similar findings were evident in earlier work that considered the viability of creating integrated clinical medical education opportunities for medical students in South Australia.[66]

3. Experiences during postgraduate training

Canada and Australia differ in the immediate options available for medical graduates entering postgraduate training pathways. Canadian graduates apply directly into a specialty training program and, on entry, immediately begin their specialty training. Australian graduates must first complete a year of internship, in which the doctor is employed as a hospital generalist with no specific specialty. A second year of work as a junior doctor is then required, before he or she can apply for a position in a designated training pathway. Despite these preregistrar training requirements, the data suggest Australian interns may choose regional training experiences if they have been exposed to positive rural experiences and if they were educated in a school committed to serving underserved geographical areas.[19] Hence, what is currently known about the relation between positive rural experience and a graduate's choice to intern in a nonmetropolitan hospital will likely have a positive impact on the recruitment of trainees into generalist programs in rural Australia. Evidence to support this hypothesis comes from a 2003 Australian retrospective cohort study that found bonded medical students who had agreed to complete 2 out of the 3 years of their initial postgraduate training in a rural location were more likely to be practising in a rural location more than 5 years later.[39]

Another notable difference between Canada and Australia is the substantial remuneration paid in the Australian rural generalist training pathway that is not available in Canada.[67] Furthermore, the Australian College of Rural and Remote Medicine has developed a 4-year specialist training pathway toward a fellowship award. As such, trainees may complete their training while working at remote sites through the Remote Vocational Training Scheme.[68,69] Conversely, many Canadian family medicine residency programs offer the standard

INTRODUCTION

Developed nations currently face severe shortages of medical workers and even greater maldistribution of primary health care services between metropolitan and rural regions.[1–3] The World Health Organization (WHO) acknowledges this problem by recommending that institutions train health professionals to address the priority health needs of the surrounding communities.[4,5]

Canada and Australia have similarly low population densities with large geographical areas inhabited by relatively few people outside of urban centres.[6,7] With both countries experiencing physician shortages, rural and remote communities are working hard to retain their current physicians, while creating innovative incentives to actively recruit and retain recently trained doctors.

Recently established undergraduate and postgraduate medical training programs have emphasized provision of health services in rural areas. These programs have generated interest among new family practitioners in providing services to rural and remote regions,[1,8–13] although this interest is relatively recent and resides largely in newer graduates.

The ratio of registered family physicians to population in both countries is similar, with a more favourable ratio seen in metropolitan zones relative to regional and rural areas[6,14–17] (Table 1). There continues to be a large maldistribution of family physicians in rural and remote areas of both countries, whereas urban regions continue to have increased recruitment and retention of medical practitioners in all specialties.[5,18–22] Such trends are expected to reduce the number of Canadian and Australian doctors who serve aging rural populations.[23,24]

Attempts at rectifying these disparities are being made in different settings and manners. For example, various Canadian provincial return-of-service agreements allow family physicians to work anywhere but in urban centres.[25] The Australian remedy was to create the Rural Incentives Program, which offers financial incentives to undergraduate medical students, general practice registrars (i.e., family practice residents) and registered practitioners.[26] Research shows that key issues considered by practitioners when deciding to begin or maintain a rural practice include the availability of collegial support and links to the academic community,[12] the beauty of the rural environment,[27,28] increased demand for procedural work,[29,30] access to primary and secondary educational facilities, access to various social and recreational amenities, the availability of diagnostic and treatment facilities, and public and private remuneration offers.[12,31–36]

In this literature review, we explore the factors that attract and retain family practitioners in rural and remote areas of Canada and Australia and highlight the similarities and differences between the countries. We also examine the rationale and successes of programs and policies, and make recommendations to address shortages of family physicians in rural areas.

Table 1. Ratios of family physicians to population in Canada and Australia, by degree of rurality[16,17]

	No. of physicians per 1000 population	
Census area*	Canada (1993)	Australia (1991)
Metropolitan	2.6	1.8
Regional	1.9	1.1
Rural/small town	0.9	0.9

*Metropolitan area population: > 100 000; regional area population: 10 000–99 999; rural/small town area population: 1–9999.

METHODS

We conducted a literature review of original research and relevant meta-analyses to gain a better understanding of present knowledge about the recruitment and retention of family physicians in rural and remote areas. The definition of "rural and remote" varies, and we did not control for the definition of this concept.

We used MEDLINE on OvidSP to search for relevant publications from Jan. 1, 2000, to June 30, 2012. We used exploding keywords (i.e., terms used to initiate the literature search led to the inclusion of related key words) and the following medical subject headings: general practitioner, GP, doctor, family doctor, family practitioner, rural, remote, health, recruitment, retention, Canada, Australia, workforce and manpower.

RESULTS

We collected and analyzed a total of 114 sources. After further consideration of the inclusion criteria we excluded 28 sources, leaving 86 for analysis (Table 2).

Many of the sources were qualitative studies that examined the thoughts and opinions of key participants by means of one-on-one interviews or focus group discussion. Considerable data have also been collected using quantitative methods, such as questionnaires, to gather participant demographic and statistical information. The vast majority of

work in this field has been cross-sectional, instead of the preferred longitudinal method of analysis. This limitation remains unaddressed.

Determining what factors are important in the recruitment and retention of family physicians in rural and remote regions may be examined using a longitudinal approach.

Previous literature suggests that the analysis should consider all stages in a doctor's experience, including commencement of undergraduate medical school and establishment as a rural practitioner. We examine the 5 stages (Box 1[37]) as follows, with a view to the literature.[37]

1. Life before medical school

Research shows that various factors, including attributes pertaining to life before medical school, increase the likelihood that a medical graduate will decide to work in a rural or remote area. Much of this research was conducted in Canada and Australia (Box 2[13,38–45]).

Whatever the cause, the enrolment pattern of Canadian medical students is of concern, with only 6% of medical students coming from rural regions and about 30% of Canada's population classified as "rural."[46] This discrepancy has been partially addressed in Australia, where in the year 2000, 25% of all medical students country-wide were from a rural area.[39,45] Although this figure is better than Canada's, it does not reflect the fact that 35% of Australia's total population resides in rural areas, again demonstrating ongoing underrepresentation of rural and remote areas.[40]

2. Experiences during medical school

a. Demographics

Research has shown that, regardless of their rural elective experiences, some medical students are more likely than others to choose to practise in rural settings. Whereas many investigations have cited length of time spent living in a rural area before medical school as a strong corollary, Feldman and colleagues[47] found that Canadian medical students

Box 1. Life stages of a family practitioner in rural practice

1. Life before medical school
2. Experiences during medical school
3. Experiences during postgraduate training
4. Recruitment and retention after completion of fellowship qualifications
5. Maintenance action plan: remaining satisfied

Table 2. General inclusion and exclusion criteria

Category	Inclusion criteria	Exclusion criteria (no. excluded)
Type of report	• Systematic reviews • Randomized controlled trials • Cohort studies • Cross-sectional descriptive studies • Single case studies	Anecdotal reports (9)
Themes	• Recruitment and retention • General practitioners • Workforce turnover • Education program description*	• Survey/method implementation • Allied health • Nursing • Social accountability (9)
Location	• Australia • Canada • New Zealand • South Africa • United Kingdom • United States • "Rural and remote"†	Metropolitan‡ (1)
Publication date	Published between Jan. 1, 2000, and June 30, 2012	Published before Jan. 1, 2000, or after June 30, 2012 (9)

*Some sources described the elements of an undergraduate or postgraduate medical education program. These sources were included if the objective of the article was to highlight how education programs were increasing rural and remote recruitment and retention.
†The term "rural and remote" is used by many sources, but not controlled in this study. The distance from urban centres may therefore vary from one source to another.
‡Sources dealing with metropolitan workforces were excluded, unless the article compared this workforce with family practice in rural, remote and regional areas.

2-year training program, with options to complete an extra year of training in a specialty, giving the newly certified family practitioner additional focused training. The options available include obstetrics, anesthetics and emergency medicine.

The lack of a rural generalist training pathway may be one of many factors that explains why Canada has more difficulty with the recruitment and retention of doctors into rural areas. Rourke and colleagues[46] reported that 28% of family medicine training programs in Canada were designated rural, with only 10% of all family medicine doctors practising in rural areas. These figures demonstrate the underrepresentation of rural communities, considering that 30% of Canada's population lives in rural or remote areas.[46]

At present, family medicine residency programs have, for the most part, created streams that permit students to elect whether to complete most of their training in either an urban or rural area. Similar to the Australian model, all Canadian family medicine training programs include a mandatory 2 months of rural service in an attempt to attract residents into rural medicine.[70–72] Unfortunately, the definition of what is deemed rural is left up to individual residency training programs, without any control measures in place. Chan and colleagues[70] surveyed Canadian doctors who had completed postgraduate family medicine training from 1991 to 2000, asking the doctors to state whether they were satisfied with their rural training experience. Median results showed that doctors who were unsatisfied with their level of rural training stated that they would have preferred at least 6 months of rural-based training. Conversely, doctors who were satisfied with their level of rural experience stated that 6 months was adequate exposure to rural medicine.[70]

As is the case with medical students who have had positive experiences with rural electives, it follows that such experiences are more likely to increase recruitment of postgraduate trainees into rural practice, whereas negative experiences will have the opposite effect. Program directors should therefore consider the possibility that postgraduate rural training may not always be a positive experience for all trainees owing to differences in what communities can offer and other factors outside of one's control. Elliott and colleagues[73] explored the thoughts and expectations of Australian postgraduate trainees before and after their placement in a rural setting. The authors concluded that prerotation briefings on the possible negative aspects of rural rotations may increase success at recruiting new doctors to rural medicine, even in the presence of subsequent negative experiences (Box 4).[73]

As reported by Medves and colleagues,[74] the expectations of postgraduate trainees may differ depending on the individual trainee, what he or she is hoping to learn and gain from the rural rotation, and his or her personal circumstances. For example, a trainee who leaves home and a few friends may have a different experience than a trainee who leaves behind 3 children.[74]

Female postgraduate trainees in Australia were surveyed to determine whether they were encouraged to stay in a rural area after they completed rural electives.[75] The researchers found that most of the trainees enjoyed the rural term, but those who did not were likely to remain in urban practice and tended to avoid rural practice (Box 5).

Comparison of data provided by Charles and colleagues[75] relative to that of Elliott and colleagues[73] suggests that one of the most important factors requiring attention to attract postgraduate trainees into rural practice is social isolation. Compensating

Box 4. Expectations before placement and experiences after placement of Australian postgraduate trainees[73]

Expectations before placement

Positive
- Establishing good relationships with rural patients
- Rural lifestyle outside of practice
- Opportunity to work with specific rural supervisors

Negative
- Family issues
- Relocation logistics
- Dealing with emergency and trauma situations without much collegial support
- Lack of supervisor support

Experiences after placement

Positive
- Lifestyle was enjoyable
- Clinical presentations were challenging
- Supervisor level of support
- Social experience

Negative
- Separation from partner and family

Box 5. Positive and negative attributes of rural practice reported by female postgraduate trainees[75]

Positive
- Ability to provide whole-patient and multigenerational care
- Nature of the clinical work is challenging and varied
- There is a sense of connectedness to the patient and the community

Negative
- Pressure to work full-time, a lot of on-call time and after-hours consultations
- Social isolation, away from family and friends

for this issue by attracting the family to the rural town, providing suitable housing and employment for the partner, and ensuring that the children receive quality education are some of the ways in which communities may be able to increase the recruitment of trained family practitioners.[76,77]

4. Recruitment and retention after completion of fellowship qualifications

Investigations have cited many reasons as to why doctors may or may not choose to practise in rural areas (Box 6[78–85]). Much of this work has focused on recruitment efforts in the Australian and Canadian rural primary health care sector, but some work has also been conducted in the United States, the United Kingdom and South Africa, with similar findings reported.[47,56,86]

Poor retention must be addressed to avoid problems inherent in frequent staff turnover if underserved communities continue putting resources into recruiting family practitioners. Although the solution to a retention problem is specific to each individual community and what it has to offer, Rourke and colleagues[85] outlined a set of recommendations that were based on practitioner responses provided in a cross-sectional survey (Table 3). Chauhan and colleagues[34] had similar findings after surveying Canadian rural doctors (Table 4). Interestingly,

Box 6. Positive and negative correlatives associated with the recruitment of doctors into rural practice in Canada and Australia

Canada

Positive
- Positive rural experiences during postgraduate training[18,34,78,85]
- Availability of financial incentives[79–81]
- Partner satisfaction and integration into the rural community[27]
- Access to desirable child care and education facilities[27]

Negative
- Experiencing burnout in rural practice*[34]
- Inability of partner to find employment in the rural community[27]
- Difficulty in achieving a balance between having a professional relationship with the patient and a personal relationship with the community[33]
- Excellent training received in rural areas, but long-term plan always included practising in urban regions because of one's family situation[32,34]

Australia

Positive
- Adequate collegial support[57]
- Desirable on-call arrangements[57]
- Strong professional relationship with academic institutions[57]
- Group practice arrangement with other clinicians (especially important for female physicians)[84]
- Good variety of clinical presentations[82,83]

Negative
- Perceived lack of collegial support[82,83]
- Lack of undergraduate or postgraduate training in rural medicine[82,83]
- Social isolation from family and friends[28]

*A lack of locum coverage was found to place Canadian doctors at risk of burnout because of inability to take a personal holiday or attend sessions for continuing medical education. Despite this, financial incentives that aim to look after the doctor's family (e.g., accommodation, spousal employment and child daycare) may make the doctor more resilient to burnout.

Table 3. Factors favouring retention of family physicians in underserved communities[85]

Solution	Description
Medical education	• Trained rural clinical teachers • Undergraduate medical return-of-service agreements • Increased mandatory and elective postgraduate rural training opportunities • Advanced skills training • Continuing medical education
Rural practice	• Friendly specialist referral network via telephone, fax and Internet • Improvements in information technology with electronic databases of patient records • Access to allied health professionals • Increased remuneration • Improved call shift arrangements

Table 4. Reasons cited by family physicians for remaining in rural practice[34]

Reason	Description
Incentives	• Cash incentives • Tuition repayment • Accommodation • Paid vacations • Assistance with finding spousal employment • Child daycare
Intrinsic value to practising and living in a rural area	• Opportunity to practise full skill set • Community has health needs that match career interests • Enjoyment of the rural lifestyle
Positive rural experiences during postgraduate training	• Very important for younger doctors relative to older doctors
Personal and professional satisfaction	• Recreational activities are abundant and enjoyable • Time away only possible with locum coverage
Improvements in opportunities for continuing medical education and continuing professional development	
Improved hospital infrastructure and availability of services	
Improved earning potential and regular work hours	

many of these recommendations are congruent with several suggestions offered by South African rural doctors,[86] reflecting the commonalities of current intercontinental rural and remote medical workforce issues.

Social relationships are only one of many factors that can influence a practitioner's decision to leave rural and remote practice. Levels of satisfaction among practitioners have been the focus of work conducted by Gardiner and colleagues,[87] wherein questionnaires completed by doctors in South Australia revealed that almost 10% of sampled practitioners had expressed "quite a lot" of distress attributable to being in a rural practice. The vast majority of respondents reported being either "not at all" or "somewhat" distressed.[87]

5. Maintenance action plan: remaining satisfied

The literature suggests that doctors who choose to remain in rural practice are very satisfied with their jobs. A Canadian cross-sectional survey of family practitioners working in small towns, regional areas and metropolitan centres found that those individuals who worked in small towns and rural areas were more satisfied with their practice arrangement relative to metropolitan doctors, despite being busier and having to accept a higher number of patients.[31,88] Australian literature reveals similar results.[89] Box 7[29,30,89–94] highlights the positive and negative factors that have been shown to contribute to a general practitioner's level of satisfaction while in rural practice.

Box 7. Positive and negative factors that contribute to the maintenance of a family practitioner's level of satisfaction

Positive

- Increased breadth of clinical presentations[30,90]
- Increased demand for procedural work[30,90]
- Working in a cohesive and supportive team environment within the rural practice[93]
- A high sense of satisfaction among support staff at the practice[93]
- Increased clinical and managerial autonomy[89,94]
- Appropriate remuneration[89,94]

Negative

- Lack of appreciation for services provided[29]
- Poor relationships encountered with hospital administration and hospital-based clinicians[29]
- Suboptimal remuneration[29]
- Long working hours[29]
- Poor on-call arrangements with other general practitioners in the area[29]
- Inability to find locum coverage when wanting to take a vacation or undertake activities for continuing medical education[91,92]

DISCUSSION

In this literature review we examined research that focused primarily on 5 stages in the professional development of a doctor. Although much of the research originated in Australia or Canada, similarities were found in recruitment and retention factors for family practitioners in underserved areas of countries such as the US, South Africa and the UK. The evidence strongly suggests that doctors are likely to start and continue practising rurally if they have spent a substantial part of their childhood formative years in a rural or remote area. This is an important factor that begs consideration by medical schools and postgraduate training programs working on the WHO recommendation for socially accountable medical education. Additionally, a curriculum that highlights the health needs of underserved communities, combined with enriching and desirable clinical placements at all training levels, positively correlates with rural recruitment and retention of doctors.

Solutions to the disparity between rural and urban services are complex and multifaceted. Moreover, doctors in rural practice become vulnerable to burnout owing to the high workload and low level of collegial support. Although perhaps this service disparity is inevitable, the provision of financial incentives, suitable housing, partner employment arrangements and access to childcare facilities could be effective countermeasures. As communities successfully recruit multiple doctors, the burden on individual health practitioners eases. Thus, better collegial support and after-hours arrangements, with increased opportunity for personal vacation and professional development, can be expected.

One literature review challenged the hypothesis that exposure to rural practice settings increases uptake of family practitioners into rural medical practice throughout the country.[26] These authors cited the variation in what defines "rural" and what constitutes "rural exposure," although they agreed that this limitation cannot be easily addressed.[26]

Limitations

The limitations of the current literature review are common in research about family practitioner recruitment and retention: because of the nature of the field of research, no randomized control trials are available. Qualitative studies collected data by use of interview and/or focus group methodology. Most of the quantitative research used cross-sectional surveys, with very few using a longitudinal approach to data collection.

Therefore, longitudinal and high-quality cohort studies are required to further efforts to increase rural and remote primary health care delivery.

Most of the cited work was completed in either Australia or Canada, with a few sources from South Africa, the UK or the US. Whereas the objective of this review was to highlight the similarities and differences in recruitment and retention of family physicians into underserved regions of Australia and Canada, future work should make a stronger effort to compare other developed nations that have large rural populations.

CONCLUSION

The aging populations of rural and remote areas of Australia and Canada are in greater need of health care services. Strategies designed to increase the recruitment and retention of a general practice workforce into underserved regions of both countries cannot solely take into account the immediate factors that are thought to be important to doctors. Longitudinal efforts should be made at various points in the "making" of a family practitioner, beginning with steps to generate interest in pursuing a medical career among secondary school students through to practice certification and up to time of retirement. Medical education programs and underserved communities can both prosper when these factors are considered. Many opportunities for intervention exist at each stage of developing a doctor.

A direct comparison between the attitudes and behaviours of currently practising Canadian and Australian rural doctors should be made, as this will make more apparent the successes and failures of each country. Future work to look at the success of individual incentive programs is indicated if governments and communities are going to continue allocating resources toward the recruitment and retention of health professionals. Finally, further follow-up of the above highlighted educational programs is warranted to ensure continued refinement of socially accountable policies and initiatives.

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REFERENCES

1. Strasser R, Neusy A-J. Context counts: training health workers in and for rural and remote areas. *Bull World Health Organ* 2010;88:777-82.
2. Joyce C, Wolfe R. Geographic distribution of the Australian primary health workforce in 1996 and 2001. *Aust N Z J Public Health* 2005;29:129-35.
3. Joyce CM, McNeil JJ, Stoelwinder JU. More doctors, but not enough: Australian medical workforce supply 2001–2002. *Med J Aust* 2006; 184:441-6.
4. Boelen C, Woollard B. Social accountability and accreditation: a new frontier for educational institutions. *Med Educ* 2009;43:887-94.
5. Boelen C. Social accountability: medical education's boldest challenge. *MEDICC Rev* 2008;10:52.
6. Australian Bureau of Statistics. Population density. Available: www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2008-09~Main+Features~Main+Features?OpenDocument#PARALINK1 (accessed 2011 July 10).
7. Statistics Canada. Population density, births and deaths for selected countries. 2005. Available: www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo01a-eng.htm (accessed 2011 Mar. 1).
8. Larkins S, Sen Gupta T, Evans R, et al. Addressing inequities in access to primary health care: lessons for the training of health care professionals from a regional medical school. *Aust J Prim Health* 2011;17:362-8.
9. Jones GI, Alford KA, Russell UJ, et al. Removing the roadblocks to medical and health student training in rural hospitals in Victoria. *Aust J Rural Health* 2003;11:218-23.
10. Sen Gupta TK, Murray RB, McDonell A, et al. Rural internships for final year students: clinical experience, education and workforce. *Rural and Remote Health* 2008;8:827.
11. Sen Gupta T. *Going bush — a chance of a lifetime: key factors ensuring the quality of 4- and 8- week rural placements for medical students*. Douglas, Queensland (Australia): General Practice & Rural Medicine, School of Medicine, James Cook University; 2005.
12. Goertzen J. The four-legged kitchen stool: recruitment and retention of rural family physicians. *Can Fam Physician* 2005;51:1181-3.
13. Hays R, Stokes J, Veitch J. A new socially responsible medical school for regional Australia. *Educ Health (Abingdon)* 2003;16:14-21.
14. Australian Institute of Health and Welfare. *Medical labour force 2006*. 2008. Available: www.aihw.gov.au/publication-detail/?id=6442468174&tab=2 (accessed 2011 Aug. 13).
15. Scott's Medical Database. *Supply, distribution and migration of Canadian physicians, 1986–2004. General Practitioners/Family Physicians per 100,000 Population by Province/Territory, 1986–2010*. Available: www.cma.ca/multimedia/CMA/Content_Images/Inside_cma/Statistics/14-FP_per_pop.pdf (accessed 2011 Aug. 11).
16. Statistics Canada. How far to the nearest physician? *Rural and Small Town Canada Analysis Bulletin*;1999;1:1. Available: www.statcan.gc.ca/pub/21-006-x/21-006-x1998005-eng.pdf (accessed 2011 Aug. 11).
17. Australian Bureau of Statistics. *Health services: distribution of general practitioners*. Australian Social Trends, 1994. Available: www.abs.gov.au/ausstats/abs@.nsf/2f762f95845417aeca25706c00834efa/0a85acee2642f292ca2570ec00785dc4!OpenDocument (accessed 2011 July 10).
18. Heng D, Pong RW, Chan BT, et al. Graduates of northern Ontario family medicine residency programs practise where they train. *Can J Rural Med* 2007;12:146-52.
19. Sen Gupta T, Hays RB, Murray RB. Intern choices for James Cook University graduates. *Med J Aust* 2007;187:197.
20. Wilkinson D. Selected demographic, social and work characteristics of the Australian general medical practitioner workforce: comparing capital cities with regional areas. *Aust J Rural Health* 2000;8:327-34.
21. Wilkinson D. Inequitable distribution of general practitioners in Australia: analysis by state and territory using census data. *Aust J Rural Health* 2000;8:87-93.
22. Wakerman J. Innovative rural and remote primary health care

models: What do we know and what are the research priorities? *Aust J Rural Health* 2009;17:21-6.

23. Harrison C, Britt H. General practice: workforce gaps now and in 2020. *Aust Fam Physician* 2011;40:12-5.
24. Curran V, Bornstein S, Jong M, et al. *Rural medical education: a review of the literature, in strengthening the medical workforce in rural Canada: the roles of rural/northern medical education*. St. John's (NL): Memorial University of Newfoundland; 2004.
25. Government of Ontario. HealthForceOntario Postgraduate Return of Service (ROS) Program. 2010. Available: www.health.gov.on.ca/english/providers/program/uap/uap_hfo_ros.html (accessed 2011 Mar. 7).
26. Ranmuthugala G, Humphreys J, Solarsh B, et al. Where is the evidence that rural exposure increases uptake of rural medical practice? *Aust J Rural Health* 2007;15:285-8.
27. Mayo E, Mathews M. Spousal perspectives on factors influencing recruitment and retention of rural family physicians. *Can J Rural Med* 2006;11:271-6.
28. Auer K, Carson D. How can general practitioners establish 'place attachment' in Australia's Northern Territory? Adjustment trumps adaptation. *Rural Remote Health* 2010;10:1476.
29. MacIsaac P, Snowdon T, Thompson R, et al. General practitioners leaving rural practice in Western Victoria. *Aust J Rural Health* 2000; 8:68-72.
30. Robinson M, Slaney GM, Jones GI, et al. GP proceduralists: 'the hidden heart' of rural and regional health in Australia. *Rural Remote Health* 2010;10:1402.
31. Lepnurm R, Dobson R, Backman A, et al. Factors associated with career satisfaction among general practitioners in Canada. *Can J Rural Med* 2007;12:217-30.
32. Lu DJ, Hakes J, Bai M, et al. Rural intentions: factors affecting the career choices of family medicine graduates. *Can Fam Physician* 2008;**54**:1016-7.e5.
33. Miedema B, Hamilton R, Fortin P, et al. The challenges and rewards of rural family practice in New Brunswick, Canada: lessons for retention. *Rural Remote Health* 2009;9:1141.
34. Chauhan TS, Jong M, Buske L. Recruitment trumps retention: results of the 2008/09 CMA Rural Practice. *Can J Rural Med* 2010; 15:101-7.
35. Hays RB, Veitch PC, Cheers B, et al. Why doctors leave rural practice. *Aust J Rural Health* 1997;5:198-203.
36. Gardiner M, Sexton R, Durbridge M, et al. The role of psychological well-being in retaining rural general practitioners. *Aust J Rural Health* 2005;13:149-55.
37. Henry JA, Edwards BJ, Crotty B. Why do medical graduates choose rural careers? *Rural Remote Health* 2009;**9**:1083.
38. Talley RC. Graduate medical education and rural health care (abstract). *Acad Med* 1990;65(Suppl):22-5.
39. Dunbabin, J, Levitt L. Rural origin and rural medical exposure: their impact on the rural and remote medical workforce in Australia. *Rural Remote Health* 2003;**3**:212.
40. McGrail M, Humphreys J, Joyce C. Nature of association between rural background and practice location: a comparison of general practitioners and specialists. *BMC Health Serv Res* 2011;11:63.
41. Laven GA, Beilby JJ, Wilkinson D, et al. Factors associated with rural practice among Australian-trained general practitioners. *Med J Aust* 2003;179:75-9.
42. Bly J. What is medicine? Recruiting high-school students into family medicine. *Can Fam Physician* 2006;52:329-34.
43. Hensel JM, Shandling M, Redelmeier DA. Rural medical students at urban medical schools: Too few and far between? *Open Medicine* 2007;1:e13-7.
44. Hays RB, Bower AJ. Modifying academic ranking of rural and remote medical school applicants. *Med J Aust* 2001;174:371-2.
45. Hutten-Czapski P, Pitblado R, Rourke J. Who gets into medical school? Comparison of students from rural and urban backgrounds. *Can Fam Physician* 2005;51:1240-1.
46. Rourke J, Newbery P, Topps D. Training an adequate number of rural family physicians. *Can Fam Physician* 2000;46:1245-8, 1252-5.
47. Feldman K, Woloschuk W, Gowans M, et al. The difference between medical students interested in rural family medicine versus urban family or specialty medicine. *Can J Rural Med* 2008;13: 73-9.
48. Stagg P, Greenhill J, Worley PS. A new model to understand the career choice and practice location decisions of medical graduates. *Rural Remote Health* 2009;**9**:1245.
49. Barrett FA, Lipsky MS, Lutfiyya MN. The impact of rural teaching experiences on medical students: a critical review. *Acad Med* 2011; 86:259-63.
50. Eley D, Young L, Shrapnel M, et al. Medical students and rural general practitioners: congruent views on the reality of recruitment into rural medicine. *Aust J Rural Health* 2007;15:12-20.
51. Jones GI, DeWitt DE, Cross M. Medical students' perceptions of barriers to training at a rural clinical school. *Rural Remote Health* 2007;7:685.
52. Hsueh W, Wilkinson T, Bills J. What evidence-based undergraduate interventions promote rural health? *N Z Med J* 2004;117:U1117.
53. Strasser RP, Lanphear JH, McCready WG, et al. Canada's new medical school: The Northern Ontario School of Medicine: social accountability through distributed community engaged learning. *Acad Med* 2009;84:1459-64.
54. Couper ID, Hugo JF, Conradie H, et al. Influences on the choice of health professionals to practise in rural areas. *S Afr Med J* 2007; 97:1082-6.
55. Orpin, P, Gabriel M. Recruiting undergraduates to rural practice: what the students can tell us. *Rural Remote Health* 2005;**5**:412.
56. Deaville JA, Wynn-Jones J, Hays RB, et al. Perceptions of UK medical students on rural clinical placements. *Rural Remote Health* 2009;9:1165.
57. Wilkinson D, Symon B, Newbury J, et al. Positive impact of rural academic family practices on rural medical recruitment and retention in South Australia. *Aust J Rural Health* 2001;9:29-33.
58. Schofield D, Fletcher S, Fuller J, et al. Where do students in the health professions want to work? *Hum Resour Health* 2009;7:74-81.
59. Jones M, Humphreys J, Prideaux D. Predicting medical students' intentions to take up rural practice after graduation. *Med Educ* 2009;43:1001-9.
60. Veitch C, Underhill A, Hays RB. The career aspirations and location intentions of James Cook University's first cohort of medical students: a longitudinal study at course entry and graduation. *Rural and Remote health* 2006;**6**:537.
61. Scott I, Wright B, Brenneis F, et al. Why would I choose a career in family medicine? Reflections of medical students at 3 universities. *Can Fam Physician* 2007;53:1956-7.
62. Boelen C, Heck JE. *Defining and measuring the social accountability of medical schools*. Geneva: World Health Organization; 1995.
63. Couper I, Worley PS, Strasser R. Rural longitudinal integrated clerkships: lessons from two programs on different continents. *Rural Remote Health* 2011;11:1665.
64. Lanphear JH, Strasser R. Developing partnerships for distributed community-engaged medical education in northern Ontario, Canada. *MEDICC Rev* 2008;10:15-9.
65. Morgan S, Smedts A, Campbell N, et al. From the bush to the big smoke — development of a hybrid urban community based medical education program in the Northern Territory, Australia. *Rural Remote Health* 2009;**9**:1175.

66. Taylor J, Blue I, Misan G. Approach to sustainable primary health care service delivery for rural and remote South Australia. *Aust J Rural Health* 2001;9:304-10.

67. Queensland Health. Rural Generalist Pathway. Available: www.health.qld.gov.au/ruralgeneralist/ (accessed 2011 Sept. 9).

68. Australian College of Rural and Remote Medicine. Vocational Training: training towards fellowship of ACRRM. Available: www.acrrm.org.au/vocational-training (accessed 2011 Sept. 4).

69. Wearne S, Giddings P, McLaren J, et al. Where are they now? The career paths of the Remote Vocational Training Scheme registrars. *Aust Fam Physician* 2010;39:53-6.

70. Chan BT, Degani N, Crichton T, et al. Duration of rural training during residency: rural family physicians prefer 6 months. *Can Fam Physician* 2006;52:210-1.

71. Krupa LK, Chan BTB. Canadian rural family medicine training programs: growth and variation in recruitment. *Can Fam Physician* 2005;51:852-3.

72. Australian General Practice Training. *National Minimum Terms and Conditions for GP Registrars. Incorporating the Australian General Practice Training and Prevocational General Practice Placements program.* Available: www.agpt.com.au/Registrars/GeneralInformation/ (accessed 2011 Sept. 7).

73. Elliott T, Bromley T, Chur-hansen A, et al. Expectations and experiences associated with rural GP placements. *Rural Remote Health* 2009;9:1264.

74. Medves JM, Paterson M, Young TR, et al. Preparing professionals from a wide range of disciplines for life and work in rural and small communities. *Aust J Rural Health* 2006;14:225-6.

75. Charles DM, Ward AM, Lopez DG. Experiences of female general practice registrars: Are rural attachments encouraging them to stay? *Aust J Rural Health* 2005;13:331-6.

76. Kelley ML, Kuluski K, Brownlee K, et al. Physician satisfaction and practice intentions in Northwestern Ontario. *Can J Rural Med* 2008;13:129-35.

77. Larkins SL, Spillman M, Parison J, et al. Isolation, flexibility and change in vocational training for general practice: personal and educational problems experienced by general practice registrars in Australia. *Fam Pract* 2004;21:559-66.

78. Cahill JL. Practising in northern Ontario. Why young physicians are choosing Timmins. *Can Fam Physician* 2005;51:1193-4, 1196.

79. Bärnighausen T, Bloom DE. Financial incentives for return of service in underserved areas: a systematic review. *BMC Health Serv Res* 2009;9:86-102.

80. Pong RW. Strategies to overcome physician shortages in northern Ontario: a study of policy implementation over 35 years. *Hum Resour Health* 2008;6:24.

81. Buykx P, Humphreys J, Wakerman J, et al. Systematic review of effective retention incentives for health workers in rural and remote areas: towards evidence-based policy. *Aust J Rural Health* 2010;18:102-9.

82. Smith, DM. Barriers facing junior doctors in rural practice. *Rural Remote Health* 2005;5:348.

83. Humphreys JS, Jones MP, Jones JA, et al. Workforce retention in rural and remote Australia: determining the factors that influence length of practice. *Med J Aust* 2002;176:472-6.

84. Wainer J. Work of female rural doctors. *Aust J Rural Health* 2004;12:49-53.

85. Rourke JT, Incitti F, Rourke LL, et al. Keeping family physicians in rural practice: solutions favoured by rural physicians and family medicine residents. *Can Fam Physician* 2003;49:1142-9.

86. Kotzee T, Couper ID. What interventions do South African qualified doctors think will retain them in rural hospitals of the Limpopo province of South Africa? *RuralRemote Health* 2006;6:581.

87. Gardiner M, Sexton R, Kearns H, et al. Impact of support initiatives on retaining rural general practitioners. *Aust J Rural Health* 2006;14:196-201.

88. May J, Jones PD, Cooper RJ, et al. GP perceptions of workforce shortage in a rural setting. *Rural Remote Health* 2007;7:720.

89. Joyce CM, Schurer S, Scott A, et al. Australian doctors' satisfaction with their work: results from the MABEL longitudinal survey of doctors. *Med J Aust* 2011;194:30-3.

90. Wetmore SJ, Stewart M. Is there a link between confidence in procedural skills and choice of practice location. *Can J Rural Med* 2001;6:189-94.

91. Goldman J, Reeves S, Lauscher HN, et al. Integrating social accountability into continuing education and professional development at medical schools: the case of an institutional collaborative project in Canada. *J Interprof Care* 2008;22(S1):40-50.

92. Angle P, Kurtz Landy C, Murthy Y, et al. Key issues and barriers to obstetrical anesthesia care in Ontario community hospitals with fewer than 2,000 deliveries annually. *Can J Anaesth* 2009;56:667-77.

93. Harris MF, Proud foot JG, Jayasinghe UW, et al. Job satisfaction of staff and the team environment in Australian general practice. *Med J Aust* 2007;186:570-3.

94. Green ME, Van Iersel RI. Response of rural physicians in a non-fee-for-service environment to acute increases in demand due to physician shortages. *Can J Rural Med* 2007;12:10-5.

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