

Rural background and clinical rural rotations during medical training: effect on practice location



Evidence

Études

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Abstract

Background: Providing health care services in rural communities in Canada remains a challenge. What affects a family medicine resident's decision concerning practice location? Does the resident's background or exposure to rural practice during clinical rotations affect that decision?

Methods: Cross-sectional mail survey of 159 physicians who graduated from the Family Medicine Program at Queen's University, Kingston, Ont., between 1977 and 1991. The outcome variables of interest were the size of community in which the graduate chose to practise on completion of training (rural [population less than 10 000] v. nonrural [population 10 000 or more]) and the size of community of practice when the survey was conducted (1993). The predictor or independent variables were age, sex, number of years in practice, exposure to rural practice during undergraduate and residency training, and size of hometown.

Results: Physicians who were raised in rural communities were 2.3 times more likely than those from nonrural communities to choose to practise in a rural community immediately after graduation (95% confidence interval 1.43–3.69, $p = 0.001$). They were also 2.5 times more likely to still be in rural practice at the time of the survey (95% confidence interval 1.53–4.01, $p = 0.001$). There was no association between exposure to rural practice during undergraduate or residency training and choosing to practise in a rural community.

Interpretation: Physicians who have roots in rural Canada are more likely to practise in rural Canada than those without such a background.

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Providing health care services in rural communities remains a challenge to the Canadian health care system.¹⁻⁴ One large problem is the maldistribution of physicians: although 31.6% of Canadians live in communities with a population less than 10 000, only 18.6% of family physicians and 3.8% of specialists work in these areas.² In Ontario the Small Hospital Medical Services Survey indicated a worsening shortage of rural physicians providing emergency care, obstetrics, anesthesia and general surgery services.⁵ In light of these findings, several authors have examined the determinants of the geographic distribution of physicians in Canada.^{1,3-7} The recruitment and retention of physicians in rural communities is affected by numerous factors: the physician's background,^{1,3,4,6} exposure to rural communities during medical training^{1,3,4,6} and various financial, professional and lifestyle issues.^{1,3-7} These same determinants have been found in studies conducted in the United States⁸⁻¹¹ and Australia,^{12,13} countries that also face difficulties in providing adequate numbers of rural physicians.

The effect of rural experiences during both undergraduate and postgraduate medical training on the subsequent decision to practise in a rural community has previously been suggested.^{1,3,4,6,10,14-21} Indeed, exposure to the challenges and opportunities unique to rural medicine is thought to have a powerful effect on students who are considering a future rural practice.^{1,3-6}

Recent examination of Canadian family medicine residency programs showed that all programs offered training opportunities in rural satellite training facilities.⁴ In two-thirds of programs some form of rural training was a mandatory part of the



curriculum. By the end of residency training, over 80% of family medicine residents had received some training in a rural area.⁴

The objective of this study was to determine whether exposure to rural practice during undergraduate medicine or family medicine residency is associated with an increased likelihood of practising in a rural area. We also wished to determine whether there is any association between the choice of a rural practice location and the physician's age or sex, length of time in practice or size of the physician's hometown.

Methods

In 1993 questionnaires were mailed to physicians who graduated from the Family Medicine Program at Queen's University, Kingston, Ont., between 1977 and 1991. The questionnaire had been previously pretested in the Kingston area for wording, ambiguities, and face and content validity. Two follow-up mailings were sent to nonrespondents after the initial mailing.

Information was collected on sex, age, number of years in practice, size of physician's hometown, community size of first practice and of current practice, and exposure to rural practice during undergraduate and family medicine residency training.

The outcome variables of primary interest were the size of the community where the graduate first practised and the size of the community in which he or she practised at the time of the survey. We were most interested in determining whether there was an association between exposure to rural practice during training and eventual practice in a rural community.

We defined "rural community" as any community with a popula-

tion less than 10 000. The size of the hometown (rural v. nonrural) was based on the approximate population of the community in which the physician spent the greater part of his or her childhood.

We used the χ^2 test in bivariate analysis to determine whether the respondents' decision to practise in a rural or underserved area was associated with any of 6 independent variables. The 2 outcomes evaluated were the size of the community (rural v. nonrural) of first practice and of current practice (at the time of the survey). The 4 categorical independent variables were physician's sex, size of physician's hometown (rural v. nonrural), and previous exposure to rural medicine at the undergraduate level and at the residency level. The 2 continuous independent variables assessed were physician's age and number of years since residency. Physician's age was grouped by quartiles into 4 age groups: less than 33 years, 33–37 years, 38–42 years and more than 42 years. We used logistic regression analysis to control for potential confounding effects. In the regression analysis the number of years in practice was not used as an independent variable since it correlated highly with age ($r = 0.7$).

The survey was conducted by the Northern Health Human Resources Research Unit, Laurentian University, Sudbury, Ont., on behalf of the Queen's University Family Medicine Program. Before the questionnaires were sent out, approval was obtained from the Laurentian University Committee for the Ethical Review of Research Involving Human Subjects and from the Queen's University Research Ethics Board.

Results

Of the 303 graduates surveyed, 230 (75.9%) responded to the questionnaire. The respondents and the nonre-

Table 1: Factors affecting choice of first practice location among 159 graduates of the Family Medicine Program at Queen's University, Kingston, Ont.

Independent variable	Practice location;* no. (and %) of respondents		RR (and 95% CI)	<i>p</i> value
	Rural <i>n</i> = 45	Nonrural <i>n</i> = 114		
Undergraduate exposure to rural practice				
Yes	29 (35.4)	53 (64.6)	1.70 (1.01–2.97)	0.041
No	16 (20.8)	61 (79.2)		
Residency exposure to rural practice				
Yes	37 (31.4)	81 (68.6)	1.62 (0.82–3.16)	0.147
No	8 (19.5)	33 (80.5)		
Sex				
Male	23 (29.5)	55 (70.5)	1.08 (0.66–1.78)	0.745
Female	22 (27.2)	59 (72.8)		
Age, yr				
< 33	8 (27.6)	21 (72.4)	1	
33–37	16 (26.2)	45 (73.8)	0.95 (0.46–1.96)	0.892
38–42	18 (40.0)	27 (60.0)	1.44 (0.73–2.89)	0.275
> 42	3 (12.5)	21 (87.5)	0.45 (0.13–1.51)	0.178
Rural hometown†				
Yes	16 (51.6)	15 (48.4)	2.30 (1.43–3.69)	0.001
No	28 (22.4)	97 (77.6)		

Note: RR = relative risk, CI = confidence interval.

*Rural = population < 10 000, nonrural = population \geq 10 000.

†Data were available for 156 respondents.



spondents did not differ significantly in sex, province of residence or year of graduation, which suggested that the respondents were a representative sample of the subjects surveyed.

Of the 230 respondents, 71 were excluded from the analysis: 54 because they had received further postgraduate specialty training, and 17 because they had received a bursary or other incentive to encourage practice in a rural area. Data for the remaining 159 respondents (81 women, 78 men) were complete with the exception of size of hometown (missing for 3 physicians).

The mean age of the respondents was 56.1 (standard deviation 5.8) years. The mean length of time since residency was 8.8 (standard deviation 4.9) years. For 45 (28.3%) of the respondents first practice was located in a rural community. For 40% the community had a population of 25 000 or less, for 50% the population was 50 000 or less and for 80% it was 100 000 or less; for only 3% was the population 500 000 or more.

The results of the analysis of factors affecting choice of location of first practice are shown in Table 1. Physicians exposed to rural practice during their undergraduate medical training were 1.70 times more likely (95% confidence interval [CI] 1.01–2.97, $p = 0.041$) to practise in a rural area immediately on completion of their training than those who did not have such exposure. Although a similar difference was suggested when location of the first practice was correlated with exposure to rural practice during family residency training (relative risk 1.62, 95% CI 0.82–3.16), this difference was not significant. Similarly, neither the physician's age nor sex was associated with location of the first practice. In contrast, hometown size was

strongly associated with choosing a rural community as the first practice location: physicians from hometowns of less than 10 000 people were 2.30 times more likely (95% CI 1.43–3.69, $p = 0.001$) to choose rural practice than physicians whose hometown had a population of 10 000 or more.

Although physicians exposed to rural practice during undergraduate training were more likely than those without such exposure to choose a rural community as their current practice location (relative risk 1.49, 95% CI 0.86–2.51), the difference was not significant (Table 2). Similarly, exposure to rural practice during residency was not significantly associated with current location in a rural practice. Only the size of the hometown was associated with current practice location: physicians from hometowns of less than 10 000 people were 2.48 times more likely (95% CI 1.53–4.01, $p = 0.001$) to choose rural practice than physicians from hometowns of 10 000 people or more.

The results of the logistic regression analysis are shown in Tables 3 and 4. The independent variables tested included the physician's exposure to rural medicine during undergraduate and postgraduate training, the physician's sex and age, and the size of the physician's hometown. Only hometown size was significantly associated with the decision to practise in a rural community after residency training (Table 3). When we used size of community of current practice as the dependent variable, hometown size was again the only independent variable that showed a significant association (Table 4). Exposure to rural practice during undergraduate or residency training was not found to be significantly related to either of the dependent variables.

Table 2: Factors affecting choice of current practice location

Independent variable	Practice location; no. (and %) of respondents		RR (and 95% CI)	<i>p</i> value
	Rural	Nonrural		
Undergraduate exposure to rural practice				
Yes	27 (32.9)	55 (67.1)	1.49 (0.86–2.51)	0.126
No	17 (22.1)	60 (77.9)		
Residency exposure to rural practice				
Yes	37 (31.4)	81 (68.6)	1.84 (0.88–3.79)	0.078
No	7 (17.1)	34 (82.9)		
Sex				
Male	25 (32.0)	53 (67.9)	1.36 (0.82–2.27)	0.226
Female	19 (23.4)	62 (76.5)		
Age, yr				
< 33	8 (27.6)	21 (72.4)	1	
33–37	12 (19.7)	49 (80.3)	0.71 (0.33–1.55)	0.399
38–42	17 (37.8)	28 (62.2)	1.37 (0.68–2.75)	0.366
> 42	7 (29.2)	17 (70.8)	1.06 (0.45–2.49)	0.436
Rural hometown				
Yes	16 (51.6)	15 (48.4)	2.48 (1.53–4.01)	0.001
No	26 (20.8)	99 (79.2)		



Interpretation

In recent years numerous studies concerning the determinants of the geographic distribution of physicians have been conducted. Key recruitment factors determining the initial practice location after residency training include the background of the physician, influences and exposures during medical training, relative income, and various professional and lifestyle factors. We found a significant association between being raised in a rural community and deciding to choose a rural community as one's first practice location. This is in agreement with much of the literature.^{1,3,4,6,8,12,15} In addition, Rabinowitz¹⁴ found that graduates of a medical program that preferentially admitted applicants with rural backgrounds were 3 times more likely to practise in rural areas than those who graduated outside the program.

In our study, although a greater proportion of physicians who were exposed to rural practice during family medicine residency training than those without such exposure chose a rural community for their first practice, the difference was not significant. When bivariate analysis was used, undergraduate exposure to rural medicine was associated with choosing a rural community as the first practice location. However, this association was no longer present when we controlled for confounding effects of other variables.

In an attempt to examine the related problem of physician retention, we also looked at the association between the independent variables and the practice location of physicians at the time of the survey. The only variable significantly associated with a rural location of the current practice was the size of the physician's hometown. Neither exposure to rural practice during undergraduate training nor exposure during residency training was correlated significantly with current practice location.

There are some limitations to our study. First, our findings are based on the distinction between rural and nonrural communities. Although there are many interpretations of "rural," we chose one of the stricter definitions, that of any community with a population under 10 000. We chose this

definition primarily for the sake of simplicity and because it has been used by Statistics Canada and in previous studies.⁴⁻⁶ Recently, Rourke² examined numerous ways by which "rural" might be defined in the Canadian context. As well, the General Practice Rurality Index for Canada, which was developed by Leduc²² in 1997, was not available at the time of this study.

A second limitation of our study is that, as part of a large cross-sectional survey of Queen's Family Medicine Program graduates, our sample was limited to the number of graduates from that program. As a result, the power of our study may not have been great enough to detect less strong associations between exposure to rural practice and subsequent practice location. The fact that our study may not have had the power to detect a difference that may be significant at a policy level must not be overlooked. Indeed, numerous studies have shown that rural experiences during either undergraduate or residency training are an important component in the decision to enter rural practice.^{1,3,4,6,9,11,13,16-21}

We did not explore many of the professional and lifestyle factors that have been found to enter into the physician's decision to practise in a rural locale.^{1,3,7} Future research in this area is necessary so that integrated policies to increase the numbers of rural physicians can be developed.¹

Finally, the phenomenon of self-selection must be considered. Residents may choose the Queen's University Family Medicine Program because of its reputation for offering rural medical training and that the early decision to pursue a rural practice drives medical students to seek out the necessary rural exposure at both the undergraduate and postgraduate level. Because of this, the effectiveness of undergraduate and residency programs in influencing the subsequent practice location of their participants is difficult to evaluate, even when statistically significant differences in subsequent practice location are found.

In a larger sense, the most intensive "rural experience" is to have grown up in a rural environment. Our study shows that this experience is indeed associated with choosing to practise in a rural community.

Competing interests: None declared.

Table 3: Odds ratios for variables associated with first practice location

Independent variable	Crude OR (and 95% CI)	Adjusted OR (and 95% CI)
Undergraduate exposure to rural practice	2.09 (1.02-4.25)	1.96 (0.89-4.29)
Residency exposure to rural practice	1.88 (0.79-4.47)	2.01 (0.77-5.23)
Sex	1.12 (0.56-2.24)	1.26 (0.56-2.84)
Age, yr		
< 33	1	1
33-37	0.93 (0.34-2.52)	0.83 (0.28-2.46)
38-42	1.75 (0.64-4.80)	1.74 (0.55-5.49)
> 42	0.38 (0.08-1.61)	0.34 (0.07-1.62)
Rural hometown	3.69 (1.63-8.93)	4.77 (1.91-11.90)

Note: OR = odds ratio.

Table 4: Odds ratios for variables associated with current practice location

Independent variable	Crude OR (and 95% CI)	Adjusted OR (and 95% CI)
Undergraduate exposure to rural practice	1.73 (0.85-3.51)	1.65 (0.75-3.66)
Residency exposure to rural practice	2.22 (0.90-5.46)	2.47 (0.91-6.73)
Sex	1.54 (0.76-3.10)	1.72 (0.75-3.97)
Age, yr		
< 33	1	1
33-37	0.64 (0.23-1.80)	0.51 (0.16-1.58)
38-42	1.59 (0.58-4.39)	1.41 (0.44-4.51)
> 42	1.08 (0.33-3.59)	0.76 (0.19-3.07)
Rural hometown	4.06 (1.78-9.28)	4.92 (1.98-12.12)



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