

# The relation between personal characteristics of physicians and practice location in Manitoba

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**A questionnaire survey of 562 physicians in Manitoba who had graduated from the University of Manitoba was carried out to assess the effect of personal characteristics on choosing a practice location. The results closely resemble those of studies performed in the United States: the choice of a nonurban practice location is significantly more likely if the physicians and their spouses have nonurban backgrounds and if the physicians have had a nonurban preceptorship during undergraduate medical education. In this study practitioners who were male and whose fathers were farmers or health care professionals were also more likely to practise in nonurban areas. These findings will help in making physician distribution more equitable.**

**Enquête par questionnaire auprès de 562 médecins manitobains diplômés de l'université de Manitoba afin de cerner les particularités qui ont influé sur le choix de l'endroit où ils exercent. Comme lors d'enquêtes semblables faites aux États-Unis, nous trouvons que le choix d'un milieu non-urbain est significativement plus probable si le médecin et son conjoint ont grandi dans un tel milieu et si le médecin, dans le cours de ses études prédoctorales, a effectué un stage auprès d'un précepteur en milieu non-urbain. Le même choix est plus fréquent chez les praticiens du sexe masculin et ceux dont les pères étaient soit cultivateurs, soit professionnels de la santé. Nos constatations vont servir à rendre plus équitable la répartition des médecins.**

**M**any studies have reported a disproportionate concentration of physicians in urban areas compared with nonurban ones.<sup>1-13</sup> Although most of the figures were arrived

at over a decade ago,<sup>2-4,6,8,10-13</sup> recent data have revealed no notable trend toward more uniform patient-physician ratios,<sup>1,7,9</sup> despite efforts to improve the situation.<sup>7,11,12,14</sup>

In September 1985 the College of Physicians and Surgeons of Manitoba listed 1959 licensed physicians, 1521 (78%) of whom were practising in Winnipeg. Only 55% of Manitoba's 1.1 million population lived in or near Winnipeg at the time; therefore, the average number of patients per physician was just under 400 in Winnipeg and 1130 in the rest of the province.

Attempts have been made to understand why physicians in the United States choose certain practice locations.<sup>1-4,6,10,12,13</sup> The results have been consistent. The variables related to choosing a nonurban location include growing up in a nonurban community, exposure to a nonurban practice during training, marriage to a person from a nonurban area and training in family medicine rather than other specialties.

No studies have been reported that have examined the relative importance of these factors in Canada. Manitoba is ideal for such a study because there is only one large urban area and because most (84%) of the Canadian-trained physicians who practise in the province graduated from the University of Manitoba. A number of extraneous and possibly confounding factors, such as different urban areas and training centres, are eliminated. Therefore, physicians in Manitoba were surveyed, and the relative importance of their background and training and their spouses' background was assessed in relation to the location of their practices.

## Methods

Questionnaires were sent by mail to 562 physicians who were graduates of the University of Manitoba; a stamped return envelope was enclosed. Two groups of physicians were involved: all those practising outside Winnipeg (149), and all

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general practitioners (308) and a group of specialists (105) practising in Winnipeg. The specialists were randomly selected and were matched by specialty on a 3:1 ratio with the 35 specialists in the nonurban areas.

Physicians were asked about their background and that of their spouses, their place of residence during grades 1 through 8, during grades 9 through 12 and at high-school graduation, and the university at which their premedical education was obtained. Any undergraduate training in a nonurban area (e.g., a nonurban preceptorship) was to

**Table I — Response rates for physicians in nonurban and urban areas in Manitoba, by size of community**

Community; population	No. of physicians	No. (and %) of replies*
Nonurban	149	135 (91)
< 5 000	54	47 (87)
5 000–24 999	68	61 (90)
25 000–50 000	27	27 (100)
Urban		
> 50 000	413	288 (70)
Total	562	423 (75)

\*Twenty replies, from physicians still in residency training, were deleted from the analyses because the ultimate practice location had not yet been determined.

**Table II — Crude likelihood ratios for nonurban practice locations, by background and training variables**

Variable	Likelihood ratio
Community of origin	
Nonurban residence	
Grades 1–8	6.15
Grades 9–12	6.33
High school graduation	5.42
Background of spouse	
Nonurban residence in grades 9–12	3.84
Training	
Premedical education outside Winnipeg	3.22
Nonurban preceptorship	2.03
Family background, with farming related to other paternal occupations	
Blue collar	5.26
White collar	7.14
Business owner	7.14
Health care professional	2.44
Other professional	5.88

**Table III — Likelihood ratios for nonurban practice locations, adjusted by multiple logistic regression analysis**

Step	Variable	Likelihood ratio*	p
1	Nonurban high school education	4.63	0.0001
2	Male	3.53	0.005
3	Nonurban preceptorship	1.87	0.02
4	Father a health care professional	2.41	0.02
5	Father a farmer	2.39	0.02

\*The ratios presented are those for step 5.

be listed, along with the place and duration. Occupations of the parents were also requested. Finally, information on the type and size of practice was sought.

## Results

The response rate of 70% for Winnipeg was considerably lower than the rate of 91% for the nonurban areas combined (Table I). Most of the respondents (84%) were men. However, the relation between practice location and gender was statistically significant ( $p < 0.005$ ); 84% of the women were practising in Winnipeg, compared with 63% of the men. The mean number of years in practice — 17.4 (standard deviation [SD] 11.9) years and 15.4 (SD 11.9) years respectively — did not differ significantly between the urban and nonurban groups. The nonurban physicians, however, were almost twice as likely to be in a group practice and to have been trained at a foreign medical school as the urban physicians.

Tests of statistical significance were carried out to assess the comparability of the specialists and family physicians in terms of each of the variables studied. Because none of the results were significant at  $p < 0.10$ , the specialists and family physicians in urban and nonurban areas were combined for the following analyses.

Crude likelihood ratios for the physicians in nonurban practices are presented in Table II. They indicate the extent to which the odds favouring nonurban practice were increased by a given characteristic. The likelihood of practising in a nonurban area was increased for those who grew up in a nonurban area, whose spouse also came from such an area and who had trained at smaller, nonurban universities. The categories of the father's occupation were each calculated as they related to farming. For all occupational categories except health care professional, farming was relatively more important in selecting a nonurban practice location; however, the ratio was stronger for health care professionals than for the others. Unfortunately, a homemaker category was not included on the questionnaire, and it was believed that those who did not respond to the family background section could have had mothers who were homemakers. However, misclassification might have resulted; therefore, likelihood ratios

related to maternal occupation were not calculated.

Ratios adjusted by means of multiple logistic regression analysis were used to assess the influence of each variable on choosing an urban or nonurban practice location. In step 1 the variable with the strongest relation is entered; in step 2 the remaining variables are considered, and the strongest one is selected. This procedure continues until no more variables make a contribution at  $p \leq 0.05$ .

Nonurban high school education had the strongest influence on choosing a nonurban practice location (Table III). Four other variables each affected the choice. Although some variables showed a relation to practice location when considered separately, they were not selected, because they were strongly related to previously selected variables.

The results of this stepwise analysis can be used to determine the likelihood of choosing a nonurban practice location when a combination of characteristics are present. For example, a female physician who attended a high school in Winnipeg, who did not have a nonurban preceptorship and whose father was a businessman is not likely to choose a nonurban practice.

## Discussion

The results from this survey are similar to those reported in the literature.<sup>1-4,6,11,13,14</sup> Physicians who practised in nonurban centres were more likely to have nonurban backgrounds, as were their spouses, and were more likely to be men. They had trained outside of Winnipeg and had had a nonurban preceptorship. In addition, their fathers were more often farmers or health care professionals. Almost half of the graduates in towns with populations less than 5000 had a farming background. The use of a stepwise analysis revealed that a nonurban background was the most important variable in choosing a nonurban practice location and that being male, having a nonurban preceptorship and having a father who was a farmer or a health care professional affected the choice, whereas place of training and location of high school graduation did not.

These findings have several implications that may assist in making physician distribution more equitable. First, recruitment of students from nonurban areas could be emphasized. Studies have shown that students from those areas perform as well as their urban counterparts during medical training<sup>7,9</sup> and that some inducement techniques can be helpful.<sup>11</sup> In addition, nonurban preceptorships could be encouraged, if not required, during medical training, since experience in nonurban areas may affect the decision of where to practise.<sup>14</sup> Selection on the basis of place of residence and, especially, sex could be discriminatory. Therefore, the best strategy might involve concentrating on the recruitment into medical school of qualified applicants from nonurban areas.

Should any of these strategies be implemented, their effectiveness should be evaluated by means of well-controlled, prospective studies in which several cohorts of medical students admitted before and after the introduction of these strategies would be followed up beyond graduation.

In-depth studies could also be undertaken in an attempt to better understand why physicians choose different practice locations. Direct interviews with practising physicians in various locales could include questions about why a specific choice was made as well as what factors might induce physicians from urban areas to relocate in nonurban areas. Suggestions could be invited as to how medical education might be modified to foster nonurban practice.

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