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Physician recruitment and retention in Manitoba: results from a survey of physicians' preferences for rural jobs

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Introduction: Rural recruitment and retention continues to present challenges to health workforce planners. This paper reports and analyzes the results of a survey sent to physicians in Manitoba, eliciting their opinions regarding rural jobs.
Methods: A survey was sent to all physicians in Manitoba. Part 1 of the survey included questions about background and demographic information; part 2 was a set of job satisfaction questions regarding respondents' current job; and part 3 included 2 sets of stated-choice questions eliciting preferences for a set of attributes relevant to rural recruitment and retention.
Results: Of the 2487 physicians who received surveys, 561 (22.6%) responded. Respondents indicated that income, hours worked and on-call frequency are very important: overall job satisfaction increased with income and decreased with hours worked. Income, hours and on-call frequency were ranked "very important" by the largest proportions of physicians. The estimated compensation for on-call more frequent than 1-in-4 was very high (82% of average income), and additional hours worked were worth $183 per hour. Other attributes that were important included professional interaction, housing availability and community incentives during the first year, which were valued at 11%–31% of annual income.
Conclusion: Work–life balance is a key consideration for rural jobs, and there are incentives that can compensate for less desirable attributes.

Introduction : Le recrutement et le maintien en poste continuent d'être une source de défis pour les planificateurs des ressources humaines en santé. Cet article présente et analyse les résultats d'un sondage sur le travail en milieu rural mené auprès de médecins au Manitoba.
Méthodes : Un questionnaire a été envoyé à tous les médecins au Manitoba. La partie 1 du questionnaire recueillait des renseignements démographiques et généraux; la partie 2 présentait un ensemble de questions sur la satisfaction professionnelle des répondants à l'égard de l'emploi actuel; la partie 3 contenait 2 séries de questions à choix fixes pour déterminer les préférences en regard d'aspects pertinents au recrutement et au maintien en poste en milieu rural.
Résultats : Sur les 2487 médecins ayant reçu le questionnaire, 561 (22,6 %) ont répondu. Les répondants ont indiqué que le revenu, les heures de travail et la fréquence du service de garde sont très importants : le taux de satisfaction générale augmentait en fonction du revenu et diminuait selon le nombre d'heures de travail. Le revenu, les heures de travail et la fréquence du service de garde étaient considérés comme étant « très importants » par le nombre le plus élevé de médecins. La rémunération estimée pour un service de garde de fréquence supérieure à un rapport d'un sur quatre était très élevée (82 % du revenu moyen), et la valeur accordée à chaque heure supplémentaire était de 183 $ l'heure. Parmi les autres aspects jugés importants, mentionnons l'interaction professionnelle, la disponibilité de logements et des mesures incitatives communautaires la première année, le tout évalué à 11 %–31 % du revenu annuel.
Conclusion : L'équilibre entre le travail et la vie personnelle est un facteur clé pour les emplois en milieu rural et il existe des mesures incitatives pour compenser les caractéristiques moins désirables.

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INTRODUCTION

The physician-to-population ratio in Canada has been well below the Organisation for Economic Co-operation and Development average for many years.[1] A recent report by the Canadian Institute for Health Information, however, suggests that this ratio is increasing, as the number of physicians is growing faster than the population.[2] These statistics appear promising yet hide important regional disparities: in 2014, Manitoba, Nova Scotia and Prince Edward Island were the only provinces where the physician-to-population ratio was not the highest ever recorded.[3] Since 2010, the total number of doctors in Manitoba has increased by 12.2% while the national average was 14.6%.[4] Rural areas generally have fewer physicians relative to the proportion of population living there than urban areas, and this is true across Canada.[4] Manitoba has the highest outmigration of doctors, speculated to be caused in part by the high number of foreign-trained physicians: in 2014, 34.3% of all physicians and 48.5% of family physicians in the province were foreign-trained, compared to the national averages of 25.4% and 28.3%, respectively.[4] The problem is more acute across Manitoba's Regional Health Authorities: in the Winnipeg Regional Health Authority, 40.4% of family physicians were foreign-trained, whereas 83.9% were foreign-trained in the Northern Regional Health Authority.[4] Similar differences were present in other provinces.[4]

Recruitment and retention, particularly to rural, underserviced areas, has long been a policy goal of the government of Manitoba and of all other provincial and territorial governments in Canada. In Manitoba, incentives to support recruitment to these areas include return-of-service grants, financial incentives to recruit workers and a commitment to new technologies to expand expertise.[5]

There is a sizeable literature on reasons why physicians leave rural areas, including intense workloads,[6] difficulty taking time off,[7] professional isolation,[8] lack of specialized education[9] and lack of professional support.[10,11] However, practising in rural areas also has advantages: a greater variety of work,[12,13] more continuity of care[8] and community characteristics, such as welcoming employers, peer support and outdoor recreation[14–17] are appealing. Many of the reasons physicians cite for wanting or not wanting to work in rural areas are nonpecuniary, yet financial incentives continue to be key strategies for improving rural recruitment and retention.

Financial incentives can help recruit physicians to rural areas, but they do little to retain them.[18] Nonpecuniary incentives (e.g., programs that support medical practice) to improve recruitment and retention are being used more frequently,[19] but there is no clear evidence to show what type of and how much nonpecuniary compensation is necessary to balance undesirable job characteristics.

The aim of the present study was to assess the financial value and the importance overall and relative to each other of pecuniary and nonpecuniary factors that are known to affect recruitment and retention. Trade-offs between desirable and undesirable job attributes are possible to reduce recruitment problems and attrition. This link between the literature, which documents mostly nonpecuniary reasons for rural recruitment and retention problems,[6,7] and policies and incentives to attract physicians to rural areas (some of which are financial[20]) has been largely missing so far. However, it is key to designing more successful job packages and incentives to attract physicians to rural areas and retain them. As an example, it is well known that physicians prefer less frequent on-call, but it is not clear from the literature how physicians should be compensated for providing additional on-call services and at which level of frequency they need additional compensation. Furthermore, compensation can be pecuniary or nonpecuniary; financial incentives have not been very successful,[16,21] and to use nonpecuniary compensation requires information on what job attributes such as on-call are worth, both in monetary value and in terms of nonpecuniary incentives. The purpose of this study was to collect information about the value of and preferences for different types of incentives.

METHODS

A questionnaire was sent to all physicians in Manitoba who were listed on the College of Physicians and Surgeons of Manitoba's physician directory[22] in December 2012. A hard-copy survey together with instructions for completing the survey online and a stamped return envelope were mailed out by first-class post. A reminder postcard with the online log-in information was sent to all who had not replied 3 weeks after the initial mail-out. The survey was sent to all physicians in Manitoba in order to achieve an adequate sample size to conduct the analyses.

The survey consisted of 3 main sections: 1) questions about physicians' current job, background and

sociodemographic information, 2) a section on job satisfaction and 3) 2 sets of questions about preferences for rural jobs. Questions on job satisfaction were scored on a 5-point Likert scale ranging from "very dissatisfied" to "very satisfied." A "not applicable" option was included for each item. The third section consisted of a discrete choice experiment (DCE)[23] and a simple ranking exercise using the same set of attributes included in the DCE.

In the DCE, respondents were presented with 9 choice pairs in the questionnaire (see Figure 1 for example). Respondents made 2 choices for each pair: between job A and job B, and among job A, job B and their current job. The second question makes the DCE more realistic since respondents may, in reality, choose neither job. The attributes for the DCE were chosen in focus group discussions with physicians and policy-makers familiar with rural practice and were deemed important and feasible.

Attribute levels were chosen based on the same criteria and in the context of what is appropriate and possible for jobs in rural Manitoba. In addition, a "location" attribute was included as a measure of the degree of rurality, and the attribute levels were constructed to facilitate classification of all communities in Manitoba, except Winnipeg and Brandon, into 4 groups (population < 5000 and ≤ 3-hr drive from Winnipeg; population < 5000 and > 3-hr drive from Winnipeg; population 5000–15 000 and ≤ 3-hr drive from Winnipeg; population 5000–15 000 and > 3-hr drive from Winnipeg). According to the 2011 census,[24] there were 261 communities in Manitoba with a population less than 5000, of which 123 are more than a 3-hour drive from Winnipeg (calculated using Google Maps). There were 22 communities with a population of 5000–15 000, of which 4 are more than a 3-hour drive from Winnipeg. Three of these 4 communities (Thompson, The Pas and Flin Flon) are in northern Manitoba. Attribute levels for Winnipeg and Brandon were deliberately excluded to avoid respondents' choosing jobs based on a strong preference for an urban location. Attributes and levels are listed in Appendix 1. A D-efficient design was used to generate the DCE using SAS software,[25] with 36 choice pairs blocked into 4 sets of questions.

The DCE was followed by a question asking respondents to rank each attribute in terms of importance for rural recruitment and retention. In particular, for 9 of the 10 attributes included in the DCE, respondents were asked to indicate whether they thought it was "very important," "somewhat important" or "not important." The attribute "location" was not included since this was not an amendable incentive.

Statistical analysis

The DCE data were analyzed with the use of NLOGIT software; all other analyses were done with the use of Stata 13. The main results for the DCE were generated using all responses, and robustness checks were done using 2 subsamples. The first subsample included only specialists likely to be found in rural and remote areas (general practitioners, internists, general surgeons, pediatricians,

Attribute	Job A	Job B
Income (gross, annual)	$250 000	$300 000
Hours worked per week	55 hours	45 hours
Spouse finding work	Acceptable opportunities	Acceptable opportunities
On-call activity	Once every 6 days	Once every 8 days
Type of practice	Solo	Group
Additional rural training	None	Periodic sessions
Community-sponsored incentives	None offered	Provided continuously while working in the community
Housing availability	Adequate selection	Limited selection
Clinic technology	Electronic medical record	Electronic medical record
Location	Rural, population 5000–15 000; more than 3-hr drive to Winnipeg	Rural, population < 5000; more than 3-hr drive to Winnipeg

1. Which job do you prefer? Job A ☐ Job B ☐

2. Which job would you choose? Job A ☐ Job B ☐ My current job ☐

Fig. 1. Example of a discrete choice experiment question.

obstetrician/gynecologists, anesthesiologists and psychiatrists), to ensure that the results were not affected by preferences of specialists unlikely to even consider rural locations. The second subsample included only physicians with a Canadian undergraduate degree, omitting international medical graduates. The complement to this latter analysis, international medical graduates only, had too few observations, and so conjectures about preferences of these physicians can be made only by comparing the difference in results for Canadian-trained physicians (subsample 2) to all physicians (main results) and attributing these to the preferences of international medical graduates.

Table 1: Respondent characteristics

Characteristic	No. (%) of respondents*
Physician type	
General practitioner/family physician	246 (45.3)
Specialist	297 (54.7)
Sex	
Female	179 (33.1)
Male	362 (66.9)
Age, yr	
< 45	202 (37.8)
45–64	270 (50.6)
> 64	62 (11.6)
Undergraduate degree completed in Canada	
Yes	381 (70.5)
No	159 (29.5)
First postgraduate degree completed in Canada	
Yes	392 (72.8)
No	146 (27.8)
Most recent postgraduate degree completed in Canada	
Yes	275 (77.7)
No	79 (22.3)
Gross annual income, $	
≤ 275 000	165 (30.8)
275 001–325 000	90 (16.8)
325 001–375 000	65 (12.2)
375 001–425 000	66 (12.3)
425 001–475 000	40 (7.5)
> 475 000	109 (20.4)

*Sample size varies since not all respondents answered all questions.

Ethics approval

Ethics approval was obtained from the University of Manitoba's Research Ethics Board.

RESULTS

The survey was completed by 561 (22.6%) of 2487 physicians; 552 answered at least some of the questions regarding job satisfaction and stated preferences. A total of 112 respondents (20.0%) completed the survey online. This yielded about 4300 usable responses to the DCE questions. Table 1 presents an overview of the respondents' characteristics.

Table 2 shows where the respondents lived and worked, from their survey responses. Physicians who worked in Winnipeg or in a small community near Winnipeg were underrepresented in the survey, and physicians who worked in Brandon, in a medium-sized community or in a small community far from Winnipeg were overrepresented compared with the Manitoba physician population.[23] There is also evidence that a small proportion of physicians commuted.

The imputed average hourly wage for the sample was $134, which was calculated from the income categories and the reported number of hours worked.

Of the 530 respondents who answered the return-of-service and intention-to-leave questions, 77 (14.5%) had completed a return-of-service

Table 2: Location of respondents

Location	No. (%) of respondents*		Work location of all Manitoba physicians†
	Work	Home	
Winnipeg	347 (64.0)	368 (68.2)	1865 (75.0)
Brandon	41 (7.6)	42 (7.8)	127 (5.1)
Town with population 5000–15 000			
≤ 3-hr drive to Winnipeg	67 (12.4)	51 (9.4)	157 (6.3)
> 3-hr drive to Winnipeg	33 (6.1)	26 (4.8)	97 (3.9)
Town with population < 5000			
≤ 3-hr drive to Winnipeg	33 (6.1)	38 (7.0)	164 (6.6)
> 3-hr drive to Winnipeg	21 (3.9)	15 (2.8)	77 (3.1)

*Sample size varies since not all respondents answered all questions.
†As per College of Physicians and Surgeons of Manitoba physician directory.[22]

agreement, and 152 (28.7%) planned to leave their job in the next 5 years (Table 3).

Responses to questions about spousal employment are shown in Table 4.

Job satisfaction

Proportionally, physicians were most dissatisfied with after-hours work, rural training, community incentives and clinic technology (Table 5). They were most satisfied with practice type, location, housing availability and cost of living.

Table 6 shows the Kendall τ-b correlation[26] between overall job satisfaction and the other job satisfaction questions, in decreasing order of correlation. The correlation was highest between overall job satisfaction and work–life balance; that is, respondents tended to rate their overall job satisfaction highly if they also rated their satisfaction with their work–life balance highly.

The job satisfaction responses were further analyzed by means of an ordered logit regression to investigate which variables significantly affected each response item (Table 7). Generally, the better the attribute level of the respondent's current job, the higher his or her level of satisfaction. This was also the case for the results of the remaining items not shown in the table. Two separate regressions for location were run, one that included housing availability, the other without (location I and II, respectively), and these suggest that satisfaction with location is related to amenities (adequate housing) rather than geographic location, since the location variables are significant (at 10%) only when housing is not included.

Table 3: Return-of-service agreement and intentions regarding leaving job

Variable	No. (%) of respondents*
Completed return-of-service agreement	
All	77 (14.5)
And planning to leave job	16 (20.7)
And completed undergraduate degree in Canada	47 (61.0)
And completed undergraduate degree outside Canada	30 (39.0)
Planning to leave job in next 5 yr	
All	152 (28.7)
And born before 1952	48 (31.6)
And outside Winnipeg and Brandon	54 (35.5)
And living in town < 5000 population	21 (13.8)

*Sample size varies since not all respondents answered all questions.

Table 4: Spousal employment and employment opportunities

Variable	No. (%) of respondents*
Spouse employed	320 (65.5)
And living in Winnipeg or Brandon	252 (78.8)
Spouse not employed	168 (34.4)
And looking for employment	30 (19.4)
No job opportunities for spouse looking for employment	21 (70.0)

*Sample size varies since not all respondents answered all questions.

Table 5: Job satisfaction

	Response; no. (%) of respondents				
Attribute	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
Overall job satisfaction	121 (22.2)	**309 (56.6)**	82 (15.0)	31 (5.7)	3 (0.6)
After-hours work	66 (12.7)	218 (41.8)	102 (19.6)	**101 (19.4)**	34 (6.5)
On-call	79 (16.2)	217 (44.5)	100 (20.5)	71 (14.6)	21 (4.3)
Support staff	87 (16.2)	267 (49.7)	88 (16.4)	73 (13.6)	22 (4.1)
Practice type	**181 (34.3)**	**291 (55.1)**	45 (8.5)	9 (1.7)	2 (0.4)
Hours worked	89 (16.3)	265 (48.6)	91 (16.7)	86 (15.8)	14 (2.6)
Income earned	136 (24.9)	274 (50.2)	84 (15.4)	48 (8.8)	4 (0.7)
Continuing medical education opportunities	117 (21.4)	277 (50.6)	80 (14.6)	57 (10.4)	16 (2.9)
Rural training	17 (5.7)	68 (22.7)	**135 (45.2)**	**54 (18.1)**	**25 (8.4)**
Clinic technology	86 (16.4)	218 (41.7)	101 (19.3)	81 (15.5)	**37 (7.1)**
Location	**181 (33.2)**	272 (49.9)	64 (11.7)	22 (4.0)	6 (1.1)
Work–life balance	78 (14.3)	222 (40.8)	126 (23.2)	93 (17.1)	25 (4.6)
Ability to take time off	117 (21.4)	249 (45.5)	95 (17.4)	64 (11.7)	22 (4.0)
Housing availability	**167 (33.3)**	260 (51.8)	51 (10.2)	20 (4.0)	4 (0.8)
Cost of living	146 (27.5)	**286 (53.9)**	64 (12.1)	29 (5.5)	6 (1.1)
Community incentives	20 (6.5)	82 (26.5)	**133 (42.9)**	**53 (17.1)**	22 (7.1)
Spousal employment opportunities	85 (19.7)	192 (44.6)	87 (20.2)	48 (11.1)	19 (4.4)

Attribute importance

The attributes ranked by most respondents as "very important" were on-call, income and hours worked (Table 8). The attributes ranked as "not important" by the largest proportion of respondents were community incentives, rural training and clinic technology.

Table 6: Kendall τ-b correlation between overall job satisfaction and the other job satisfaction measures

Measure of satisfaction	τ-b
Overall	1.0000
Work–life balance	0.5338
Hours worked	0.4826
Practice type	0.4467
Ability to take time off	0.4123
After-hours work	0.3936
Income	0.3859
Housing availability	0.3780
Cost of living	0.3615
On-call	0.3284
Continuing medical education	0.3271
Location	0.3054
Support staff	0.2982
Rural training	0.2663
Community incentives	0.2629
Clinic technology	0.2498
Spousal employment opportunities	0.2450

Discrete choice experiment

The DCE results reported here use data from the first question (the choice between job A and job B). A total of 82.4% of responses to the second question (job A, job B or current job) are for "current job," and 65% of respondents always chose "current job" for this question. The regression results from the mixed logit model[27] are shown in Table 9.

Rural training and spousal employment opportunities were not significant in the model. A 1-in-3 on-call ratio was not significantly different from a 1-in-2 ratio, although ratios less frequent than these were clearly preferred to a 1-in-2 ratio. The income coefficient does not have a standard deviation since it was specified to be a fixed variable, which is necessary for the willingness-to-pay calculations.[28]

Results of the rural specialties subsample were basically the same as the main results that included all specialties. The only difference in the subsample was that a 1-in-6 on-call ratio was not significantly different from a 1-in-2 on-call ratio. However, respondents in this subsample also clearly preferred less on-call to more, and so the insignificance of the 1-in-6 ratio is likely due to reduced sample size. Results for respondents with a Canadian undergraduate degree were also mostly the same as the results for the entire sample, with 2 exceptions. First, those with a Canadian undergraduate degree

Table 7: Ordered logit regressions with dependent variable "job satisfaction"

		Job satisfaction			
Attribute (base category)*	Level	Overall	On-call	Location I	Location II
Income		3.6×10^{-7}§	-1.2×10^{-7}	0.5×10^{-7}	0.8×10^{-7}
Hours		–0.2341§	–0.0153‡	–0.0133†	–0.0128†
Spousal employment opportunities (no)		0.3223	–0.0340	0.4330‡	0.5330‡
On-call		–0.0009	0.0212§	0.0022	0.0028
Rural training (none)		0.6258‡	0.0125	0.2386	0.2248
Housing availability (poor)	Adequate	0.0595	–0.2331	0.2932	
	Good	0.4762	0.1809	1.1652‡	
Location (small, far)	City	–0.0469	0.2087	0.5887	0.9794†
	Medium, close	–0.2636	–0.0672	0.7277	0.9882†
	Medium, far	–0.6120	–0.1084	–0.6060	–0.6494
	Small, close	–0.1156	–0.0472	0.3881	0.6110
Sex (male)		0.1944	–0.1564	0.4817‡	0.5613§
Age		0.0179†	–0.0068	0.0133	0.0156†
No. of observations		479	425	479	479
Pseudo-R^2		0.0517	0.0705	0.0689	0.0578

*Other covariates included practice type, community incentives, clinic technology, having children, being married and physician type; all were nonsignificant in these regressions.
†$0.05 < p \leq 0.10$.
‡$0.01 < p \leq 0.05$.
§$p \leq 0.01$.

significantly preferred "acceptable" employment opportunities for their spouse to "limited" or "some" opportunities. Second, they preferred small (population < 5000) towns within a 3-hour drive to Winnipeg to small towns more than a 3-hour drive to Winnipeg, whereas in the main results there was no significant difference between these. Hence, international medical graduates are likely to generally prefer larger towns to smaller ones, no matter how close the small towns are to the city.

Table 8: Ranking of attributes by respondents

	Ranking; no. (%) of respondents		
Attribute	Very important	Somewhat important	Not important
Income	**415 (78.6)**	109 (20.6)	4 (0.8)
Hours worked	**405 (78.3)**	104 (20.1)	8 (1.6)
Spousal employment opportunities	219 (44.6)	**241 (49.1)**	31 (6.3)
On-call	**443 (85.4)**	72 (13.9)	4 (0.8)
Type of practice	**272 (56.3)**	193 (40.0)	18 (3.7)
Rural training	104 (24.2)	**278 (64.6)**	48 (11.2)
Community incentives	96 (21.4)	**299 (66.6)**	54 (12.0)
Housing availability	**249 (51.6)**	217 (44.9)	17 (3.5)
Clinic technology	145 (32.5)	**257 (57.6)**	44 (9.9)

Table 9: Regression results from mixed logit model

Attribute (base category)	Level	Mean ± SD
Income		9.85×10^{-6}*§
Hours		–0.0956§ ± 0.0456§
Spousal employment opportunities (limited)	Acceptable	0.1453 ± 0.4996§
	Some	0.0277 ± 0.0656
On-call ratio (1-in-2)	1-in-8	0.9794§ ± 1.2037§
	1-in-6	0.3968‡ ± 0.4335†
	1-in-5	0.3955§ ± 0.5117§
	1-in-4	0.4133§ ± 0.5763§
	1-in-3	–0.1310 ± 0.2232
Practice type (hospital-based)	Interprofessional	0.0218 ± 0.4143§
	Group	0.5253§ ± 0.3565‡
	Solo	–0.6258§ ± 0.3098
Rural training (none)	Periodic	0.0792 ± 0.0633
	One-time	–0.0352 ± 0.1597
Community incentives (none)	Continuously	–0.0055 ± 0.3447‡
	During first year	0.2080‡ ± 0.2282‡
Housing availability (poor)	Adequate	0.3110‡ ± 0.3572§
	Limited	0.0435 ± 0.0279
Clinic technology (no technology)	Electronic medical record and telehealth	0.2497§ ± 0.2112
	Electronic medical record	0.1054 ± 0.3849§
Location (population < 5000, > 3-hr drive to Winnipeg)	Population 5000–15 000, ≤ 3-hr drive to Winnipeg	0.5301§ ± 0.1643
	Population 5000–15 000, > 3-hr drive to Winnipeg	–0.2825§ ± 0.0144
	Population < 5000, ≤ 3-hr drive to Winnipeg	0.0392 ± 0.2581
Constant		–0.0175

SD = standard deviation.
*The income coefficient does not have an SD since it was specified to be a fixed variable, which is necessary for the willingness-to-pay calculations.[28]
†$0.05 < p \leq 0.10$.
‡$p \leq 0.01$.
§$0.01 < p \leq 0.05$.
Number of observations = 4169, Akaike information criterion = 4783.5, Bayesian information criterion = 5074.9, pseudo-$R^2 = 0.1882$.
Levels are effects coded, so the base-case coefficient is the negative sum of the included levels.[30]

Table 10 shows willingness to pay to avoid moving from a better level to a less desirable level. Willingness to pay was calculated from the coefficients of the mixed logit model and is interpreted as the amount of annual income that physicians would need to be given in order to compensate them for a move to less desirable levels. Variables that were not statistically significant are not included in Table 10.

The results show that, for example, a physician would be willing to give up $308 000 in annual income to avoid moving from a 1-in-8 on-call ratio to a 1-in-2 on-call ratio, all else being equal. The income range in the DCE was $250 000 to $500 000, so the average income was $375 000. Hence, $308 000 corresponds to 82% of annual average income. The same interpretation applies to the other results. For hours worked, physicians would be willing to give up $9700 of their annual salary not to work an extra hour per week, which works out to an hourly wage of about $183. This is 37% higher than the imputed average hourly wage of $134.

The willingness-to-pay values for the 2 subsamples (rural specialists and physicians with a Canadian undergraduate degree) were not substantially different from those for the entire sample, although the rural specialists' willingness to pay was generally greater in magnitude. The willingness to pay not to work an extra hour per week, for example, was $222.56 for the rural specialists and $189 for physicians with a Canadian undergraduate degree. Another notable difference for the rural specialists subsample was a much higher willingness to pay to avoid moving from a 1-in-8 on-call ratio to a 1-in-2 on-call ratio (96% of income compared to 82% for the entire sample).

DISCUSSION

The survey was completed by nearly 25% of all physicians in Manitoba. The sample of respondents was largely representative of the physician population in Manitoba.[4] The proportion in each age group in the sample roughly corresponded to the Manitoba average.[29] The DCE questions yielded about 4300 usable responses, which is more data than required by a number of measures.[31,32] When respondents had the option to choose "current job" in the second DCE question, 65% of them always chose it, which is consistent with other DCEs that included a "current job" option.[33]

The results echo those in the literature, which indicates that income, hours worked and on-call duties are among the most important attributes for recruitment and retention.[6,33] Careful consideration toward maintaining a good work–life balance as well as ensuring professional interaction are recognized as important considerations for health workforce planning.[34]

There are several important outcomes and policy implications from the survey. First, on-call is a significant contributor to job (dis)satisfaction; anything less than a 1-in-4 ratio was highly undesirable, while anything more than 1-in-4 (up to 1-in-6) was not worth any additional income. A 1-in-8 ratio was worth about 15% of annual income more than a 1-in-4, 1-in-5 or 1-in-6 ratio. Financial incentives for frequent on-call duties (1-in-3 or more) would

Table 10: Willingness to pay to avoid moving from a better level to a less desirable level

		Willingness to pay	
Attribute	Level change	$/yr	% increase/yr
Hours	Increase by 1 hr/wk	9700	2.6
On-call ratio	From 1-in-8 to 1-in-2	308 000	82.1
	From 1-in-6 to 1-in-2	249 000	66.4
	From 1-in-5 to 1-in-2	249 000	66.4
	From 1-in-4 to 1-in-2	250 000	66.7
Practice type	From group to solo	117 000	31.2
	From hospital-based to solo	71 500	19.1
Community incentives	From during first year to none	41 700	11.1
Housing availability	From adequate to poor	67 600	18.0
Clinic technology	From electronic medical record and telehealth to no technology	61 400	16.4
Location	From medium and close to medium and far	82 500	22.0
	From medium and close to small and far	83 000	22.1

have to be very large: 66% of annual income for those with 1-in-4 on-call duties or less frequent to accept a 1-in-3 or 1-in-2 ratio, and 82% of annual income for those with an on-call frequency of 1-in-8 to accept the same ratios. Other policy options (such as alternating on-call duties between different clinics) would likely be needed. Furthermore, an on-call ratio of 1-in-4 was a threshold, with anything less frequent (up to 1-in-6) being valued equally by the respondents. This is lower than the Society of Rural Physicians of Canada's recommendation that on-call schedules include at least 5 participating physicians.[35]

Several of the attributes that reflected the need for professional and social inclusion were found to be important: group practice, community incentives (during the first year) and access to clinic technology, particularly telehealth. Physicians preferred group practices to hospital-based and solo practices, with group practices being the most preferred. Physicians working in a hospital-based practice would need to be compensated 19% of annual income to work solo, and physicians in a group practice would need over 30%. Community incentives during the year were worth 11% of annual income, and clinic technology that includes both electronic medical records and telehealth, 16%. These are sizable valuations and suggest that investments that connect rural physicians professionally (and socially) are worthwhile.

Adequate housing availability was important, although no significant difference was found between "poor" and "limited;" this may have been due to the wording of the DCE levels. Adequate housing was worth about 18% of annual income, which emphasizes the importance of aspects of life outside work. Location mattered: medium-sized towns within a 3-hour drive of Winnipeg were the most preferred, and small and medium-sized towns more than 3 hours from Winnipeg were the least preferred. Most of the towns that fit the "medium and far" description are northern communities (Thompson, The Pas, Flin Flon), with the exception of Dauphin (a 3.5-hour drive). City as a level was deliberately excluded as an option in the DCE to avoid respondents' choosing jobs based only on this and ignoring the other attributes. Finally, hours worked was important: 1 additional hour was valued at $183, and hours worked also played a consistent role in the job satisfaction questions. The imputed average hourly wage in the sample was $134, so additional hours were valued about 37% above the average gross hourly wage.

The willingness-to-pay results of the DCE show possible trade-offs to compensate for less desirable job attributes. For example, a physician in a hospital-based practice with no clinic technology is almost compensated for a move to a solo practice by having all technology available, since the compensation required for moving from a hospital-based practice to a solo practice ($71 500) is just slightly higher than the willingness to pay to trade off no technology for electronic medical records and telehealth ($61 400). Along the same calculations, changing all attribute levels to their best possible level is only just enough compensation to accept a 1-in-2 on-call ratio over a 1-in-8 ratio, further underscoring the burden of high on-call frequency and the need for other solutions.

Limitations

There are several limitations. First, other factors affect rural life, such as social interactions, recreation, children's education and cultural aspects. These may be more important for certain physicians, such as international medical graduates, who come to Canada from different cultures. This survey elicited preferences only for certain aspects of rural life and work; however, these were chosen in discussion with physicians and policy-makers who are familiar with rural practice and so are likely to be among the most influential, at least for Manitoba. Second, the survey was sent only to physicians in Manitoba, so the results may not be generalizable to other jurisdictions. However, since Manitoba's rural communities are characterized by above-average isolation from metropolitan zones[36] and a cold climate, the estimates reported here likely form an upper boundary on the incentives required for physicians to accept these job attributes. Third, the terminology to describe the attributes was sometimes a catchall. For example, "community incentives" can include a variety of incentives, ranging from complementary community club memberships for the physician and family to initial provision of office staff paid by the community. Future research should include a deeper investigation into specifying what these attributes should incorporate.

CONCLUSION

This is a comprehensive and methodical study of rural job preferences in Manitoba, where the problem of rural recruitment and retention is acute. The results show that financial compensation for high on-call frequency is very expensive, if valued appropriately. Other undesirable job attributes are compensable; for example, for a physician to work in a

solo or hospital-based practice rather than a group practice, improving clinic technology would be a feasible solution.

The paper makes 2 main contributions. First, it presents comprehensive information regarding preferences for rural job attributes and incentives collected from physicians in Manitoba. Second, the methodology has provided monetary valuations of nonpecuniary benefits, showing the amount of compensation required for certain job attributes, which can be used to design more successful rural incentive packages.

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Appendix 1: Attributes and levels used in the discrete choice experiment

Attribute	Level
Remuneration, $	500 000
	450 000
	400 000
	350 000
	300 000
	250 000
Hours worked per week	35
	45
	55
	65
Spousal employment opportunities	Acceptable
	Some
	Limited
On-call ratio	1-in-8
	1-in-6
	1-in-5
	1-in-4
	1-in-3
	1-in-2
Type of practice	Interprofessional
	Group
	Solo
	Hospital-based
Additional rural training	Periodic sessions
	One-time session
	None
Community incentives	Provided continuously while working in community
	Provided during first year of work in community
	None offered
Housing availability	Adequate
	Limited
	Poor
Clinic technology	Electronic medical record and telehealth facilities
	Electronic medical record
	No existing e-health technology
Location	Population 5000–15 000; ≤ 3-hr drive to Winnipeg
	Population 5000–15 000; > 3-hr drive to Winnipeg
	Population < 5000; ≤ 3-hr drive to Winnipeg
	Population < 5000; > 3-hr drive to Winnipeg