SELECTED FINDINGS: FEEDBACK TO THE SURVEY ON RURAL HEALTH PRACTICE IN CANADA, 2001

This appendix describes in detail selected findings from feedback to the Survey on Rural Health Practice in Canada, 2001. The following issues are addressed:

1. Satisfaction with Rural Practice
2. Services Provided in the Rural Community
3. Recruitment and Retention
4. Telehealth
5. Defining Rural/Remote
6. Retention Predictors for Healthcare Professionals in Rural/Remote Communities

1. Satisfaction with Rural Practice

1.1 Introduction

The following sections of this report provide detailed analysis of nurses', physicians', and pharmacists' feedback on their satisfaction with both professional and personal aspects of rural life.

1.2 Summary: Comparison Between Professional Groups

Rural health professionals were asked to rate their level of satisfaction with respect to professional and personal aspects of rural practice.

With respect to professional issues, the majority of health care providers polled were somewhat or very satisfied with the hospital services in their community; figures ranged from 63% to 69%, depending on the provider group.

There were differences among the providers for other professional factors. Physicians were the least satisfied with their hours worked (47%) compared to 62% of registered nurses (RNs). Pharmacists were the most satisfied with their earning potential (63%) compared to only 37% of licensed practical nurses (LPNs). Less than half of the LPNs were content with consultation/advice they received from their profession, and RNs were the least satisfied with coverage/vacation relief provided by their nursing colleagues.

There appeared to be more consistency in how the professionals rated their satisfaction with personal factors. The majority had a strong sense of belonging to, and being appreciated by, the community, although pharmacists led the group with over 80% satisfied with both these factors. LPNs were the least likely to feel appreciated at 65%.

The provider groups rated recreational aspects of rural life in a similar manner, with the majority satisfied. Less than half, however, reported being satisfied with cultural opportunities. Physicians were the least satisfied with education opportunities for children (39%). Less than half of all professional groups were satisfied with job

opportunities for their spouse and very few were satisfied with career opportunities for their children (13% to 21%).

1.2.1 Physicians

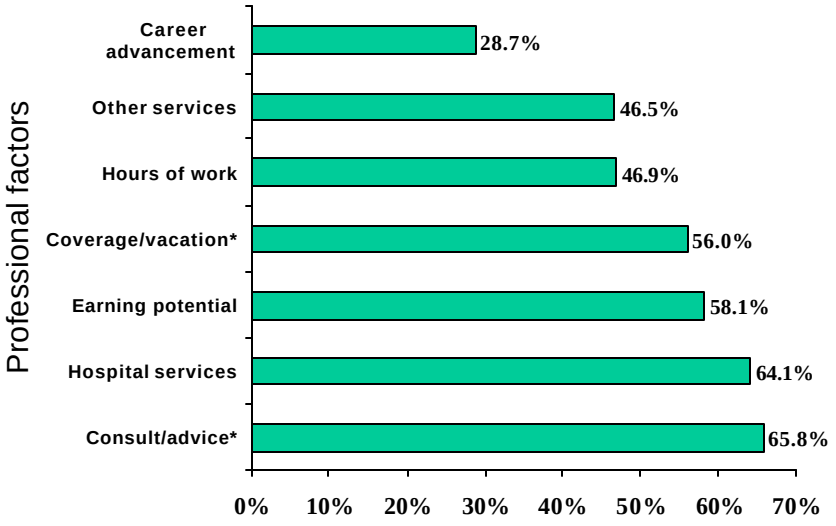
For every personal and professional factor listed in the survey, the percentage of physicians who were somewhat or very satisfied was greater than the percentage of those who were somewhat or very dissatisfied. The rest chose to remain neutral. The one exception, however, was with respect to opportunities for career advancement, which had equal numbers of respondents who were satisfied and dissatisfied (28%).

Two-thirds of rural physicians were somewhat or very satisfied with the consultation and advice they received from their physician colleagues and satisfaction with hospital services was almost as high (64%). The majority of respondents were satisfied with their earning potential (58%) and coverage/vacation relief provided by other members of their profession (56%). Less than half of all respondents were satisfied with their hours of work (47%). Chart 1 provides an overview of feedback from rural physicians on their satisfaction with professional factors.

CHART 1

Physicians: Satisfaction with Rural Practice, Professional Factors

Percent reporting somewhat or very satisfied



* provided by other physicians

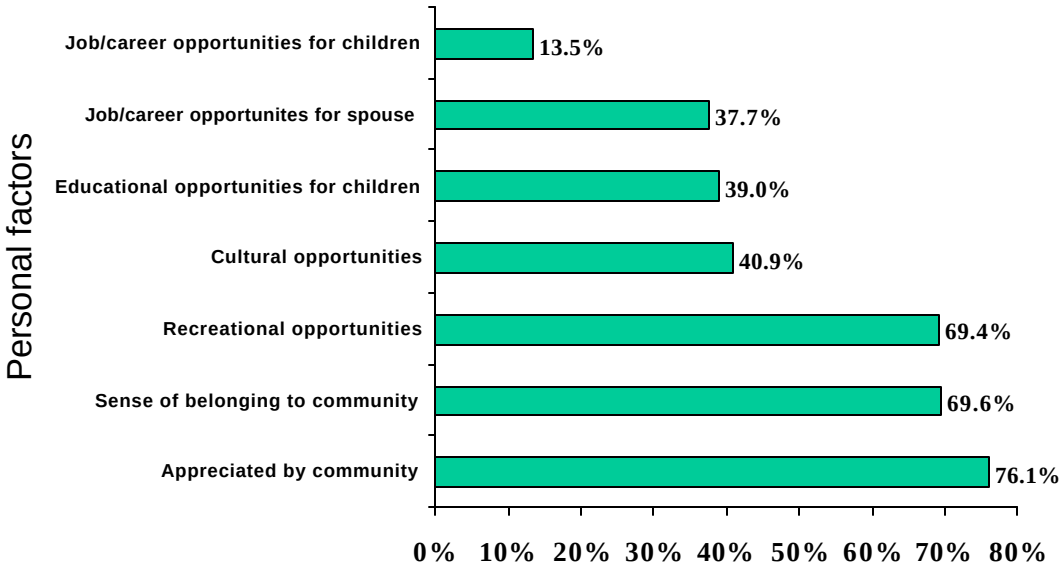
Source: Survey on Rural Health Practice in Canada, 2001

More than three-quarters of physician respondents (76%) reported feeling appreciated by the community and 70% had a sense of belonging. Close to 70% were satisfied with the recreational opportunities that rural life offered, but this dropped to 41% when asked about cultural opportunities. Thirty-nine percent (38%) were satisfied with educational opportunities for children and almost the same (38%) were satisfied with job/career opportunities for their spouse. Only 14% were satisfied with job/career opportunities for children. Chart 2 illustrates the percentage of physicians who are satisfied with the various personal factors listed in the survey, which could affect rural life.

CHART 2

Physicians: Satisfaction with Rural Practice, Personal Factors

Percent reporting somewhat or very satisfied



Source: Survey on Rural Health Practice in Canada, 2001

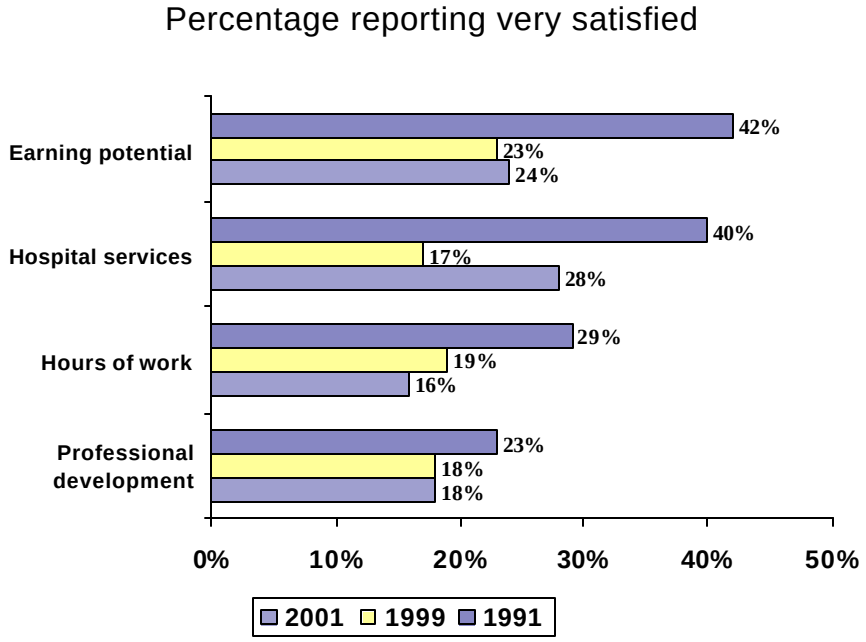
There was no appreciable difference between male and female physicians in the percentage of those satisfied with professional life, nor between those who lived in small (less than 5000) versus large (5000+) rural communities. Those in the smaller communities, however, were much less satisfied with some of the personal factors associated with rural life; for example, 57% were dissatisfied with job/career opportunities available for their children compared with 42% in the larger rural communities. Similarly, there was significantly more dissatisfaction with cultural opportunities (45% vs. 34%), educational opportunities for children (40% vs. 27%), and job/career opportunities for spouse/partner (36% vs. 26%).

Specialists seemed concerned about lack of opportunities for continuous professional development with 42% reporting dissatisfaction, compared to 31% for family physicians.

Due, however, to the small number of specialists reporting (n=132), the difference is statistically significant only at the 90% confidence level.

CHART 3

Physicians: Satisfaction with Rural Practice, Professional Factors



Note: Small differences are not statistically significant

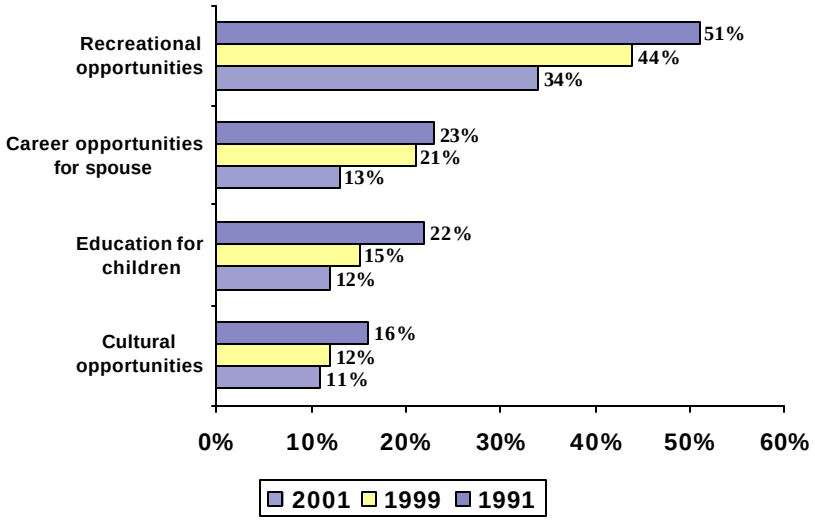
A few of the personal and professional factors could be tracked from earlier surveys. For all comparable factors, there was a decrease in satisfaction between 1991 and 2001. As shown in Chart 3, the percentage of physicians who were *very* satisfied with hospital services dropped significantly from 40% in 1991 to 28% in 2001. Similarly, 42% of respondents were very satisfied with their earning potential in 1991, compared to 24% in 2001. Only 16% were very satisfied with their hours of work in 2001, down considerably from almost 30% in 1991.

Chart 4 shows that the personal factors showed the same trend. Fewer physicians were very satisfied with recreational opportunities (34% vs. 51%). Educational opportunities for children fell from 22% being very satisfied in 1991 to 12% in 2001. The percentages were almost identical for job/career opportunities (23% vs. 13%).

CHART 4

Physicians: Satisfaction with Rural Practice, Personal Factors

Percentage reporting very satisfied



Note: Small differences are not statistically significant

1.2.2 Nurses

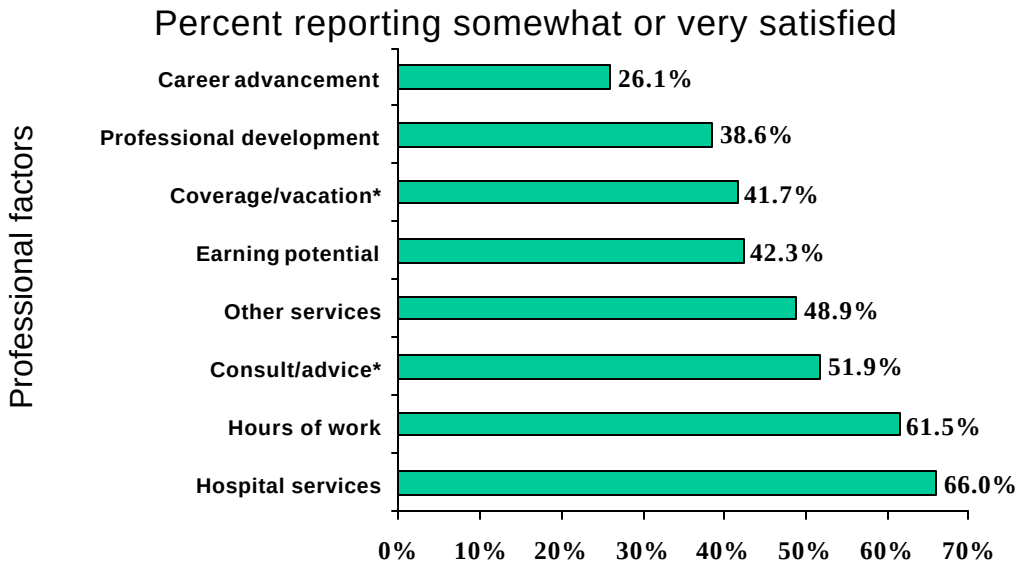
With respect to professional issues, nurses appear to be quite satisfied with the availability of hospital services (66%) and their hours of work (62%), as shown in Chart 5. Just over half (52%) were satisfied with the support (consultation/advice) they receive from colleagues in their profession. No other professional factors showed satisfaction of at least 50% of the nurse respondents. Earning potential, as well as coverage/vacation relief provided by other nurses, was ranked as satisfactory by 42% of the nurses polled.

Satisfaction with opportunities for professional development (39%) and consultation/ advice provided by other healthcare professions (38%) followed. Opportunities for career advancement rated lowest, with one in four rural nurses (26%) being satisfied.

Responses from RNs and LPNs differed in a few respects. RNs were more likely to be satisfied with their earning potential (47%) than were LPNs (37%). LPNs were happier than RNs with non-hospital services (54% vs 44%), as well as coverage/vacation relief (47% vs 36%).

CHART 5

All Nurses: Satisfaction with Rural Practice, Professional Factors



* provided by other nurses

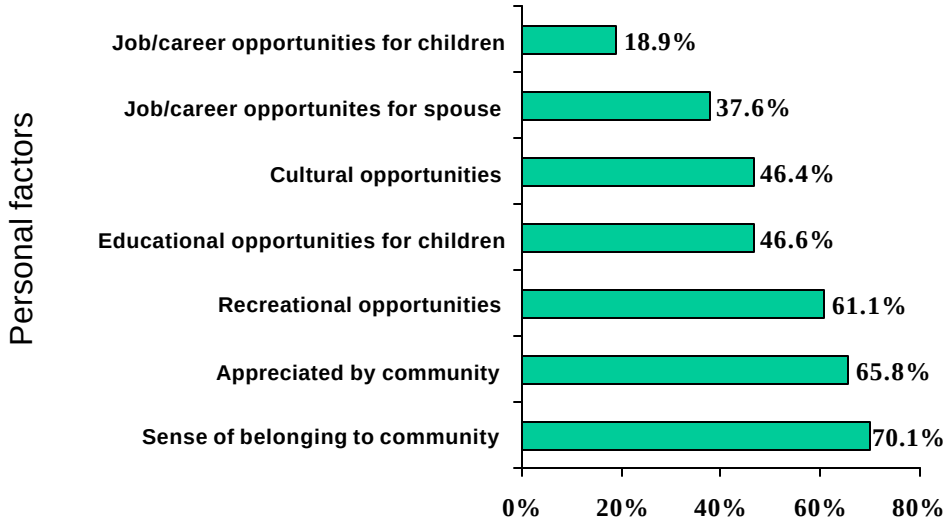
Source: Survey on Rural Health Practice in Canada, 2001

Satisfaction ratings of personal factors, as shown in Chart 6, were very similar between RNs and LPNs in every instance. More than 60% were content with recreational opportunities, but this fell to 46% when asked about cultural opportunities. Also, rural nurses were more satisfied with job opportunities for their spouses (38%) than they were for their children's careers (19%). There was a strong sense of belonging to their community (70% satisfied) and being appreciated (66%).

CHART 6

All Nurses: Satisfaction with Rural Practice, Personal Factors

Percent reporting somewhat or very satisfied



Source: Survey on Rural Health Practice in Canada, 2001

1.2.3 Pharmacists

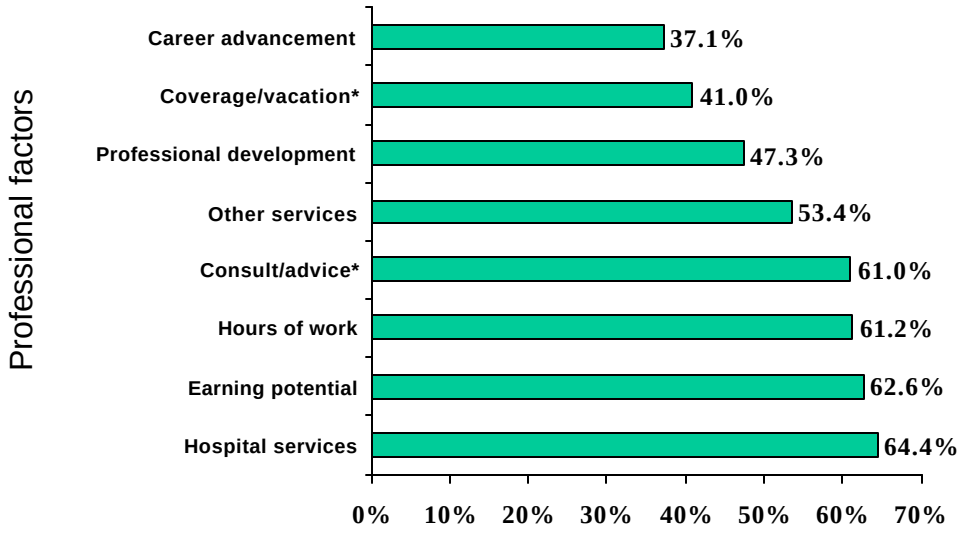
For the most part, rural pharmacists seem quite content with both their professional and personal lives. In particular, they reported a strong sense of belonging to and being appreciated by their communities. As previously mentioned, over 80% of all pharmacists reported being satisfied with this aspect of rural life.

Sixty-four percent (64%) were satisfied with the availability of hospital services, and 61% were content with the consultation and advice they received from other members of their profession. The profession was not as satisfied (35%), however, with the level of support from colleagues for coverage and vacation relief.

CHART 7

Pharmacists: Satisfaction with Rural Practice, Professional Factors

Percent reporting somewhat or very satisfied



* provided by other pharmacists

Source: Survey on Rural Health Practice in Canada, 2001

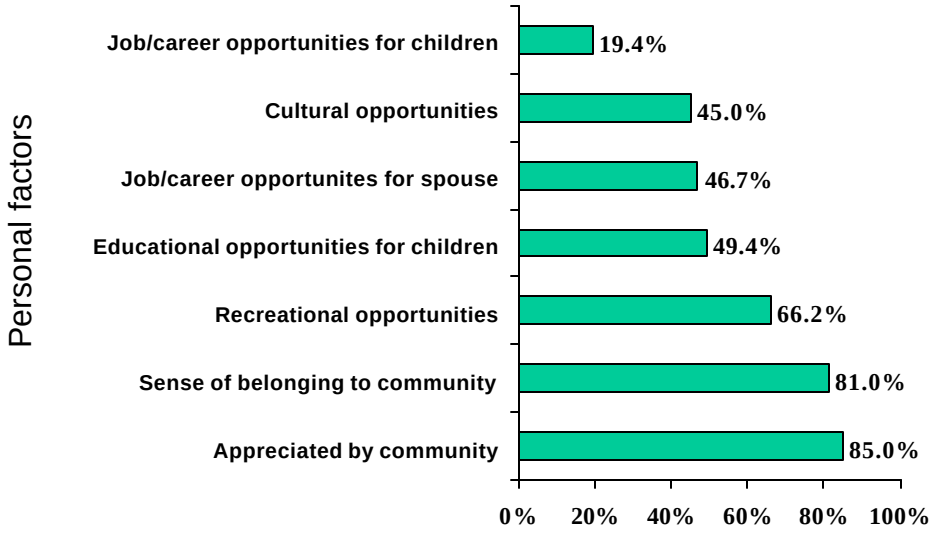
Hours of work did not appear to be an area of strong dissatisfaction for rural pharmacists (only 8% very dissatisfied), and earning potential in rural areas appeared to be good (63% satisfied). Although expressing satisfaction generally, pharmacists were more divided with respect to opportunities for professional development (47% satisfied; 38% dissatisfied) and career advancement (37% satisfied; 22% dissatisfied).

In terms of personal and family factors (refer to Chart 8), rural pharmacists were generally either neutral or satisfied with their personal and family lives. The only exception was job/career opportunities for children, which rated only 19% satisfaction.

CHART 8

Pharmacists: Satisfaction with Rural Practice, Personal Factors

Percent reporting somewhat or very satisfied



Source: Survey on Rural Health Practice in Canada, 2001

2. Services Provided in the Community

A clear majority of all providers reported having ambulance (92%), pharmacy (91%), dentistry (77%), laboratory (75%) and x-ray (75%) services always available in their communities or available most of the time. Physicians were most likely to be in communities with these services and pharmacists the least likely (with the exception of pharmacy services). Only 61% of pharmacists reported having x-ray or lab services usually available, compared to between 80% and 86% of nurses and doctors. It should be noted, however, that pharmacists were the most likely to live in communities of less than 2000 (39%), compared with nurses (33%) and physicians (22%). These smaller communities may be less likely to have these services available.

The biggest gaps in services appeared to be with respect to dialysis, cancer therapies and some radiology services. Sixty-five percent (65%) of all respondents did not have any dialysis service in their communities. More than 80% had no access to radiotherapy in their communities and 45% had no chemotherapy services available. According to almost three quarters (74%) of rural health care professionals, a CT scanner was not present in their communities, and mammography was listed as unavailable by 47%. Forty percent (40%) reported that ultrasound was not among their community services.

3. Recruitment and Retention

Community success in the recruitment and retention of healthcare providers was answered by each respondent for all the professional groups, but the analysis presented here assumes that each group would know the success among their own profession best.

Only one fifth (21%) of nurses felt that their communities were successful in recruiting RNs, and virtually the same proportion (22%) reported success in retaining these professionals in their communities. Thirty percent (30%) of rural nurses, however, reported success in both recruiting and retaining LPNs (or equivalent).

For rural pharmacists, 42% believed that their communities were successful in recruiting pharmacists and 48% reported success in retaining these professionals in the community.

In terms of recruiting GP/FPs, 35% of physicians believed that their communities have been successful*;* however, only 14% indicated success in recruiting specialists. Similarly, 36% of physicians reported success in the retention GP/FPs, whereas only 17% reported success in retaining specialists.

4. Telehealth

More than 30% of respondents indicated that continuous professional development was a telehealth service that was available in their community, with an additional 8% indicating that it is available but not utilized. Those indicating the availability of telehealth for other purposes was fairly low. Only 14% reported having telehealth available for assessment and triage, and 16% reported the ability to perform diagnostic imaging. Uptake was higher for health information and advice for the consumer (29%), patient treatment and management (23%), and counseling services (21%). For all of these services, there was an additional 3% to 4% that said the service was available but not utilized.

5. Defining Rural/Remote

The 2001 Survey on Rural Health Practice in Canada asked respondents to choose 5 factors (from a total of 16), in no particular order, that they believed were most important in defining a community as rural/remote from a healthcare perspective. Respondents were not asked to rank the factors they chose; therefore, any reference to placement or ranking in the analysis is based strictly on the aggregate number of mentions.

5.1 Factor Ranking by Professional Group

When the number of mentions for each factor was compiled and examined, certain differences and similarities were revealed in the ranking of the factors between the professional groups, as seen in Table 1.

Table 1: Factor Rank by Professional Group

Factor	All n=2993	MDs n=887	RNs N=500	LPNs n=535	Pharms n=1019
	Factor rank (1=most mentions)				
Long distance to a secondary referral centre	1	1	2	1	2
Barriers (geography/weather/roads)	2	2	1	4	3
Insufficient health care providers	3	6	4	3	1
Inability to provide obst, gen surg, anesthesia, etc.	4	5	5	2	4
Long distance to a tertiary referral centre	5	3	3	7	9
High level of on-call responsibilities	6	4	7	9	7
Difficulty in obtaining locums	7	9	8	5	5
Lack of equipment such as x-rays, lab	8	7	11	10	6
Limited/non-existent public transportation	9	10	6	8	8
Sparsely populated catchment area	10	8	10	15	10
High turnover rate of healthcare providers	11	11	14	10	11
Limited or restricted ambulance service	12	12	9	14	12
Lack of capacity to utilize equipment	13	14	13	6	13
Insufficient continuous professional development	14	13	11	12	14
Lack of access to telecommunication	15	15	15	13	15
Limited opportunity for sabbaticals	16	15	16	16	16

Note: Rankings will repeat when the number of mentions is identical.

Although the rankings differed slightly, the 10 most frequently mentioned factors were very similar among all the professional groups. It should, however, be noted that, for the RNs, "lack of equipment" placed eleventh and "limited/restricted ambulance service" was included in their top 10. Also, among LPNs where "sparsely populated catchment" rated only fifteenth, "lack of capacity to utilize equipment" placed sixth.

5.1.1 Physicians: Analysis

The five most frequently mentioned factors that physicians felt defined a community as rural were (in rank order):

1) long distance to secondary referral centre
2) barriers (geography/weather/roads) to timely access to healthcare services
3) long distance to a tertiary referral centre
4) high level of on-call responsibilities
5) inability to provide services such as obstetrics, general surgery, and anaesthesia

The top five factors chosen by physicians represented over half of all mentions (54%), while the top 10 captured 85%. Sixty-three percent (63%) of all physician respondents chose "long distance to secondary referral centre" as one of the 5 factors that they felt define a community as rural. Male physicians' responses followed this order, whereas females ranked "lack of equipment such as x-rays and lab services" among the top 5. For female physicians, "inability to provide services such as obstetrics" placed 6th , and so the difference between males and females was not great. The top 10 factors for male and female physicians were the same, although not necessarily in identical rank order.

There was strong agreement among regions as to the 5 most frequently cited factors. The only differences were in central Canada, where Quebec respondents ranked "lack of equipment" as fourth compared with 10th for Ontario. Ontario was the only region where physicians included "'insufficient health care providers" among their top 5.

For their top 5 factors in defining rural/remote, physicians in both the 35-44 and the 45-54 age groups chose the same 5 factors identified by the physician group as a whole. For younger physicians (less than 35) "lack of equipment" placed 5th; older physicians (55-64 and 65+) ranked "difficulty obtaining locums" among the top 5. The oldest category (65+) did not see barriers as an important factor, ranking it only 10th while "sparsely populated catchment area" placed 5th.

The 4 most frequently mentioned factors were identical for both family physicians and specialists, even in terms of relative ranking. The top 10 factors were the same, although the ranking was not identical. Among specialists, "sparsely populated catchment area" was cited frequently and placed 5th on their list, compared to 8th for family physicians. "Lack of equipment" was mentioned often enough by family physicians to place 6th compared to 9th for specialists.

5.1.2 Registered Nurses, Nurse Practitioners, Advanced Practice Nurses: Analysis

The number of responses (n=21) from nurse practitioners and advanced practice nurses was too small to analyze separately. These practitioners have been included with the RNs for the purpose of this analysis.

The five most frequently mentioned factors that RNs felt defined a community as rural were (in rank order):

1) barriers (geography/weather/roads) to timely access to healthcare services
2) long distance to secondary referral centre
3) long distance to tertiary referral centre
4) insufficient healthcare providers
5) inability to provide services such as obstetrics, general surgery, and anesthesia

Over half of all mentions were captured in these top 5 factors (52%), and 80% were included when looking at the 10 most frequently indicated factors.

All age groups of RNs placed "barriers to timely access…" first and "long distance to secondary referral centre" as second. The only difference in the selection of the top 5 factors was "limited or non-existent public transportation" which was considered much more important among nurses 55 or older (placed 4th) than with the youngest age group (<35), where it placed 11th.

It was not feasible to poll nurses in Quebec; therefore, Quebec is not included in the regional analysis. Respondents in all regions indicated "barriers" as the number one factor that defines a community as rural. In Atlantic Canada, British Columbia (BC) and the territories (this includes Yukon, Northwest Territories and Nunavut), "long distance to a secondary referral centre" placed second, and for Ontario and the Prairie regions it placed third.

Respondents in 3 of the regions (Ontario, Prairies, BC and the Territories) ranked "inability to provide services…" as 4th. Nurses in Atlantic Canada did not consider it as important a factor as it placed 7th on their compiled list. A "sparsely populated catchment area" was seen by BC and the Territories' nurses as much more important in defining a rural community (8th place) compared to the Prairies, where it was the third least mentioned factor (14th).

5.1.3 Licensed Practical Nurses, Registered Practical Nurses, Nurse Assistants: Analysis

For the purpose of this analysis, licensed practical nurses, registered practical nurses and nurse assistants will all be referred to as LPNs.

The five most frequently mentioned factors that LPNs felt defined a community as rural were (in rank order):

1) long distance to a secondary referral centre
2) inability to provide services such as obstetrics, general surgery and anaesthesia
3) insufficient healthcare providers
4) barriers (geography/weather/roads) to timely access to healthcare services
5) difficulty in obtaining locums (temporary or casual professional staff)

These 5 categories comprised over half (51%) of all mentions. Sixty-two percent (62%) of respondents chose "long distance to secondary referral centre" more often than any other factor as defining a community as rural.

For all age groups, the same factors were included among the 4 most frequently mentioned, although not with identical order of magnitude. For the older LPNs (45-55 and 55+), "limited/non-existent public transportation" was included among their most commonly mentioned factors, but this factor placed only 14th among young LPNs (<35years).

Young LPNs were more likely than other age groups to include "limited/restricted ambulance service" among the factors they selected as defining a community as rural. This factor placed within the top 10 compared to 13th or 14th position for all other age groups.

It was not feasible to poll nurses in Quebec so that province is not included in the regional analysis. There were no regional differences in those factors that had sufficient mentions to place in the top 4 and, for every region, "long distance to a secondary referral centre" was the most popular choice.

Ontario respondents were less likely than those in other regions to define a rural community by the difficulty in obtaining locums. This factor placed 10th in Ontario compared to 5th or 6th for the other regions. Instead, Ontario respondents placed "limited non-existent public transportation" 5th compared to the 12th place position it held in the BC region.

Survey respondents in BC and the Territories were more likely to place "high turnover rate of healthcare providers" as defining a community as rural. This factor was mentioned often enough to place it 6th on the list whereas respondents in the Atlantic region, it placed 14th.

LPNs in the Prairie region included "high level of on-call responsibilities" among the top 5 compared to a relative placement of 13th in Ontario.

5.1.4 Pharmacists: Analysis

Both community and hospital-based pharmacists were surveyed. While the number of responses from hospital pharmacists was too small for in-depth analysis (n=102), there did appear to be at least one significant difference between the two groups in the overall placement of the factors that best define a community as rural. Forty-two percent (42%) of hospital pharmacists mentioned "long distance to a tertiary referral centre" among their 5 choices. This is considerably more than the 22% of community pharmacists who mentioned it.

For the remaining analysis below, responses from the 2 pharmacists groups have been combined.

The 5 most frequently mentioned factors that pharmacists felt defined a community as rural were (in rank order):

1) insufficient health care providers
2) long distance to a secondary referral centre
3) barriers (geography/weather/roads) to timely access to healthcare services
4) inability to provide services such as obstetrics, general surgery and anesthesia
5) difficulty in obtaining locums (temporary or casual professional staff)

The top five factors represented over half of all mentions (51%); the top 10 captured 80%. Fifty-seven percent of all pharmacist respondents identified "insufficient healthcare providers" as one of the 5 factors that they felt identified as defining a community as rural.

Older pharmacists placed "lack of equipment such as x-ray and lab" much lower (12th), compared with 6th or 7th for the other age groups; however, given the small sample size of this group (n=48), the results are not necessarily significant.
There were slight regional differences in the top 5 factors. Quebec included "lack of equipment", which in the Prairies ranked 8th. The 5th place position in the Prairies was "high level of on-call responsibilities" which was ranked 11th in Quebec.

There was a wide range of opinion with respect to "high turnover rate of health care providers", ranging from 7th place in the Atlantic region, to 12th in Ontario.

5.2 Factor Ranking by Region

The number of mentions for each factor was also examined by certain region. The results can be seen in Table 2.

To improve comparability, Quebec was excluded from the regional analysis since it was not feasible to survey RNs or LPNs in that province.

Respondents in all 4 regions mentioned "long distance to a secondary referral centre" and "barriers to timely access" the most often. For all regions except BC and the territories, the 3rd most frequently mentioned factor was "insufficient health care providers". For BC, 3rd place was held by "inability to provide obstetrical, general surgery and anesthesia services."

Due perhaps to the geography of the Atlantic region, respondents from this region did not feel strongly that "long distance from a tertiary centre" defined a community as rural. It placed 8th on their list compared with 4th or 5th for the other regions.

Table 2: Factor Rank by Region (all professional groups combined)

Factor	Atlantic N=540	Ontario n=643	Prairies N=968	BC & terr n=467
	Factor rank (1=most mentions)			
Long distance to a secondary referral centre	1	1	1	2
Barriers (geography/weather/roads)	2	2	2	1
Insufficient health care providers	3	3	3	6
Inability to provide obst, gen surg, anes, etc	4	5	4	3
Long distance to a tertiary referral centre	8	4	5	4
High level of on-call responsibilities	5	7	6	5
Difficulty in obtaining locums	6	8	7	7
Lack of equipment such as x-rays, lab	7	9	8	8
Limited/non-existent public transportation	9	6	9	11
Sparsely populated catchment area	10	10	12	9
High turnover rate of healthcare providers	11	13	10	10
Limited or restricted ambulance service	13	11	13	14
Lack of capacity to utilize equipment	12	12	11	13
Insufficient professional development	14	14	14	12
Lack of access to telecommunication	15	16	15	15
Limited opportunity for sabbaticals	16	15	16	16

Note: Quebec was excluded from the regional analysis since it excluded LPNs.

6. Predictors of Healthcare Professionals' Intention to Remain in the Community

6.1. Background

One of the questions asked in the Survey on Rural Health Practice in Canada, 2001 was, "Do you plan to be in practice in the community in 2 years' time?" Feedback to this question provided an excellent opportunity to determine the predictors of healthcare professionals' intention to remain in the community.

6.2. Methodology

The following variables, also collected in the survey, were used to determine the predictors of a health professional's intent to remain in the community in which he or she was practising at the time of the survey. The analyses were done for the population as a whole and then for each of the 3 professional groups, i.e., nurses, physicians and pharmacists.

Scores on questions relating to satisfaction with professional and personal aspects of life in the community were summed to produce total satisfaction scores for each of the personal and professional aspects. While using these 2 scores in the multivariate analysis would be more powerful than using each of the 17 satisfaction questions as separate variables, this would not truly indicate specific aspects of personal and professional life that could be targeted when developing retention strategies in rural communities. For this reason, a factor analysis was undertaken to produce a smaller number of variables consisting of similar questions.

Chi-square tests and independent t-tests were used to test for differences between those who planned to stay and those who did not for categorical and interval/ratio variables respectively. This was done for the whole sample and then within each professional group. All p-values smaller than or equal to 0.15 are reported.

Multivariate, hierarchical, logistic regression analysis was then done including only variables with p values less than or equal to 0.15. The -2 log likelihoods were used to check the incremental benefit (gain in prediction accuracy) of adding community factors to personal factors in the model.

6.3. Results

6.3.1 Univariate Analyses

The impact of continuous variables was studied using independent t-tests and chi-square tests. The total number in the data base for whom information on "Plan to be in community in 2 years" was available was 2922.

Table 3. Potential Predictor Variables

Variable	Coding/level of measurement
Years practicing in present community	Interval/ratio
Live in community of practice? (yes, no)	Cat (yes/no)
Size of community	Interval/ratio
Distance to population centre of 100,000+	Interval/ratio
Availability of hospital services	Cat (1 Very Dissatisfied, 2 Somewhat Dissatisfied, 3 Neither Satisfied nor Dissatisfied, 4 Somewhat Satisfied, 5 Very Satisfied)
Availability of other services	Cat (1 Very Dissatisfied, 2 Somewhat Dissatisfied, 3 Neither Satisfied nor Dissatisfied, 4 Some what Satisfied, 5 Very Satisfied)
Own profession: Coverage/vacation relief	Category (“)
Own profession: Consultation/advice	Cat (“)
Other professions: Coverage/vacation relief	Cat (“)
Other professions: Consultation/advice	Cat (“)
Hours of work	Cat (“)
Opportunities for professional development	Cat (“)
Opportunities for career advancement	Cat (“)
Earning potential	Cat (“)
Recreational opportunities	Cat (“)
Cultural opportunities	Cat (“)
Educational opportunities for children	Cat (“)
Job/career opportunities for spouse/partner	Cat (“)
Job/career opportunities for children	Cat (“)
Sense of belonging to community	Cat (“)
Sense of being appreciated by community	Cat (“)
Sex	Cat (M/F)
Lived in rural community at least 2 years before post-second	Cat (Y/N)
Marital status	Cat (1 Single, separated, divorced, widowed, 2 Married, common-law, living with partner)
Spouse/partner a health professional?	Cat (Y/N)
Children living at home?	Cat (Y/N)
Age	Interval/Ratio
Time in Practice	Cat (1.00 5 and less, 2.00 6-15, 3.00 16-24, 4.00 25 and over)

Table 4: Results of univariate analyses

	All Groups	Nurses	Physicians	Pharmacists
Professional Groups Recode into 3 Groups	NS (n=2899)			
Years practicing in present community	NS (t-test)	NS	NS	NS
Live in community of practice? (yes, no)	NS	NS	NS	NS
Size of community	NS (t-test)	.048	.130	NS
Size of catchment area	NS (t-test)	NS	NS	NS
Distance to population centre of 100,000+(t-test)	P=.001 N=2234	.008	.088	.055
Availability of hospital services	.044	NS	.080	NS
Availability of other services	.001	.141	NS	NS
Own profession: Coverage/vacation relief	.016	NS	.006	NS
Own profession: Consultation/advice	.000	.001	NS	.002
Other professions: Coverage/vacation relief	.108	NS	.024	NS
Other professions: Consultation/advice	.007	NS	.061	.036
Hours of work	.000	.000	.001	.001
Opportunities for professional development	.000	.028	.000	.002
Opportunities for career advancement	.000	.078	.001	.000
Earning potential	.001	.140	.009	.009
Recreational opportunities	.000	.029	.000	.066
Cultural opportunities	.000	.000	.000	.007
Educational opportunities for children	.000	.001	.000	.000
Job/career opportunities for spouse/partner	.000	.002	.001	.001
Job/career opportunities for children	.000	.043	.001	.000
Sense of belonging to community	.000	.000	.002	.000
Sense of being appreciated by community	.000	.021	.000	.000
Sex	NS	NS	.084	NS
Lived in rural community at least 2 years before post-secondary education	NS	NS	NS	NS
Marital	.000 (n=2899)	.000	NS	.002
Spouse/partner a health professional?	NS	NS	NS	NS
Children living at home?	.000 (n=2873)	.000	.000	.000
Age(t-test)	P<.001 (N=2876)	.116	.001	.026
Time in Practice (cat)	.003 (N=2913)	.001	.000	.000
Combined score for professional aspects	P<.001 (t-test)	.028	.001	.000
Combined score for personal aspects	P<.001 (t-test)	.000	.000	.000
Combined professional and personal factors				
Professional factors (availability)	.002 (N=2856)	NS	.002	NS
Professional factors (coverage and consults)	.000 (N=2254)	NS	.003	.027
Professional factors (time and money)	.000 (N=2617)	.004	.001	.000
Personal factors (opportunities)	.000 (N=2537)	.002	.000	.000
Personal factors (community)	.000 (N=2882)	.000	.000	.000

6.3.2 Data Reduction/Factor Analysis

In order to reduce the number of variables included in the multivariate logistic regression analyses, principle components factor analysis (varimax rotation) was performed for the professional and personal factors variables. The professional factors variables included, and the rotated factor matrix, are shown in the following table.

Table 5. Factor Analysis – Professional Factors

Variable	Factors		
	Coverage and backup	Hours. pay, opportunities	Availability of services
Availability of hospital services	.186	.161	.862
Availability of other services	.193	.176	.855
Own profession: Coverage/vacation relief	.743	.242	6.322E-02
Own profession: Consultation/advice	.717	.325	.133
Other professions: Coverage/vacation relief	.818	.165	.184
Other professions: Consultation/advice	.761	.187	.249
Hours of work	.276	.538	.190
Opportunities for professional development	.249	.767	.128
Opportunities for career advancement	.202	.837	7.250E-02
Earning potential	.148	.728	.139

Three principle components were generated with eigenvalues of 4.40, 1.175, and 1.071 accounting for 66.49% of the variance in these 10 questions. Variables in the above factors were combined to produce 3 new variables relating to levels of satisfaction with the professional aspects of health professionals work: professional factors (availability), professional factors (coverage and consults), and Professional factors (time and money).

The personal factors variables included, and the rotated factor matrix, are shown in the following table.

Table 6. Factor Analysis – Personal Factors

Variables	Factors	
	Family opportunities	Relationship with community
Recreational opportunities	.601	.412
Cultural opportunities	.757	.266
Educational opportunities for children	.793	.195
Job/career opportunities for spouse/partner	.735	.167
Job/career opportunities for children	.784	2.055E-03
Sense of belonging to community	.236	.877
Sense of being appreciated by community	.112	.904

Two principle components were generated with eigenvalues of 3.468 and and 1.212 accounting for 66.85% of the variance in the seven questions. Variables in the above factors were combined to produce two new variables relating to levels of satisfaction with the personal aspects of health professionals work: personal factors (opportunities), personal factors (community).

6.3.3. Multivariate Analyses

Measures of satisfaction may relate to an overall level of satisfaction and have the potential to be highly correlated, leading to problems of multicollinearity when multivariate analysis is done. The factor analysis using a varimax rotation should produce orthogonal factors and avoid this problem; however, bivariate (Pearson) correlations were done to ensure that there were no correlations higher than 0.7 between the measures of satisfaction. These are reported in the following table.

Table 7. First-Order Correlations Between Independent Variables

	Professional			Personal	
	Availability	Coverage& consults	Time&money	Opportunities	Community
Profession factors (availability)	1				
Profession factors (coverage and consults)	r=.429** r^2=.184	1			
Professional factors (time and money)	r=.387** r^2=.150	r=.564** r^2=.318	1		
Personal factors (opportunities)	r=.363** r^2=.132	r=.369** r^2=.136	r=.446** r^2=.199	1	
Personal factors (community)	r=.229** r^2=.052	r=.285** r^2=.081	r=.349 ** r^2=.122	r=.437** r^2=.191	1

** Correlation is significant at the 0.01 level (2-tailed).

All variables measuring satisfaction were significantly and moderately correlated, but the highest r is .446; therefore, all these variables were entered simultaneously into the analysis.

6.3.3.1 All Health Professionals

Logistic regression analysis was performed in a hierarchical fashion by entering health care professional attributes in the first step and community factors in the second step. Variables from the univariate analyses were included if p <.15 for all health professionals. Factor scores were used instead of individual personal and professional factors. As a result of missing data for some respondents (n = 1260), only 1733 (58%) were included in the analysis. Only significant odd ratios (Exp(B)) are reported.

6.3.3.2. Nurses

Logistic regression analysis was performed in a hierarchical fashion by entering health care professional attributes in the first step and community factors in the second step. Variables from the univariate analyses were included if p <.15 for all health professionals. Factor scores were used instead of individual personal and professional factors. As a result of missing data for some respondents (n = 540), only 516 (49%) were included in the analysis.

Table 8. Multivariate, Hierarchical, Logistic Regression Analysis Results: All Professions

Variable	B	S.E.	Sig.	Exp(B)
STEP 1 (-2 log likelihood 1225.57)				
Marital status	.160	.231	.487	
Children living at home?	-.662	.168	.000	.516
Age	.038	.009	.000	1.039
Time in Practice (compared to 25+)			.000	
Duration 1 (<=5)	.903	.263	.001	2.47
Duration 2 (6-15)	-.264	.255	.299	
Duration 3 (16-24)	-.520	.274	.058	
STEP 2 (-2 log likelihood 1152.40)				
Distance to population centre of 100,000+	.001	.000	.000	1.001
Profession factors (availability)	.034	.040	.400	
Profession factors (coverage and consults)	-.008	.025	.754	
Professional factors (time and money)	-.066	.026	.011	.936
Personal factors (opportunities)	-.060	.021	.004	.942
Personal factors (community)	-.109	.042	.010	.897

The addition of community factors to the model significantly improved its fit (χ^2 = 73.18, df = 6, p<0.001).

Table 9. Multivariate, Hierarchical, Logistic Regression Analysis Results: Nurses

Variables	B	S.E.	Sig.	Exp(B)
STEP 1 (-2 log likelihood 344.42)				
Marital status	.806	.372	.030	2.24
Children living at home?	-.709	.310	.022	.492
Age	.006	.018	.732	
Time in Practice (compared to 25+)			.014	
Duration 1 (<=5)	.852	.532	.109	
Duration 2 (6-15)	-.121	.513	..814	
Duration 3 (16-24)	-.551	.573	.336	.576
STEP 2 (-2 log likelihood 324.87)				
Size of community	.000	.000	.814	
Distance to population centre of 100,000+	.001	.000	.001	1.001
Profession factors (availability)	.138	.081	.086	
Profession factors (coverage and consults)	-.025	.045	.575	
Professional factors (time and money)	-.068	.049	.161	
Personal factors (opportunities)	-.040	.042	.332	
Personal factors (community)	-.047	.083	.569	

The addition of community factors to the model significantly improved its fit (χ^2 = 19.55, df = 7, p=0.01).

6.3.3.3. Physicians

Logistic regression analysis was performed in a hierarchical fashion by entering health care professional attributes in the first step and community factors in the second step. Variables from the univariate analyses were included if p <.15 for all health professionals. Factor scores were used instead of individual personal and professional factors. As a result of missing data for some respondents (n = 333), only 554 (63%) were included in the analysis.

Table 10. Multivariate, Hierarchical, Logistic Regression Analysis Result: Physicians

Variables	B	S.E.	Sig.	Exp(B)
STEP 1 (-2 log likelihood 415.21)				
Marital status	-1.489	.684	.030	.226
Children living at home?	-.732	.306	.017	.481
Age	.035	.016	.024	1.036
Time in Practice (compared to 25+)			.000	
Duration 1 (<=5)	1.182	.470	.012	3.261
Duration 2 (6-15)	.010	.458	.982	
Duration 3 (16-24)	-.595	.513	.246	
STEP 2 (-2 log likelihood 378.68)				
Size of community	.000	.000	.390	
Distance to population centre of 100,000+	.001	.000	.008	1.001
Profession factors (availability)	-.047	.072	.520	
Profession factors (coverage and consults)	.030	.046	.508	
Professional factors (time and money)	-.087	.047	.066	
Personal factors (opportunities)	-.080	.037	.029	.923
Personal factors (community)	-.086	.073	.238	

The addition of community factors to the model significantly improved its fit (χ^2 = 36.56, df = 7, p<0.001).

6.3.3.4. Pharmacists

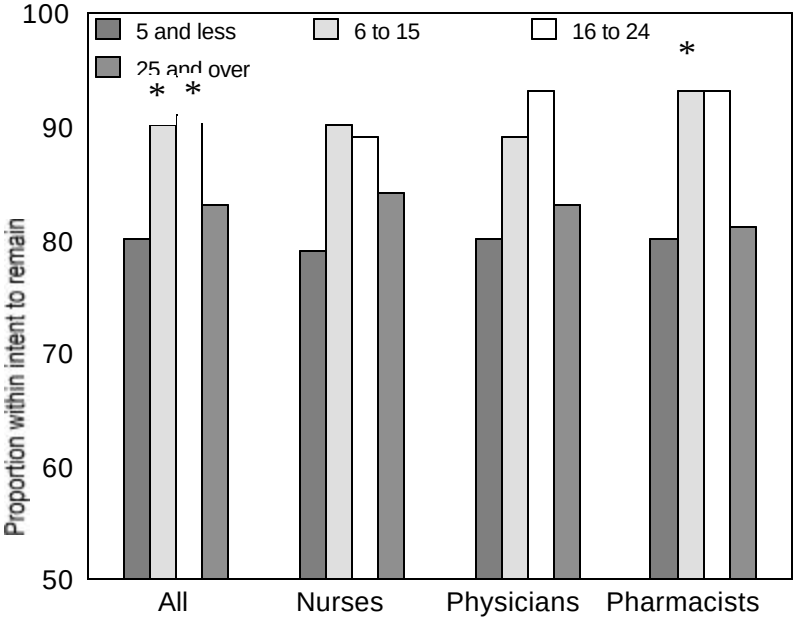
Logistic regression analysis was performed in a hierarchical fashion by entering health care professional attributes in the first step and community factors in the second step. Variables from the univariate analyses were included if p <.15 for all health professionals. Factor scores were used instead of individual personal and professional factors. As a result of missing data for some respondents (n = 425) only 594 (58%) were included in the analysis.

Table 11. Multivariate, Hierarchical, Logistic Regression Analysis Results: Pharmacists

Variables	B	S.E.	Sig.	Exp(B)
STEP 1 (-2 Log likelihood = 405.301)				
Marital status	.623	.383	.104	
Children living at home?	-.516	.312	.098	
Age	.061	.017	.000	1.063
Time in Practice (compared to 25+)			.001	
Duration 1 (<=5)	.823	.490	.093	
Duration 2 (6-15)	-.571	.448	.203	
Duration 3 (16-24)	-.720	.458	.116	
STEP 2 (-2 Log likelihood = 365.615)				
Distance to population centre of 100,000+	.000	.001	.432	
Profession factors (availability)	.066	.073	.360	
Profession factors (coverage and consults)	-.003	.046	.952	
Professional factors (time&money)	-.111	.051	.029	.895
Personal factors (opportunities)	-.073	.040	.071	
Personal factors (community)	-.215	.077	.005	.806

The addition of community factors to the model significantly improved its fit (χ^2 = 39.69, df = 6, p<0.001).

CHART 9. Proportion with Intent to Remain by Years in Practice and Professional Group



Asterisks indicate practice durations, which differ significantly from 25+ years.

Time in practice (duration) The relationship between time in practice and intent to remain in the community for another 2 years is not linear and warrants further exploration. In all professional groups those in practice the shortest and longest times said that they were less likely to be practicing in the community in 2 years. The pattern is similar for each of the professional groups. The overall chi-square tests of difference in intent to remain by time in practice were statistically significant for all professions combined and within each professional group. The results of the univariate overall tests of difference are consistent with those of the multivariate logistic regression, but the results of the individual contrasts between times in practice are not; this may be related to the impact of other variables included in analysis and also to the smaller numbers included in the multivariate analysis. The numbers of respondents in each practice duration category in multivariate analysis will have been fairly small reducing the power to find differences if they existed.

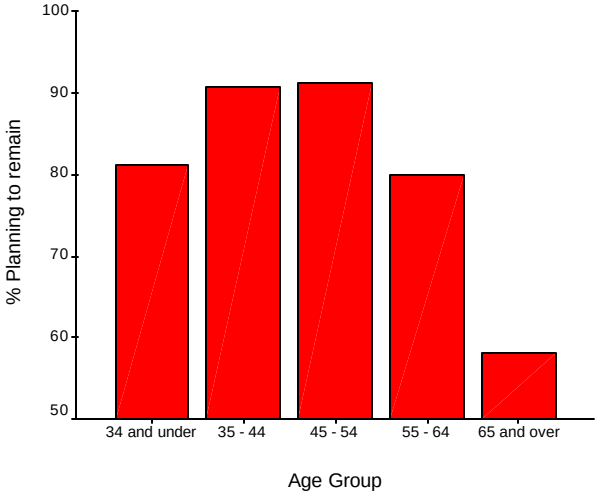
6.4. Discussion/Conclusions

6.4.1 Univariate Analyses

The following health professional characteristics, in univariate analyses, predicted intent to be practicing in the same community in 2 years for all health professionals combined:

- ***Marital status***: Married persons were more likely to say they would remain. The only group for which this was not significant in the univariate analysis was physicians. Physicians and pharmacists were significantly more likely than nurses to be married ($p < .001$). Although sex was not a predictor of intent to remain in the community, the difference in impact of marital status on intent to remain may be related to sex. Seventy-two percent (72%)

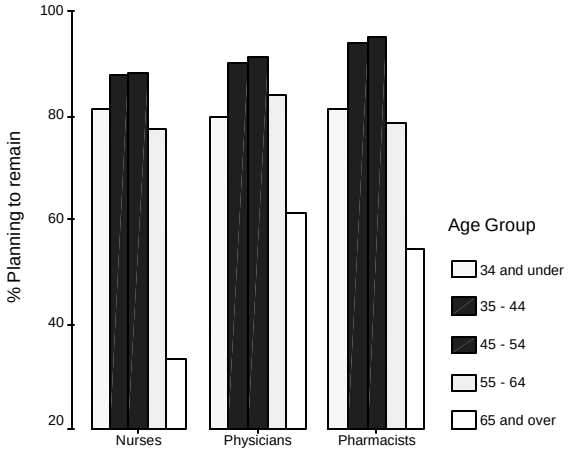
CHART 10. Intention to Remain by Age Group



of physician respondents were male as compared to 55% of pharmacists and three percent (3%) of nurses.

- ***Children living at home***: Health professionals with children living at home were more likely to state that they intended to remain in the community.
- ***Age***: The mean age of those intending to remain in practice in the community was lower that those who did not intend to remain. The only group for which this was not significant was nurses. When this relationship is studied by age groups, like time in practice, the relationship is not a linear one (Figure 2). Persons between the ages of 35 and 54 were more likely to intend to remain than either older or younger persons. A similar pattern is seen in each of the professional groups (Figure 3). In older persons this may be because of intent to retire but not necessarily to leave the community.

CHART 11. Intent to Remain by Age and Professional Group



- ***Time in practice***: Time in practice was a significant predictor of intent to remain for all professional groups. Those with the longest and shortest time in practice were least likely to intend to remain in practice in the community for another two years. For those with the longest time in practice, this may be related to intent to retire but not necessarily with the intent to leave the community.

The following community characteristics predicted intent to be practicing in the same community in 2 years for all health professionals combined:

- ***Distance to population centre of 100,000+***: the longer the distance, the less likely they were to say they would stay. The size of the community was also a predictor for nurses but not for physicians, pharmacists or the sample as a whole (the larger the community the more likely nurses were to say they would remain).
- ***Professional factors (availability).*** This factor included satisfaction with availability of hospital and other services and was a predictor of intent to remain for physicians, but not for pharmacists or for nurses.
- ***Professional factors (coverage and consults)***: Comprised of coverage and vacation relief and availability of consultation/advice by own and other professions, satisfaction in this area was a significant predictor of intent to remain for all professions combined as well as for physicians and pharmacists, but not for nurses. The availability of consultation/advice by members of their own profession was a predictor on intent to remain in nurses and pharmacists, but not by physicians. Coverage and vacation relief was important to physicians but not to the other 2 professional groups. Pharmacists were the only professional group for whom consultation/advice from another professional group was important. These differences probably reflect differences in practice patterns between the 3 professional groups.

- ***Professional factors (time and money)***: This factor was a significant predictor of intent to remain for all professional groups and included hours of work, earning potential, and opportunities for professional development and career advancement. All of the individual measures were also significant predictors within each professional group, with the exception of nurses for whom earning potential and the opportunity for career advancement were not important.
- ***Personal factors (opportunities)***: Recreational, cultural, educational and career opportunities for spouse and children comprised this factor, which was a significant predictor of intent to remain in all professional groups.
- ***Personal factors (community)***: Again, satisfaction in this area was a predictor of intent to remain for all healthcare professionals.

6.4.2 Multivariate Analyses

The multivariate predictors of intent to remain in practice in the community for a further 2 years differ somewhat between professional groups. Table 12 summarizes the results of these analyses.

Table 12. Predictors of Intent to Remain in Practice in the Community for Two Years

	Nurse	Physician	Pharmacist
Personal attributes	• Married • Children at home • Middle years in practice	• Married • Children at home • Middle years in practice	• Middle age • Middle years in practice
Community attributes	• Closer to pop'n centres of 100,000+	• Closer to pop'n centres of 100,000+ • Personal (Opportunities)	• Professional (time and money) • Personal (community)

6.4.3 Limitations

There are a number of limitations to this analysis, but there are 3 more important ones. First and most important is the loss of almost half of the cases in the multivariable analysis. This is a result of missing/incomplete data on one or more of the variables included in the analysis for approximately half of the respondents. Respondents submitting incomplete surveys may differ systematically in some way and may bias the results of these analyses and limit their generalizability. This is balanced by the ability to make comparisons of the results of the univariate analyses, for which there is little missing data with the results of the multivariate analyses. Another limitation is with the use of expressed "intent to remain" as a proxy for actual retention. A stronger (and longer and more expensive) study design would be a longitudinal one. Finally, the use of satisfaction with various professional and personal aspects of the community may be a poor measure of actual community attributes. It is possible that persons who are less 'content' as a trait (as opposed to state), express lower levels of satisfaction and are less likely to remain in any position for long periods of time. There may be some literature on this topic, but it was not examined as part of this particular study.

6.4.4 Implications

Despite the limitations of this analysis, it could be used to help communities select professionals who are most likely to remain in practice in the communities for longer periods. Obviously, community attributes such as distance to large population centres cannot be changed; however, attributes that contribute to personal and professional satisfaction could be.