Do South African rural origin medical students return to rural practice?

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May 2003

Supported by a grant from the Health Systems Trust

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EXECUTIVE SUMMARY

Achieving equity in the distribution of health workers between urban and rural areas, is an important priority for the Department of Health. To approach the problem comprehensively, action is needed at every step of a doctor's career, starting with the selection of medical students.

Internationally it has been shown that medical students of rural origin are more likely to practice in a rural area after graduation, but this has not been demonstrated in South Africa before. This study aimed to investigate the career choices of medical graduates of rural origin in the South African context, and to determine what proportion of rural origin students are currently practising in a rural area.

This is a retrospective descriptive study. Sample A consisted of a cohort of doctors who graduated in 1991 and 1992. Their home postal addresses at the time of graduation were obtained from the universities, and classified into urban and rural, and their current addresses were obtained from the national medical register. The percentage of rural and urban origin students currently in rural practice was calculated, and a questionnaire was sent to them to determine the reasons for their career choices. Sample B consisted of the graduates of 1994-1996 from two medical schools. Their addresses at the time of graduation were compared with their current addresses.

Only 14.4% of the graduates of sample A were of rural origin. When comparing addresses, it was found that 38.4% of rural origin graduates are currently practising in rural areas, compared to 12.4% of urban origin graduates ($p<0.001$). The questionnaire data showed that 45.9% of the rural origin respondents are in rural practice, compared to 13.3% of the urban origin respondents ($p=0.001$). In sample B, 41.61% of the rural origin graduates are in rural practice, compared to 5.08% of urban origin graduates ($p<0.001$).

The findings suggest that the South African situation conforms to the findings in other countries, namely that rural origin medical students are more likely to choose rural careers than urban origin students are. Rural origin graduates are also more likely to choose general practice. It is recommended that:

1. the National Department of Health negotiate incentives or conditional grants to encourage medical universities to enrol more students of rural origin.
2. the selection criteria of the medical faculties be reviewed with respect to rural origin.
3. the career aspirations of applicants to medical school be taken into account in selection, particularly with respect to primary care or general practice.
4. the enrolment of rural origin students be monitored at all medical schools on an ongoing basis.
5. the proportion of rural origin graduates who return to practice in rural areas be further monitored, with a larger sample size in a subsequent study.

INTRODUCTION

There is a major shortage of doctors in rural areas in South Africa. About 46% of the population in South Africa live in non-urban areas (1), and they do not always have the same access to health services as their urban counterparts. One example is Mount Frere district, where the doctor to population ration is 1:30 000 (2).

Achieving equity in the distribution of health workers between urban and rural areas, is an important priority for the Department of Health. Strategies to address staff shortages include the recruitment of Cuban doctors since 1996 and the introduction of compulsory community service in 1999. To approach the problem comprehensively, action is needed at every step of a doctor's career, starting with the selection of medical students.

It has been shown in other countries with large rural populations, that increasing the number of medical students from rural areas can alleviate the shortages. Examples include the Physician Shortage Area Program at Jefferson Medical College in the USA (3,4), and the Illinois Rural Medical Education Program (5). The two most significant predictors of practice in a rural area have been found to be a rural background and a speciality choice in Family Medicine (6). In Norway, they called it "the hypothesis of the homecoming salmon" (7). In Australia medical schools enrol a quota of rural students, because they are more likely to practice in rural areas (8).

Selection procedures at medical schools in South Africa have been adapted in recent years in an attempt to rectify racial and gender imbalances in student profiles (9). The procedures vary between universities, from matriculation marks only to a composite score including interviews and referee reports. Apart from the University of the Free State where points are given for rural and region, no university gives specific weighting in the selection criteria to students from rural backgrounds (9).

This study aimed to investigate the career choices of medical graduates of rural origin in the South African context and to determine what proportion of rural origin students are currently practising in a rural area.

METHODS

This is a retrospective descriptive study, conducted between 2001 and 2002. The study population for sample A was the cohort of all the students who graduated in South Africa in 1991 and 1992. The years were chosen because the graduates would have had time to specialise, and settle in an area of their choice. Those who travelled overseas for a short period after graduation may have returned to South Africa. This group of doctors qualified before the onset of community service.

The researchers obtained the addresses that the graduates used at the time of graduation, from five of the eight medical schools in South Africa (Cape Town, Free State, MEDUNSA, Pretoria and Stellenbosch). Three medical schools could not provide any addresses (Wits because of a confidentiality policy; Natal and UNITRA did not have records of the addresses of 10 years previously). The addresses were classified into rural and urban. For the questionnaire, the sample included all the graduates of rural origin, and the control group was a random sample of the urban origin graduates, proportional to the total number of graduates from each university. Exclusions were foreign students, those doctors who are no longer registered and those working overseas. Because sample A was found to be biased towards male Afrikaans speaking students, it was decided to study a second sample by comparing addresses. Sample B focused on more recent graduates (1994-6) of two medical schools with a significant number of black graduates (MEDUNSA and UCT), that provided a balance in terms of ethnicity.

"Rural" has been very difficult to define, both in South Africa and internationally (10). For the purposes of this study "rural" was defined as outside of major urban centres (metropoles, large cities and provincial capitals). For the purpose of the questionnaire data "rural origin" was defined as having attended a primary school in a rural area, because the time spent in primary schools are formative years.

A postal questionnaire (Appendix 1) was piloted and then sent out to 138 rural origin and 140 urban origin graduates in December 2001. Questions included a request for demographic data, rural origin and current practice, and factors that may have influenced the person's choice of where to practice. A telephonic follow-up was done in February 2002 on those who did not respond. Data from the questionnaires was entered into Excel and Stata Statistical Software (11) was used to produce the univariate and bivariate statistics. Chi-squared tests were applied to test the relationship between the groups that were categorical. A Likert scale of 1-6 was used in the questionnaire, and Wilcoxon rank-sum tests were applied to test the significant differences between the groups. Ethical approval was obtained from the Ethics committee of the University of Cape Town.

RESULTS

The initial analysis compared addresses at the time of graduation with current addresses. Of the 1190 doctors who graduated in 1991 and 1992 (Sample A), 961 (80.8%) are currently registered with the Health Professions Council (12). Of the graduates currently registered, only 138 (14.4%) were classified as rural origin. It was found that 38.4% of the rural origin graduates are currently practising in rural areas, compared to 12.4% of urban origin graduates practising in rural areas (Chi Square = 58.86, $p < 0.001$).

Of the 1994-6 graduates (sample B), 739 of the original 887 graduates are currently registered (83.3%). Of those, 149 (20.2%) were classified as of rural origin according to their addresses at the time of graduation. 41.6% of the rural origin graduates are in rural practice, compared to 5.08% of urban origin graduates. ($p<0.001$).

Table 1 and 2 shows the breakdown by university, of the graduates who are currently registered. MEDUNSA and Stellenbosch have the largest percentage of rural origin students, but the Free State has the largest percentage of graduates in rural practice.

Table 1: Analysis by university for sample A

University	% registered (of total graduates)	Rural origin (% of class)	Urban origin (% of class)	% of rural origin in rural practice	% of rural origin in urban practice	% of urban origin in rural practice	% of urban origin in urban practice	Total % in rural practice
Cape Town	67.8	5.6	94.4	22.2	77.8	2	98	3
Free State	86.2	6.8	93.2	63.6	36.4	25.8	74.2	28.4
MEDUNSA	91.8	24.6	65.4	36.4	63.6	6.9	93.1	14.2
Pretoria	84.6	12.1	87.9	52.6	47.4	12	88	16.9
Stellenbosch	83.3	24.9	75.1	25.5	74.5	14.1	85.9	16.9
Total	80.8	14.4	85.6	38.4	61.6	12.4	87.6	16.1

Table 2: Analysis by university for sample B

University	% registered (of total graduates)	Rural origin (% of class)	Urban origin (% of class)	% of rural origin in rural practice	% of rural origin in urban practice	% of urban origin in rural practice	% of urban origin in urban practice	Total % in rural practice
Cape Town	79.8	6.6	93.4	58.3	41.7	3	97	6.6
MEDUNSA	87	33.2	66.8	38.4	61.6	8	92	18
Total	83.3	20.2	79.8	41.6	58.4	5.1	94.9	12.5

Of the 278 questionnaires sent out, 82 responses were received, including those received after telephonic follow-up. This is a response rate of 29.5%, which is not unusual for postal surveys. The responses consisted of 37 of the 138 questionnaires sent to rural origin graduates (response rate 26.8%) and 45 of the 140 questionnaires sent to urban origin graduates (response rate 32.1%). There is not a significant difference in the response rate between the rural and urban origin graduates ($p=0.329$).

The respondents included 21 females (25.6%) and 61 males (74.3%). 74 (90.2%) are married, 3 (3.6%) are living together, and 5 (6.1%) are single, while 64 (78%) have children. There are only slight differences in the gender distribution between urban and rural practice ($p = 0.616$), with the female: male ratio in urban areas 1:2.6 and in rural areas 1:3.6. 51 (62.2%) of the

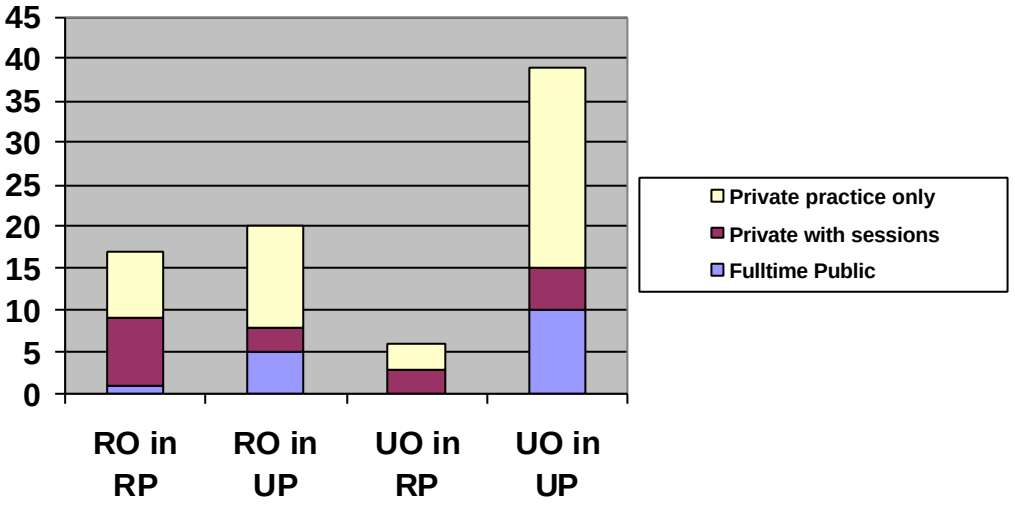
respondents were Afrikaans speaking, 21 (25.6%) English speaking, and 10 (12.2%) indicated one of the indigenous languages as home language.

The respondents were classified into rural and urban origin according to the town where they attended primary school. Kappa statistics were applied to measure the agreement between the classification into rural and urban origin by address at the time of graduation, and the primary school definition. The Kappa coefficient was 0.70 with $p < 0.001$ and the observed agreement was 0.85%.

Of the rural origin respondents, 17 (45.9%) are in rural practice and 20 (54%) in urban practice. Of those in rural practice, 1 is in fulltime public service, 8 are in private practice while doing sessions in public hospitals, and 8 are in private practice only. That means that 9 out of 17 (52.9%) are working at least part time in the public sector. Of the rural origin respondents in urban practice, 5 are in fulltime public service, 3 are in private practice while doing sessions in public hospitals, and 12 are in private practice only.

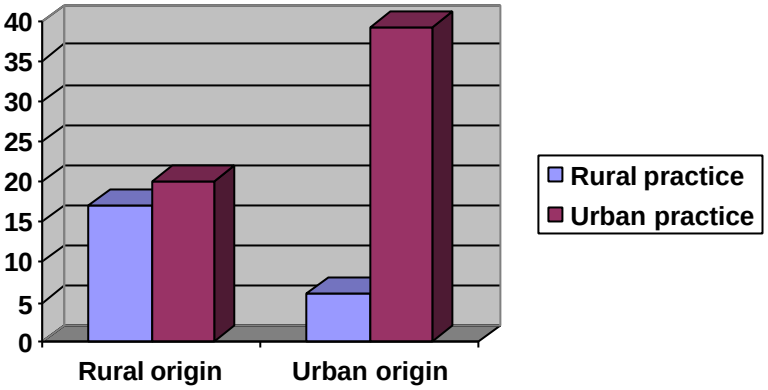
Of the urban origin respondents, only 6 (13.3%) are in rural practice and 39 (86.6%) are in urban practice. Of those in rural practice, 3 are in private practice while doing sessions in public hospitals, and are 3 in private practice only. Of those in urban practice, 10 are in fulltime public service, 5 in private practice with sessions in public hospitals, and 24 in private practice only.

Figure 1: Current practice of rural origin (RO) and urban origin (UO) respondents (RP = rural practice and UP = urban practice)



In summary, 17 (45.9%) of the rural origin respondents are currently in rural practice, compared to 6 (13.3%) of the urban origin respondents. The difference is statistically significant, with a p-value of 0.001.

Figure 2: Current practice of rural and urban origin respondents

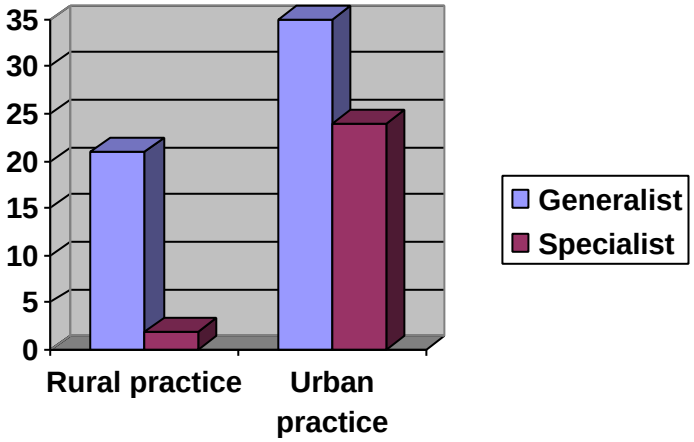


In response to the question about rural exposure during undergraduate training, only 34.8% of those in rural practice felt it influenced their choice of where to practice, while 27.1% of those in urban practice felt it influenced them.

The years spent since graduation in public service and private practice were analysed. Doctors currently in rural practice, spent an average of 2.9 years since graduation in the public service, compared to an average of 6.7 years for doctors in urban practice. This may be influenced by the fact that 40.7% of the respondents in urban practice are specialists who had to spend a minimum of 4 years in an academic public hospital for postgraduate training. 23 (28%) of respondents have spent some time working overseas (average 1.5 years).

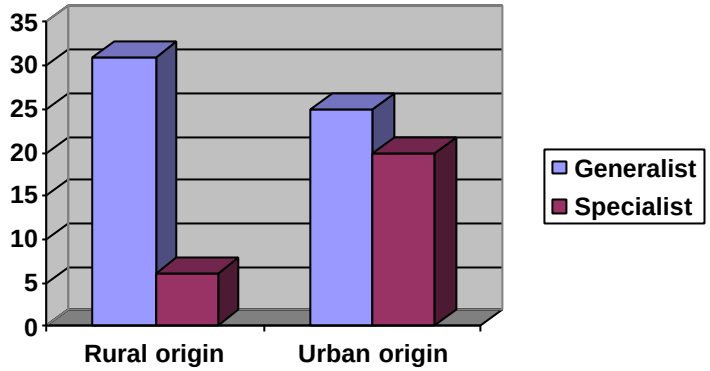
Of the respondents, 26 (31.7%) are specialists. Most of the specialists work in urban areas (40.68%), with only 2 (8.7%) in rural practice. Of the respondents in rural practice, 91.3% are generalists.

Figure 3: Generalists and specialists in urban and rural practice



Rural origin graduates are more likely than their urban origin counterparts to be generalists than specialists (p=0.006). Of the rural origin respondents, 83.78% are generalists and 16.22% specialists, compared to the urban origin respondents where only 55.56% are generalists and 44.44% specialists.

Figure 4: Rural and urban origin generalists and specialists



The questionnaire included a Likert scale (attached as appendix 2) on which respondents had to rank 27 factors that may have influenced their choice of where to practice, with 1 indicating "totally unimportant" and 6 "vitally important". The data was treated as numerical, with the median indicating central tendency. The p-value was calculated using the Wilcoxon rank-sum test, and the level of significance sought was $p < 0.05$.

Five factors were rated significantly more important by urban origin respondents, namely the availability of specialists ($p=0.003$), facilities e.g. movies/shops ($p=0.03$), income ($p=0.006$), the availability of adequate resources ($p=0.01$) and adequate staffing levels ($p=0.02$).

The only factor that the rural origin respondents ranked significantly higher, is a sense of feeling needed ($p=0.04$).

The following factors were found not to be rated significantly different by rural and urban origin respondents: educational opportunities for children, a good place to raise children, providing continuing care, responsibility to my community, using a wide range of skills, opportunities for spouse/partner, access to social/family networks, a supportive community, recreational opportunities, professional independence, crime and safety issues, seeing a variety of conditions, opportunity for part time work, a sense of vocation/calling, a sense of adventure, a love of nature, a place to focus on the family, my speciality, access to academic input, living conditions / state of housing, and access to church / religion of choice.

DISCUSSION

The limitations of the study include a small sample size and a bias in the questionnaire respondents towards male and Afrikaans speaking graduates. The reasons for the small sample size include that three of the eight medical schools in South Africa could not provide any addresses of their graduates (Natal, Wits and UNITRA), and that only a small percentage of the students was of rural origin (14.4% of sample A and 20.2% of sample B). Many graduates (19.2% of sample A and 16.7% of sample B) could not be traced on the medical register, either because they have left the country or are no longer practising medicine. Some female doctors may have changed their surname when they got married, and could therefore not be traced. Sample A was biased towards Afrikaans speaking graduates, because three of the five medical schools from whom addresses were obtained, still used Afrikaans as lingua franca at the time that the doctors in the sample studied medicine (Free State, Pretoria and Stellenbosch). The selection of medical students in 1986/7 did also not reflect the demography of the population in South Africa, as only small numbers of black students and females were admitted at that time. Sample B focused on more recent graduates (1994-6) of two medical schools with a significant number of black graduates (MEDUNSA and UCT), that provides a balance in terms of ethnicity.

Despite the limitations, the significant finding is that the situation in South Africa is similar to the international experience (3,4,5,6,7,8), namely that rural origin graduates are more likely to practice in rural areas than their urban counterparts are. For sample A, comparing addresses found that 38.4% of rural origin graduates are currently practising in rural areas, compared to 12.4% of urban origin graduates. This was validated by the data from the questionnaire, which indicated that that 45.9% of the rural origin respondents are in rural practice, compared to 13.3% of the urban origin respondents. This difference is statistically significant ($p=0.001$). For sample B, 41.6% of rural origin graduates are in rural practice, compared to 5.08% of urban origin graduates ($p<0.001$).

Very few of the respondents are in fulltime public service, and most of them in urban areas. This confirms Couper's observation (13) that "going back home" is not a common reason for doctors working in rural public hospitals in South Africa, but is so in the case of rural private practice. Of the rural origin respondents in rural practice, almost half (47%) combine private practice with sessions at a public hospital or clinic, thus contributing to the public health service. The private practitioners are an essential part of health care delivery in rural South Africa, and they also treat large numbers of the rural poor privately with their so-called "cash practices" where a single fee is paid for a consultation and medication.

Another finding that conforms to the international experience, is that rural origin graduates are more likely to be generalists than specialists when compared to their urban origin counterparts. At Jefferson Medical College in the USA rural origin students were 5 times more likely to become family physicians (3,4).

The small sample size may have contributed to the fact that very few of the factors listed in the Likert scale, were ranked significantly differently by urban and rural origin graduates. Rural origin doctors are clearly less concerned about the availability of specialists; facilities e.g. movies/shops; income; availability of adequate resources and adequate staffing levels than their urban origin counterparts are. They seem to be motivated more by "a sense of feeling needed".

With the ongoing political transition in South Africa, the demographic profile of medical students is changing continuously (9,14), such that students of previously disadvantaged backgrounds are being actively recruited into medical schools. As part of this transformation, it is important that those applicants from rural backgrounds be given the opportunities to study medicine, thus increasing the proportion of those choosing rural careers.

CONCLUSION

The findings suggest that recruiting larger numbers of rural origin graduates may alleviate shortages of doctors in rural South Africa as a long term strategy, as was recommended by the WONCA Working Party on Training for Rural Practice (15). The results further support the findings of Rabinowitz (3,4) that applicants to medical schools, who express an initial interest in primary care or general practice, are more likely to eventually practice in rural areas. Both of these conclusions have implications for the selection criteria and policies of the medical universities and should form part of a comprehensive national policy on recruitment of health professionals for rural areas. If more rural origin students are selected and eventually practice in rural areas, it will impact positively on service delivery because there will be more staff in rural hospitals, and they will understand the local language and culture.

RECOMMENDATIONS

It is recommended that:

1. the National Department of Health negotiate incentives or conditional grants to encourage medical universities to enrol more students of rural origin.
2. the selection criteria of the medical faculties be reviewed with respect to rural origin.
3. the career aspirations of applicants to medical school be taken into account in selection, particularly with respect to primary care or general practice.
4. the enrolment of rural origin students be monitored at all medical schools on an ongoing basis.
5. the proportion of rural origin graduates who return to practice in rural areas be further monitored, with a larger sample size in a subsequent study.

The authors gratefully acknowledge that this research was supported by a grant from the Health Systems Trust.

Appendix 1: Questionnaire

Please circle the appropriate answers.

1. Gender — Female ☐ Male ☐

2. Marital status — Single ☐ Living together ☐ Married ☐

3. Do you have children? — Yes ☐ No ☐

4. Home language? _____

5. Please name the town where you attended primary school?_____

6. Would you consider the above — Urban ☐ Rural ☐

7. Did you have rural exposure during your undergraduate training? — Yes ☐ No ☐

8. If yes, did this influence your eventual career choice? — Yes ☐ No ☐

9. I spent most of my career since graduation in: (Tick below)

Public service ☐ Private practice ☐ Other (specify) ☐ _____

Urban area ☐ Rural area ☐ Overseas ☐

10. Current practice: (Tick below)

Fulltime public service ☐ Private only ☐ Private with sessions ☐

Other (please specify) ☐ _____

Specialist ☐ Generalist ☐

11. Please name the town where you are currently practising: _____

12. Would you describe your current practice as being in an under-served area ? — Yes ☐ No ☐

Questionnaire Page 2

We have listed several factors that may have influenced your choice of where to practice. Please rate the importance of each of these factors to you, on the 6 point Likert Scale, with 1 indicating 'totally unimportant' and 6 'vitally important'.

Educational opportunities for children	1	2	3	4	5	6
Good place to raise children	1	2	3	4	5	6
Providing continuing care	1	2	3	4	5	6
Having personal knowledge of patients	1	2	3	4	5	6
Availability of specialists	1	2	3	4	5	6
Using a wide range of skills	1	2	3	4	5	6
Opportunities for spouse/partner	1	2	3	4	5	6
Access to social/family networks	1	2	3	4	5	6
A supportive community	1	2	3	4	5	6
Recreational opportunities	1	2	3	4	5	6
Professional independence	1	2	3	4	5	6
Crime and safety issues	1	2	3	4	5	6
Seeing a variety of conditions	1	2	3	4	5	6
Facilities e.g. movies/shopping	1	2	3	4	5	6
A sense of feeling needed	1	2	3	4	5	6
Opportunity for part time work	1	2	3	4	5	6
A sense of vocation/calling	1	2	3	4	5	6
A sense of adventure	1	2	3	4	5	6
A love of nature	1	2	3	4	5	6
A place to focus on the family	1	2	3	4	5	6
Income	1	2	3	4	5	6
Speciality	1	2	3	4	5	6
Availability of adequate resources	1	2	3	4	5	6
Access to academic input	1	2	3	4	5	6
Living conditions / state of housing	1	2	3	4	5	6
Adequate staffing levels	1	2	3	4	5	6
Access to church / religion of choice	1	2	3	4	5	6
Other (……)	1	2	3	4	5	6

Appendix 2: Factors influencing choice of where to practice, showing median and inter-quartile range for each factor

Factors	Urban origin	Rural origin	P-value#
Educational opportunities for children	5.5 (5-6)	5 (2-6)	0.16
Good place to raise children	6 (5-6)	5 (5-6)	0.14
Providing continuing care	5 (4-5)	5 (3-5)	0.80
Responsibility to my community	4 (3-5)	4 (3-5)	0.09
Availability of specialists	5 (4-6)	4 (3-5)	0.003*
Using a wide range of skills	4 (3-6)	4 (4-5)	0.97
Opportunities for spouse/partner	5 (3-5.5)	5 (4-6)	0.26
Access to social/family networks	4.5 (3.5-5)	4 (3-5)	0.51
A supportive community	4 (2.5-5)	4 (3-5)	0.27
Recreational opportunities	4 (3-5)	4 (3-5)	0.57
Professional independence	5 (4-6)	5 (4-6)	0.68
Crime and safety issues	5.5 (4-6)	5 (4-6)	0.59
Seeing a variety of conditions	4 (3-5)	5 (4-6)	0.20
Facilities e.g. movies/shopping	4 (3-5)	3 (2-4)	0.03*
A sense of feeling needed	3 (2-5)	4 (3-5)	0.04*
Opportunity for part time work	2 (1-4)	3.5 (1-5)	0.06
A sense of vocation/calling	4 (2-5)	3 (2-4)	0.70
A sense of adventure	3 (2-4)	3 (2-4)	0.73
A love of nature	3 (2-5)	4 (3-6)	0.12
A place to focus on the family	5 (4-5.5)	5 (4-5)	0.98
Income	5 (4-6)	4 (3-5)	0.006*
My speciality	5 (4-6)	4 (3-6)	0.10
Availability of adequate resources	5 (4-6)	4 (3-5)	0.01*
Access to academic input	5 (4-6)	5 (3-5)	0.17
Living conditions / state of housing	5 (5-6)	5 (4-6)	0.56
Adequate staffing levels	5 (4-5)	4 (3-5)	0.02*
Access to church / religion of choice	4 (2-5.5)	4 (2-5)	0.82

Wilcoxon rank-sum test
* Statistically significant

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