



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

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**Objectives.** To investigate the career choices of medical graduates of rural origin in the South African context, and to determine what proportion of rural-origin graduates are currently practising in a rural area.

**Design.** This is a retrospective descriptive study. Doctors' addresses at the time of graduation were compared with their current addresses in terms of rural/urban classification, and a questionnaire survey was done.

**Subjects.** Sample A consisted of a cohort of doctors who graduated in 1991 and 1992. Sample B consisted of the 1994 - 1996 graduates of two medical schools.

**Outcome measures.** Percentage of rural-origin graduates in rural practice.

**Results.** In sample A 14.4% were rural-origin students. When comparing addresses, it was found that 38.4% of rural-origin graduates are currently practising in rural areas, compared

with 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 with 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 with 5.08% of urban-origin graduates ( $p < 0.001$ ).

**Conclusion and recommendations.** The findings suggest that the South African situation is similar to that in other countries, with rural-origin medical students more likely to choose rural careers than urban-origin students. Rural-origin graduates are also more likely to choose general practice. It is recommended that the selection criteria of the medical faculties be reviewed with regard to rural origin, and that the career aspirations of applicants to medical school be taken into account in selection, particularly with regard to primary care or general practice.

*S Afr Med J* 2003; 93: 789-793.

There is a major shortage of doctors in rural areas in South Africa. An example is Mount Frere district, where the doctor-to-population ratio is 1:30 000.<sup>1</sup> About 46% of the population in South Africa live in non-urban areas.<sup>2</sup> Achieving equity in the distribution of health workers between urban and rural areas is an important priority for the Department of Health. In other countries with large rural populations it has been shown 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,<sup>3,4</sup> and the Illinois Rural Medical Education Program.<sup>5</sup> The two most significant predictors of practice in a rural area have been found to be a rural background, and a specialty choice in family medicine.<sup>6</sup> In Norway the former is called 'the hypothesis of the homecoming salmon'.<sup>7</sup> In Australia medical schools enrol a quota of rural students because the latter are more likely to practise in rural areas.<sup>8</sup>

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.

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### Methods

This is a retrospective descriptive study. The study population for sample A was the cohort of students who graduated in South Africa in 1991 and 1992. These 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 graduated 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 (Universities of Cape Town (UCT), Free State, Pretoria, Stellenbosch and the Medical University of South Africa (MEDUNSA)). Three medical schools could not provide any addresses (University of the Witwatersrand, Natal and Transkei (UNITRA)). The addresses were classified into rural and urban, and compared with current addresses obtained from the Medical Register and the South African Medical Association (SAMA). For the purposes of the questionnaire the sample included all graduates of rural origin, while the control group was a random sample of the urban-origin graduates, proportional to the total number of graduates from each university. Excluded were foreign students, those doctors who are no longer registered, and those working overseas. For sample B, the 1994 - 1996 graduates from MEDUNSA and UCT were studied by comparing addresses.



'Rural' has been very difficult to define both in South Africa and internationally.<sup>9</sup> For the purposes of this study 'rural' was defined as outside of major urban centres (metropolises, large cities and provincial capitals). For the purpose of the questionnaire data individuals were defined as being of 'rural origin' if they had attended a primary school in a rural area, as the primary school period covers the formative years.

A postal questionnaire was piloted and sent out to 138 rural-origin and 140 urban-origin graduates in December 2001. Questions included a request for demographic data and information on rural origin, current practice and factors that may have influenced the person's choice of where to practise. Those who did not respond were followed up telephonically in February 2002. Data from the questionnaires were entered into Excel, and Stata Statistical Software<sup>10</sup> was used to produce the univariate and bivariate statistics. Wilcoxon's rank-sum test and the chi-square test were used. 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 1 190 doctors who graduated in 1991 and 1992 (sample A), 961 (80.8%) are currently registered with the Health Professions Council.<sup>11</sup> Of

the graduates currently registered, only 138 (14.4%) were classified as being of rural origin. It was found that 38.4% of the rural-origin graduates are currently practising in rural areas, compared with 12.4% of urban-origin graduates practising in rural areas ( $\chi^2 = 58.86, p < 0.001$ ).

Seven hundred and thirty-nine of the original 887 1994 - 1996 graduates (sample B), are currently registered (83.3%). Of these, 149 (20.2%) were classified as being of rural origin according to their addresses at the time of graduation. Of the rural-origin graduates 41.6% are in rural practice, compared with 5.08% of urban-origin graduates ( $p < 0.001$ ).

Tables I and II show 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. When comparing the figures for 1991/92 and 1994 - 1996, it is obvious that the percentage of UCT students of rural origin, and practising in a rural area, remained small. In the case of MEDUNSA the percentage of rural origin, and the percentage practising in rural areas, increased in the second sample.

Eighty-two responses were received for the 278 questionnaires sent out, including responses received after telephonic follow-up. This is a 29.5% response rate, which is not unusual for postal surveys. Responses were received for 37 of the 138

**Table I. 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 II. 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



questionnaires sent to rural-origin graduates (26.8% response rate) and 45 of the 140 questionnaires sent to urban-origin graduates (32.1% response rate). 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%). Seventy-four (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 being 1:2.6 and in rural areas 1:3.6. Fifty-one of the respondents (62.2%) were Afrikaans-speaking, 21 (25.6%) English-speaking, and 10 (12.2%) indicated one of the indigenous languages as their home language.

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

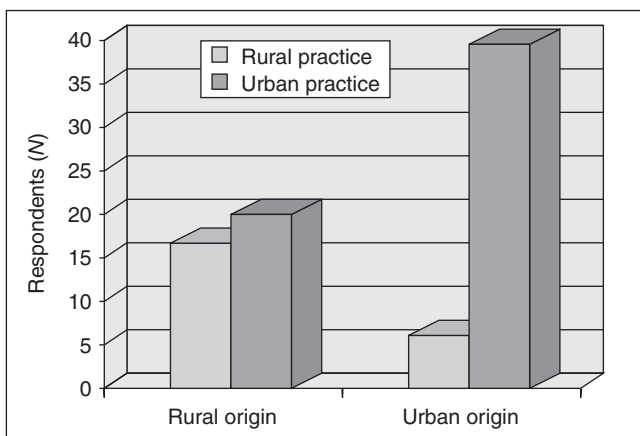


Fig. 1. Current practice of rural- and urban-origin respondents.

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 3 are in private practice only. Of those in urban practice, 10 are in full-time public service, 5 in private practice

with sessions in public hospitals, and 24 in private practice only.

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

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

An analysis was done of the years since graduation spent in public service and private practice. Doctors currently in rural practice spent an average of 2.9 years since graduation in public service, compared with 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. Twenty-three respondents (28%) had spent some time working overseas (average 1.5 years).

Of the respondents, 26 (31.7%) are specialists. Of the respondents in urban practice, 24 (40.68%) were specialists, compared with only 2 (8.7%) of the respondents in rural practice. Of the respondents in rural practice, 91.3% are generalists. 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, while of the urban-origin respondents only 55.56% are generalists and 44.44% specialists.

The questionnaire included a Likert scale on which respondents had to rank 27 factors that may have influenced their choice of where to practise, with 1 indicating 'totally unimportant' and 6 'vitaly important'. The data were treated as numerical, with the median indicating central tendency. The  $p$ -value was calculated using the Wilcoxon's 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 was a sense of feeling needed ( $p = 0.04$ ).

The following factors were not rated significantly different by rural- and urban-origin respondents: educational opportunities for children, a good place to raise children, providing continuing care, responsibility to the 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, exposure to a variety of medical 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, specialty, 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 for their graduates (Natal, Wits and UNITRA), and that only a small percentage of the students were 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 had left the country or because they are no longer practising medicine. Some female doctors may have changed their surnames when they married, and could therefore not be traced. Sample A was biased towards Afrikaans-speaking graduates because three of the five medical schools that supplied addresses still used Afrikaans as lingua franca at the time that the doctors in the sample studied medicine (Free State, Pretoria and Stellenbosch). Furthermore the selection of medical students in 1986/87 did not reflect the demography of the population in South Africa as only small numbers of black students and women were admitted at that time. Sample B focused on more recent graduates (1994-1996) of two medical schools with a significant number of black graduates (MEDUNSA and UCT), which 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,<sup>3,8</sup> namely that rural-origin graduates are more likely to practise in rural areas than their urban counterparts. In sample A, examination of addresses revealed that 38.4% of rural-origin graduates are currently practising in rural areas compared with 12.4% of urban-origin graduates ( $p < 0.001$ ). This was validated by the data from the questionnaire, which indicated that 45.9% of the rural-origin respondents are in rural practice, compared with 13.3% of the urban-origin respondents. This difference is statistically significant ( $p = 0.001$ ). In sample B, 41.6% of rural-origin graduates are in rural practice compared with 5.08% of urban-origin graduates ( $p < 0.001$ ).

Very few of the respondents are in full-time public service, and most of them are in urban areas. This confirms Couper's observation<sup>12</sup> that 'going back home' is not a common reason for doctors working in rural public hospitals in South Africa, but that it is so in the case of rural private practice. Of the rural-origin doctors 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 in their so-called 'cash practices' where a single fee is paid for a consultation and medication.

Another finding conforming to the international experience is that rural-origin graduates are more likely to be generalists than specialists compared with their urban-origin counterparts. At Jefferson Medical College in the USA rural-origin students were five times more likely to become family physicians.<sup>3,4</sup>

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 such as movies/shops, income, availability of adequate resources and adequate staffing levels than their urban-origin counterparts. 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,<sup>13,14</sup> such that students of previously disadvantaged backgrounds are being actively recruited into medical schools. As part of this transformation it is important that applicants with rural backgrounds be given the opportunity 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 World Organisation of Family Doctors (WONCA) Working Party on Training for Rural Practice.<sup>15</sup> The results further support the findings of Rabinowitz<sup>3,4</sup> that applicants to medical schools who express an initial interest in primary care or general practice are more likely to practise in rural areas eventually. Both of these conclusions have implications for the selection criteria and policies of the medical universities.

## Recommendations

It is recommended that: (i) the National Department of Health negotiate incentives or conditional grants to encourage medical universities to enrol more students of rural origin; (ii) the selection criteria of the medical faculties be reviewed with regard to rural origin; (iii) the career aspirations of applicants to medical schools be taken into account in selection, particularly with regard to primary care or general practice; (iv) the enrolment of rural-origin students be monitored at all medical schools on an ongoing basis; and (v) the proportion of rural-origin graduates who return to practise in rural areas be



monitored further, using 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.

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Accepted 6 June 2003.