

ORIGINAL RESEARCH

Rural origin and rural medical exposure: their impact on the rural and remote medical workforce in Australia

J Dunbabin, L Levitt

NSW Rural Doctors Network, Australia

Present address: L Levitt, Scientific Information and Communications, Clinical Outcomes and Research Institute, Eli Lilly, Sydney, NSW, Australia

Submitted: 23 April 2003; Revised: 3 June 2003; Published: 25 June 2003

Dunbabin J, Levitt L.

Rural origin and rural medical exposure: their impact on the rural and remote medical workforce in Australia
Rural and Remote Health 3 (online), 2003.

Available from: <http://rrh.deakin.edu.au>

ABSTRACT

Australia, like many countries, finds it difficult to recruit enough medical practitioners to live and work in rural and remote communities. Over the last decade the Australian Commonwealth Government has invested in a national strategy to train its medical workforce to encourage recruits to rural and remote general practice. This strategy is based on overseas experience that rural origin students, and those experiencing early and repeated rural exposure during training, are more likely to practise in a rural location. The importance of rural origin as a predictor of rural practice is well documented in the literature. More recent studies have tended to focus on rural exposure during both undergraduate and early postgraduate years, and on developing rural curricula in a multifaceted approach to medical training. All 11 medical schools in Australia have modified their selection criteria to encourage students from rural and remote locations, and have, to a varying degree, encouraged rural exposure in parallel with developing uniquely rural content in their curricula. Many of these initiatives are quite recent and have not yet been thoroughly evaluated against their success in addressing shortages in the rural and remote medical workforce. The aim of the review was to explore how the relationship between rural origin and rural exposure during undergraduate and postgraduate training and choice of practice location has underpinned initiatives in medical education in Australia in the years 1998–2003.

Keywords: career choice, medical education, practice location, recruitment, rural and remote medical workforce.



Introduction

Maintaining an adequate medical workforce supply in rural and remote areas has been a challenge in Australia and overseas for many years. In 1998 only 15.6% medical practitioners worked in rural and remote Australia, caring for 28.7% of the population¹. The demographics of the potential future rural and remote workforce may well add to these challenges. For example, both the number of female medical practitioners and the average age at which medical practitioners enter the workforce is increasing, resulting in different work participation patterns^{2,3}. This reinforces the need for effective strategies to increase the proportion of the medical workforce practicing in rural and remote areas.

The aim of this review was to explore how the relationship between rural origin and rural exposure during undergraduate and postgraduate training, and choice of practice location has underpinned initiatives in medical education in Australia in the years 1998–2003. The paper is a narrative review designed to provide a basis for, and broad overview of, the changes. Papers referring to rural origin, rural exposure, undergraduate and post-graduate training and recruitment were sourced through Pub Med and through the MEDLINE database, from the Internet and from other reports between 1977 and 2003. The interpretation of the terms 'rural' and 'rural and remote' are left to the discretion of the authors of each article included in the paper. The review does not discuss the impact of rural origin and rural medical exposure on retention of doctors in rural and remote locations, which is a more complex issue influenced by a range of factors also including income, professional factors and lifestyle issues. It is not designed to be a systematic review and does not draw quantitative conclusions about the relationship between rural origin, rural exposure and practice location.

Rural origin and rural medical exposure

The impact of selecting medical students with a rural background and exposing them to rural medicine during their training has been studied in most countries where there

is a dispersed population leading to a shortage of medical practitioners in less populated areas, including the USA, Canada and Australia.

North American training programs

Medical practitioner shortages were recognised in the USA in the 1960s. In the early 1970s the first medical school programs were initiated to specifically recruit medical school applicants from rural backgrounds and to modify training to place more emphasis on rural medicine. Since that time the medical literature has consistently shown that a rural background is the single most significant personal characteristic influencing doctors' decisions to practise in rural locations^{4,12}. However, those not interested in rural practice were highly unlikely to change their career choice^{4,10}.

By the end of the 1980's, four basic 'truths' of rural health were put forward by Talley based on observations from medical school initiatives designed to attract rural doctors¹³. They were that: (i) students of rural origin were more likely to return to rural areas to practise medicine; (ii) recent medical graduates trained in rural areas were more likely to choose rural practice; (iii) family medicine (general practice) was the key discipline of rural health care; and (iv) the likelihood of recent medical graduates practising close to where they train.

It was clear that medical schools varied enormously in the proportion of graduates who entered rural practice, although few of the training programs had been rigorously analysed at the time. Using a cross-sectional study of 121 US medical schools, Rosenblatt et al found a range of 2% to 41% graduating medical students selected rural practice¹⁴. The (i) location of the medical school in a rural state; (ii) its public ownership; (iii) the production of family physicians (related to the medical school's mission); and (iv) comparatively less funding from the National Institute of Health were the four variables associated with rural practice location in their study.



There is now a variety of medical school training programs. One of the most widely recognised is the WWAMI program, set up in 1971 at the University of Washington School of Medicine. It was set up to serve the predominantly rural states of Washington, Wyoming, Alaska, Montana and Idaho. Students entering the program are preferentially selected from rural settings, returned to rural areas for pre-clinical and clinical experience and supported during rural family medicine residency programs¹⁵.

Adkins et al.¹⁶ described the results of the first 7 years of the WWAMI program (1975–1981) in terms of the geographic and specialty distribution of graduates before and after the establishment of the program. At the time of the study, 23% of graduates from the WWAMI program practised in non-metropolitan areas, compared with only 13% of all US physicians (servicing 24% of the US population). In addition, 61% WWAMI graduates were in primary-care practice, in contrast to 35% of all US physicians. Adkins et al. noted that:

...if all US physicians behaved as these graduates do, the distribution of US physicians would be reversed, with the proportion of physicians practicing primary care in non-metropolitan areas being larger than the proportion of the population living in those areas¹⁶.

Other medical school programs were independently initiated at approximately the same time to attempt to overcome shortages of rural doctors. The Rural Physicians Associate Program (RPAP) was established in 1971 at the University of Minnesota (Duluth School of Medicine). It is a 9 month elective open to 40 third-year medical students. During this time students study mostly within rural community settings and receive a scholarship to cover additional costs. The RPAP has been successful in producing a higher proportion of rural practitioners when compared with non-participant cohorts, although the rural origin of the students was not determined¹⁷.

Thomas Jefferson Medical College initiated the Physician Shortage Area Program (PSAP) in 1974 for a portion of each new college intake. This program was also set up to recruit

and admit medical school applicants from rural backgrounds intending to practise medicine in rural and underserved areas, combined with special education programs. Evaluation of the first 9 classes showed that PSAP graduates were approximately four-fold more likely than their non-PSAP classmates to enter rural practice. They were also seven- to ten-fold more likely to combine a career in family medicine with practice in a rural or underserved area^{8,9}. A follow-up evaluation indicated that these figures remained relatively unchanged with no overall attrition¹⁸. Although the PSAP is small, averaging only 15 students per year, it has had a disproportionate impact on the rural medical workforce in Pennsylvania. Of a total of 150 graduates from all 7 Pennsylvania medical schools practising family medicine in rural Pennsylvania (1978–1991), 21% were PSAP graduates, even though they represented only 1% of all graduates from these schools¹⁹.

Rabinowitz et al. reported further on data collected as part of the Jefferson Longitudinal Study, relating to medical students graduating from Jefferson Medical College between 1972 and 1991, and practising in Pennsylvania in 1996¹². Their study analysed more than 90 variables for 1609 Jefferson graduates over 20 classes. ‘Growing up in a rural area’ was the most important independent predictor of practice in a rural area. ‘Entering medical school with plans to become a family physician’ was the only other independent predictor of rural practice.

In 1993 the University of Illinois College of Medicine, Rockford developed a Rural Medical Education Program (RMED) to train rural family physicians, based on existing literature and earlier rural programs. The RMED program is a comprehensive multifaceted program combining recruitment, admissions, curriculum, support and evaluation components, and is longitudinal across all 4 years of the medical school experience²⁰. The admissions process seeks to select students who are thought likely to succeed in family practice. These traits are fostered and developed by the 4 year rural curriculum, which emphasises family medicine and community-oriented primary care.



The screening instrument used in student selection is based on four major areas: (i) academic performance; (ii) indicators of rural background; (iii) indicators of family medicine preference; and (iv) demographics²¹. Indicators of rural background include locations of schools attended; home country's underserved and rural status; size of home town; and three letters from community members supporting the applicant's preferences for rural practice. Rural communities are actively involved in the selection of 15 applicants they think will be most likely to go to rural communities. After 6 years, RMED had graduated 39 physicians, of whom 69% went into family practice and 82% selected primary-care residencies²⁰.

Evaluating rural medical exposure as a factor in career choice and practice location

From a US national sample of physicians, Xu et al. demonstrated that, consistent with earlier published studies, personal characteristics; financial aid obligations; and an expressed interest to practise in an underserved area prior to entering medical school were the most important factors influencing choice of practice location in underserved areas²². Their data suggested that medical school experiences and graduate training experiences, independent of these background variables, had little effect on physicians' decisions to practise in underserved areas. They concluded that admission policy is the key to increasing the number of graduates likely to practise in underserved areas. This conclusion was supported by data from 7 US medical school programs successfully targeting selection of students with rural backgrounds²³. The importance of admission criteria is more widely recognised^{24,25} and more research is needed to help admission committees better identify applicants likely to pursue favoured career paths²⁶, as is happening with the RMED²¹.

In another US national study, Senf et al. found the best predictors of medical students' choice of generalist practice were; level of interest in primary care at time of entry, the number of weeks required in a family medical curriculum, and the percentage of students with a rural background²⁵.

They argue that the most effective way to increase the number of physicians in general practice is to increase the number of students interested in a family medical career at matriculation.

Other studies, carried out in an attempt to understand the influence of rural exposure during medical training on career choice and practice location, have reported a positive influence. However, most training programs are voluntary, which can introduce bias when they are evaluated. Pathman et al. examined the associations between various aspects of rural medical training and the physicians' self-perceived preparedness for rural practice and subsequent retention²⁷. Among physicians in their first rural practice after training, self-reported preparedness for rural practice and living in a small town were greater for those who spent 3 months or more in rural areas during medical school training.

Pathman looked more closely at the nexus between medical education and career choices²⁶. He drew attention to the failure of most early studies to control for student's characteristics and career interests before entering medical school, making it difficult to distinguish between students' pre-existing career interests, and inclinations relevant to the influence of curricula, role models and sites of training. Campos-Outcalt et al. also evaluated and reviewed literature focusing on specialty choice between 1984 and 1993²⁸. They concluded that the medical school environment is important in determining specialty choice. They also added that the failure to control for learners' pre-existing inclinations means little is known with certainty about the educational factors affecting specialty choices. The only way to demonstrate career (or choice of practice location) effects is to conduct controlled trials with students randomly assigned as program participants or non-participants²⁹, which can be difficult in an education setting.

In studies where learners are randomly assigned to various training programs, no curriculum effect is found, at least for the typical one or 2 month primary care and rural rotation, or simple structural features of schools such as the presence of a family medicine department²⁶. Longitudinal, multi-faceted



training programs are generally considered more effective^{24,28,30}. Most controlled studies suggest that the experiences students have in medical school and especially residency training have a significant role in their decisions to practise or remain in rural areas.

Brooks et al. systematically reviewed factors associated with recruitment and retention of primary care physicians in rural areas, dividing them into pre-medical school factors, medical school factors and residency training factors³¹. They refined their search to approximately 400 articles on primary care in rural areas between 1990 and 2000. Of those only 21 met their criteria. The strongest studies were cohort studies with control groups and multivariate analysis. From these they concluded that pre-medical school factors such as rural origin and specialty preference were most strongly correlated with recruitment to rural areas. Policies should be aimed at selecting the right students (rural up-bringing and specialty preference) and exposing them to the curriculum and experiences needed to succeed in primary care in rural settings. Geyman et al. were quite clear that quality rural training programs are successful, though according to them the educational pipeline to rural medical practice is long and complex with a number of barriers³². They suggested that while much is now known about how to select, train and place physicians in rural practice, effective strategies must be as multifaceted as the barriers themselves, and include rural training tracks and some rural fellowships for postgraduate studies.

McDonald et al.³³ have also reviewed predictors of recruitment and retention, using an evidence-based approach with more emphasis on Australian literature. They concurred that rural background was clearly the primary predictor of entering rural practice, and that the link between rural placements in training and later working in a rural practice is more tenuous, though there still appears to be an association.

Countries other than North America

Both the Jichi Medical School in Japan³⁴ and University of Tromso School of Medicine in Norway³⁵ have developed

programs succeeding in supplying doctors to rural areas. Both offer a decentralised medical school curriculum providing repetitive training opportunities in rural and community-based settings. Jichi Medical School was established in 1972. Among the 1871 graduates, 42% were working in rural areas in 1995³⁴.

The University of Tromso School of Medicine must recruit a quota of medical students from rural northern Norway (50% since 1979). Up to 1990, over 50% of the graduates were practising in rural or remote regions. In addition, 82% of those who grew up in the north and were educated at the University of Tromso were still practising in rural and remote areas 5–10 years after graduation³⁵. Therefore, it appears that the combination of rural background and decentralised training programs is a favourable one. Canada has adopted similar strategies in some provinces^{11,36}. Other countries are in their infancy in this regard. For example, De Vries describes the career choices of medical graduates of rural origin in South Africa for the first time, and notes that there has been no active recruitment of medical students from rural background³⁷.

Australian situation

Until the 1990s, changes in medical education in Australia were usually slow³⁸. Both undergraduate and postgraduate training were perceived to generate a negative view of rural general practice and failed to provide future rural and remote medical practitioners with adequate training in the skills they require³⁹. At the same time rural students, particularly those from smaller rural high schools, were under represented in undergraduate cohorts at the University of Western Australia (WA) medical school³⁹. Reasons given included low career expectations; lack of competition from peers; and high throughput of inexperienced teachers. On the basis of a survey of rural and remote high school students in NSW, Heaney summarised the barriers to higher participation in health professional careers by rural high school students as marks, money and motivation⁴⁰. The educational disadvantage for rural students is also discussed by Adendorff et al.⁴¹.



Based on overseas and limited Australian research, as well as political and community concern, Kamien and Butfield recommended changes in medical school selection and undergraduate training as potential solutions to the inadequate rural and remote medical workforce^{42,43}. They suggested changes in the selection criteria to facilitate entry of more rural and remote students and called on medical schools to provide leadership in providing students with

opportunities for rural involvement, flexibility in curricula and encouragement for those with a predisposition and possible attraction for the challenges of rural practice. Strasser also called for universities to adopt an affirmative action plan for rural medical students; to increase exposure to rural practice in the undergraduate curriculum; and for the establishment of rural medical education centres⁴⁴.

Table 1: Summary of Australian Commonwealth Government initiatives to target medical education to address rural and remote workforce shortages^{45,47-54}

Year	Initiative	Comments
1990	Rural Health Support Education and Training (RHSET) Program ⁴⁷	To enhance the access of rural communities to effective health services, with an emphasis on professional workforce issues, including medical students and potential medical students.
1990 onwards	Rural Health Clubs ⁴⁸	Eighteen multidisciplinary clubs set up to promote rural practice and nurture students with an interest in rural medicine. Funding extended for a further 3 years in 2003.
1992	General Practice Rural Incentives Program (GPRIP) ⁴⁹	Improve access to general practice services in rural and remote areas; 10% set aside to assist medical schools to set up programs to challenge and encourage medical students to pursue a career in rural practice.
1993	Rural Training Pathway – a dedicated general practice rural training scheme ⁵⁰	200 out of 450 general practice training places set aside to provide registrar training with a rural focus.
1994	Rural Undergraduate Support and Co-ordination (RUSC) Program initiated by the Department of Human Services and Health. Reviewed in 1998 and again in 2000 ^{45,50} .	Funding to medical schools to support increased rural student intake to 25%, an expanded rural curriculum, rural placements (a minimum of 8 weeks in rural practice for medical students, together with financial and support networks), and to develop and enhance university departments of general practice. 25% of students to receive 50% of clinical training in a rural setting by 2004.
1996	University Departments of Rural Health (UDRH)	Funding for 7 UDRH throughout Australia to contribute to an increase in rural and remote workforce through education and training programs.
1997	John Flynn Scholarships ⁵¹	Awarded to undergraduates prepared to spend 2 weeks per year for 4 years in the same rural community, allowing them to develop personal links with that community. Approximately 150 scholarships awarded each year and the first cohort graduated in 2001.



Table 1: (Continued)

1998	Establishment of Rural Workforce Agencies (RWA)	To provide support and training for existing rural GPs and facilitate undergraduate training where applicable. RWAs, through Rural Medical Family Networks, support medical families in rural areas.
1998	Rural and Remote General Practice Program (RRGPP) (superceding the GPRIP)	The aim is to increase access to general practice services for rural and remote Australians. The Program is administered by the RWAs in each State and the Northern Territory
1999	Rural and Remote Area Placement Program (RRAPP)	Administered through the Australian College of Rural and Remote Medicine (ACRRM) enabling recent medical graduates undertaking hospital internships to undertake a 10–13 week placement in a rural general practice/rural community practice setting.
2000	1. Rural Australia Medical Undergraduate Scholarships (RAMUS) 2. Higher Education Contribution Scheme (HECS) Reimbursement 3. UDRH and Clinical Schools ⁵²	100 per year allocated to rural origin students in return for a commitment to practise in rural and regional areas for at least 7 years after postgraduate training. Gives graduating medical students the opportunity to offset their HECS debt by working in rural practice. Estimated that 200 graduates will benefit in 2001–2002. Funding to establish 3 more UDRH and 10 Clinical schools around Australia to create a better infrastructure for rural medical training, allowing medical students to undertake training in rural settings.
2001	Commonwealth Medical Rural Bonded Scholarship Scheme	Scholarships are being offered to 100 medical students in return for a commitment to practise in rural and regional areas for at least six years after completing their fellowship as a GP or specialist. Medical school places will be increased cumulatively by 100.
1999–2004	Establishing new medical schools in Townsville and Canberra ^{53,54}	The first regionally based medical schools in Australia.

Data source: Commonwealth Department of Health and Aged Care(46).

† Some State and organisation initiatives excluded, see McDonald *et al.*(33) for these.

The message was received, and the Commonwealth government responded with a number of funded initiatives during the 1990s and into the early 21st century to build a rural focus into medical training (Table 1). These include financial incentives for medical schools that introduce and achieve targets for selection of rural background students, rural curriculum development, and decentralisation of resources to rural and regional centres⁴⁵. State Governments, Rural Workforce Agencies, Divisions of General Practice, Universities and rural communities have all become involved in these and similar initiatives³³, resulting in huge changes in the education of medical students and registrars in Australia over the past 15 years. Australia is now in the

unique position of having implemented a national program to address selection and training of medical students as a means of targeting practice location; in contrast to the more fragmented, geographically based programs adopted by most other countries, notably the US and Canada.

Selection of medical students

During the 1990s the (then) 10 Australian medical schools revised their curricula substantially. Four medical schools (at Sydney, Flinders, Queensland (QLD) and Melbourne Universities) changed to a 4 year, graduate-entry course, with entry through a national Graduate Australian Medical



Schools Admission Test (GAMSAT) and a structured interview. Most other medical schools have adopted an alternative national Undergraduate Medical Admissions Test (UMAT), developed by Newcastle University, in addition to year 12 secondary school results and an interview, although the process varies⁵⁵. All medical schools have developed policies to bring rural student numbers in line with the target of 25% set by the Rural Undergraduate Steering Committee (RUSC). Most now have targeted access schemes for rural and remote applicants, such as the Rural Student Entry Scheme at the University of New South Wales (NSW)⁴¹, and some have developed strategies for promoting health careers to rural secondary school students⁵⁶. There is also work being undertaken to measure students' intention to work in a rural setting, which may further modify admission procedures used by medical schools⁵⁷.

The various government measures to attract more rural origin students to medicine have had an impact. One in every 10 students commencing medical studies in 1989 came from a rural background⁵⁸. This had increased to 17.3% by 1997, and further to 25.2% by 2000⁴⁶ in line with the target set by RUSC.

Exposure to rural general practice

In addition to admission procedures, major changes have occurred in curricula content and delivery⁵⁵, resulting in more rural medicine content. Students are exposed to clinical instruction earlier, and some teaching is being moved from teaching hospitals to smaller hospitals, general practice and community practice settings. The establishment of clinical schools and University Departments of Rural Health (UDRH) in rural and remote Australia has helped create a better infrastructure for rural medical training, and has built academic capacity in those communities. Most Australian medical schools now operate a rural or regional campus⁵².

A number of innovative programs have been developed to provide students with more exposure to rural medicine. For example, Flinders University and the Riverland Division of General Practice developed the Parallel Rural Community

Curriculum program and piloted it in 1997⁵⁹. Eight fourth-year students undertook the entire year of undergraduate clinical curriculum in rural general practice in the Riverland, approximately 300 km north-east of Adelaide, South Australia (SA), where the Flinders University campus is located. The students were spread between five participating practices with a locally based coordinator. The students have not been academically disadvantaged compared with their metropolitan-based peers. This scheme has now been extended to the Greater Green Triangle in south-east SA where there are three towns involved, some 200 km apart⁶⁰.

Another example is the School of Rural Health, based at Wagga Wagga, 470 km south-west of Sydney, NSW⁶¹. It was established in 1999 to provide an alternative community based medical education program for teaching clinical skills at the University of NSW. Teaching is based on a patient centred longitudinal curriculum taught to fourth year students who come to the clinical school on a voluntary basis. Since its inception, 9 more clinical schools have been funded across Australia.

Under the medical education reforms two new medical schools have been created in regional areas. In 1999 a medical school was established at James Cook University in Townsville, QLD (population approximately 140,000) building on a collaboration between the North QLD Clinical School and the Royal Australian College of General Practitioners (RACGP)⁶². The school focuses on rural and remote, indigenous and tropical health, all necessary to the health care of people living in northern Australia. It offers a 6 year undergraduate course with the first intake in 2000. Geographic location; selecting the right students; staff with a strong rural orientation; supporting rural attachments; and providing local postgraduate training and career options all underpin the philosophy. Over 50% of students are from designated rural areas and 10% are Indigenous Australians, well over the 25% imposed on all medical schools and the 5 places originally set aside for Indigenous Australian students⁶³. The school is based on a vertically integrated model with responsibility for education in general practice and rural medicine across the continuum from promotions to



school students, undergraduate education, junior doctor hospital training and vocational training to continuing professional education⁵³.

The Canberra Medical School, Australian Capital Territory, Australia's twelfth, is expecting its first intake of students in 2004⁵⁴. It will offer a 4 year graduate medical degree, with the first 2 years taught mostly on the Australian National University campus in Canberra. The third year will be taught off campus in nearby south-eastern NSW. The first cohort will consist of 60 government-funded places. Two places are set aside for Indigenous Australian students, and 6 places for a rural stream. In addition, 25 places must be filled by applicants taking up Medical Rural Bonded Scholarships⁴⁶. A clinical school is also being established in 2 rural centres as part of the Canberra Medical School.

Post graduate training schemes

Australian medical educators are striving to achieve vertical integration of training from undergraduate, through postgraduate years one to three, to vocational training and continuing medical education. This has been achieved in north QLD through the James Cook University Medical School, but in many parts of Australia there is a gap between graduation and vocational training. In 1999 the Commonwealth Government funded the Australian College of Rural and Remote Medicine (ACRRM) to develop the Rural and Remote Area Placement Program (RRAPP) to help fill this gap. The RRAPP provides junior doctors (postgraduate years 1–3) with a 10–13 week term in rural general practice/rural community practice settings. It provides 13 training sites and placements for up to 90 doctors per year, giving experience to junior doctors, whether they become general or specialist practitioners⁶⁴.

Vocational training for general practitioners (GPs) has been provided by the RACGP since 1973⁴⁹. In 1993 a Rural Training Pathway was developed specifically for registrars with an interest in rural general practice⁶⁵. It catered for 200 of the 450 general practice training places available each year. A more substantial reorganisation of general practice

vocational training took place in 2002 with the creation of 15 regional training consortia, set up to provide locally based education and training⁶⁶. Under this regionalised framework, medical registrars can apply to the training provider of their choice. Training is based on the standards and curriculum established by the RACGP, but is now delivered by the training consortia. An additional 12 training consortia are likely to be established in 2003, bringing the number to 27 and giving coverage throughout urban and rural Australia. The impact of this change on registrars willing to train (and work) in rural and remote locations needs to be thoroughly evaluated to ensure that its impact on the rural and remote medical workforce is positive.

Evaluation

Australian data on the importance of admission policies in favour of rural origin applicants, and rural medical exposure, show the same trends as found in overseas data (39,67–71). Kamien³⁹, surveyed 350 randomly chosen doctors in WA between 1971 and 1976. Sixty-six percent of those with rural background had become rural doctors in comparison to 16% of doctors without rural backgrounds, a somewhat higher figure than that found by Colditz and Elliot⁶⁷ in QLD. In 1990, Rolfe et al.⁷¹ surveyed doctors who had graduated from the University of Newcastle medical school between 1982 and 1988. Those living in a rural area before enrolling in medical school were 2.5 times more likely to be working in a rural location than those who lived in an urban area. Rural doctors were far more likely to be in general practice (89% compared with 47% of doctors employed in urban areas).

More recently Wilkinson et al.⁷² compared data from postal surveys of both urban and rural GPs in SA to further explore the association between rural background and practice location. They found that rural GPs were more likely to report having grown up in the country than were urban GPs (37% compared with 27%, respectively), having received primary and secondary education in a rural area, and having a life partner who grew up in a rural area. Receiving primary education in a rural area was the only factor independently



associated with rural medical practice. Rural GPs were 2.43 times more likely to have received primary education in a rural area than were their urban colleagues. In multivariate analysis comparing only rural and urban GPs with a partner, the association with the primary education remained. However, the strongest association with rural practice was having a partner who grew up in a rural area. Rural GPs were 3.14 times more likely to have a partner with a rural background than were urban GPs. This finding supports a range of studies^{39,73-76} showing that rural communities appear to appeal to partners who are from rural communities themselves. The period during which medical students train, in many instances, coincides with the time they find a lifetime partner, which can influence their choice of practice location and have an impact on their attitude towards decentralised medical education. This provides an argument for policies that address the needs of partners and maintain quality primary and secondary education in non-metropolitan areas. The importance of the needs of families has been recognised by the state-based Rural Workforce Agencies in establishing Rural Medical Family Networks to support medical families. In 2001 the Commonwealth Government provided additional funding to support these family networks.

These issues are being further investigated as part of a case control study of whether medical students of rural origin are more likely to become rural GPs than are students of urban origin⁷⁷. The authors have also carried out a systematic and critical review of literature on factors that influence the decision to take up rural medical practice as part of this study (as yet unpublished).

There have been a number of preliminary evaluations of rural attachments as part of both undergraduate^{59,71,78} and postgraduate training programs^{79,80}. The majority of studies have only examined student attitudes and intentions, which are generally positive, but do not provide behavioural outcomes that have a demonstrated effect on GP recruitment and retention. For example, Strasser⁷⁰ concluded from his study of rural attachments for undergraduates from Monash University, VIC, that they are effective in providing students

with a broad range of clinical experience and in changing students' perceptions of rural practice, especially general practice. Hays et al. reported that undergraduate rural clinical attachments did not appear to influence regional practice choice⁷⁸. Non-metropolitan attachments after graduation for those with no prior rural life experience did appear to have been an important influence. However, the sample size was not sufficient to draw any significant conclusions.

Azer et al. found that first-year students with a rural background attending Melbourne University, VIC, were more willing to undertake postgraduate training in a rural hospital at that stage than were those from non-rural backgrounds⁸¹. This was in agreement with work by Somers and Strasser with first-year students at Monash University⁸². They followed up the same students in second year and found that rural attachments were also important. Negative rural attachments were worse than no attachment at all in shaping students intended practice locations. AMWAC also reported that positive experiences at formative times early in careers can play an important role in attracting medical practitioners to rural areas⁸³.

Worley et al. have reviewed the evidence supporting rural placements as a long-term medical workforce strategy as well as the apparent educational benefits of such placements⁸⁴. They consider that a rural community is an excellent generalist learning environment for all medical students as part of their undergraduate training, whether or not they turn to rural practice.

More thorough evaluations of the many initiatives in medical education in Australia are necessary to determine the impact on the rural and remote medical workforce. McDonald et al. have ranked various interventions connected to medical education from the most to the least effective³³. Those relevant here are bonded student scholarships; strategies to increase the proportion of rural origin medical students; and rural placements and rurally-located medical schools (although they noted there was no evidence for the latter at the time of the study).



The Committee of Deans of Australian Medical Schools is working on a proposal to develop a national data collection mechanism to track medical students' rural experiences during their studies as a basis for longitudinal evaluations of a range of programs. It is important to recognise that 75% of all Australian medical students grow up in metropolitan areas. Even though each individual may be less likely to choose rural practice, those with an interest in general practice need to be nurtured in the same way as rural origin students.

Impact of the changing workforce

The demographics and attitudes of medical students have changed rapidly in the past 5 years. Of the 604 applicants to the General Practice training program (GPETC) in 2003, 56% were female, 67% were born overseas and 35% did their undergraduate training overseas⁸⁵. In addition, 62% were aged over 30 years, twice as many as 5 years ago. These figures highlight important shifts (generational change) already noted in the future workforce^{2,3}.

The proportion of females commencing a medical degree exceeded 50% for the first time in 1998⁴⁶, which reflects general labour force trends in Australia. This trend will lead to more females in rural practice, and will impact on working patterns. In 2000, 87% of female rural GPs in NSW had children, and 78% of those had the main responsibility for care of their children⁸⁶. Therefore, increasingly, the rural and remote GP workforce will need greater flexibility in working hours to cater for the increasing number of female GPs, who often choose to work part time for a part of their career.

Thompson observed major differences between the 50 registrars in the Rural Training Scheme in SA and the practising rural GPs there in terms of the number of female practitioners, skill levels, emphasis on social and family values, desire for flexible work arrangements and willingness to work in isolated and remote rural environments⁸⁰. Spouse employment was important and the

registrars stated preferences for larger practices within a 300 km radius of the State capital, Adelaide.

The introduction of a graduate entry program by 5 of the 12 Australian universities (including the new Canberra Medical School) means that many medical graduates are older and more likely to have partners and families than before. Their partners are more likely to have an established career and may be less willing to move long distances away from metropolitan centres. These factors may impinge on willingness to undertake decentralised training programs, as well as to practise in rural and remote locations. The impact of the wider ethnic and socio-economic backgrounds of graduates is not well documented. Anecdotal evidence suggests that medical students (like all students) are acquiring increased levels of debt through the Higher Education Contribution Scheme² and this may influence specialty choice and or location³¹. All these factors will shape the future of rural and remote medicine, and in particular the composition and roles of the workforce.

Extending rural and remote training initiatives beyond general practice

In addition to GPs, there are shortages of most other health professionals in rural and remote areas, including medical specialists, nurses and allied health professionals. To date there have been no systematic national strategies to recruit nursing and allied health professionals, as there have been for medical students⁸⁷. The University of Sydney has had a Rural Careers Project since 1991, which includes rural attachments for up to 14 health disciplines⁸⁸. Likewise, the QLD University of Technology has had a rural undergraduate clinical placement program for nurses since 1996⁸⁹. Recent budget initiatives by the Commonwealth Government include Rural Nursing Scholarships and Allied Health Rural and Remote Scholarships. Any major initiatives to decentralise training for pharmacy, dentistry, nursing and other allied health professionals will need to provide sufficient infrastructure funding to overcome accommodation shortages in non-metropolitan communities.



Conclusions

On the premise that rural origin and rural medical exposure can positively influence practice location, millions of dollars have been spent on medical education in Australia over the last 15 years to change selection criteria, overhaul the curricula and decentralise training to increase rural content and exposure. The number of rural origin students has increased from 10% in 1989 to 25% in 2000^{58,46}. Rural high school students are encouraged to consider careers in medicine and selection criteria based on a stated intention to enter rural practice are being developed.

As yet, it is not clear to what extent undergraduate or graduate rural exposure has on choice of practice location as many of the initiatives in this area, such as UDRH and rural clinical schools, are relatively new. Many students who choose programs offering rural exposure and training do so because they are from rural or remote areas, and/or have an interest in general practice or rural practice. Only studies controlling for these factors will give clear answers. Australia has the advantage of having a national strategy built around longitudinal, multi-faceted training programs, such as the James Cook Medical School, Queensland. Rigorous evaluation of these programs is necessary, but may be complicated by the number of initiatives introduced with in a relatively short time frame. Future research to further strengthen selection of students most likely to choose rural and remote practice is a positive step, particularly as characteristics of students change. Lessons learned from the training of medical graduates (including the need for adequate accommodation) need to be heeded in developing similar programs for pharmacy, dentistry, nursing and a range of allied health professions, all of which are in demand in rural and remote areas.

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