

Chapter 4.2.3

PROMOTING RURAL PRACTICE THROUGH STUDENT SELECTION

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Introduction

Selection of students into medical school is generally regarded as the single most important variable predicting graduate doctors' future rural practice. A variety of recruitment strategies have been identified regarding selection into medical school – but as selection is just one variable in the continuum of recruitment and retention, it is therefore best regarded as part of an overall rural strategy.

This chapter will describe a number of factors associated with rural practice which are relevant to selection processes – a range of which will be described with some comments on how these can be adapted to improve rural access. A case study from one rurally-oriented medical school, James Cook University in North Queensland, Australia will be discussed. Finally, the concept of the rural pipeline will be further explored.

The principles described in this paper may be useful for those choosing to develop rurally-oriented medical programmes, or pathways for a smaller cohort.

What's the evidence?

A number of factors relevant to recruitment and retention of medical students are described in the North American, European and growing Australian literature on rural medical workforce. These include:

- rural background;
- (positive) rural placements during training;
- rurally oriented curricula and teachers;

- rural role models;
- postgraduate training opportunities; and
- professional and personal issues such as professional isolation, partner's background and employment options, and children's education.

Both recruitment and retention include professional factors such as workload and job satisfaction, access to support, specialty services, continuing education, training opportunities and remuneration. Personal issues to be considered include family needs, children's education, partner's career and employment opportunities, and recreation and cultural opportunities.

Addressing under-representation of rural students

The literature suggests that all stakeholders – medical schools, governments, communities and rural interest groups – need to ensure health careers are promoted to rural-origin students with initiatives to promote a career in medicine. Strategies include: rural doctors as mentors; increasing exposure to science curricula; promotional activities such as career promotion workshops, audiovisual material, and other programmes; use of rural alumni; and examination help and other assistance with the application process and support in the early part of the course. Similar approaches are described to facilitate the entry of Indigenous students into medicine.

Many schools in North America have identified that rural students are under-represented in medical schools. Some describe a 'pre-selection bias' with admissions criteria biased against students from rural and under-served areas.

A number of medical schools have reformed assessment practices and institutional culture to facilitate the entry of rural students into medicine. Strategies include: separate rural admission stream; selective recruitment policies and ensuring rural input into the design and implementation of selection processes; availability of programmes in regional (non-metropolitan) locations; and enhancing the attractiveness of a programme to rural applicants by marketing, rural placements, curricular options in decentralised sites, rural staff and rural role models.

In addition, characteristics of students who would be more likely to practice rural medicine have also been identified. Apart from rural background these include growing up in an underserved area, interest in rural medicine and in family medicine (general practice).

Methods of selection into medical school

A variety of methods are used to select applicants into medical school, which can be modified in the light of the evidence above.

Academic achievement

Medical schools typically use measures of academic achievement and intellectual ability - including variations of the Medical College Admissions Test, final year of high school results and university grade point average. While some studies have found such tests have limited predictive ability for academic performance in medical school, especially after year one (1), it could be argued that such performance is due to a student's exertion rather than ability, and the important outcome is completing course requirements and graduating. Rurally-oriented schools need to consider if they are prepared in their selection processes to adjust the weighting of academic scores to favour applicants more likely to succeed in their programme, and what minimum academic score they are prepared to accept.

Written applications

Written applications take several formats and may require applicants to answer structured questions, unstructured questions, address scenarios and answer questions that show aspects of their personality. Some may also involve a portfolio where information is collected in multiple domains including academic performance, rural, social or cultural background, research and work experience, sporting, music, church and other leadership opportunities.

There is limited literature specifically on this topic and conflicting views on the reliability and validity of written applications as selection tools. Advantages of written applications include their reproducibility, ability to gain insight into a student's professionalism and personal statements (2). Disadvantages of written selection includes conflicting evidence about the reliability of a written statement as a predictor of performance, difficulty assessing subjective attributes, failure to judge interpersonal skills, difficulty establishing reliability of written references, lack of evidence about the reliability of personal written statements, inability to prove authorship of applications and subjectivity of marking (3).

Written applications are more cost effective than interviews, as fewer staff are required to assess and less time and logistical management are involved, especially if online processes are utilised. There is also less variation if panels of markers are trained.

While written applications may give valuable information about rural interests and background, concerns remain that it is not possible to ensure applications are true and accurate representations of the person and they do not necessarily allow for personal values, beliefs and communication skills to show through.

Interviews

Interviews are widely used as a component of both undergraduate and postgraduate medical student selection and postgraduate training programme selection (especially into general practice). Interview panels usually comprise two or three interviewers from a variety of backgrounds including a clinical, education and a community representative.

Rurally-oriented schools may want to utilise strategies such as emphasising the rural focus of the topics explored at interview, ensuring interview panels have one or more members with a rural background or interest, and maximising the pool of rurally interested applicants who are interviewed.

Applicants are typically asked six to eight questions requiring that they answer questions and respond to scenarios, in interviews which last between 30 and 60 minutes. Questions are structured with pre-determined criteria and usually focus on non-cognitive aspects and past experiences. Interviews are more likely to be reliable and predictive when interviewers are experienced and trained to focus on objectives and the use of structured questions (4,5).

Interviews may have a number of advantages: an aggregated score is calculated which reduces the effect of interviewer bias; interviewers can probe or follow up on information in the application; there is more opportunity to identify applicants whose personality may not fit with elements of the course e.g. rural placements; and they provide an opportunity for applicants to self-select out when they realise the questions and their responses do not match their expectations (6).

However, interviews are time consuming, labour intensive and logistically challenging.

Questions

Questions to ask on written applications and in interviews might encompass the following themes:

- background experiences, including rural exposure
- substantial and meaningful exposure to medicine
- type of practice they want to work in
- affinity for medical lifestyle
- sense of social responsibility and social justice
- prestige in the community
- financial and other rewards
- career pathway
- family issues e.g. spouse's needs, children's needs, proximity to family.

Combination – written application and Interview

Such approaches typically see students scored on both a written application and an interview. Their written application is scored by two or three independent judges and they are then interviewed on a set of predetermined questions. Ranking is on the basis of their face-to-face performance score combined with their written application score.

Multiple mini-interview (MMI)

The MMI involves a series of interview stations in an OSCE (Objective Structured Clinical Examination) format and was developed at McMaster University (7). Applicants are asked one or two questions with one (or two) interviewers before moving on to the next station. The interview typically requires completion of a two-hour circuit comprising ten ten-minute interview stations. At each station applicants are presented with a scenario or question testing their knowledge and attitudes related to issues concerning ethics, professionalism, communication skills, reliability, responsibility, collegiality, teamwork, social issues, altruism etc. Applicants may have to answer a question or respond to an interaction with an actor.

MMI tests non-cognitive aspects and aims to dilute the influence and bias of any one interviewer. The MMI has been used by universities to select medical students and has been found to be more effective than previous multi-member panel interviews (8, 9, 10). Again, rurally-oriented schools using the MMI could choose to review the content, mix of interviewers or pool of applicants.

Referee reports

Referee reports are used as a selection criterion and are usually a component of the written application. These reports may involve asking structured questions or for statements regarding an applicant's personal traits. There is uncertainty as to the accuracy of such reports and who may have written them, and there is little evidence as to their usefulness (11).

Team-based exercises

In team-based exercises, applicants are placed in groups comprising four to ten people with whom they are required to solve a number of problems or address scenarios as a group. Observations are made which are useful for assessing communication skills, performance under a time limit, and teamwork / collaborating with others (12). These exercises are often run by an external human resource organisation so selection bias is reduced – although there is significant expense associated with these activities.

Psychometric tests

Specific questionnaires evaluating personality, motivation, intellectual ability or manual dexterity may be used for selection. Psychometric tests such as the Five Factor Model, Myers-Briggs Type Indicator, California Personality Inventory and 16PF have been used to predict career outcomes for doctors. The California Personality Inventory and Five Factor Model have been used regularly, with the most common predictors of success in medical training being dominance, tolerance, sociability, self-acceptance, well-being, responsibility, and achievement (13).

Psychometric tests are time consuming to administer, applicants may fake 'good' responses and may not value the questions asked as being relevant to medicine.

Inventories have been used with medical students to investigate dysfunctional tendencies and coping behaviours for rural medicine. The Hogan Development Survey has been used as a predictor of dysfunctional personality characteristics that inhibit good working relationships and communication with others and teamwork. It is able to discriminate negative personal characteristics that are not detected during the medical student selection interview (14). Early research using the Temperament and Character Inventory has been able to identify differences in temperament and character traits between students with medium and low interest in practising rural medicine (15). While these research findings do not appear sufficiently robust to be adopted by rurally-oriented schools, there is some promising work in this area that is worthy of further exploration.

Lottery

In the Netherlands selection into medical school is by a lottery, with higher academic scores contributing more lottery tickets i.e. more chances to be selected. In a review of four lottery selection studies, three out of four did not reflect improved grades when compared with conventional selection (16). Such selection procedures are inexpensive, equitable and students believe they are fair; however lottery-selected students have a higher dropout rate than those who undertake a selection process (17).

Overview

Many schools choose to combine a number of these methods, although outcomes are not always clear. A recent study identified no significant association between a combination of four different medical school selection techniques for selecting students who had a positive attitude towards serving the underserved. Medical test entrance score, interview score, written portfolio and positive attitude to serving underserved populations were associated with academic performance however none was significantly associated with a positive attitude to working with underserved populations after one year in medical school (18). Further evaluations are needed, particularly focusing on outcomes such as choice of career and location.

Case study: James Cook University

In Australia, a number of medical schools have developed ways to facilitate the entry of rural students into medicine using a variety of selection methods as described above. For example, the James Cook University (JCU) programme, which had its first enrolment in 2000, selects students using a combination of school-leaving score, written application and semi-structured interview. The school-leaving score is adjusted for rural-origin candidates, using a formula which accounts for rurality as measured by the Accessibility/Remoteness Index of Australia (ARIA) score across the 12 years of schooling. The School has consistently exceeded its target of 30% rural entry, with approximately 66% of graduates being from designated rural centres across the whole of Australia, based on the Australian Standard Geographical Classification Remoteness Area (ASGC-RA) index (19).

Having an evidence-based selection process aligned with the School's mission helped manage any perceptions of discrimination. It was acceptable for a rurally-oriented School to explicitly favour rural candidates and the literature strongly supported this as an important way to help the School achieve its mission.

The environment in which the selection process of this School operated was important. Specific rural workforce initiatives in Australia were supported by the Rural Incentives Programme (RIP) established in 1992. Multidisciplinary rural health clubs were established, promoting careers in rural health to their members and through rural high school visits (5).

Subsequent government initiatives including Rural Undergraduate Support and Co-ordination (RUSC), university departments of rural health, and rural clinical schools have seen an explosion in rural academic activity, research and teaching in rural areas, and in rural placements for medical students from all medical schools. In addition a range of rural scholarships, both bonded and non-bonded, were introduced for Australian medical students. These factors strengthened the rural pipeline and ensured that the rurally-focused selection processes were occurring in an environment supportive of a rural career.

Tracking the first seven years of JCU graduates (536 doctors) indicates a positive uptake of rural and regional internships. Two-thirds of graduates have elected to undertake their internship outside of major cities compared to one in six other graduates (Odds Ratio=10) and half in outer-regional or remote areas as against 1 in 20 from elsewhere (Odds Ratio =17). The pattern of rural work destination seems to be maintained in the second postgraduate year and beyond (19).

JCU data shows that 48% of the first four graduating cohorts (postgraduate year 4+) have completed or are undertaking general practice training, one third of whom are rural generalist/ACRRM trainees (20). Nine out of 10 JCU graduates intend to practice outside capital cities compared to one in three who graduated from other medical schools (odds ratio=17). Half would prefer to work in a remote, rural or smaller regional centre (population < 100,000) compared to one in six from elsewhere (Odds Ratio =5) (19).

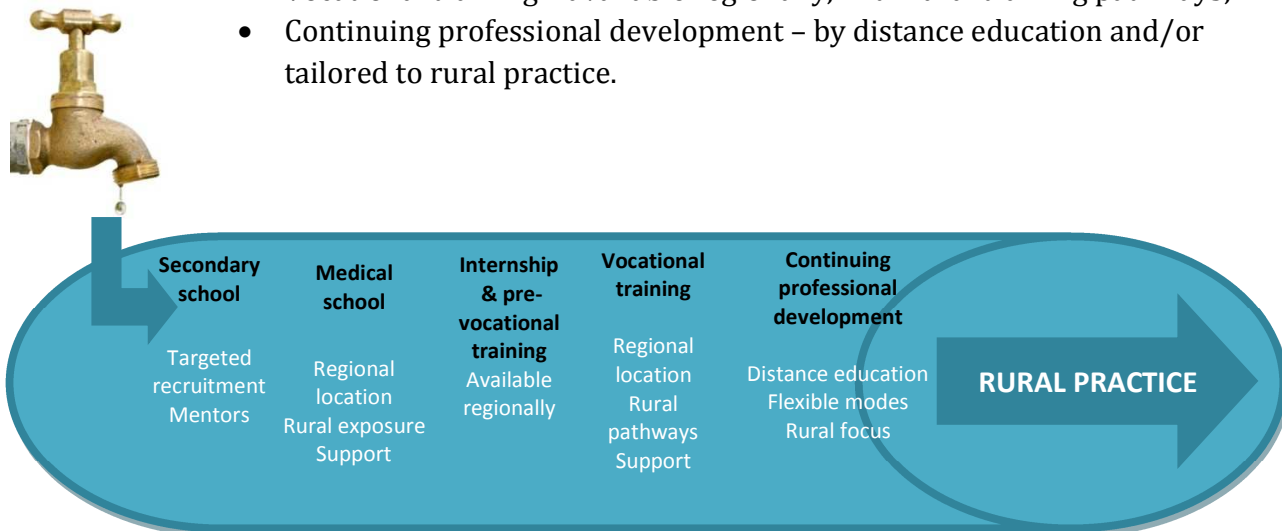
The School has contributed to a doubling of the numbers of resident medical staff in the region within five years of the first graduation.

The rural pipeline

‘The key seems to be the creation of a pipeline that reaches out to rural communities to encourage the selection and success of rural students, gives them opportunities throughout medical school and residency to work in rural settings, and supports them in practice after they do settle in rural areas’ (21).

The components of the pipeline can be summarised as:

- Secondary school (or possibly upper primary school) – targeted recruitment;
- Medical school – located in regional settings, rural exposure and support;
- Internship and pre-vocational training – available regionally;
- Vocational training – available regionally, with rural training pathways;
- Continuing professional development – by distance education and/or tailored to rural practice.



The transitions between each component of this pipeline are critical, for example, from school to university or from medical school to internship. ‘Leakage’ at any transition, or ‘pressure points’ in any of the individual components, can significantly weaken the pipeline. ‘Vertical integration’ is the term commonly used to describe this combination of one or more components – and it often has shared staff, resources and facilities, which typically integrate across the student – junior doctor – vocational training continuum.

The WWAMI programme in the north-west of the USA is a well-known example of a vertically integrated pipeline, developing regionally based medical education for the states of Washington, Wyoming, Alaska, Montana and Idaho (WWAMI). The medical school at Tromsø in northern Norway is another well-established programme, with many graduates now serving on the faculty¹, which is verification of the pipeline concept.

One Australian study (22) summarises positive and negative influences on the pipeline. Features that are likely to have a positive impact on choice of a rural career include:

- extended, collegiate and well co-ordinated rural clinical placements for students;
- internships in regional hospitals or regional hospital term rotations for metropolitan interns;
- students’ and interns’ perception of supportive supervisors and teaching staff as graduates take on increased responsibilities;
- opportunities for medical students and interns to interact with local health professionals during rural placements; and
- postgraduate opportunities for pursuing careers in general practice or other specialist training in rural or regional settings.

Factors that appear to have a negative impact on the pipeline include:

- students’ and interns’ perception of lack of support from supervisors and/or teaching staff (e.g. due to workforce pressures);
- perceived professional and personal tensions between health professionals in rural workplaces;

¹ ‘Faculty’ is another term for members of academic staff.

- a belief that rural placements limit career options;
- preference for a metropolitan lifestyle and perceived isolation from metropolitan-based family and friends; and
- a partner who is not committed or able to work in a rural site and/or is committed to a metropolitan lifestyle.

Practice pearls

What to do

- Selection of students is critical.
- Rural origin/background appears to be the most important variable in predicting rural practice.
- Think of selection as an integral part of the rural pipeline continuum.

What not to do

- Don't focus on just one strategy or element of the pipeline.
- Don't forget to evaluate outcomes of your programme.

Broader applicability and conclusion

Rurally-oriented programmes need to consider carefully the applicants to be targeted for selection given that selection appears to be the most important variable for recruitment into rural medicine (22). As such, the selection process should pay attention to the following aspects:

- Do applicants know about the medical school?
- Is the medical school attractive to potential applicants?
- Are the academic standards of those in the pool of applicants adequate?
- Is any pre-selection bias managed?
- Are sufficient supports - such as mentoring and scholarships - in place to encourage students to apply, to succeed and to progress in the early years of the programme?

Other components of the pipeline must also be considered including positive rural placements and curricular time, support throughout training and postgraduate opportunities. Push and pull factors must be recognised and managed and any weaknesses in the pipeline must be addressed.

While many of these strategies are well established as contributing to rural placements, educators should also remember that all applicants to medical school may potentially practice rurally, so will benefit from all rural experiences during their time at medical school.

The James Cook University case study highlights the importance of considering the 'outcomes of interest' in selecting medical students. Recent reports highlight methodological problems, with most studies considering outcomes that are readily counted – academic achievement and intern performance rating – rather than 'the likelihood of a doctor applying the considerable privilege of a medical education towards social good rather than individual enrichment' (23).

Selection processes should focus on how best to meet the needs of the communities the School serves by defining desired candidate profiles and harnessing the best available evidence to achieve this, using academic and non-academic measures.

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Further readings

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