

Chapter 2.2.6**Assessment in rural medicine:
How to measure and motivate achievement of abilities**

Richard Murray
Tarun K Sen Gupta¹
James Cook University, Australia

'If at first, the idea is not absurd, then there is no hope for it.'

Albert Einstein

Introduction

The unique nature of rural and remote medicine is now well documented. As a result of its context, rural medicine is characterised by an expanded scope of clinical practice in the community and hospital setting, authentic multi-professional care, the necessity of a population health approach and an obligation to ration scarce resources. These are also global challenges: in high-income countries, governments are grappling with the health care demands of ageing populations and complex care; and in low-income countries, infectious and chronic disease increasingly co-exist in a predominantly rural context.

A key driver in the emergence of rural medicine as a distinct discipline has been a divergence between metropolitan and rural general practice. Expansion of medical specialist numbers and increasing sub-specialisation in cities has led to more referral-oriented practice and 'shared-care' for GPs, less GP access to hospitals and a reduced involvement in procedural and emergency medicine. In contrast, in many rural and remote areas in Australia and around the world, rural contexts continue to require comprehensively-skilled doctors who can work across the primary and secondary care settings, including emergency and hospital in-patient services as well as in population health and community

¹ Both authors are also affiliated to the Australian College of Rural and Remote Medicine (ACRRM).

primary care. While there is obviously variability, the scope of abilities typically required of rural GPs contrasts both with metropolitan office-based primary care and the newer 'GP-with-special-interest' phenomenon (for instance, GPs practicing exclusively in skin cancer clinics, sports medicine, travel and cosmetic medicine). Importantly, 'GPs' in rural Australia fill many generalist clinical roles: private office-based primary care, hospital Career Medical Officers, District Medical Officers, in aeromedical retrieval and remote flying clinics, as GP anaesthetists, obstetricians and so on.

Assessment in rural medical education

Over the 15 years since the establishment of university departments of rural health, rural clinical schools and rurally-based medical schools, the maturation of rurally-based undergraduate education in Australia has seen rural placement become much more than just a bit of rural clinical experience and a 'taste of rural life'. The curricula, educational programmes, training pathways and standards that have been developed for rural medicine have been accompanied by innovations in assessment.

This chapter will examine the development of assessment relevant to the rural medical context. The development of the assessment programme in the Australian College of Rural and Remote Medicine (ACRRM) will be used as an illustration of the principles.

The Australian College of Rural and Remote Medicine (ACRRM) was established in 1997 amidst a growing recognition of rural and remote medicine as an independent medical discipline and dissatisfaction with existing mechanisms for rural training. In 2007 the Australian Medical Council (AMC) accredited ACRRM as a standards and training provider, the first such formal recognition of a peak professional organisation with a focus on rural and remote medical education as a generalist medical discipline. This accreditation was based on the ability of ACRRM to meet the AMC's guidelines for its training and assessment programme for 'general practice' – defined by the College in expansive terms to reflect the full scope and rural and remote context (see Box 1). The Fellowship of ACRRM (FACRRM) was therefore effectively the world's first postgraduate qualification in rural and remote medicine.

Box 1:
ACRRM Definition of General Practice

The general practitioner is the doctor with core responsibility for providing comprehensive and continuing medical care to individuals, families and the broader community. Competent to provide the greater part of medical care, the general practitioner can deliver services in the ambulatory care setting, the home, hospital, long-term residential care facilities or by electronic means - wherever and however services are needed by the patient.

The general practitioner applies broad knowledge and skills in:

- managing undifferentiated health problems across the lifespan in an un-referred patient population;
- providing continuing care for individuals with chronic conditions;
- undertaking preventive activities such as screening, immunisation and health education;
- responding to emergencies;
- providing in-hospital care;
- delivering maternal and child health services; and
- applying a population health approach at the practice and community level.

General practitioners work across a dynamic and changing primary and secondary care interface, typically developing extended competencies in one or more discrete fields of medicine, thereby ensuring community access to the range of needed services in a supportive network of colleagues and health care providers.

As the medical expert with the broadest understanding of a patient's health in their cultural, social and family context, the general practitioner has a key role in co-ordinating the care pathway in partnership with the patient, including making decisions on the involvement of other health personnel. He or she practices reflectively, accessing and judiciously applying best evidence to ensure that the patient obtains benefit while minimising risk, intrusion and expense. The general practitioner contributes clinical leadership within a health care team and is skilled in providing clinical supervision, teaching and mentorship.

The purposes of assessment in the rural context

Much is now known about how to produce a fit-for-purpose rural medical workforce. The importance of rural medical student selection, rurally-oriented curricula and rural clinical experience, regional medical schools and regionally-based further training opportunities is well established. But at the end-point of medical training - the postgraduate or 'vocational' training phase - it is important to consider how training and assessment might be best structured to deliver outcomes of most value to rural doctors and communities, and certification of ability to practice unsupervised across the broad scope of rural and remote medicine.

Assuring standards in medical training is generally achieved in three ways:

- identifying a suitable clinical apprenticeship (through accreditation of training posts and supervision);
- specifying the required learning objectives (curriculum and taught syllabus); and
- by measuring the achievement of abilities (formative and summative assessment).

Although the latter is the focus of this chapter, the strategies are interlinked.

Measuring the achievement of abilities - assessment - is both a driver of learning and a measure of outcomes of education and training. As it motivates, shapes and adjudicates the achievement of abilities by the learner, it is a critical tool.

The rural context

The context of assessment in rural medicine, then, is typically an expanded scope of clinical practice, geographic isolation and workforce shortages. Of particular importance is the need for training in rural medicine to be flexible – to reflect the diversity across rural and remote community contexts and to accommodate the career interests and circumstances of graduates who are tracking to a rural medical career.

In terms of outcomes of assessment, studies demonstrate that medical students perform as well or better academically in regional, rural and remote sites compared to the cities.

Developing assessments

Various factors need to be taken into account when developing assessments in rural medicine.

Firstly, learning objectives need to be defined to enable them to be reinforced, and for learning to be driven in a desired direction. Secondly, the methods of assessment need to be ascertained - one example being an approach that focuses on documenting the learning experience (e.g. through diaries and reports) which allows learners to reflect and share experiences with their colleagues, supervisors and educators. Other approaches could include certification of competence in specified skills signed off by approved supervisors via a logbook, or formal inclusion of rural context and content in summative examinations as described below.

As geography, workforce and access to information and communication technology (ICT) can be important considerations, assessment solutions should make use of available facilities, bandwidth and so on and avoid the problems associated with requiring candidates to travel (time, cost, depopulating rural areas of doctors). Other than the inconvenience, 'traditional' national examinations held in capital cities may also not measure nor motivate achievement of key abilities relevant to the practice of rural medicine.

Context specificity is important in rural assessments. Some assessments may foreground the rural context, requiring learners to understand how general clinical problems may be managed *in the rural setting* – while content that is *specific to the rural context* may also be assessed. These might include issues relating to rural populations and demographics; or a referral task which requires the learner to manage the hand-over of a rural patient to a tertiary facility through a telephone discussion and a letter.

And finally population health projects may also be used for rural assessments, allowing learners to develop and be assessed on a broader range of skills. This might include the possibility of 'service learning' through undertaking useful and meaningful projects.

What should be assessed?

Assessment should relate directly to the desired outcomes of the education or training programme, namely the enhanced abilities of the graduate in relation to the knowledge, skills, contexts etc that have been offered through a formalised curricula. To this end, the development of curricula that reflect the full scope and context of rural generalist practice has been essential.

The fourth edition of the ACRRM core curriculum - developed *by* rural doctors *for* rural doctors across Australia - is structured as 18 curriculum statements across seven domains, these being: provision of medical care in the ambulatory and community setting; care in the hospital setting; responding to emergencies; a population health approach; needs of culturally diverse and disadvantaged groups; an ethical, intellectual and professional framework; and a rural and remote context of practice.

Assessment for Fellowship of ACRRM

In designing its assessment programme, ACRRM considered a number of principles:

- The assessment had to reflect the content and context of rural medicine in Australia.
- The diversity of rural practice had to be accommodated whilst ensuring coverage of core abilities to assure quality and public safety.
- Flexible delivery was also key. The exam had to be available in formats that were accessible to rural doctors, ideally in ways that minimised the need for them to travel from their areas.
- The assessment programme had to satisfy the AMC's requirements of assessment.

The team that led the development of the ACRRM assessment recommended a 'programmatic' approach, applying a suite of complementary assessment methodologies that, when taken as a whole, provided valid, reliable, feasible, acceptable assessment with a positive impact on learning. The strategy used six main steps, consistent with approaches described in the literature:

1. Developing the assessment blueprint and classification system.
2. Identifying the assessment model.
3. Choosing the assessment methods.
4. Writing the assessment items.
5. Investigating the feasibility of purchasing assessment items and feasibility of the proposed assessment tools.
6. Piloting the chosen assessment methods.

1. *Developing the assessment blueprint and classification system*

The assessment blueprint was drawn from existing curricular material including the ACRRM Primary Curriculum, a number of electronic resources and ACRRM's domains of rural and remote medical practice, which describe the unique aspects of the horizontal discipline of rural and remote medical practice.

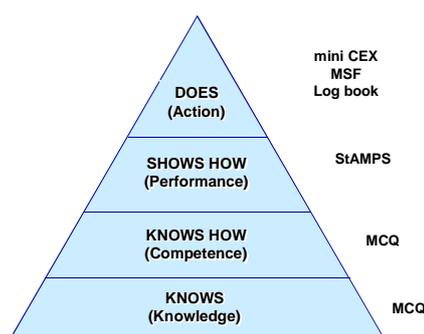
2. *Identifying the assessment model*

A literature review identified the evidence on which to base ACRRM's assessment programme. A 'programmatic' model was chosen, seeing assessment as a 'programme' across the entire training spectrum, rather than an end-point measure. This comprised a balance between formative and summative assessment and the enabling of the collection of a portfolio of evidence about candidates over their entire training period. In this way multiple assessment methods could be used in order to address the criteria mentioned and develop an assessment programme acceptable to the profession and to external organisations.

3. *Choosing the assessment methods*

High stakes assessment processes must be of high quality and defensible. Given that no single assessment method has all the required qualities, a combination of methods over a range of times was developed, based on Miller's Pyramid (Figure 1). Assessment methods were chosen based on the four levels or hierarchies - 'knows', 'knows how', 'shows how' and 'does'.

Figure 1: Hierarchy of assessment methods



Source: The Australian College of Rural and Remote Medicine (ACRRM).
Fellowship Assessment Handbook.

Six summative assessment methods were chosen, the last four of which are also used formatively:

1. Written examination: a three-hour multiple choice questionnaire (MCQ) examination - delivered on-line and undertaken during the second half of training, with a locally identified and contracted invigilator.
2. StAMPS examination: Structured Assessment using Multiple Patient Scenarios – an innovative new assessment method, developed specifically for ACRRM, consisting of a two-hour, eight-station assessment of clinical reasoning undertaken via videoconference.
3. Clinical skills log book: an existing electronic logbook revised to link with the assessment blueprint.
4. Multi-source feedback (360 degree feedback): a practice-based assessment used to assess interpersonal and professional attributes.
5. Mini-CEX (Mini-clinical evaluation exercises): a series of brief encounters across multiple patients, problems, and clinical settings to assess clinical skills.
6. Portfolio: learning plans, results of other formative and summative assessment items, accredited courses, completed modules and other activities, recorded electronically

5. *Writing the assessment items*

An assessment writing workshop was held during which assessment items, relevant criteria and guidelines and a draft regulatory framework were developed, following the principle that ACRRM's assessment was *for rural doctors by rural doctors* (or rural medical educators).

Editing, item banking, standard setting and blueprinting procedures were established and expertise was utilised to provide professional development for case writers and staff.

6. *Investigating the feasibility of purchasing assessment items and feasibility of the proposed assessment tools*

ACRRM investigated the feasibility of purchasing assessment items from other medical colleges and boards in the interests of time and cost. It identified the American Board of Family Medicine (ABFM) in-training examination as the most suitable. Apart from similar contexts, the examination enabled international benchmarking for candidates and ACRRM and allowed candidates experience in undertaking an internet-based examination.

6. *Piloting the chosen assessment methods.*

Pilots were undertaken to evaluate three of the chosen assessment methods: the StAMPS examination; the MCQ examination; and the American Board of Family Medicine web-based in-training assessment.

Detailed evaluations were conducted on the feasibility, reliability and acceptability of each of these tools. The StAMPS exam was evaluated in some detail and the findings published as it represented a new form of assessment. It was designed specifically for a postgraduate examination in the rural and remote context and the format was developed to meet two purposes.

Firstly, the StAMPS exam provided an interactive assessment tool that candidates could undertake in their own practice, using distance technology to minimise the time, cost and inconvenience of travelling away from their rural and remote community. Second, ACRRM sought to develop an adaptive assessment method allowing an examiner to explore a variety of options in a clinical scenario with a candidate, including how they respond to changing circumstances such as variations in a patient's condition or resource availability.

Technical advice was sought for the exam design and appropriate use of information technology. An objective structured clinical examination (OSCE)-style format was developed using multiple examiners who saw all candidates via videoconference. Examiners were based centrally at the main videoconferencing venue, with candidates in/near their home towns. Considerable effort was invested in case design, examiner training and technical support, with the pilot demonstrating good feasibility and high reliability (generalisability coefficient of 0.76).

The exam was suited to the rural and remote context, with candidates able to undertake each assessment component within or close to their local community. This approach used a variety of carefully selected and credible assessment methods with progressive assessment across all four years of training catering to a variety of learning styles and needs with a system of ongoing feedback.

This suite of formats - combining assessment items specifically written for the Australian rural context with work-based assessments and portfolios - enabled ACRRM to meet its goals of a valid and reliable assessment programme that comprehensively reflected the curriculum and the educational outcomes of the training programme.

After the successful pilots in 2006 and subsequent ratification by the AMC, the ACRRM examination process formally commenced in 2008. An assessment committee was established with appropriate expertise in assessment and rural medical education, and staff appointed to support the examination processes. From 2008 to 2011, Fellowship candidates undertook a total of 465 examination segments, with pass rates in the various segments ranging from 66% (StAMPS) to 84% (mini-CEX).

Practice pearls

- Assessment should consider both the content and the context of rural and remote medicine.
- Robust assessment processes can ensure confidence in standards despite variations in training pathways and experiences.

What not to do

- Don't miss opportunities to develop innovative assessment approaches for the rural and remote context.

Summary

A transparent and robust assessment programme is essential to ensure the legitimacy and acceptance of rural medicine as a medical discipline, signaling the content, expected standards, and performance required to meet these standards to candidates, the profession and external accreditation agencies. Properly designed rural assessment can be used to drive training programmes and learning in the desired directions at undergraduate and postgraduate levels. Existing examination formats can be modified for use in rural assessments, or innovative approaches may need to be developed to meet specific requirements e.g. StAMPS. An essential principle is for the profession to own and manage the process, so that the assessment is for rural doctors by rural doctors.

Assessment is a key factor in allowing greater flexibility for doctors in training to meet their own and community needs. Confidence in the measurement of abilities gives greater scope for flexibility in the sequence, nature and location of education and training experiences and allows for greater variability in supervision and instruction / teaching.

As the discipline of rural and remote medicine becomes established in medical curricula around the world, additional assessment approaches will need to be developed in order to monitor, confirm and drive student learning.

Further reading

1. Hays RB, Sen Gupta TK. Ruralising medical curricula: The importance of context in problem design. *Australian Journal of Rural Health*, 2003; 11: 15-17.
2. The Australian College of Rural and Remote Medicine (ACRRM). Primary Curriculum (4th Edition) <http://www.acrrm.org.au/misc/curriculum/Default.htm> (accessed March 2014).
3. The Australian College of Rural and Remote Medicine (ACRRM). Fellowship Assessment Handbook, p9. <https://www.acrrm.org.au/files/uploads/pdf/Assessment%20Handbook%202014.V1.pdf> (accessed March 2014).
4. Miller G. The assessment of clinical skills/competence /performance. *Academic Medicine* 1990; 65 Suppl: S63-S67.
5. Sen Gupta TK, Hays RB, Kelly G, Buttner P. Are medical student results affected by allocation to different sites in a dispersed rural medical school? *Rural and Remote Health* 2011; 11:511. <http://www.rrh.org.au> (accessed June 2011).
6. Smith JD, Prideaux D, Wolfe C, Wilkinson TJ, Sen Gupta T, DeWitt DE, Worley P, Hays RB, Cowie M. Developing the accredited postgraduate assessment program for Fellowship of the Australian College of Rural and Remote Medicine. *Rural and Remote Health* 2007; 7:805. <http://www.rrh.org.au> (accessed June 2011).
7. Wilkinson TJ, Smith JD, Margolis SA, Sen Gupta TK & Prideaux DJ. Structured assessment using multiple patient scenarios by videoconference in rural settings. *Medical Education* 2008; 42: 480–487.
8. Worley P, Esterman A, Prideaux D. Cohort study of examination performance of undergraduate medical students learning in community settings. *British Medical Journal* 2004; 328(7433):207-9.

This article is a chapter from the **WONCA Rural Medical Education Guidebook**.
It is available from www.globalfamilydoctor.com.

Published by:
WONCA Working Party on Rural Practice
World Organization of Family Doctors (WONCA)
12A-05 Chartered Square Building
152 North Sathon Road
Silom, Bangrak
Bangkok 10500
THAILAND



manager@wonca.net

© Murray R, Sen Gupta, TK, 2014..

The authors have granted the World Organization of Family Doctors (WONCA) and the WONCA Working Party on Rural Practice permission for the reproduction of this chapter.

The views expressed in this chapter are those of the authors and do not necessarily reflect the views and policies of the World Organization of Family Doctors (WONCA) and the WONCA Working Party on Rural Practice. Every effort has been made to ensure that the information in this chapter is accurate. This does not diminish the requirement to exercise clinical judgement, and neither the publisher nor the authors can accept any responsibility for its use in practice.

Requests for permission to reproduce or translate WONCA publications for commercial use or distribution should be addressed to the WONCA Secretariat at the address above.



Suggested citation: Murray R, Sen Gupta, TK. Assessment in rural medicine: How to measure and motivate achievement of abilities. In Chater AB, Rourke J, Couper ID, Strasser RP, Reid S (eds.) *WONCA Rural Medical Education Guidebook*. World Organization of Family Doctors (WONCA): WONCA Working Party on Rural Practice, 2014. www.globalfamilydoctor.com (accessed [date]).