Welcome to AMEE Guides Series 2

The AMEE Guides cover important topics in medical and healthcare professions education and provide information, practical advice and support. We hope that they will also stimulate your thinking and reflection on the topic. The Guides have been logically structured for ease of reading and contain useful take-home messages. Text boxes highlight key points and examples in practice. Each page in the guide provides a column for your own personal annotations, stimulated either by the text itself or the quotations. Sources of further information on the topic are provided in the reference list and bibliography.

Guides are divided into series according to subject:

- Teaching and Learning
- Research Methods
- Education Management
- Curriculum Planning
- Assessment

The Guides are designed for use by individual teachers to inform their practice and can be used to support staff development programmes.

‘Living Guides’

An important feature of this new Guide series is the concept of supplements, which will provide a continuing source of information on the topic. Published supplements will be available to all who have purchased the Guide.

If you would like to contribute a supplement based on your own experience, please contact the Guides Series Editor, Professor Trevor Gibbs (tig.gibbs@gmail.com).

Supplements may comprise either a ‘Viewpoint’, when you communicate your views and comments on the Guide or the topic more generally, or a ‘Practical Application’, where you report on implementation of some aspect of the subject of the Guide in your own situation. Submissions for consideration for inclusion as a Guide supplement should be maximum 1,000 words.

Other Guides in the new series

A list of topics in this exciting new series is listed on the back inside cover.
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Abstract

The goal of global equity in health care requires that the training of health care professionals be better tuned to meet the needs of the communities they serve. In fact medical education is being driven into isolated communities by factors including workforce undersupply, education pedagogy, medical practice and research needs.

Rural and remote medical education (RRME) happens in rural hospitals and rural general practices, singly or in combination, generally for periods of four to forty weeks. An effective RRME programme matches the context of the local health service and community. Its implementation reflects the local capacity for providing learning opportunities, facilitates collaboration of all participants and capitalises on local creativity in teaching. Implementation barriers stem from change management, professional culture and resource allocation. Blending learning approaches as much as technology and local culture allow, is central to achieving student learning outcomes and professional development of local medical teachers.

RRME harnesses the rich learning environment of communities such that students rapidly achieve competence and confidence in a primary care/generalist setting. Longer programmes with an integrated (generalist) approach based in the immersion learning paradigm appear successful in returning graduates to rural practice and a career track with a quality lifestyle.

TAKE HOME MESSAGES

- Healthcare professionals should be trained to meet the needs of the communities they are to serve
- The need for medical education in rural areas is driven by:
  - Medical workforce undersupply and misdistribution
  - Changes in medical practice
  - Changes in medical education
  - Need for medical research relevant to rural practice
- Rural practice contexts suitable for training include:
  - Rural hospitals
  - Rural general practices
  - “Community immersion” utilising both local hospital and primary care agencies (integrated placement)
- In planning an RRME programme consider the:
  - Location
  - Duration of programme
  - Number of students required
  - Learning resources available
  - Style of learning
  - Provision of staff and student support
  - Available finances
- Remote and rural communities provide a rich learning environment in which students can rapidly acquire competences and confidence in primary care in a generalist setting.
Introduction

Recent years have seen a growth of interest in developing the role of undergraduate medical teaching sites in rural or remote settings. There is both a need to provide clinicians to practice in non-urban areas and a need to spread medical education to locations away from urban-based teaching hospitals. This AMEE Guide looks at the background to these developments and reviews the range of opportunities they can provide.

As the world-wide demand for health care increases, so too does the need to train health-care providers and to distribute them where needed (Price 2008). Some populations are, for whatever reason, remote from healthcare support, so there is a further requirement to train the providers appropriately to practice in these areas of need. Although similar rural health care issues are present in various countries, so far North America and Australia have described more experiences with addressing these needs than Africa or Europe (Hays 2007a).

In an overview of the world’s medical schools Boulet and colleagues (Boulet et al. 2007) described the regional balance of medical schools, physicians and populations. Issues highlighted were physician migration, the relationship between physician output and population mortality/morbidity, the cost and quality of training programmes, but all were qualified by limitations of the source databases and audit practices.

Of these global perspectives it is the characteristics of the training programmes that relate to the topic of this guide, i.e. the congruence of training resource focus and health care need.

What constitutes rural and remote?

There is regional and international variation in the definitions of rurality and remoteness. In developed countries the rural proportion of populations ranges from approximately 15 to 45%. Many countries define rural as “at or beyond the fringe of urban areas” (Statistics-Canada 2001) and Couper (Couper 2003a) has proposed a definition including characteristics of the local health care services (Box 1).

BOX 1

“A definition of rural areas are those outside of metropolitan centres where there is not ready access to specialist, intensive and/or high technology care, and where resources, both human and material, are lacking” (Couper 2003a)

In Australia a number of classification scales have been published by government agencies, eg. the rural, remote and metropolitan areas scheme (RRMA) of 1994; and the accessibility/remoteness index of Australia scheme (ARIA) of 2001. These are based variously on the population density and “road distance from service centres” of census-based “statistical local areas” and are revised as population demographics evolve (Department of Health
and Ageing 2008a). For simplicity’s sake in the guide we will use the term “rural” to refer to both “rural” and “remote” except where specific reference to remote issues is required. However a key common denominator in rural health for both the developed and developing worlds is disadvantage of access to resources, workforce, facilities, choice and health outcomes (Rosenblatt 2004, Rabinowitz 2005, Kamien & Cameron 2006, Price 2006). All these may be coupled with a greater sense of community than in urban populations but also a greater reluctance to seek help (Hays 2007b). Yet these circumstances offer unique training opportunities.

For learners, the special characteristics of the educational environment in rural settings (vs urban) include:

- more intense and sustained experiential learning (i.e. more challenges)
- usually a much higher teacher to student ratio, (i.e better supervision, more support)
- more opportunities for longitudinal follow up of patients (i.e. see the whole person)
- greater emphasis on personal and professional development (i.e. setting boundaries, maintaining relationships and teamwork)
- increased visibility and sense of collegiality.

For teachers:

- the presence of students can be used to create a community of learning among the local health team.
- when students are present for periods long enough to establish competence they can ease the clinical workload.
- students can act as advocates for rural health issues on their return to the urban setting.

What drives the need for medical education in rural and remote areas?

The first multifactorial rationale for rural medical education was published in 2000 (Worley et al. 2000a). Prior to this, the principle context for rural medical education articulated in the literature was that of the rural medical workforce crisis (Rosenthal et al. 1989, Cullen et al. 1997). Whilst this workforce driver is still politically powerful, and has been responsible for significant investment in this area by government (Department of Health and Ageing 2008b, 2008c, 2008d), it no longer does justice to the sophisticated pedagogical understandings that have emerged in this field. It is now helpful to conceptualise the drivers for rural medical education under four headings:

- Medical workforce undersupply and maldistribution
- Changes in medical practice
- Changes in medical education
- Need for medical research relevant to rural practice.
There is considerable evidence in the world literature from America (Cullen et al. 1997), Australia (Eley & Baker 2007), (Playford et al. 2008) and South Africa (Reuter 2007), that future attraction to the rural workforce can be influenced by medical school student selection and positive undergraduate work experience in rural placements. Evidence from America (Rabinowitz et al. 2008), Australia (Wilkinson et al. 2003, Kamien & Cameron 2006, Worley et al. 2008), Canada (Curran & Rourke 2004), Japan (Matsumoto et al. 2008), Norway (Magnus & Tollan 1993), South Africa (De Vries & Reid 2003) and Scotland (Richards et al. 2005) has confirmed that medical students from a rural background are more likely to take up rural medical practice than their peers from city origins.

A key aspect to understanding the requirements of rural and remote medical education is its regional context. Local and regional factors have a greater influence on health outcomes in rural as distinct from urban areas (Galea et al. 2005); such factors also preclude global assumptions regarding training requirements for doctors working in rural communities. Both health care strategy research (Wells & Banaszak-Holl 2000) and health care intervention studies (Johns et al. 2005) have concluded a non-transferability across regions of the world.

The predominant model of medical education that evolved after the second world war was oriented towards the specialist practitioner in large, high-tech city medical centres (Fiedler 1981); such an educational environment did not train doctors for primary care practice in non-urban areas and its deep systemic entrenchment has made implementing change a slow process. A curriculum model which promotes competency in a wide range of specialties is required to produce a doctor comfortable with practice in a rural area (Price 2008, Rabinowitz et al. 2008, Ellis 2008).
Changes in medical practice
In the UK, two drivers can be identified for the changes seen in medical practice:

- Changes in patients' expectations, especially the desire for investigations and treatment to be available nearer to the home community
- An increasing number of medical students.

England and Wales have seen a 40% increase in recent years in the number of students admitted to medical school (Dent & Harden 2005). These factors are driving educators to consider the increased use of rural locations for medical teaching. Changes in doctors' availability and workload (partly following the European working time directive) and changes in students' requirements have also challenged the suitability of tertiary referral hospitals for undergraduate medical teaching (Hays 2007b, Denz-Penhey & Murdoch 2008a).

Strategies to address the shortage of health care workers in rural areas in the United States (US) and Canada have included establishing medical school campuses in regional areas as part of a rural pipeline programme (Crump et al. 2006) and refocusing academic health centres in the service of rural populations (Mennin et al. 1996, Curran & Rourke 2004, Gazewood et al. 2006). Family medicine training programmes still need further tuning for rural career promotion (Lu et al. 2008).

Australia has relatively few urban centres and vast rural/remote areas, so the increasing trend for doctors to practise in city rather than rural communities has led to a critical shortage rurally (Department of Health and Ageing 2001). In response, rural and remote medical education (RRME) is being used to reaffirm a career in rural medicine as an attractive professional and personal choice; and early indications are that this national strategy has been successful (Eley & Baker 2007, Playford et al. 2008).

Changes in medical education
The increasing numbers of students who cannot be accommodated in traditional urban facilities has stimulated interest in RRME in the majority of Europe with the exception of Norway, Scotland and Croatia, where remoteness has been a driver (Hays 2007a).

In the UK, the development of ambulatory diagnostic and treatment centres (ADTCs) (Hall 2002, Hall 2006) in rural areas has provided a new venue for student clinical placements (Dent et al. 2007). Interest in remote and rural medical careers have been fostered by learning programmes introduced at the Universities of Aberdeen (Wilson & Laing 2007) and Cardiff (Deaville et al. 2007). Elsewhere in Europe, the requirement to recruit students to rural general practice has led to studies in student selection procedures (Magnus & Tollan 1993, Polasek & Kolcic 2006, Rygh & Hjortdahl 2007).

In Australia, students have been placed amongst or embedded in the rural/remote populations for short or extended periods (Worley et al. 2006, Maley et al. 2006); the latter has resulted in the evolution of programmes with improved
alignment of learning environment, curriculum approach and assessment to rural clinical needs (Maley et al. 2007). In the US, data from non-traditional rural clinical programmes and traditional programmes show equivalent academic outcomes for students (Schauer & Schieve 2006), and also equivalent educational value for junior medical students and senior trainees (Rourke 2005, Goertzen 2006).

Such changes challenge the local cultural norms in medical education and this can hinder implementation, but pedagogical integrity and sound management can prevail. The BEME systematic review of the contribution of experience in clinical and community settings to early medical education (Dornan et al. 2006) describes several benefits to students, teachers and patients. In particular it helps students to develop confidence as they adjust to their professional environment.

RRME could be considered a form of community-oriented/community-based medical education (COME/CBME). RRME adopts the principles of a community-oriented approach, in that it engages the community that its graduates aim to serve in the curriculum design process, and then evaluates its outcomes specifically in relation to what is required by that community (Hays 2007b).

The innovative curriculum at the University of Gezira features a community-orientated, community-based learning approach particularly aimed at finding solutions to Sudan’s rural community problems (Fahal 2007). The benefits of such programmes have been reported for the University of Maiduguri in Nigeria where local communities were made more aware of preventative health measures (Omotra et al. 2004).

RRME is however evolving as an entity with distinct educational characteristics as outlined in this guide, particularly the impact of “immersion learning” (Zink et al. 2008).

Vertical integration of undergraduate rural tracks with visible postgraduate career pathways is fundamental to attracting doctors to future rural practice. Significant efforts to achieve this have been pioneered in Australia yielding some early indications of success (Worley et al. 2008), a key factor being the joint management of undergraduate and postgraduate tracks by rurally focussed organisations (Skinner & Ingham 2008).

**The need for medical research relevant to rural practice**

Clinicians are familiar with the requirement to practice in a legal environment where using evidence based guidelines is crucial. However, these guidelines will almost certainly have been developed in an urban, high-resource settings and so may not necessarily be best practice in a rural, poor-resource setting. Without this knowledge it may appear that care is not as good in rural areas. This knowledge however, cannot be created without a significant rural academic presence. Teaching in rural areas provides the nucleus for this academic presence, but there must be time for these rural teachers to undertake this research. They must be more than just clinical teachers.
A taxonomy of models of medical education that have been applied in rural and remote settings

The literature reports varied approaches to rural and remote teaching ranging from day visits to full year attachments. In his typology of medical schools with rural programmes, Tesson and colleagues (Tesson et al. 2005) designate schools as either mixed urban/rural, defacto rural, or stand-alone rural schools. These all followed to some degree a “pipeline approach” including - early recruitment, admissions, locating clinical education in rural settings, a rural health focus in the curriculum and support for rural practice. The format of rural/remote medical education around the world is diverse and could be categorised in many ways. Table 1 lists exemplars of “rural practice contexts” which are being used for education and more importantly, the curriculum type being applied and whether it is into a rural or remote setting.

Further details of the experience delivered in these contexts are described below:

In rural hospitals
- A day visit to a rural hospital – a short visit to a location away from the main teaching hospital. This provides an opportunity for the introduction of a structured learning programme based on day case clinical problems unlikely to be seen in the teaching hospital. Having only a small number of students present allows for individual tuition and skills teaching – especially in practical procedures. An insight into clinical practice in a smaller location is provided.
- Structured placements in a rural hospital – a structured, interdisciplinary, outcomes-based placement giving students four weeks exposure to a variety of clinical conditions and ambulatory care venues. Students experience various clinical disciplines and a multiprofessional approach to patient care. All their experiences can be mapped to curriculum learning outcomes. The wide extent of community care available in a rural setting is experienced.
- A rural internship with full in-patient and outpatient responsibilities.

In rural general practice
One advantage of longer rural attachments in primary care is the opportunity for patient/student coupling (Delaney et al. 2002) which gives students opportunities to see the natural progression of healthcare problems with a particular patient.
- In the ACORNS course in the Department of General Practice at the University of Western Australia even a short placement of four days with a rural GP has been shown to positively influence student perceptions of rural health (Talbot & Ward 2000).
- During a one week immersion with primary healthcare professionals in remote communities in New Zealand students experienced the impact of cultural issues on community health care needs (Dowell et al. 2001) and emerged with an increased understanding of health care issues in those communities (Williamson et al. 2003).
# TABLE 1
## A Taxonomy of Rural Practice Contexts

<table>
<thead>
<tr>
<th>SETTING / BRIEF DESCRIPTION</th>
<th>COUNTRY APPLIED</th>
<th>REFERENCE</th>
<th>RURAL VS REMOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In Rural Hospitals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visits for one day to experience some aspects of ambulatory care as part of a month’s attachment in surgical specialties</td>
<td>UK (compulsory)</td>
<td>Hanna &amp; Dent 2006</td>
<td>Rural – as part of discipline-based clerkships for 4th year students</td>
</tr>
<tr>
<td>A student-selected four-week placement rotating through four integrated activities in the rural health care centre Ambulatory Diagnostic and Treatment Centre (ADTC)</td>
<td>UK (elective)</td>
<td>Dent et al. 2007</td>
<td>Rural – as part of discipline-based clerkships for 4th year students</td>
</tr>
<tr>
<td>Eight weeks rural internships with full time in-patient and out-patient responsibilities</td>
<td>Australia (compulsory)</td>
<td>Sen Gupta et al. 2008</td>
<td>Rural – an interdisciplinary approach to ambulatory care for final year students</td>
</tr>
<tr>
<td><strong>In Rural General Practice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative curricular options in rural networks (ACORNS)</td>
<td>Australia (elective)</td>
<td>Talbot &amp; Ward 2000</td>
<td>Rural – A four day programme in rural general practice</td>
</tr>
<tr>
<td>Monthly visits each year</td>
<td>Zimbabwe (compulsory)</td>
<td>Mufunda et al. 2007</td>
<td></td>
</tr>
<tr>
<td>A one week attachment in a remote community</td>
<td>New Zealand (compulsory)</td>
<td>Dowell et al. 2001</td>
<td></td>
</tr>
<tr>
<td>A four-six week programme in rural general practice</td>
<td>UK (elective)</td>
<td>Deaville et al. 2007 Critchley et al. 2007</td>
<td></td>
</tr>
<tr>
<td>A four week integrated rural primary care block at Wit’s University</td>
<td>Australia (compulsory)</td>
<td>Division of Rural Health, Annual Report 2007</td>
<td></td>
</tr>
<tr>
<td>A four month programme</td>
<td>New Mexico USA (elective)</td>
<td>Kaufman et al. 1989</td>
<td></td>
</tr>
<tr>
<td>A one year attachment (pilot study)</td>
<td>Australia (elective)</td>
<td>Margolis et al. 2005 Wilson &amp; Laing 2007</td>
<td>Rural and remote Rural – a one year programme with visits to remote practices</td>
</tr>
<tr>
<td><strong>Programmes in Integrated Settings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated community and ambulatory care programme (ICAP) Three month attachments to both rural hospital and local community general practices</td>
<td>UK (elective)</td>
<td>Grant et al. 1997; Dent et al. 2007</td>
<td>Rural – an integrated approach to ambulatory and community care</td>
</tr>
<tr>
<td>Rural Opportunities in Medical Education (ROME) Programme. A seven month programme followed by five months in the urban centre to do specialty rotations</td>
<td>Canada (elective) USA (elective)</td>
<td>Rourke &amp; Rourke 2009 Schauer &amp; Schieve 2006</td>
<td>Rural – remote discipline-based curriculum supplemented with urban specialty terms</td>
</tr>
<tr>
<td>A six month rural immersion experience in the Northern Territories</td>
<td>Australia (elective)</td>
<td>McDonnel et al 2008</td>
<td></td>
</tr>
<tr>
<td>Rural Physician Assistant Programme (RPAP). A nine month immersion in a rural hospital and clinic setting</td>
<td>USA (elective)</td>
<td>Halaas 2005b</td>
<td>Rural – discipline-based curriculum in a community setting supplemented with an urban term</td>
</tr>
<tr>
<td>Parallel Rural Community Curriculum (PRCC) Programme. A selected group of students are “embedded” in a rural community for a full academic year with opportunities general practice and rural hospital involvement.</td>
<td>Australia (elective)</td>
<td>Worley et al. 2000</td>
<td>Rural – discipline-based ruralised curriculum in a community/general practice setting</td>
</tr>
<tr>
<td>Clinical Learning Embedded in Rural Communities (CLERC). Students are embedded in a rural or remote community for a full academic year participating in both community and rural hospital work.</td>
<td>Australia (elective)</td>
<td>Maley et al. 2006</td>
<td>Rural – remote – integrated approach using a rural &amp; remote medicine curriculum</td>
</tr>
</tbody>
</table>
A four to six week programme in rural general practice gives students a non-urban experience of healthcare provision (Deaville et al. 2007) in the UK.

A six week “satellite rural education” experience comprising a set of three 2-week attachments in each of internal medicine, surgery and general practice was initiated by the University of Tampere in 1991 in the hospital district of South Ostrobothnia, Finland. The students experienced diagnosis and treatment of common diseases in ordinary health care units and developed team skills with other health professionals (Virjo et al. 2006).

The Australian Commonwealth funded University Department of Rural Health (UDRH) at the University of Melbourne found that the required community based rural health courses of four weeks positively influenced students views of rural general practice (Critchley et al. 2007).

A four month programme was developed as a parallel track in New Mexico (Kaufman et al. 1989).

The University of Queensland, Australia, describes a one year attachment with a private, solo general practice in a rural area (RRMA 5/6) to students in their penultimate year of a four year post graduate course (Margolis et al. 2005). Similarly the University of Aberdeen, Scotland, offers fourth year students a year-long placement in a remote urban location with vocational attachments with rural general practitioners in the Highlands which can be continued into final year (Wilson & Laing, 2007).

During the third and fourth years of a four year course, one or more of the six week clerkships in clinical disciplines can be completed in a rural community setting as part of the decentralised medical education programme over five states in the US, the WAMI group (Schwarz 2004)

**Integrated rural placements with both rural hospital and general practice components**

Well supervised student visits for a minimum of four weeks are the most effective for allowing students to see the full range of rural health service activities (Couper 2003b).

**Integrated community and ambulatory care programme (ICAP).** This follows work by Grant and colleagues (Grant et al. 1997) where fourth year students were attached for three months to community hospital based general practices and were found to achieve satisfactory portfolios of learning experiences and practical clinical skills. In a similar programme (Dent et al. 2007) students at the University of Dundee can spend four weeks in community general practice followed by four weeks in the nearby rural hospital and finish with a further four weeks back in the same general practice. This programme is designed to give students the opportunity to observe the continuity of care which can be provided in the rural community and may positively influence students’ perception of rural general practice.

**Rural Medical Education Programme (RMED).** A State University of New York rurally focussed programme stream which supplements the standard curriculum in a four year course. Its final capstone is a sixteen week rural family medicine preceptorship (Steams et al. 2000).
• **Rural Opportunities in Medical Education (ROME)**. This is a seven month programme in North Dakota, US, in which designated clinical rotations are undertaken in an approved rural setting and the remaining rotations completed back in the urban hospital centre (Schauer & Schieve 2006).

• **Rural Physician Associate Programme (RPAP)**. The University of Minnesota RPAP, commenced in 1971, is a 36 week, community-based continuity primary care experience during which third year students live, learn and work alongside a physician in a rural community (Halaas 2007). Based on the students’ logging of case exposure in the local hospital and clinics their requirements for time in specialty rotations can be met, as well as a primary care clerkship (Halaas 2005a). Students are assessed for competence on site by both local preceptors and central faculty through written papers, case presentations and objective structured clinical examinations (OSCE).

• **Parallel Rural Curriculum (PRCC)**. At Flinders University in South Australia, the PRCC is a longitudinal integrated clerkship that enables Year 3 students to undertake their entire major clinical year (40 weeks) based in rural towns of between 5,000 and 20,000 in population. Students follow patients from the rural clinic through the local health system which may include admission to the local hospital, referral to a visiting or resident specialist, and interaction with allied health professionals. Students learn concurrently the disciplines of Surgery, Paediatrics, Medicine, Obstetrics and Gynaecology, Psychiatry, and General Practice. They sit their major clinical examinations at the end of the PRCC (Worley et al. 2000b).

  The program commenced with eight students in the Riverland region of South Australia and now incorporates 30 students over four regions of the state. Flinders has more recently created a half year version of the PRCC for remote aboriginal settings in the Northern Territory. The Northern Territory program is complemented by half a year of specialist rotations in the regional referral hospital in Darwin.

• **Clinical Learning Embedded in Rural Communities (CLERC)**. This programme is listed separately from the PRCC even though both are year long “community immersions” in the fifth year of a six year undergraduate course. They are distinct in the finer detail of curriculum approach and the degree of rurality/remoteness of their respective contexts. The CLERC programme has evolved out of the Rural Clinical School of Western Australia (RCSWA) over a five year period, from a pilot with nine students in 2003 to 74 in 2009. The evolution was from a transplanted city, specialty-siloed curriculum framework to a horizontally integrated, case-based approach during which the students begin the process of building a portfolio of clinical experience for active reflection. In the RCSWA, the programme is delivered to ten sites ranging from 300 km to 2,200 km in distance from the capital city, each with three to ten students. Of the ten sites, three are classified as “small rural centres” (RRMA 4), one as a “rural area” (RRMA 5), five as “remote centres” (RRMA 6) and one as “remote area” (RRMA 7) (Maley et al. 2006).
**Design: Matching curriculum to cause and context**

It is important to establish the degree of rurality/remoteess when considering a rural medical education programme.

**In rural hospitals**

In schools which have adopted outcome based education (Harden et al. 1999), such as “The Scottish Doctor” (Simpson et al. 2002) (Figure 2), the learning opportunities available to students in the rural hospital can be mapped to the desired learning outcomes of the curriculum. Often these are different from those available in the central teaching hospital.

![Figure 2: The 12 learning outcomes of the Scottish Doctor](image)

A previously under-utilized clinical resource may be identified in the rural hospital which may be appropriate as a new teaching venue. This may be a single location such as a day case theatre which can be used to increase student exposure to peri-operative care and the patient journey (Hanna & Dent 2006).

Alternatively the ADTC can provide a range of facilities which illustrate other learning outcomes despite there being no acute services on site (Dent et al. 2007). Students document their learning by completing structured logbooks (Dent & Davis 1995). The acronym EPITOMISE (Figure 3) is used to help them relate clinical cases to the learning outcomes.

**In rural general practice**

Structured packs for independent learning in the community developed for 3rd year students at Kings College School of Medicine and Dentistry, London, led to more efficient use of contact time (Graham et al. 1999). In a four week attachment in rural general practice Teague and colleagues (Teague et al. 2000) found that the quality of the teaching programme was improved by issuing students with laptop computers. These helped to decrease their feeling of isolation, increased engagement with course outcomes and helped rural teachers to be more involved.
Integrated programmes

Furthermore, the rural hospital visit can be linked to a rural placement in general practice. This integrated programme provides opportunities to experience elements of community care, holistic practice, and the continuity of care between the ambulatory care unit and the community.

Although the RMED programme has successfully produced more primary care physicians from its participants than from the non-rurally streamed students, a recent decreased enrolment is linked to the removal of supporting scholarships and a need to target students with a rural background (Smucny et al. 2005). This highlights the importance of student selection and support, a design component, in the viability of rural learning programmes.

"Continuity of care" learning was a conscious design focus for the rural/primary care experience in the ROME programme (Schauer & Schieve 2006).

In the RPAP, education for competency is the design template, adopting apprenticeship-style learning and teaching approach in an immersion context (Zink et al. 2008). “Immersion” is common to health professions education generally.

In the PRCC, the learning objectives of the six separate disciplines are compared with the epidemiology of what is seen and done at the local clinics and hospital; if there is a match, then a PRCC is possible! The next step in design is to map the clinical learning opportunities available in the community and determine what, if any, needs to be imported through videoconference or visiting faculty.

A typical week for a student will involve daily ward rounds of all admitted patients, two rostered sessions in the general practice, a surgical list in the hospital, a specialist consulting session (visiting or resident) and two nights on call. Wednesdays are allocated to group learning for students within easy reach of each other (usually within a radius of 70km). In the Northern Territory, where the students are up to 1500km apart, videoconferencing is used for group learning.
Students are able to undertake their written examinations in their rural town, but they travel to the city (either Adelaide or Darwin) for the OSCE. Student performance in the examinations has consistently been above that of their peers in the tertiary centres.

The **CLERC** programme (Figure 4) is delivered throughout the academic year as sequential phases of foundations study, skills development, skills consolidation and skills review; these are punctuated by school-wide synchronous formative assessment exercises and an options period. The learning environment has a primary care, generalist framework, includes the students as “student colleagues” and is set in the reality of rural or remote practice. It adopts an experiential learning cycle in which the interactions of student with patient and student with mentor (medical teachers) form “the experience”; the process of the guided logging of patient encounters (a web based personal log), and of student engagement in regular log-stimulated discussions, forms “the reflection on action”; “the reflection in action” is facilitated by the emphasis on longitudinal patient follow-up and by the partitioned spiral structure of the programme itself. Virtual patients are made available to fill gaps in experience that are evident from the students’ logs. Initially, it was considered a “model” teaching programme for the week included six clinical sessions (half days), three tutorial sessions and a reflection/documentation session, as well as taking out of hours opportunities in the emergency room (Denz-Penhey & Murdoch 2008b). However, experience has shown that as the teaching confidence and competence of the local medical teachers grows, a “best fit model” is formed for each site which matches the local clinical opportunities and teaching styles.

The learning tools provided for students include, firstly the Rural Clinical School (RCS) Student eLog, a personal, online, searchable database resource which facilitates the building of a portfolio of personal learning and clinical experience. Students have access to online information searching via the university library and to online curriculum resources through a learning environment (eg. FlyingFish® [http://www.mech.uwa.edu.au/NWS/ae/index.html](http://www.mech.uwa.edu.au/NWS/ae/index.html)). A schedule of whole of school clinical tutorials via videoconference and teaching by visiting clinicians is highly valued. Continuous assessment is through completion of regular mini clinical examinations (mini-CEX) (Norcini et al. 2003), both formative and summative, from their performance in the regular log-stimulated discussions and a series of written papers due throughout the year. End of year summative assessment is by OSCE and written exams. Formative OSCEs are held twice during the year. The programme is supported by clear curriculum documentation which is a key factor for local preceptor teaching.

Students are loaned a laptop preconfigured for email and web access using rural clinical school (RCS) networks for the year. Support is available from one IT staff at the RCS urban centre and limited training relating to online resources is done at an education/technology orientation just before the academic year begins.

From a design perspective the curriculum, the teaching/learning methods and the assessment all match the way in which students encounter patients (i.e. learning opportunities) throughout the year. The eLog interface
challenges the students to consider the learning issues from each patient as well as key encounter data, the care and discipline contexts and basic clinical data. The bank of cases is then used reflectively to evidence their learning and forms part of their life long professional portfolio. The active adoption of online and other technologies designed for remote interaction is another adaptation of the learning environment to match the circumstance.

**FIGURE 4**
The CLERC Programme

**PHASES OF THE RCS YEAR**
- Introduction & Orientation (2 wks)
- Foundations (12 wks)
- FARTS (1 wk)
- Skills Development (8 wks)
- Options (4 wks)
- Skills Consolidation (8 wks)
- Skills Review (3 wks)
- Assessment:
  - Formative
  - Summative

**LEARNING**
- Interaction with:
  - Patients
  - Virtual Patients
  - Med Co-ords (Experience)
- eLog recording:
  - Patients
  - Virtual Patients (triggers reflection on action)
- Discussion with Med Co-ord (facilitates reflection in action)
- Apply in next RCS Phase

**LEARNING TOOLS**
- RCS Student Log
- Online resources:
  - FlyingFish®
  - Library
  - Virtual Patients
- Tutorials:
  - Videoconference
  - Visiting clinicians

**ASSESSMENT**
- mini CEX weekly
- Continuous Summative – 7 written

**Implementation: capacity, collaboration and creativity**

Several preparatory steps are necessary before it is possible to initiate a new development in clinical teaching in a new location (Dent 2003). It is usually necessary to gain the support of all stakeholders in the institution and form a steering/implementation group. This may involve a site manager and senior administrator in the new location as well as clinicians and other healthcare providers who will act as clinical tutors. A formal memorandum of understanding may need to be drawn up between the university medical school and the health service or other hospital owners. An adequate budget to sustain the programme must be identified and active support from the local community fostered (Walker 1999, Albert et al. 2004, Walker 2007).

The most appropriate year of the medical course to benefit from the programme must be identified, a study guide and other support material provided and space for student/patient interaction identified. Staff development opportunities will also be required.

**In rural hospitals**

Before sending students on a day visit to a rural centre care must be taken to be sure that structures are in place to help them integrate the experience to learning they have acquired elsewhere. As with any new venture the
cooperation of all participants is imperative to the implementation of a new programme. Planning meetings should highlight the advantages and identify the potential problems of the proposed teaching programme at an early stage. For instance it may be perceived that the increased prestige which will come to the local hospital from being associated with the university medical school is an important benefit. On the other hand a programme heavily dependent on one person may be unsustainable. The method of delivery of the curriculum will be determined by the resources available in the location which may range from paper-based study guides to computer-based logbooks.

A **day visit** focussed on the patient journey.

As well as local clinicians motivated to devote time to teaching, a day surgery based tutor in the unit (DSU) who can supervise the students is necessary. This person may be in addition to the surgeon whose theatre is being visited (Dent 2003). Student learning is prompted by a structured logbook focusing on pre-operative assessment, peri-operative issues, including anaesthesia and surgery and post-operative care and follow-up.

As well as decreasing the student numbers in the central teaching hospital 4th year students participating in a structured programme in the DSU preferred the variety of active learning opportunities available compared to a traditional theatre visit where they passively observed prolonged or unusual procedures (Hanna & Dent 2006).

**Short-term placement** - A four week programme focussed on integrated learning in core clinical problems.

A low-budget innovation can be achieved with the support of colleagues with enthusiasm for teaching. A paper-based, structured programme with small student groups rotating through various activities may be easily introduced as it is perceived as requiring little surveillance and causing minimal disruption to the routine delivery of patient care. A programme has been described for up to eight students rotating in pairs through four clinical teaching locations, the outpatient department (OPD), multiprofessional patient-care activities, the clinical investigations units and theatres (Dent et al. 2007). In the OPD they attend clinics in up to 12 disciplines including general surgery, orthopaedics, ophthalmology, ENT and urology and general medical clinics including cardiology, endocrinology, and dermatology. Multi-professional activities include pre-operative assessment, audiology, urology and chronic pain clinics as well as the stroke rehabilitation unit. The investigations week offers experience in upper and lower gastrointestinal endoscopy and cystoscopy together with procedures in the radiology department including magnetic resonance imaging, computerised tomography and ultrasound scanning and reporting sessions for plain radiographs and contrast studies. The theatre week includes opportunities to participate in orthopaedics, general surgery and urology.
In a rural general practice
A twelve week programme focussed on health-care provision in a rural setting.

Collaboration between course organisers from different medical school departments produced an integrated ambulatory/community care placement in which the community hospital block was placed between two attachments to local general practice. This prolonged attachment in one location was popular with students who, for various reasons, wished to remain in the same area. There is value in establishing a contract for expected roles and responsibilities of all participants in the programme (Kelly 1997).

- **Staff development**: Regular communication in the form of a staff newsletter distributed to all participating staff is important to maintain enthusiasm and ownership of the programme. Formal staff development sessions are not always well attended but printed material such as “Getting started...” (Dent & Davis 2005) can provide a readily available source of practical information to clinical teachers.

- **Evaluation**: A questionnaire pitched at level 1 of Kirkpatrick’s model (Kirkpatrick 1959) was circulated to participating students and both teaching and administrative staff. Results indicate that students appreciate the benefits of one-on-one teaching, the opportunities to consolidate their learning in preparation for their first postgraduate year (Foundation Year one in the UK) and the friendliness of the working environment. Staff enjoyed having students with them and did not find their attendance compromised patient care (Dent et al. 2007).

In integrated programmes

- **PRCC**: For each regional cluster of eight to ten students, a local clinician takes responsibility for academic coordination of the faculty in the practices and hospitals, with two full time general staff responsible for the complex individualised student timetables and managing accommodation, transport, learning resource availability and other student support.

Curriculum delivery options are still limited by the poor access to the internet in many of the teaching sites. This has led to the concept of ‘redundancy’ for learning resource staff, i.e. students must be provided with more than one way of accessing/learning core material. For example, this may mean having lectures available for both web streaming and delivered on DVD, or key references available in both electronic and hard copy. This approach also allows for different student learning styles.

A key component of the quality and sustainability of rural practice-based education has been university investment in consulting and learning space for the students in the rural clinics. In addition, providing comfortable accommodation, especially suitable for families, is critical to the year being a positive experience and thus having a positive, not negative, impact on subsequent career choice.
It is now becoming evident that longer attachments are more effective in awakening future interest in rural practice. Extended placements of at least 5-6 months have been shown to be more economically sustainable than shorter rotations (Worley & Kitto 2001) and also more beneficial to student learning (Denz-Penhey et al. 2005).

**CLERC**: The educational entity that CLERC now represents is in existence because “the system” allowed an evolutionary, (“action research”) approach to be implemented. A realistic budget was provided and sound leadership was sourced.

Aside from the educational programme and its delivery, there are other key factors for successful implementation, including the recruitment of students, their further selection and the organisational response to student needs. The students in a CLERC programme have been uprooted and placed in a strange, new physical environment; the impact of this should not be under-estimated by managers and adequate pastoral care is a wise investment (Maley et al. 2006).

The RCSWA programme is promoted to students in their fourth year starting from April; this is via a package of paper based materials and a DVD disc containing a website including student snippets and specific study and administrative information. A formal information evening is held in June; applications close in July; all applicants are interviewed two weeks later and advice of outcome and an offer is made in August. The RCS academic year commences in mid-January and end of year exams are held late in November. This timetable is tight administratively leaving little down time at year turnaround and obviously requires significant commitment from all team members.

Evaluation is another key element for success. In the early years of the RCSWA, the programme of evaluation comprises a mid-year series of confidential student and staff interviews at all sites; these are conducted by an experienced evaluation officer and issues for inclusion are canvassed from both administrative and academic staff. Responding appropriately to feedback from stakeholders was critical to the safe evolution of the programme. More recently the DREEM (Roff 2005) evaluation has been trialled and appears to approximate the feedback from the more labour intensive evaluation which was applied in the early years (Denz-Penhey and Murdoch 2009).

Staff development/support for the medical teachers had priority in the early life of the RCSWA; this included not only the salaried medical coordinator(s) at the sites, but also their local colleagues who contributed as preceptors by hosting students in general practice / hospital / clinic settings. Of key importance is to keep this initiative rolling at a local level in sites as these staff often have a high turnover in rural healthcare and the camaraderie and networking that results is paramount to maintaining optimal learning opportunities for students (Walters et al. 2005).
Cultural including indigenous cultural aspects of communication impact greatly in rural/remote areas of Australia. Understanding Aboriginal health issues is important in any rural curriculum and the appointment of staff with specific expertise or formal networks into local indigenous peoples greatly facilitates this.

Common problems in implementation

Transferring aspects of undergraduate medical teaching to a new programme in a remote or rural location challenges the orthodoxy that the tertiary referral teaching hospital is the only place where students can be taught (Worley et al. 2004b). Not surprisingly there may be problems with the implementation and running of the new programme. Barriers to change may come from both the parent medical school and the new venue.

From the students’ perspective there is often a problem relating to IT access to the medical school server when in a remote location. Both internet and Intranet access may be difficult. This adds to the isolation which students may feel when away from their usual base with its social, family and academic support (Maley et al. 2006).

Similarly, there may be difficulties of communicating effectively over a large distance with clinical tutors and supplying them with the timely support and dialogue they need.

Student anxiety is quoted as the main problem for recruiting students to a rural programme (Denz-Penhey et al. 2004). Anxiety may relate to social/family isolation and missing out on city experience and centre medical school support. There may be concern about the quality of the teaching as well as transport and financial issues. It is probably most useful if the rural practice experience is spread throughout the medical curriculum (Curran & Rourke 2004, Jones et al. 2007).

In a new venue there may be territorial problems of perceived ownership of resources and sharing of space between the university and the health authority.

The arrival of students in a rural general practice may impact in nine areas; personal, time, patient care, professional relationships and development, business and infrastructure, recognition and remuneration (Walters et al. 2005).

The idea that the clinical experiences themselves can be made to determine the curriculum, may be difficult for some schools to accept (Murdoch, personal communication).

Finally, staff support; GP preceptors may receive no formal preparation or support for their role. A study in the University of Tasmania found that many did not know how their contribution fitted into the overall curriculum (Baker et al. 2003).
The best solution to these problems is to anticipate them; to build in strategies to minimise their impact by careful forward planning, good communication amongst all stakeholders and ongoing evaluation of these relationships.

**Further development**

The inequalities of medical education in Africa are summarised by (Gibbs 2007) in a commentary to a series of papers in Medical Teacher. A recent government directed change in medical education in South Africa has focused on the increasing role of generalist training and the establishing of Family Medicine as a subject in universities (Hellenberg & Gibbs 2007). The result is that, “more appropriate students are being taught more relevant medicine in places that are more likely to see them practice in underserved areas” (Kent & De Villiers 2007). “Training according to the community-orientated approach”, say Mash & De Villiers (Mash & De Villiers 1999), “does not equal delivering the same training as previously merely in a decentralised facility. It requires embracing the paradigm of horizontal thinking as opposed to a vertical approach to health care”.

Recent years have also seen the development of rural medicine as an independent discipline (Curran & Rourke 2004), (Murdoch & Denz-Penhey 2007) as evidenced by the Journal of Remote and Rural Health. University awareness of the role of RRME is increasing. There is a growing realisation of the impact of students on GPs leading to the formation of symbiotic partnerships between GPs and universities. It will benefit students to keep universities informed as to how the teaching practices are affected (Walters et al. 2005). An increasing capacity for more and longer opportunities in RRME and for more student cohorts to take part can be expected.

Page & Birden (Page & Birden 2008) emphasise the importance of the structure and supports required to ensure quality and enjoyment in rural placements. Their twelve tips (Table 2) apply to any placement regardless of context or duration.

**TABLE 2**

**“Twelve tips on rural medical placements: what has worked to make them successful” (Page & Birden 2008)**

<table>
<thead>
<tr>
<th>• Focus training in appropriate areas</th>
<th>• Take advantage of the potential to provide trans-disciplinary health care team learning (and doing) experiences</th>
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<tbody>
<tr>
<td>• Select students wisely</td>
<td>• Provide adequate learning supports for the home campus</td>
</tr>
<tr>
<td>• Provide adequate practice infrastructure support</td>
<td>• Capitalise on the opportunity to provide an immersion learning experience</td>
</tr>
<tr>
<td>• Provide good (not merely adequate) accommodation</td>
<td>• Evaluate</td>
</tr>
<tr>
<td>• Provide strong student support</td>
<td>• Involve rural clinicians and students in course development and evaluation</td>
</tr>
<tr>
<td>• Provide strong preceptor/supervisor support</td>
<td>• Foster involvement of the community at large</td>
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</table>
A blended learning approach between RRME and innovative curriculum approaches such as the extended use of virtual patients, is anticipated (Maley et al. 2007, 2008). However, a further evolution of the relationship between a rural and remote medicine undergraduate curriculum and the endorsed curriculum of the “urban centre” also needs to occur. Some evidence exists that the latter is being influenced by proven excellence in the outcomes from rural clinical school experiences (Worley et al., 2004a). Yet, a visible casting off from the urban model of discrete/blocked clinical discipline-based rotations still needs to be achieved when the learning is in a generalist context rather than in a siloed specialist context. With possibly only one exception, even the longer term immersion-type models still feign a parallelism with traditional rotations. The landmark for this paradigm shift will be the adoption and endorsement of benchmarked assessment practices which match the generalist learning environment. The benchmarking will be a key step as it requires the engagement of rural teachers as assessors who are endorsed as such by urban academia.

The marketing of the rural context as a superior learning and teaching environment is facilitated by its expanding community of teaching practices and student alumni who experience its special characteristics (Table 3).

### TABLE 3
**List of Characteristics of Rural / Remote Medical Education Environment**

<table>
<thead>
<tr>
<th>For Learners:</th>
<th>For Teachers:</th>
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<tr>
<td>• more intense and sustained experiential learning (i.e. more challenges)</td>
<td>• the presence of students can be used to create a community of learning among the local health team</td>
</tr>
<tr>
<td>• usually a much higher teacher to student ratio, (i.e. better supervision, more support)</td>
<td>• when students are present for periods long enough to establish competence they can ease the clinical workload</td>
</tr>
<tr>
<td>• more opportunities for longitudinal follow up of patients (i.e. see the whole person)</td>
<td>• students can act as advocates for rural health issues on their return to the urban setting</td>
</tr>
<tr>
<td>• greater emphasis on personal and professional development (i.e. setting boundaries, maintaining relationships and teamwork)</td>
<td></td>
</tr>
<tr>
<td>• increased visibility and sense of collegiality</td>
<td></td>
</tr>
</tbody>
</table>

In the postgraduate arena we will see fast-tracking or vertical streaming of interested students into careers as rural practitioners and the development of continuing medical education opportunities with networking and mentoring frameworks. Although at present, the extent to which the use of rural and remote settings for undergraduate medical education may have a positive impact on the personal professional development of rural practitioners is still to be evaluated.

Staff development as always will be a key issue. Strategies such as the POPPIES programme; Preceptor Onsite Preparatory Programme for Information, Education and Support (Baker et al. 2003) will be necessary to support GP tutors. Courses offering a Masters in Rural and Remote Medicine which are attractive to course coordinators are already emerging (Maley et al. 2009).
Conclusions

To quote from (Fiedler 1981) “The issue of quality is an evasive one. Its slippery character has complicated efforts to measure the progress toward the goal of equity of health care” (across urban and rural communities). The solution lies in effectively harnessing the rich learning environment provided by rural/remote community settings. A key approach is to engage all stakeholders (students, teachers and community) in a community of practice toward a common outcome.

A variety of models with various degrees of complexity and integration have been described. An approach is to select the model from the taxonomy that best fits the local context and availability of resources. Following initial successful implementation the insurance of sustainability and a plan for ongoing development are essential. Local community engagement is fundamental to all phases of this continuum.

Appropriate investment by government/university/community partnerships will, in the long term, open the path to redressing the migration of doctors away from rural areas, provide better care locally, support community development and present the rural setting as a viable/exciting generalist/primary care career path for students and trainees. To quote Murdoch and Denz-Penhey (Murdoch & Denz-Penhey 2007) in an Australian context, “The Rural Clinical Schools model needs to be expanded to provide a platform for appropriate education and a training pathway not only for medical students, but also for prevocational, vocational and established rural generalists. Only in this way will we be able to convert the ‘Tsunami of medical graduates’ expected in 2010 to an adequate supply of rural and remote generalist into the future.”
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