Chapter 2.2.2

MAKING MEDICAL EDUCATION PRACTICAL IN RURAL SETTINGS

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The advantages of rural and regional medical education

Rural and regional medical education may, at this point in time, actually represent the very best in educational models for several reasons.

First, recent curriculum renewal efforts at several universities, including Harvard, Melbourne and the University of British Columbia, parallel other new medical schools such as James Cook and Northern Ontario School of Medicine in emphasising the relationships of learners and patients as central to the process of becoming a physician[1] (1,2,3).

Secondly, once rural health care providers are 'on board', the simple fact that they know their patients and the learners well, allows them to be more specific in targeting areas of strength and areas of need. Of course, this requires faculty[2] development specifically aimed at how to assist learners to develop increasing skills, and at how to identify and help learners in difficulty (4). Importantly, Walters et al. propose that teacher flexibility to address learner needs is key to excellent clinical education in patient-care settings (5).

Finally, if made central and explicit to the learning agenda in rural, remote and regional settings, the 'competence' movement, most well-known via the CanMEDs Competencies (6), can frame learning activities and free teachers to work on learner-driven issues rather than on generating lectures and didactic learning materials.

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1 A 'physician' here (in North America more broadly) is another term for 'doctor' or general practitioner, while in countries like South Africa and Australia, a 'physician' is a specialist in internal medicine.

2 'Faculty' is another term for members of academic staff.

Workforce challenges

Rural workforce shortages have been the major driver for rural medical education and training in many countries. Predicting shortages in physicians and other healthcare providers, they have expanded existing and initiated new rural programmes.

However, the movement of residents[3] and specialists into rural settings has generally lagged behind the movement of primary care (general practice, family medicine) into rural medical education and postgraduate training. While rural clinical settings provide a rich breadth of clinical experience for learners, the inadequate numbers of teachers and supervisors remains a problem, as does supervisors' lack of teaching experience and lack of funding for teaching which can be significant barriers to recruitment.

Academic (classroom) learning in rural settings

The wide geographical distribution of learners in regional hubs or spread across truly distant rural sites, singly or in pairs, complicates and drives delivery methods. Many medical schools have struggled with how to best deliver lectures and tutorials to an increasing number of these learners via a spectrum of media - including in person, via videoconference, on-line, or pre-recorded. Despite this variety of models of delivery and variance in teacher experience, studies have shown that rurally-based students perform as well as students based in academic teaching hospitals (7).

The most common concern for clinical supervisors relates to their assumption that they must provide expert medical knowledge (e.g. by 'lecturing' students). Conversely, research shows that self-directed active learning results in higher retention rates; 50% compared with a retention rate of 20-30% for lectures (8).

[3] A resident – or registrar – is a qualified doctor who is usually part of a structured specialist training programme, be it vocational or postgraduate.

Clinical learning in rural settings

Research has also shown that learners retain information that is meaningfully related to particular patients more readily than information presented in isolation (9).

Learning should be 'organised' to cover a breadth of material and patient experiences should be facilitated so that students focus on core clinical skills, such as gathering patient data and interpreting that information (10,11). Clinical learning is opportunistic, however, as it depends on the patients' diagnoses - but patient logs, internet resources and directed study can be used to ensure that learners 'see' an appropriate breadth and depth of material. Expert educators argue that continuity with fewer patients allows breadth of clinical learning in a patient-centered, contextual learning environment (1).

Supporting clinical experience with evidence is a relatively new opportunity but challenges both learners and teachers as new and specific skills are needed in order to select and utilise the 'best' evidence from an overwhelming number of potential sources. Perhaps the most important task for rural programmes, then, is to engage clinicians whose task is to interpret and 'unpack' information with learners, preferably in conjunction with questions about students' own patients, during 'academic' time.

Supplementing and formalising clinical learning

A weekly academic half-day (three hours - either in person or video-conferenced) might comprise the following; a debriefing discussion regarding core 'didactic' material through, for example, videotaped lectures or readings to help students consolidate material. This might be followed by a discussion on a particular topic (e.g. chest pain) with the students (or postgraduate learners) bringing their own cases with ECGs, x-rays, etc. While this means less work for supervisors, 'teachers' must be open to joint learning and discovery rather than being an expert on the topic. Ideally learners take turns presenting their own cases related to the week's topic, thus applying and consolidating new information relating to their own cases.

Depending on the stage of the learner, tutors (residents, generalists or specialists) may focus on the form and content of case presentations (commenting on which information goes where and why; what to include); diagnostics and clinical reasoning; and management. Postgraduate learners then progress to focus on management skills.
In this modern learning environment, learners need guidance in assessing, filtering, managing and applying knowledge. During case discussions group questions can drive 'just-in-time' learning, using evidence-based bedside clinical tools (e.g. UpToDate; the Cochrane database; drug databases; national guidelines; hospital guidelines). This helps students develop self-directed, time-efficient problem-solving skills that are used daily in practice.

On-line teaching and learning

In addition to active learning, the internet has fundamentally changed the way we learn. Previously, summarised information was time-consuming to find and was often provided only in lectures, making it highly valuable. In contrast, information on a particular topic is now only seconds or minutes away, accessible through the internet.

Lectures and small group discussions that include active multi-site participation and multimedia across several or many medical school sites are becoming increasingly common. In rural areas, the major barrier to wider use of these options is internet delivery (bandwidth) and the expense of developing supporting infrastructure as well as the substantial cost of developing multimedia material for internet delivery. That being said, many medical schools have developed on-line interactive curricula that engage learners and allow for flexibility. For example dermatology and radiology are relatively easy to deliver as 'videos' of many clinical examinations exist; and in the case of psychiatry programmes, case-videoconferencing is used. Fortunately, open source or shared curricula are becoming much more common. Groups at Canadian medical schools - such as University of British Columbia (child psychiatry) (12) and the University of Alberta (surgery)[4] and others - have developed open sites. The Kahn Academy is developing free medical education content[5] and Massive Open Online Courses (MOOCS), offer courses such as Duke University's neuroscience[6] e.g. via Coursera. Online offerings are accessible but fee-based (currently about US$50) if taken 'for credit'.

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4 See https://itunes.apple.com/ca/podcast/surgery-101/id293184847?mt=2
5 See https://www.khanacademy.org/science/healthcare-and-medicine.
6 See https://www.coursera.org/course/medicalneuro.

A developmental learner-centred approach

There are a variety of time-efficient ways to incorporate learners into patient care, even when extra space for learners is lacking (13).

When participating in busy settings, learners should only 'sit in' and observe for one session as adult learning is most effective when learners have an opportunity to understand a task (e.g. a patient visit) and then immediately try to do the task (14). The concept of 'entrustable professional activities' (2) suggests that supervisors should give learners a task that they can do themselves after it has been modelled by the supervisor.

In moving to enabling students to see 'their own' patients, the key to success in busy clinics is explicitly 'priming' the learner and 'framing' the goals of the student-patient encounter: "Mr. X is a patient with Type 2 diabetes here for an insulin review. Please assess his glucose control". (Be explicit with instructions at the first visit, but tell the learner that you will expect them to do this without priming next time this issue presents.) 'Priming' and 'framing' allow the brain to incorporate information efficiently (15). Even then, explicitly framing simple tasks engages learners, e.g. looking up patient medications during the consultation or taking the blood pressure.

At some point, the learner then becomes 'entrusted' with taking on tasks with less supervision and more independence, freeing the supervisor up for other patient care tasks. For example, "Watch how I counsel this patient about smoking cessation. I will watch you do it next time the opportunity arises, and then you can do it on your own".

Progressive learning and 'entrustment' are along a continuum and might look like this in practice:

Session 1:

The student observes three to six encounters with the supervisor actively engaging them by having them make problem lists or medication lists, write prescriptions, fill out requisitions, perform limited parts of the exam with the supervisor in the room (who may be doing other tasks related to that patient), etc. concurrently, the supervisor explicitly explains the process of seeing patients, e.g. "We always do a medication review"; "We don't usually do this"…etc.

The supervisor debriefs with the student, providing feedback and expectations for the next session: "You did well with X. Next time I want you to be ready to see the patients"… e.g. "by yourself before you call me to see the patient with you."

Session 2:

The supervisor gives very explicit directions regarding tasks: "This patient is here for follow up of removal of a skin lesion. Please do the consent (or the local anaesthetic, or the sterile prep, etc.)…."
Or "This patient is here for [same]. What should we do now?|"

Session 3: Increasing 'entrustment'.

The supervisor very briefly primes and frames the visit by reviewing consult notes or prior practice/specialist notes with the learner, or asks the learner to review the previous patient note or consult and summarise the priorities for the day.
The 'frame' for the visit might be: "Please do as much as you can with this patient in 20 minutes focussed on (one of) their hypertension, heart disease, diabetes, etc."

After several sessions, the student and supervisor may be comfortable with the student addressing multiple problems, counseling the patient, or calling a patient for follow-up. At this point, the learner should be familiar enough with the specifics of patient charting that their notes could be used as the basis for the supervisor's notes or dictations, with the "How close is it to mine?" serving as one valid measure for assessing the learner's progress (16).

The challenge for medical schools and clinical supervisors is to balance the breadth of student experiences across sites and specialties (i.e. in the traditional metropolitan rotational model; or with a one-off specialty experience) with continuity that engenders continuous student growth with deliberate coaching and entrustment - while ensuring that student see a variety of medical issues across knowledge and competency domains (i.e. objective/competency-driven log books and portfolios). Continuity is an important principle in establishing 'entrustment'. In my experience, three to four sessions with a student over a period of weeks is the very minimum amount of time that allows me to help students progress with their skills.

Finally, facilitating student introductions to patients as partners in care and options for patient-student follow-up, - e.g. via telephone calls to relay lab results or reinforce counselling regarding life-style changes - can be enormously beneficial and meaningful to both students and patients.

Balancing teaching and patient care

Regional and rural campuses have grown with the mission of increasing learners' familiarity with, and thus their comfort and competence in, rural settings where practice requires a greater breadth of skills (17). The issue of perceived, and real, increased breadth of practice in rural medicine can be intimidating for learners. Significant rural experiences help learners understand how rural doctors deal with the expanded scope of practice, and thus plays a part in increasing the likelihood that they will choose a career in rural medicine (18).

While many rural providers have had some experience with teaching, the rapid expansion of rural programmes has meant that providers need strategies to facilitate learning while balancing patient care needs Educators should aim to help potential and current clinical supervisors develop skills to develop efficiency while facilitating learning in the clinical setting. (Note, as above, that this differs from 'teaching' per se. Alguire et al, have summarised the literature and developed practical tips for supervisors in ambulatory settings (19).)

Furthermore, the distribution of postgraduate training into rural areas is both facilitating and complicating medical school distribution into rural settings (20). There are significant efforts towards vertically integrating ambulatory learning in the same way that traditional in-patient learning has relied on a vertical teaching and learning structure in which postgraduate trainees do a substantial amount of teaching and supervision.

Practical problem: Postgraduate trainees traditionally play a significant role in teaching medical students. As postgraduate training programmes are expanding into rural settings more slowly than medical schools - again due to shortages of training supervisors, especially in hospital/specialty-based programmes - there are far fewer residents/registrars in regional and rural hospitals than in traditional metropolitan teaching hospitals. In addition, many house officers and postgraduate trainees have been trained in other countries and are still learning the Australian healthcare system themselves. As we place more learners in rural settings, the question arises as to how to manage the teaching loads that are traditionally done by residents (and registrars)?

As rural settings expand to include both undergraduate and postgraduate learners, and postgraduates have a mandate to learn how to teach, various models on how to manage the patient and teaching loads are outlined in Appendix A.

Anecdote: Balancing teaching of undergrads and postgrads with patient care in a busy ambulatory setting

Most clinical supervisors in specialty metropolitan ambulatory clinics work with only one or two students, and up to four senior postgraduate trainees at a time. My favourite teaching experience in ambulatory settings involved having two students (1st Clinical year) and one senior resident/registrar with a five-room 'pod' in Shepparton, Australia. I typically scheduled 12 to 16 patients in a half-day (1 pm-5 pm) busy, 'complex' general medicine clinic, with about half the patients coming for diabetes care. One nurse, shared between two specialty clinics, was available to take vital signs. After a pre-clinic orientation huddle that including priming and framing, the students saw the patients first, presented the patient in the room, and the patient, student and I would finalise the next steps. Students wrote initial notes, including a problem list and medication list at every visit.

The resident would see about half the patients, sometimes primarily supervising a student's patient, and I would see all the patients, even if very briefly. The resident and I would split the patient dictation letters, emphasising the reason for the visit and recommendations for the patients' primary care doctors. We explicitly listed reasons and steps for any follow-up with us, so that future students and residents could quickly and easily identify what to focus on at the next visit.

One day my resident was ill and, that morning, I recruited two additional students, who had already done three sessions with me, to help see the 16 patients booked for the afternoon. At our pre-clinic huddle (10-15 minutes) I was very specific about what needed to be done for each patient, and referred students to the notes as above for returning patients and briefly discussed new consult requests to focus the students' approach. As patients came in to the waiting area, I apologised to them for any wait and explained the situation. No patients expressed concerns about timing or about working with the students. The four students and I finished the clinic at 5pm sharp, with only a few notes left to dictate. The key during the afternoon was delegation and a focus on priming and framing. The students were thrilled to be truly needed and really rose to the challenge. The patients were glad not to be rescheduled and also really tried to help the students. While such an effort might be exhausting if done every day, it was a real learning experience for me, even as a very experienced clinical teacher, about pushing the limits regarding how much students could contribute under time pressure when given the opportunity.

Enhancing 'fly-in, fly-out' specialist experiences

When specialists visit rural sites they often seek to maximise the number of patients they see, for obvious reasons. This means there is limited space and time for learners, with rural clinicians literally having to choose between patient care in a provider-shortage environment and teaching learners.

One way to establish learners' baseline knowledge and set up an 'approach' for their participation in rural specialty clinics is to ask specialists to have a 'didactic' session or workshop evening for a larger group of learners at the beginning of an academic year. Perhaps not surprisingly, even this minimal contact whets students' appetites for clinical experiences with that specialist and appears to give students confidence to participate in clinical encounters. While webinars and vod-casts are options, one-time face-to-face contact where logistically feasible is highly valued by both learners and teachers, creating connections that tend to enhance further clinical or distance experiences.

Setting up specific pre-experience learning tasks that refresh learners' memories just before one-on-one clinical specialty opportunities - e.g. reviewing stroke diagnosis and treatment basics before a neurology day - gives learners confidence going into what can be an intimidating experience, and allows them to interact at a higher level in their limited clinical time with supervisors.

Since students can't possibly see every sub-specialty in a meaningful way, focussing on generic skills and competencies should be stressed to specialists who often want to impart detailed specialist level knowledge, even to junior learners. Wherever possible the multi-room model - e.g. one for the specialist and one for the learner - applies here. The common model, 'parallel consulting' utilises two rooms for a supervisor-learner pair.

Longitudinal Integrated Clerkships (LICs) as an educational model

On the education side, the interest in Longitudinal Integrated Clerkships (LICs) (21) has promoted continuity for students and teachers without compromising learning outcomes. Using a coaching model, if not an apprenticeship, LICs counter the metropolitan teaching hospital rotational model that emphasises specialist-driven clerkships in which students must re-orient themselves to a new environment every four to eight weeks. However, such models outside of long-established major teaching hospitals, cause clinical teachers to struggle to meet both education and service needs - unless the teaching model is planned to promote efficiency of care and inclusion of learners in 'service-learning' (22) without falling into the service trap that has led to work-hour reform and formal educational limits for learners. Learners do struggle with integrated learning, as they attempt to focus on multiple issues (easier in specialty determined 'blocks'). However, most learners hit a critical tipping point after several month (23,24).

From an educational viewpoint, both approaches, whether students see more patients with focussed learning experiences or fewer patients with more in-depth involvement can provide valid and learning. Since any student or resident sees only a fraction of all medical problems, the most important teaching and learning points involve clinical diagnosis, and patient and practice-centred problem-solving. In fact, students may learn better in generalist settings, with residents more focussed on specialist practice.

Suggestions re how to address some practical barriers to rural programmes

***Issue**:* If I don't have a specialist to teach the students, how can I make sure they get enough of X specialty?

What to do

- Group patients in afternoon 'specialty' areas such as neurology and dermatology. Many generalists are already capable of teaching 'specialist' issues at a medical student level (or are interested in upskilling themselves). Rural patients are often willing to help, since they are well aware of the doctor shortage. Recruit volunteers from public service groups as well as patients from local practices.

- Educate specialists about 'parallel' consulting models in ambulatory settings with either extra rooms or physician 'delegation' of tasks while they attend to other patient issues (dictations, phone calls). Develop faculty so that they can frame 'snapshot' experiences for students and balance these specifically framed brief and focussed learning experiences with more 'complete' history and physical challenges with patients when space and time permit.
- If billing and consultation rules permit, use specialist-generalist participatory consults (e.g. specialist-general practitioner (GP) case conferencing) to facilitate specialist 'education' for both GPs, aka family doctors, and students.

What not to do

- Have learners 'sit in' and watch dozens of patient visits with a specialist (or generalist) in the hope that they will gain significant (specialty) knowledge.

***Issue**:* How do we teach in the hospital when we don't have residents and everyone is overworked?

What to do

- Limit and group classroom activities so that students can attend clinical activities.
- Give students meaningful supervised 'responsibility' in hospital, even if only for one or two patients at a time.
- Develop a clinical education facilitator (CEF) model: nurses teach students and observe their basic clinical skills on wards; the CEFs give feedback on history and physical examination, presentations and procedural skills.

What not to do

- Have students simply watch and answer questions on rounds.
- Keep students in lectures to keep them 'out of the way'.

Issue

How do we get consistency of student presentations, when consultant's preferences are fairly different?

What to do

- Develop student and faculty tools such as a standardised pocket template for notes and presentations.
- Brand your template as your medical school presentation/note/handover method.
- Communicate this to your clinical teachers just as you do with medical knowledge objectives.

Issue

How can we best use our new simulation lab for medical students?

What to do

- In addition to standard procedural or emergency scenarios, develop simulations in common medical student skills including: how to admit a patient, teamwork, and handover. Incorporate basic clinical skills such as counselling families, obtaining information from other doctors' offices, etc.
- How to complete paperwork (orders, charts, prescriptions, laboratory and radiology requisitions) can be included as a learning task during a simulation.

Practice pearls

- Capitalize on continuity: Rural settings are ideal for continuity due to the high likelihood that students will see patients in multiple settings (e.g. hospital and practice).
- Recruiting patients is often easier in rural settings, but some people remain concerned about being 'guinea pigs'. Work with both doctors and staff to highlight learner involvement as a positive thing for patients and the clinical environment. Emphasise the extra time and attention they will get (though this must be balanced for people in a hurry) when learners are involved in their care. Engage patients as 'teachers' who can help learners hone their skills (25, 26).
- Whenever possible, have learners present in the room 'at the bedside' (27). Patients get more time and attention that way and supervisors can use any discussion to educate both the learner and the patient. This model can be efficient, neutralising supervisor time commitment (5, 28, 29).
- Orientation to staff and the physical environment is a requirement in most clinical environments. However, orientation to expectations and task responsibilities is probably the most important educational action and helps with visit efficiency.
- Longer rural 'rotations' or longitudinal rural placements increase interest in rural careers. They also facilitate increasing 'entrustment' and to enable learners to contribute to patient care while learning, thus off-setting costs.

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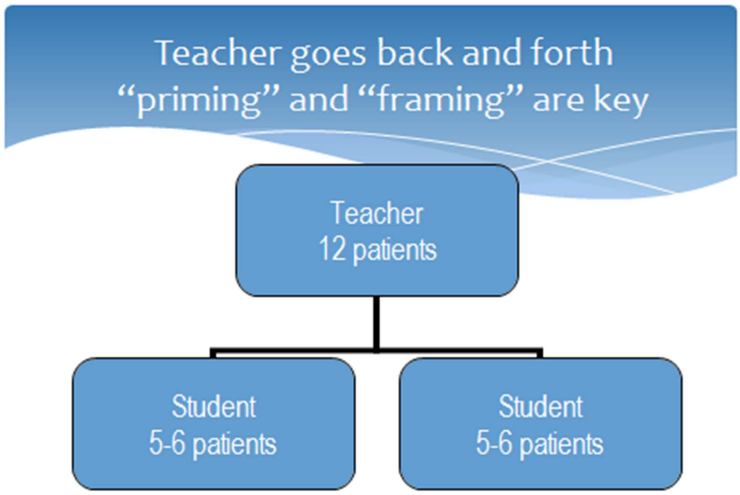
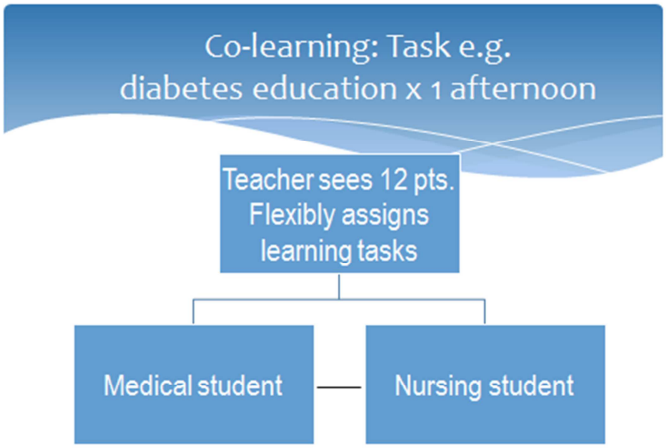
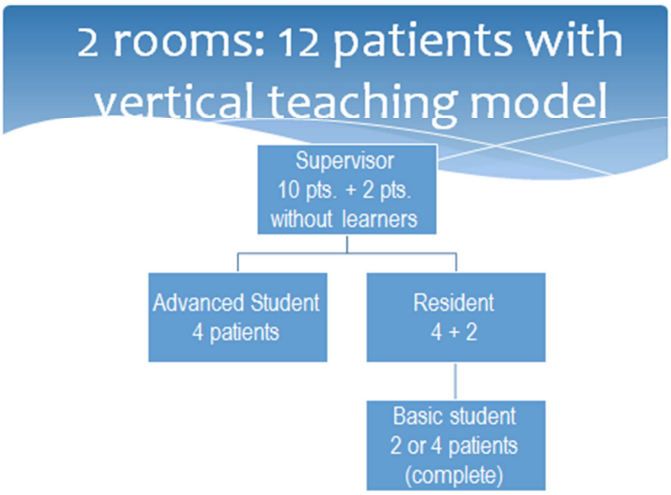
Appendix A

Models for teaching and supervision in ambulatory settings

The basic 'wave' model assumes that the supervisor assigns every third or fourth patient to the student and carries on seeing other patients with every third or fourth patient care slot used to see the students' patient (parallel consulting). Variations on this model include the options represented below.






2 rooms: 12 patients with vertical teaching model
Supervisor
10 pts. + 2 pts. without learners
Advanced Student
4 patients
Resident
4 + 2
Basic student
2 or 4 patients
(complete)

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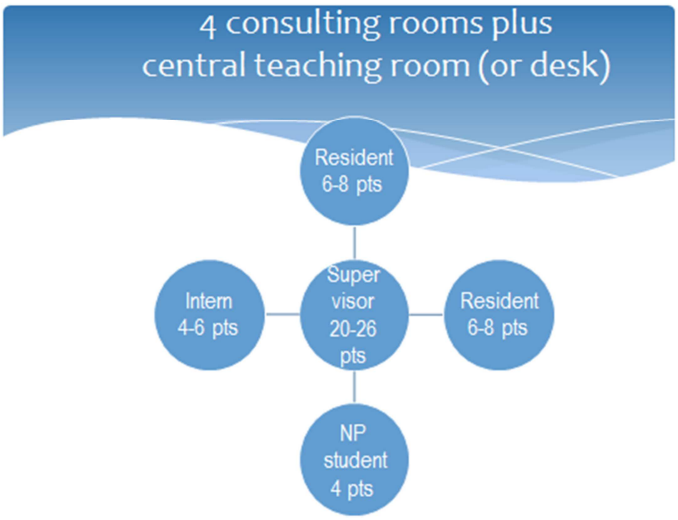
4 consulting rooms plus central teaching room (or desk)
Resident
6-8 pts
Intern
4-6 pts
Super visor
20-26 pts
Resident
6-8 pts
NP student
4 pts

This article is a chapter from the ***WONCA Rural Medical Education Guidebook***.
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