

## Chapter 5.2.2

### MAINTENANCE OF EMERGENCY SKILLS IN RURAL PRACTICE

**David Campbell**

*Monash University, Australia*

---

#### Introduction

You are an experienced rural doctor in a town of 3 200 people. You and two colleagues provide comprehensive care for the community, including 24-hour emergency care in your local 20-bed hospital. It is a continual challenge to find time and locum replacements to enable you and your colleagues to undertake any continuing professional development.

Your practice is a teaching practice, and you recently engaged a senior GP registrar<sup>1</sup> who will be working in your practice for the next 12 months. While you are looking forward to this doctor joining your on-call roster, the registrar expresses some nervousness about dealing with emergencies, and apart from an emergency department rotation in his first postgraduate year, his only formal training in emergency care was an early management of severe trauma (EMST) course two years ago.

How will you deal with this situation? How will you assess this doctor's ability to manage emergencies presenting when he is on-call? What education programme will you put in place for him? How will you conduct this programme? What are your own educational needs regarding emergency skills?

In this chapter we will explore some answers to these questions, as well as present evidence from the literature about the desirable frequency and nature of educational interventions to maintain emergency skills. We will also explore some of the attitudes to such activity amongst practicing clinicians.

---

<sup>1</sup> A registrar – or resident – is a qualified doctor who is part of a structured specialist training programme, be it vocational or postgraduate.

## Discussion

It is well-understood, and repeated many times in this guidebook, that rural medical practice is characterised by relative professional isolation compared to metropolitan practice; by an almost unavoidable involvement in after-hours and emergency care; by a greater likelihood of involvement in hospital practice; by a relative lack of technology and infrastructure to deal with all clinical presentations; and by a reliance on emergency skills (1,2).

In 1999 Tolhurst et al found that 'rural doctors need the opportunity to access emergency medicine training that provides upskilling, not only in the management of clinical problems, but also in practical procedures' (3). This is true of any rural and remote clinical environment, regardless of the level of infrastructure and technological support. Management of emergencies in remote clinical practice brings its own spectrum of challenges, and the approach to emergency care in such environments has been carefully studied and documented (4).

A team-based approach to emergency presentations has been shown to improve clinical outcomes (5). Ideally, this approach should be taken to rehearsal and education for emergency care, with members of the team understanding the structured approach to resuscitation and stabilisation and being aware of the roles and responsibilities of other members of the team.

Clinicians vary in their perceptions and attitudes regarding the frequency of re-training and rehearsal of emergency skills (6). An increasing focus on quality and safety amongst professional and regulatory bodies is also having an impact on skills maintenance and requirements for demonstration of continued clinical competence.

### ***Retention of knowledge and skills and impact on clinical practice***

It is instructive to examine the current evidence regarding the frequency of revision of skills needed to maintain clinical competence, as well as the degree of retention of skills after an educational intervention. Over the past 25 years there has been a moderate number of articles in the literature on this topic (7-10) - which report a variable rate of knowledge and skills retention after an educational activity. They also highlight the difficulty of evaluating the impact of procedural skills education, in particular, however, and very few studies have measured the impact on *clinical practice* after such education programmes or courses. Generally however, studies

assessing skills retention, by whatever measure, report a significant decline in basic and advanced life support skills over a period of 6-18 months (10).

This is examined in significant detail in a meta-analysis of the literature conducted in 2007 by Marinopoulos et al (11) – which was commissioned by the Agency for Healthcare Research and Quality, US Department of Health and Human Services, and carried out by the Evidence-based Practice Centre at John Hopkins University.

As part of this study, the question applied to the analysis of the available literature was ‘Do changes in knowledge, attitudes, skills, practice behaviour, or clinical practice outcomes produced by continuing medical education (CME) persist over time (greater than or equal to 30 days)?’. In summary, they found the following:

- The majority of systematic reviews that reported skills outcomes involved cognitive skills, with only a small number involving psychomotor skills.
- ‘Little can be said about the effectiveness of CME for psychomotor skills given the paucity of data in this area.’
- ‘Given the limited number of studies .....it is difficult to draw conclusions about the education techniques that have the greatest short- and long-term effects on skills.’
- ‘Most of the studies that met their skills objectives had multiple exposures to the CME activity as did most of the studies that evaluated the long-term effects on skills.’ (11)

It is clear, therefore, that the current literature is inadequate with respect to informing us of the most appropriate educational modalities for learning and maintaining emergency skills, as well as the ideal frequency of revision of these skills. It seems likely that cognitive skills can be retained for some time, and that multiple exposures to the learning activity are likely to embed these cognitive skills over the longer term. There is insufficient data on retention of psychomotor skills.

One study that did assess retention of a psychomotor skill was conducted in 2003 by Vertongen et al from Dunedin (10). This study compared the use of the laryngeal mask and the oesophageal-tracheal Combitube to successfully ventilate a mannequin. Subjects were taught to ventilate a mannequin using both devices, and their ability was tested immediately and seven months later. The study found that the ability to successfully ventilate is better maintained with the laryngeal mask (85%) than the Combitube (77%) after seven months.

## ***Simulation***

Marinopoulos also examined the evidence from systematic reviews regarding the effectiveness of simulation methods in undergraduate and postgraduate medical education (excluding continued medical education)(11). The simulation methods included in these studies were computer-based methods, virtual reality, standardised patients, and mannequins.

This analysis showed that the overall evidence pointed to the effectiveness of simulation training, especially in psychomotor skills (i.e. procedures or physical examination techniques) and communication skills. However, 'the strength of the evidence was considered low, due to the small number of appropriate studies, the scarcity of quantitative data, and a number of study limitations' (11).

Nestel et al have also examined the current state of 'best evidence' in the use of simulation for learning procedural and operative skills (12). They found that trainees and instructors express high levels of satisfaction with simulation as an educational method. Simulation usually results in improved knowledge and skills, but most studies have focussed on short-term gains in knowledge and skills, with outcomes usually tested in simulation rather than in clinical practice. In the few studies that have evaluated the impact of learning on clinical practice, the evidence is positive.

'Simulation not only supports learning but retention and revalidation of procedural skills. We need to understand more about the complex relationships of timing and duration of procedural skills training, frequency of use of the skill, initial competence and skill decay' (12).

## **Relevance to rural practice**

How does this evidence from the literature relate to the context of rural practice and rural medical education?

As discussed previously, severe emergencies occur frequently in rural practice and involve a wide range of diagnoses, the most common being medical problems such as cardiovascular disease. 'Rural doctors require adequate facilities and special skills in emergency medicine to treat these people' (13).

Short courses in emergency medicine have become increasingly available over the past two decades. Courses such as Early Management of Severe Trauma (EMST), Advanced Life Support (ALS), Advanced Paediatric Life Support (APLS), and Pre-hospital Trauma Life Support (PHTLS) are now part of the medical education landscape internationally. In Australia, rural doctors have developed a two-day course Rural Emergency Skills Training course (REST) specifically designed for the small rural hospital and pre-hospital context (14). This course has also been modified for other contexts and is now being delivered in rural areas of South Africa. All of these courses employ simulation techniques, and impart knowledge and skills via a combination of written text (course manual), lectures, skills stations and simulated clinical scenarios. Assessment and feedback is included in these courses, based on principles of adult learning (15).

In designing such courses, there is a need to find a balance between the extent of knowledge and skills taught and the need for efficient learning outcomes. Psychomotor skills such as basic and advanced airway management, intravenous access, defibrillation, cervical spine immobilisation and needle thoracocentesis are regarded as essential inclusions in such courses. Other less-commonly used skills such as surgical airway, intraosseous access and chest drain insertion are also included in some courses. The rationale for mastery of these latter skills, even though rarely if ever used, is that the rural doctor may be called on to undertake such a procedure to save a life, and is likely to be the only member of the local care team expected to do so.

In planning and delivery of emergency skills education, the complexity of the skill must also be taken into consideration. Clinicians report a spectrum of mastery of individual skills based on the complexity of the procedure (6). Regarding maintenance of skills in rural practice, the more complex skills such as endotracheal intubation, and the context of the use of the skill (e.g. possible need for rapid sequence induction of anaesthesia) will need to be rehearsed more frequently (if not being performed regularly in clinical practice), than other more straightforward skills.

### ***Assisting registrars***

Given these issues, how does the experienced rural practitioner assist the newly-arrived registrar introduced at the start of this chapter?

As this is an issue of both confidence and competence, some effort needs to be made in assisting the registrar to develop a learning plan to undertake during the placement. Adverse outcomes in emergency care, if perceived to be the result of inadequate knowledge and skills, can have a lasting detrimental effect on a junior doctor, perhaps directing them towards a 'safer' and less isolated clinical practice environment.

On the other hand, a structured and well-planned learning pathway, in a supportive environment relevant to the local clinical context, can be a powerful experience in building the skills and confidence of the learner. This also presents the opportunity for the experienced practitioner to rehearse and revalidate their own skills.

The first step in this process is to identify which commonly-used emergency skills the learner is comfortable with. A short initial simulated activity to practice these skills may be useful. The next step is to explore the structured approach to emergency care, as an opportunity to reinforce the physiological aspects of resuscitation and stabilisation. This will also re-introduce the concept of dealing with life-threatening conditions as they arise, such as obstructed airway, severe respiratory distress or profound circulatory shock. It is here that specific psychomotor skills can be identified, and a specific program to rehearse these skills within an achievable time can be instituted. Some of this learning may occur outside the local learning environment, for example through a specific course such as those mentioned above.

In this example, it is also important to ensure that the registrar has appropriate supervision and support when 'on-call', until he feels more comfortable as the learning process unfolds. Appropriate feedback in both the clinical practice and simulated learning environments is an essential element of this process, and is dealt with in other chapters in this guidebook.

## Practice pearls

- A structured approach to clinical emergencies, based on resuscitation and stabilisation of airway, breathing and circulation, is now the mainstay of emergency skills education programmes.
- Rehearsal and repetition of this approach, by way of simulation-based education programmes, has been shown to improve both competence and confidence of practicing clinicians. These programmes should incorporate a team-based approach to emergency care.
- Individual emergency procedural skills can be taught and maintained in a variety of ways; by frequent clinical practice (e.g. airway maintenance by a practicing anaesthetist), under supervision in clinical practice, or by planned or opportunistic simulation-based teaching.
- The challenges of rurally-based education for emergency skills are similar to those of rural practice generally; i.e. time, resources, professional isolation and the expectations of the local community.

## Summary

Management of emergencies is an unavoidable aspect of rural clinical practice. Available evidence shows that regular rehearsal of both the cognitive and psychomotor aspects of emergency skills, within a structured framework of care based on managing physiological responses to severe illness or trauma, is likely to achieve optimal patient outcomes.

The educational approach to teaching and learning the principles and practice of emergency care must include a structured and supportive environment, with use of a range of education modalities, and appropriate learner feedback. Teaching opportunities may arise in the clinical situation, but given the unpredictable nature of emergency presentations, approaches such as simulation-based education are increasingly being used to learn and maintain emergency skills, and have been shown to have a positive educational impact.

## References

1. Australian Institute of Health and Welfare. *Australia's Health*. AIHW, Canberra. Report number: 12, 2010. Cat No. AUS 122.
2. Wilkinson D. Selected demographic, social and work characteristics of the Australian general medical practitioner workforce: Comparing capital cities with regional areas. *Aust J Rural Health* 2000; 8: 327-34.
3. Tolhurst H, et al. Emergency medicine training needs of rural general practitioners. *Aust J Rural Health* 1999; 7: 90-6.
4. CRANApplus. *Clinical procedures manual for remote and rural practice: Australia and New Zealand*. 2nd edition. 2009. Alice Springs: CRANApplus
5. Small S, et al. Demonstration of high-fidelity simulation team training for emergency medicine. *Academic Emergency Medicine* 1999; 6, 312-23.
6. Taylor D, et al. Procedural skills quality assurance among Australian College for Emergency Medicine fellows and trainees. *Emergency Medicine Australia* 2006; 18, 268-75.
7. Curry L, et al. Effects of training in cardiopulmonary resuscitation on competence and patient outcome. *CMJA* 1987; 137, 491-6.
8. Hammond F, et al. Advanced life support: Retention of registered nurses' knowledge 18 months after initial training. *Aust Crit Care* 2000; 13, 99-104.
9. Bishop MJ, et al. Recertification of respiratory therapists' intubation skills one year after initial training: An analysis of skill retention and retraining. *Respir Care* 2001; 46, 234-7.
10. Vertongen V, et al. Skills retention for insertion of the Combitube and laryngeal mask airway. *Emergency Medicine* 2003; 15, 459-64.
11. John Hopkins University, Evidence-based Practice Centre. *Effectiveness of continuing medical education*. Agency for Healthcare Research and Quality. US Department of Health and Human Services, 2007.
12. Nestel D, Groom J, Husebo S, O'Donnell J. Simulation for teaching and learning procedural skills: The state of the science, *Simulation in Healthcare* 2011, 6(7):S10-S13, August 2011.
13. Tolhurst, et al. Severe emergencies in rural general practice. *Aust J Rural Health* 1995; 3, 25-33.
14. Campbell, et al. *Rural emergency skills training course manual*. 2<sup>nd</sup> ed. Brisbane: Australian College of Rural and Remote Medicine; 2011.
15. Mackway Jones K, Walker M. *Pocket guide to teaching for medical instructors*. London: BMJ Books; 1999.

This article is a chapter from the **WONCA Rural Medical Education Guidebook**.  
It is available from [www.globalfamilydoctor.com](http://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](mailto:manager@wonca.net)

© Campbell D, 2014.

The author has 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 author 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: Campbell D. Maintenance of emergency skills in rural practice. 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](http://www.globalfamilydoctor.com) (accessed [date]).