

## PERSPECTIVE

## Tyranny of distance and rural prehospital care: Is there potential for a national rural responder network?

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## Abstract

Critical illness intersects with the workload of rural doctors in Australia, mostly via their on-call responsibilities to rural hospitals. A significant proportion of these are prehospital incidents – vehicle crashes, farming injuries, bushfire etc. Effective care for such patients requires an integration of prehospital ambulance services, retrieval services and tertiary level trauma services all the way through to rehabilitation. Ambulance services in rural areas are often volunteer based, and with increasing remoteness via the ‘tyranny of distance’ comes the likelihood of increased delay in arrival of specialist retrieval services. Potential exists to utilise rural clinicians to respond to prehospital incidents in certain defined circumstances, as suggested by a recent survey of rural doctors.

**Key words:** *prehospital, retrieval, rural doctor, rural responder, trauma.*

## Introduction

Australia is a vast country of 7 617 930 sq km and a population of over 23 million people. The Remoteness Structure of the Australian Statistical Geography Standard identifies five Remoteness Area (RA) categories,

ranging from Major Cities (RA1) to Very Remote (RA5). The majority of Australians (71%) are congregated in major cities, with the remaining 29% in areas designated as rural or remote areas.<sup>1</sup> With increasing rurality comes decreasing access to specialist services, including those provided by emergency physicians. Emergency care in rural areas is commonly the responsibility of rural clinicians – typically general practitioners (GPs), although in very remote communities such care is the responsibility of remote area nurses or paramedics.<sup>2</sup>

Rural doctors perform a range of roles beyond a metropolitan GP, most commonly including work as hospital medical officers for inpatients and managing emergency presentations. Many also provide procedural services, such as anaesthetics, obstetrics and surgery. The Australian College of Rural & Remote Medicine (ACRRM) oversees the curriculum requirements of the rural generalist workforce, whereas the Rural Doctors Association of Australia (RDAA) represents their interests at a political level.

Critical illness does not respect geography.<sup>3</sup> Patients might present to the rural clinician with a wide spectrum of critical conditions, requiring initial stabilisation and transfer to metropolitan tertiary centres for definitive care. Prehospital incidents are common

in rural areas, with up to 65% of national road fatalities occurring in rural Australia.<sup>4</sup> A Western Australia study showed that rural locations accounted for one-third of major trauma cases (injury severity score >15).<sup>5</sup> Whereas transport injuries predominate, other hazards include agricultural and mining industries, as well as envenomations, wildlife–vehicle collisions and environmental hazards.<sup>6</sup> Mortality rates from trauma in rural areas are reported to be four times those in major cities.<sup>7</sup> The time from trauma to first responder input has been noted as most important in the trauma chain of survival, with a 19% increase risk of death per hour.<sup>8</sup>

Existing reliance on retrieval services ignores the potential for significant delay in such responses, which might be measured in hours in rural Australia. Similarly, many rural ambulance services are staffed by volunteers, trained to provide a basic level of care but often unable to secure i.v. access, deliver effective analgesia or perform definitive procedures.

Many States have developed integrated trauma systems, designed to care for patients from the time of initial trauma through to rehabilitation.<sup>9</sup> The lack of primary care input in trauma systems has been reported as a deficit from a patient perspective, but there has been little consideration of formally involving rural clinicians in the initial trauma response.<sup>10</sup>

Understandably, such services would prefer to concentrate clinical expertise so as to ensure best possible care to patients. Despite this intent, a national survey reported that 58% of rural GP-anaesthetists had been called to a prehospital incident in the previous 12 months.<sup>11</sup> Such calls were

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initiated by ambulance or retrieval services, due to circumstances when either local resources were inadequate or response times would be delayed. This inevitably results in ad hoc arrangements, typified by no formal activation criteria, training, equipment nor clinical governance. Moreover, these non-standardised responses fail to cater for the heterogeneity in rural clinicians' skills and experience, risking both patient and responder safety.<sup>12</sup>

Rural clinicians with ongoing skills maintenance are well placed to deliver emergency care in selected circumstances in rural communities. Specific skills that rural clinicians can deliver include the provision of effective analgesia to facilitate extrication, advanced cardiac and trauma life support, and prehospital anaesthesia.

South Australia has an embryonic model, the Rural Emergency Responder Network (RERN) scheme. This comprises 28 rural doctor members, who can be tasked to rural incidents via the South Australian Ambulance Emergency Operations Centre and obviates previous ad hoc responses (historically, help from the local GP was sought as a last resort when resources are limited or retrieval services are delayed). RERN members commit to maintain relevant emergency skills via regular training focussed on the prehospital environment, and are equipped with protective equipment, prehospital bags and equipment via Country Health South Australia. They participate in regular case audit within a clinical governance structure, fulfilling the model of the 'right person, to right patient, at right time'. Although the RERN model is well received, there exists potential for a national rural responder network.

In 2014, a short web-based survey was hosted on the free, open-access GoogleDocs platform<sup>13</sup> and distributed via email to rural doctors from the ranks of ACRRM and RDAA. Sadly, there is no national database of rural doctors – whereas ACRRM and RDAA are considered the representative bodies of rural practice, many rural clinicians might belong to another body (such as the Royal Australian College of General Practitioners) or to none. Determining a response rate

**TABLE 1.** *Demographics of rural clinician respondents (n = 420)*

	n (%)
Remoteness Area (RA)	
RA 1	42 (10)
RA 2	59 (14)
RA 3	151 (36)
RA 4	118 (28)
RA 5	50 (12)
State of primary practice	
ACT	No replies
New South Wales	84 (20)
Northern Territory	33 (8)
Queensland	105 (25)
South Australia	84 (20)
Tasmania	No replies
Victoria	50 (12)
Western Australia	64 (15)
Gender	
Female	117 (28)
Male	303 (72)
Predominant area of practice	
Primary Care only	21 (5)
Primary Care and Emergency	190 (45)
Primary Care, Emergency and Anaesthetics	105 (25)
Primary Care, Emergency and Obstetrics	43 (20)
Primary Care, Emergency and Surgery	21 (5)

from such a survey is problematic. However, 420 responses were received over 28 days from rural clinicians, with demographic breakdown (geographic distribution, age and sex) similar to that of previous surveys of the workforce.<sup>11</sup> Questions were asked regarding rural doctors' attitudes towards current and future involvement in prehospital care, as well as towards involvement in a national rural responder network. Responses are shown in Tables 1–3. A limitation of such a survey is uncertainty on how many rural procedural doctors exist in Australia or how many received the survey, thus making it impossible to determine a response rate. Maintenance of a national database of rural clinicians and procedural capabilities would aid future research. It is highly likely that the responders to this survey reflect clinicians with an ongoing interest in emergency and prehospital care, as suggested by the almost unanimous response (98%) to the question of whether it was appropriate to be involved in such care if requested.

The role of the rural GP in prehospital emergency responses is seldom acknowledged nor formally included in State-based trauma systems in Australia.<sup>14</sup> Although rural doctors have been involved in such incidents historically, there might be marked heterogeneity in responder skills.<sup>15,16</sup> Moreover, skills from the hospital setting might not translate effectively to prehospital environment. Understandably there has been a move away from prehospital care provision by 'enthusiastic amateurs', with an emphasis on the provision of high-quality, well-governed prehospital systems. Traditionally, such clinicians have been drawn from the ranks of anaesthesia, emergency medicine and intensive care. It could be argued that experienced rural doctors, with broad skills across these arenas, represent another pool of expertise.

Utilisation of self-nominated volunteer members of the rural doctor workforce would appear to offer a solution to the current problems of relatively unskilled (often volunteer-based) ambulance services in rural and remote Australia, along with the inevitable tyranny of distance causing a delay in arrival of specialist retrieval services in Australia.

### Clinical implications

Several countries, notably the United Kingdom and New Zealand, incorporate local clinicians into the prehospital environment to 'value add' to the scene, namely the British Association of Immediate Care Schemes (BASICS) and the Primary Response in Medical Emergency (PRIME) systems, respectively.<sup>17–19</sup> Both of these systems operate despite the relative geographic proximity of hospitals in both countries and the fact that neither country has an established rural GP procedural workforce. In contrast, Australia has a rural workforce of clinicians, many of whom maintain their emergency medicine and airway skills through regular on-call commitments in emergency and anaesthesia, as well as ongoing professional development courses. In rural and remote Australia, these clinicians might be the only skilled practitioners immediately available to attend a prehospital incident

**TABLE 2.** *Rural clinician responses regarding prehospital care*

Question	Yes	No
Are you regularly involved in call outs to prehospital incidents in your community? If yes, please give examples (free text):	68%	32%
Cyclone trauma incidents, frequent motor vehicle accidents, farming accidents, drownings, attempted hangings, prolonged or difficult extrications		
I am called out to attend a prehospital incident approximately once a year (in other cases, the injured arrive at the Hospital before I have been called to attend them); I've gone out to major road trauma, farm accidents and collapses due to medical conditions. Commonly, I am supervising others e.g.: volunteer ambulance officers and the 'hands on' tasks I am needed for are most commonly i.v. access and the administration of medications, as well as the decision as to when to cease resuscitation attempts		
Family tragedies; any event involving the practitioner's usual community where volunteer ambulance officer resources are overwhelmed. Significant role in communication as well as for provision of procedural skills		
Past 2 years there has been one per year – both calls to high-speed motor vehicle crash with trapped, critically injured patients		
Approximately one call per fortnight – mostly vehicle and farming incidents		
Our primary health staff respond to emergencies with the clinic nursing staff, as there are no State ambulance paramedics in remote communities. Retrieval staff then respond if the patient requires evacuation. The frequency of such responses is quite high; almost certainly a weekly event		
Car accidents where retrieval services are not practical or responses delayed		
Call outs have included motor vehicle accidents, partial limb amputation with patient trapped, gas explosion, truck crash – all had critical injuries requiring advanced critical care or surgical and anaesthetics responses. All ambulance calls for medical assistance were appropriate. I respond to 2–3 such responses per year. We have an excellent working relationship with [State Ambulance Service] and have trained with both ambulance, fire and police regularly.		
I have been involved as an attendee at several motor vehicle crashes in the past 5 years. Both myself and my husband are rural GPs. In addition, we have been involved in responding after disasters, including NSW bushfires and local storms, by providing services and counselling for patients unable to see their own doctor due to road closures/dangerous conditions etc.		
Motor vehicle crashes and out-of-hospital medical events, such as cardiac arrest, dam drownings or paediatric injuries. I work in a small community so such call outs are infrequent – perhaps every 2–3 months, shared among the two doctors on roster.		
Involved only been where advanced care is needed – e.g.: prehospital RSI, surgical airway or serious trauma. There is generally a reluctance to call the local doctor, instead relying on retrieval from the scene, which can take hours to respond. The difficulty is in integrating rural clinicians into such a system without 'treading on the toes' of the prehospital providers, as well as ensuring that rural doctors have the right skills		
Do you consider it appropriate for rural clinicians to respond to major incidents in their community if requested by ambulance or retrieval service?	98%	2%

**TABLE 3.** *Rural clinicians' course attendance and preparedness*

	n (%)
Course attended	
Rural Emergency Skills Training or Programme (REST or RESP)	168 (40)
Early Management of Severe Trauma Provider (EMST-P)	252 (60)
Early Management of Severe Trauma Refresher (EMST-R)	252 (60)
Emergency Trauma Management (ETM course)	17 (4)
Emergency Life Support (ELS)	189 (45)
Advanced Paediatric Life Support (APLS)	244 (58)
Advanced Life Support Obstetrics (ALSO)	160 (38)
Safe Transfer and Retrieval (STAR)	34 (8)
Effective Management of Anaesthetic Crises (EMAC)	63 (15)
Pre Hospital Trauma Life Support (PHTLS)	50 (12)
Major Incident Medical Management & Support (MIMMS)	17 (4)
Major Obstetric Emergency and Trauma (MOET)	34 (8)
Other (various local courses)	105 (25)
Skills able to deliver currently	
None currently (but willing to learn)	8 (2)
Assistance with scene control, triage, assessment	252 (60)
Basic life support (chin lift, jaw thrust, CPR)	315 (75)
Advanced life support (airway adjuncts, drugs, defibrillation)	336 (80)
Stabilisation and packaging (splinting, i.v. access)	324 (77)
Use of agents for analgesia (e.g. ketamine for extrication)	281 (67)
Needle, finger or tube thoracostomy	281 (67)
Prehospital advanced airway (RSI or surgical airway)	244 (58)
Other	72 (17)

in their locality, and it would appear difficult to justify their exclusion from an integrated trauma service. Indeed, the inclusion of rural doctors in roadside responses has been the subject of at least one Australian coroner's recommendation.<sup>20</sup>

Development of such a resource might offer increased community resilience in the face of State or National disasters, such as bushfire, earthquake or cyclone, adding an extra level of capacity to existing State disaster plans. Rather than engage 'enthusiastic amateurs', such a system mandates governance relevant to the prehospital environment.

As Mazur and Ellis state, the essence of good-quality critical care is the delivery of basic care, in a quality-assured manner, with attention to detail.<sup>21</sup> When care of critical patients is constrained by the tyranny of distance and lack of readily available expertise, a subset of Australia's rural clinicians are ideally placed to both limit the

therapeutic vacuum and offer a continuum of care. Appropriately selected, equipped and trained, they might epitomise the 'right person at the right time' in delivery of rural prehospital care when help is otherwise not available.

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## Author contributions

TL designed the survey and collated responses. JH developed the text and completed proofreading.

## Competing interests

None declared.

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