

PREHOSPITAL CARE

Would a prehospital practitioner model improve patient care in rural Australia?

P O'Meara

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Background: Existing rural prehospital models have been criticised for being isolated from the health-care system, and for following inflexible clinical protocols. Greater reliance on clinical judgement and informed decision making in the prehospital setting offer the potential to improve patient care.

Methods: Soft systems methodology was used to develop and critically appraise the prehospital practitioner model as an alternative to existing models. This approach started from the philosophical viewpoint that prehospital services should be patient centred. Soft systems methodology was used to structure the elements of prehospital systems and the relations between them into metaphors and pictures that could be analysed.

Results: This analysis showed that the most powerful reason for advocating the prehospital practitioner model is that it places prehospital systems within a symbiotic relationship with the healthcare system. Unlike the existing emergency service models or the "chain of survival" model, it is an integrated system that provides a range of services at multiple points during the patient care cycle. Thus, the prehospital practitioner would have roles in the prevention of injury and illness, responding to emergencies, facilitating recovery, and planning future strategies for a healthy community.

Conclusions: Implementing this new model would see the prehospital system using its available capacity more effectively to fulfill broader public health and primary care outreach roles than is currently the case. Patients would be referred or transported to the most appropriate and cost effective facility as part of a seamless system that provides patients with well organised and high quality care.

Correspondence to:
Dr P O'Meara, Monash
University School of Rural
Health, PO Box 424,
Traralgon, Victoria, 3844,
Australia;
peter.omeara@
med.monash.edu.au

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In rural settings, ambulances often transport patients long distances to healthcare facilities that are not closely affiliated with local healthcare resources. Sometimes, this is appropriate because of the requirement for sophisticated tertiary care for some emergency patients, particularly for severely injured trauma patients. However, this long distance transportation may simply reflect the traditional separation of the prehospital (ambulance) services from local primary care providers, public health and social service agencies that might be able to deal effectively with the needs of the patient. The ability to provide integrated health services is often impeded by the geographical separation of health system components and the lack of regular communication or organisational networking between them.

Prehospital care, as an important component of the rural health system, has the potential to be more closely integrated with other health services. The genesis of existing prehospital models and the role of paramedics within the public safety paradigm has resulted in a strong reliance on hierarchical structures and relatively inflexible clinical protocols to regulate professional behaviour. As a result, prehospital models have been criticised for being isolated from other health services, overly reactive to acute illness and injury, focused on service to individuals, and for failing to fully use the available human and physical resources.^{1,2} These problems are particularly evident in rural settings where healthcare resources are limited.^{3,4} Consequently, it has been suggested that locating prehospital care more firmly within the health system, with its greater reliance on clinical judgement and informed decision making, offers a potential way to improve patient care.⁵⁻⁷

The possibility of an expanded role for prehospital paramedics has been discussed in Australia within the context of a dialogue about whether they should be trained as a skilled artisan or educated as a health professional.⁷⁻¹¹ The second suggestion implies a more holistic approach to preparing for practice, with a greater emphasis on the social sciences and

preparation for independent practice and research.^{7,12,13} There is heated debate among educators and ambulance services about how much education a prehospital professional needs to competently render patient care in the out of hospital environment.^{1,9,13-16}

Review of the role of prehospital paramedics has occurred in the United Kingdom and the United States of America.^{1,2,15-24} Internationally, the most influential document has been the United States National Highway Traffic Safety Administrator's *Agenda for the Future*, which sees emergency medical services of the future undertaking a community based health management role that is fully integrated with the overall health system.⁵ The American College of Emergency Physicians has given cautious support to this vision, providing some pre-conditions are met. Their main concerns are that the current emergency response system is not compromised, appropriate educational programmes are in place, and that medical supervision is maintained.²⁵ Others caution that expanding the scope of prehospital practice needs to be closely scrutinised to ensure that any changes have positive public health outcomes.^{26,27}

In the United Kingdom, the report of the Joint Royal Colleges and Ambulance Liaison Committee on the future role and education of paramedics has set the agenda.⁶ A related proposal in the United Kingdom is the development of the practitioner in emergency care as a new healthcare profession that combines aspects of prehospital care and nursing.²⁴ It has also been rhetorically suggested, that rather than extend the education and training of ambulance paramedics, it may be more appropriate to develop a generic health worker called a paramedic practitioner who can move between a variety of community and hospital settings.^{11,19,24} Examination of the match between existing workload and training of prehospital paramedics in the United Kingdom supports this type of development. There is currently a strong training emphasis on potentially life threatening conditions and comparatively little

training about minor injuries that represent a large proportion of prehospital workload. More training would be required in the assessment and treatment of minor injuries if more responsibility were to be taken for the discharge of patients at the scene.¹⁶

In this study, soft systems methodology (SSM) was used to develop and critically appraise the prehospital practitioner model as an alternative to existing models in rural Australia.²⁸ It is anticipated that this will stimulate debate and discussion about how prehospital care could be improved in rural Australia. The philosophical starting point was that prehospital services should be patient centred. SSM was then used to structure the elements of prehospital systems and the relations between them into metaphors and pictures for analysis.

The prehospital practitioner model presented has a strong foundation within the health professions, with prehospital paramedics increasingly seeing themselves as part of an emerging health profession.²⁹ This new model incorporates the well known and validated "chain of survival" concept and increases both the depth of treatment and clinical decision making, and extends the range of prehospital practice to include primary care activities both before and after the "chain of survival" window.

METHODS

The data collection methods used included a review of the prehospital literature, collection of empirical data, interviews with prehospital experts, a focus group of ambulance service managers, and the observation of similar models operating in rural Australia. Based on these data, suggestions were developed for the future refinement and management of the prehospital practitioner model of service delivery in contemporary rural settings.

The research setting was the Australian state of Victoria, where in March 1999, the five major rural ambulance regions were amalgamated into Rural Ambulance Victoria, which provides prehospital services from 115 stations. The amalgamation provided the opportunity to study models of prehospital service delivery in rural settings during a time of major organisational change.

A systems approach, SSM, was used to make sense of the data collected because of its ability to deal with ill structured or "messy problem" contexts.²⁸ This research approach was useful because it permitted an exploration of a diversity of viewpoints as part of the decision making and intervention process.³⁰ The significant advantage of a systems approach over classic management approaches is its ability to take account of both the logic and the broader cultural context of rural Australia. It incorporates mechanisms that allow for continuous feedback loops between what is described as the "logic based stream of analysis" and the "stream of cultural analysis".³¹ At a practical level, the process is an iterative one that incorporates four main stages:

- (1) developing a "rich picture" of the situation that is considered problematical and that ensures that many different perspectives are elicited;
- (2) developing systems models of one or more aspects of the problem situation as the basis for discussion and learning about the real world;
- (3) comparing the system models with the real world, and learning about the real world; and
- (4) identifying opportunities for improvement, and making changes as the basis for further learning.³²

Defining the problem

In the first instance, a general picture of the provision of prehospital services in rural Victoria was established by examining the strengths and weaknesses of current models in terms

of what key stakeholders believe works well and those areas that could be improved. Questionnaires, sent to health professionals and selected members of the community in rural Victoria, were used to collect these data. From this analysis, the problem situation was described in terms of the ambulance service's organisational structure, the processes used to deliver services, and the cultural and technological influences on the delivery of prehospital care. The latter included the educational and technological influences that drive innovation and development. The sociopolitical situation in small rural towns was examined through a focus on links between ambulance paramedics, nurses, medical practitioners, and health services. This led to an analysis of how problems are currently managed.

Model development

The second stage of the research was the development of the prehospital practitioner model. This involved a selection of aspects of the prehospital system that were particularly worthy of further exploration. The main considerations were:

- Whether there are opportunities for major improvement?
- Are there aspects of the problem that are poorly understood?
- Is it politically wise to explore a specific aspect and is now an opportune time to consider change?
- Are there differences of opinion about current or future actions?

The major steps in this development of the model were the naming and defining of prehospital systems to identify the main inputs that are transformed into useful outputs. This identified the key elements of the systems such as service delivery processes, environmental constraints, clients of the system, service providers, and the holders of power and influence. Underpinning all of these is the dominant "worldview" that provides an explanation of the reason the services are worth providing. In this case, it is the view that prehospital services should be patient centred.

The systems were then modelled in terms of activities, links and controls as the basis for discussion of the possibilities for change. Performance monitoring and control mechanisms were also explored to turn abstract thoughts into a practical model. The main players were described according to their roles as clients, problem solvers, and problem owners. For instance, prehospital health professionals are considered to be the main problem solvers, while the government or other funding agencies are often the problem owners with the financial and legislative power to change how services are provided. The interacting elements of social systems such as roles, norms, and values were described to help appreciate how the different perspectives of health professionals and members of the community influence the development and implementation of new prehospital models.

Comparisons with reality

To make the prehospital practitioner model comprehensible to a wider audience, it was modelled further using metaphors and "rich pictures" based on an understanding of its core aims and objectives. The model and its associated metaphors are designed to stimulate discussion and debate about the changes that could improve the delivery of rural prehospital services and the accommodations that will be required between conflicting interests for the actions to improve to be taken. This dialogue, comparing the model with reality, has the potential to form the beginnings of future transition and implementation strategies.

RESULTS

The prehospital practitioner model is speculative and builds on the prehospital dialogue in the United States and the United

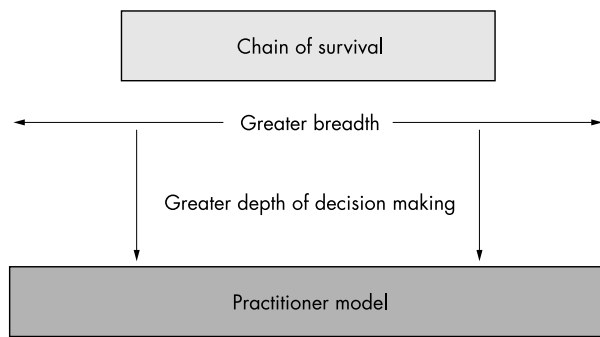


Figure 1 Location of practitioner model.

Kingdom.^{5 6 17 21 22 24 33} In an abstract sense, the model developed here is an expansion of the well established “chain of survival” model. It provides both an emergency “safety net” system and an advanced clinical care system that responds to emergency needs in a timely fashion, combined with an integrated public health role that is closely linked to the broader health system. In addition to their “life saving” role, prehospital paramedics within this model have an additional role in public education programmes that promote healthy lifestyles, and prevent death and injury. Figure 1 illustrates the practitioner model’s relationship with the “chain of survival” model.

When the prehospital practitioner model is taken apart, two important characteristics emerge. Both are illustrated in figure 2 in the form of a patient pathway. The first characteristic is the existence of a research and development agenda that is at once interdisciplinary and also independent of the dominant medical paradigm. The research agenda drives clinical care processes on the basis of evidence based practice rather than following the traditional ways of doing things. The second characteristic of the model is the existence of multiple decision points during the cycle of care. For instance, patients may be re-directed to more appropriate services when they make initial contact and following initial clinical assessment. Unlike traditional prehospital systems, patients may be directed or transported to facilities other than hospital emergency departments. This draws on the multiple option decision point (MODP) model, which uses extended protocols to place patients into four action categories:

- (1) Patient requires ambulance transport to emergency department;
- (2) Patient is thought to need emergency department evaluation, but may safely go by alternative means;
- (3) Patient may be referred to his or her primary care provider within 24 hours; or
- (4) Patient would require only field assessment and treatment.^{18 23}

The prehospital practitioner model sees the whole population, both the fit and healthy and all those in need of prehospital care as its clients. Prehospital care could be involved in the whole continuum of care from public health activities to prevent avoidable incidents, emergency responses, treatment and transport, and input into recovery programmes. The model proposed here is broad enough to account for different perspectives throughout rural Australia.

Another characteristic of the prehospital practitioner model’s service delivery processes that is of particular relevance in rural settings is the centrality of teamwork between prehospital providers, and other emergency service and health care providers. To do this most effectively, open channels of communication need to be established through co-location of facilities, combined education and training, and the establishment of multidisciplinary clinical and operational audit systems.

DISCUSSION

Metaphorically, the prehospital practitioner model can be described as a symbiotic system, where it forms an interdependent relationship with its environment. The rural environment is not seen as a threat to survival or an opportunity to exploit, but as an integral part of the whole that can be influenced and shaped for the common good. In contrast, metropolitan models that rely on advanced technology and easy access to tertiary level hospitals find it impossible to operate in some rural settings. The prehospital practitioner model encourages other parts of the health system and the community to have two way relationships with the prehospital system, both giving and receiving inputs that change the way health care is provided. For instance, independent prehospital research could influence the practice of emergency medicine or nursing in the same way these two disciplines currently influence the provision of prehospital care. This characteristic of the prehospital practitioner model is derived from its view of the world, which sees the prehospital practitioners as actors within the health system with influence over their own destiny and that of others.

Rural areas provide a unique opportunity to demonstrate the capacity of the prehospital system to fulfill broader public health and primary care outreach roles for under-served communities. In New South Wales it has been recognised that the roles of prehospital paramedics and related health professionals in small rural towns need to be redefined to make the most of limited resources. The implementation of the prehospital practitioner model would see the prehospital system using its excess capacity to fulfill broader public health and primary care outreach roles.³

The theoretical strength of the model is its ability to integrate prehospital services with public health and social service agencies, primary care providers and other healthcare facilities to ensure that patients are referred to or transported to the most appropriate and cost effective facility (fig 2). It would ensure that care occurs as part of a seamless system that provides patients with well organised and high quality care. To succeed, the model requires the cooperation and availability of each component of the emergency medical system. This includes access to medical officers trained in emergency medicine, healthcare facility staff, system planners, and others.²

Within the prehospital practitioner model, a range of healthcare professionals could work with and alongside the established prehospital professionals and in some cases carry out shared roles, with a common objective of providing an integrated range of services to prevent injury and illness, and respond to emergencies and facilitate recovery, resulting in a healthy community. Professional and industrial bodies within the health sector, health institutions, researchers, education and training providers, and community members would have a role in deciding priorities and objectives. Independent research would also inform policy formulation and implementation in the realms of emergency management and health care.⁴

Conclusions

While achieving the prehospital practitioner model is likely to be an aspirational objective in the immediate future and one that is difficult to ground in reality, there are many aspects of the model that are well worth pursuing. In particular, the aims of improving teamwork with other health professionals and developing a mature research culture. Most critically, the adoption of a mindset that places prehospital systems within a symbiotic relation with the healthcare system would be valuable. In South Australia, for instance, a prehospital practitioner model has evolved over the past five years that has been built on an improved level of education and regular clinical reviews.⁷

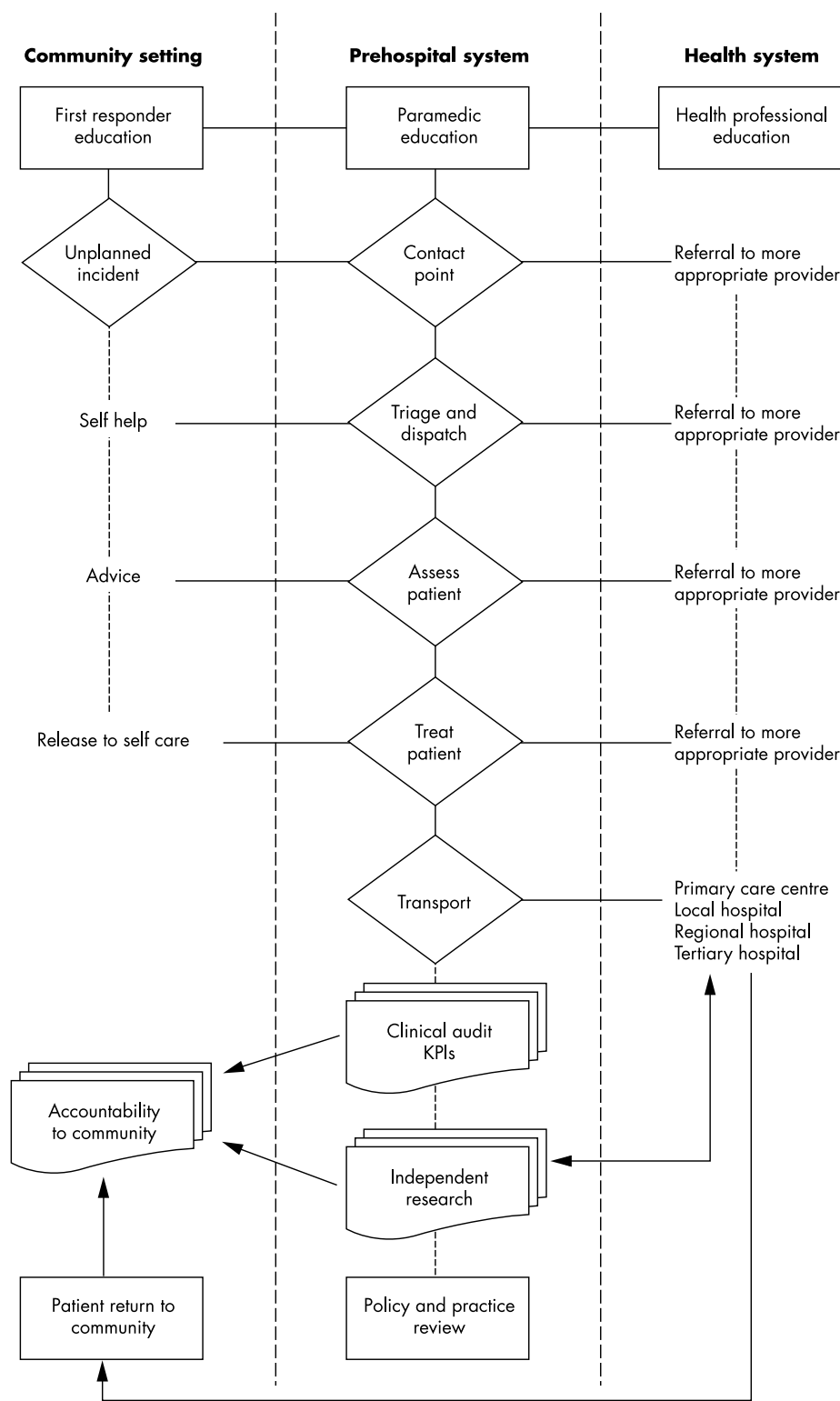


Figure 2 Patient pathway for prehospital practitioner model.

Expanding the scope of practice for prehospital paramedics would require changes in the areas of: equipment and technology; policies and procedures; education and research; legislation and organisation; and mission and attitude.¹⁵ Relaxation of traditional professional boundaries would be required if this patient centred approach to the provision of prehospital care in rural settings is to be achieved. Teamwork between health professionals would have to be the norm, with fewer professional barriers than in the past.³⁴ For instance,

prehospital paramedics would need to accept the overlapping roles of appropriately educated nurses.

To be widely accepted and to operate effectively, broad education and training needs to be available to prehospital paramedics, including independent research, and continuing and graduate education. With this and the possible introduction of professional registration would come support for an expanded scope of practice. While there are valid reasons to support high levels of medical supervision and control of prehospital practice, continued medical dominance will inevitably constrain

the development of prehospital practice as an autonomous profession that can make its own way. Like nursing, it needs to pursue independent research and set its own educational and practice standards if it is to evolve into an independent profession.^{7 8 35-37} With educational and organisational developments in the United States, the United Kingdom, and Australia, the development of the prehospital practitioner model may be more likely than was ever imagined in the recent past. Implementation of the model has the potential to improve the delivery of prehospital care in rural Australia.

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