

to use to save critically ill patients must be determined. The need to allow paramedics to treat the patient quickly must be balanced against control in the initiation of emergency procedures including administration of drugs. This interrelationship between the EAS and hospital physicians will need to be strengthened in the areas of real-time communications.

Thirdly, the degree of refinement of the Emergency Despatch System must be established, bearing in mind the local environment of multiple languages and culture. The benefits to be obtained utilising standard protocols in use by other EMS have to be weighed carefully for cost effectiveness.

Finally, recognition given to paramedics, as a profession, must be similar to that given to other paramedical vocations, such as nurses.

**Keywords:** communication; despatch; EAS; emergency medical services; EMS; paramedic; Singapore; training  
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## 2.3. Prehospital Care

### Ambulance Design and Safety

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Clinical research identifies the need for rapid response to provide definitive intervention for the critically ill or injured patient. Emphasis has been placed on the use of red lights and siren (RLS) as a means to reduce travel time by allowing continuous movement through traffic congestion and controlled intersections, especially in urban and suburban environments. The use of RLS increases the risk of the ambulance becoming involved in a crash and the severity of that crash, making safety the primary concern for ambulance design, construction, maintenance, and operation.

A systems approach is required to minimize risk. The initial development of specifications by EMS must consider local weather conditions, equipment requirements, and crew needs. The ambulance manufacturer is mandated to design, engineer, build, and test the vehicles to those minimum requirements and ensure it meets and exceeds local and national regulations. Scheduled preventive maintenance and a comprehensive safe-driving program decreases risk factors. Finally, RLS responses must be reduced. The dispatch of an ambulance is protocol driven, and clinically developed algorithms determine the use of RLS, eliminating unnecessary RLS responses. Minimizing risk during response and transport, requires continued evaluation. With demand for services steadily increasing, the emphasis on ambulance design and safety to protect the patient, medics, and the public continues to emerge as a high priority for the vehicle manufacturer and the EMS administrator.

**Keywords:** ambulance; dispatch; RLS; response; systems

approach; transport

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### Prehospital Cardiac Arrest

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Everyday in Singapore, 1 to 2 persons will have a cardiac arrest before they even reach a hospital. In adults, the most common initial rhythm is ventricular fibrillation or pulseless ventricular tachycardia.

Documented survival rates from prehospital cardiac arrest in the literature varies from 1 to 33%. We face a continuing challenge to improve our medical systems to increase the chance of survival after cardiac arrest, to save "hearts that are too good to die." The time tested principles of "early access, early CPR, early defibrillation, early advanced care" still applies. The latest developments in the field of prehospital cardiac arrest and strategies to improve prehospital medical systems are examined.

An essential component of any Emergency Medical System is a universal emergency number. This ideally should be national, easily accessible, well-publicised, and appropriately manned. Innovations include 'enhanced 9-1-1' capability, computer assisted dispatch and ambulance management, caller-assisted CPR, and appropriate Emergency Medical Dispatch protocols.

It is estimated that bystander CPR is available in only 30% or less of emergencies. There is a great challenge in improving CPR rates in communities. The advent of 'chest compression alone' resuscitation has generated much discussion and a rethink of community CPR strategies. Alternative CPR techniques have been studied including IAC-CPR, ACD-CPR, PTACD-CPR, Vest CPR and MIDCM.

The most exciting development in recent years has been Public Access Defibrillation. This has come about because of improvements in Automated External Defibrillators and the evidence that early defibrillation is more important than who performs it. Stunning results have been reported in PAD programmes. The development of biphasic waveforms gives promise of more effective defibrillation at lower energy levels.

Problems with training and skills maintenance in prehospital intubation has led to the increasing use of alternative devices such as the laryngeal mask airway, esophageal-tracheal Combitube, and pharyngotracheal lumen airway. We also examined the evidence basis for ILCOR 2000 guidelines recommending the administration of amiodarone for VT/VF, the decline in the role of lignocaine, bretylium and the role of vasopressin in cardiac arrest.

Indeed, prehospital cardiac arrest presents one of the greatest challenges and also opportunities for medical care providers today. Modern advances in acute coronary care would be in vain if the cardiac arrest patient cannot be resuscitated before arrival at a hospital.

**Keywords:** cardiac arrest; CPR; defibrillation; prehospital; public access defibrillation

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