

destination or divert the aircraft.

The problems of illness on board aircraft and the current state of in-flight medical assistance and where it appears to be heading is reviewed.

Keywords: airlines; elderly; flying; illness; medical assistance; tourists

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Radio-Maritime Medical Services: The Singapore General Hospital Experience

Fatimah Lateef, MBBS, FRCS(A&E)(Edin)

Consultant, Department of Emergency Medicine, Singapore General Hospital, Singapore

Medical care for the sick and injured on a variety of seafaring vessels throughout the world represents a challenging area of medical care, viz. maritime medicine. The scope of this field is extremely broad, and is unique in terms of the problems encountered at sea, logistical difficulties in assessment and treatment of patients, as well as in the provision of definitive medical care. Sparse resource availability, great distances, isolation, communications difficulties, accessibility, and weather are all very challenging problems.

In Singapore, radio-medical advice was first coordinated by the Port Health Authority until 1980, when the Accident and Emergency Department at Singapore General Hospital took over the responsibility of giving advice to ships on the high seas. About 100 calls for radio-medical advice are received annually.

The commonly-encountered problems, diagnoses, and frequently prescribed treatment will be discussed. The different modes of communication, provision of basic and continuing education, and skills upgrading for seamen, how to maintain standards of care on-board, as well as the latest in state-of-the-art techniques of telemedicine and video-conferencing will be highlighted.

Keywords: accessibility; communication; medical; radio-medical; sea; ships

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Research in Disaster Medicine

Marvin L. Birnbaum, MD, PhD

Editor-in-Chief, *Prehospital and Disaster Medicine*
Professor of Medicine and Physiology, University of Wisconsin-Madison USA

Disaster Medicine is a new science and the development of a science requires information. As a science, we modify what we do in a given circumstance based on the validity and reliability of what we have learned through research integrated with our own experience. Such actions are tempered by the resources available or potentially available. Furthermore, it is not possible to obtain additional resources or generate change without supporting data.

Disasters are increasing in frequency, intensity, and scale. The damage resulting from an event can be assessed in terms of human, economic, and intangible costs.

Obtaining accurate and reproducible information from each of these catastrophes is essential in order to mitigate these costs. Activities to mitigate the damage from future events may be directed toward elimination or modification of the hazards, decreasing the risks for actualization of the hazards (pre-event status), and/or in responses to the event from the initial responses through recovery and rehabilitation and constitute the objectives of disaster research and evaluation.

Disaster research, in addition to traditional medical research, e.g., randomized, controlled, experimental studies, requires qualitative research techniques that include structured interviews, surveys, and case-controlled studies. Similarly, the use of severity scores will become important. Thus, to accomplish good research in this field, we must learn new techniques and sampling strategies: ones that have high external validity, good internal validity, and high reliability. The results from their use have modified our approaches to subsequent events. The design of such studies is discussed in detail as the Third Template in the *Guidelines for Evaluation and Research in the Utstein Style*.

The sooner that a study is conducted after the event (if sudden-onset), the better will be the information obtained, as the information is perishable. Ideally, such studies should be done concurrently; but this raises some ethical issues, particularly in acute-onset events. Concurrent studies have great utility in the later stages of sudden-onset disasters and in delayed-onset or chronic types of disasters. Examples of successful projects will be discussed.

The time of anecdotal reports is past: the information obtained without a structure for data collection and analysis only serves to repeat what we already know and generally contributes little to furthering our science.

Keywords: costs; data collection; disaster medicine; guidelines; research; science; structure; techniques; timing; training

E-mail: mlb@medicine.wisc.edu

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The Future Direction of EMS in Singapore

Ltc (Dr.) Tan Eng Hoe

Chief Medical Officer, Singapore Civil Defence Force, Singapore

The current Emergency Ambulance Service (EAS) in Singapore is an amalgamation of the ambulance services of the Fire Service and Ministry of Health in the 1977. Its conversion to an emergency medical services (EMS) system utilising paramedics specialising in prehospital care, started in June 1998 and was completed a year later.

There are four challenges facing the EAS. First, it must be determined whether there is a need to further train paramedics from an EMT-Intermediate level to EMT-Paramedic level in view of factors such as the short transport time to the nearest hospitals and the longer period of training required. The current training system is based on a single-tier response and on that of the Justice Institute, British Columbia.

Secondly, the degree of medical direction required for the EAS as more procedures are made available for paramedics

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

Prof. Jerry Overton, MPA

Executive Director, Richmond Ambulance Authority
Associate Professor, Department of Emergency Medicine,
Medical College of Virginia, Virginia Commonwealth
University, USA

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

Marcus Ong Eng Hock, MBBS, FRCS (A&E)Ed

Consultant, Department of Emergency Medicine,
Singapore General Hospital, Singapore

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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