PROPOSAL FOR EMERGENCY MEDICAL SERVICES (EMS) SYSTEM IN MALDIVES

Teodoro Herbosa, MD
Tsunami Project
WHO Maldives
Male’, Maldives
Table of Contents

1. Introduction .............................................................. 3

2. Integrated Emergency Medical Service System .................. 5
   2.1 Elements of an IEMS
   2.2 Emergency Telephone number
   2.3 The Fire Brigade, Police, Security Guards, Red Crescent
       Volunteers, Scouts
   2.4 The Pre-hospital Ambulance Service
   2.5 The Emergency Department of Hospitals, PHC’s & Clinics

3. Multiple Casualties ...................................................... 7

4. Emergency Plans ......................................................... 8
   4.1 Authority: National Policy & National Guidelines
   4.2 Communication

5. Workshop Outputs ........................................................ 10

6. Annexes ................................................................. 12
   6.1 Medical First Responder Course
   6.2 EMS Systems
   6.3 Essential Equipment for Prehospital Care
1. Introduction

It is important to realize that a hospital does not manage emergencies or disasters by itself. There are other pre-hospital factors, which have to be considered. Developed countries such as the USA, the UK, other European countries, Australia and Japan already have systems that integrate pre-hospital and inter-hospital facilities. In developing countries, a pre-hospital emergency service may not exist, and resources are minimal. If we can integrate all the pre-hospital and hospital resources which are available, we can make an Integrated Emergency Medical Services System which will provide the means to manage daily emergencies and disasters in an organized way, and also provide good quality emergency medical care. Such a system should have the same organizational structure at national, provincial, district and local level so that there is uniformity even if the resources vary.

The Maldives is an archipelago of nearly 200 small islands to the south of India. A lower middle income country, it has a population of 270,000 and is visited by up to 500,000 tourists per year and has a migrant labor force of 27,000. Atolls are formed by groups of islands that encircle to form geographical regions. There are 20 atolls. Since they are far and widespread, atolls have been further grouped into 6 regions.

The Health System of Maldives is a combination of public and private medical care. All medicines sold in pharmacies all over the country are imported and therefore may lead to supply problems. There are several Non-government Organizations (NGO’s) that are focused on specific health problems. These NGO’s are: a) SHE (reproductive health and thalassemia); b) FASHAN (Adolescent issues and HIV/AIDS); c) CARE Society(disabilities and mental health; d) Maldives Eye Society; e)Maldives Association for the handicapped; f) Cancer Society and g) Diabetic Society.

In 1999, the following professional councils were formed: a) Maldives Medical Council (MMC); b) Maldives Nursing Council (MNC) and c) Maldives Board for Health Sciences (MBHS)

There is currently no system of regulation of the private hospital. It was suggested in the health report that licensing and the inclusion of a hospital disaster plan for the private hospitals in line with national health plan especially after the Tsunami.

There has been a rapid influx of health human resources (56% of staff). In 2003, there were 315 doctors & specialists; 87.9% were government employed.
Seventy-nine percent (79.4%) were expatriates. There is a good Patient to Physician Ratio of one physician for every 858 persons.

The total Bed capacity of the Maldives is 643 hospital beds. This amounts to about 420 persons per hospital bed in the country. This is a very good ratio.

There are 785 nurses; 454 paramedical staff; 119 Community Health Workers (CHW); 333 FHW (family health workers) foolhumaas or TBA’s (Traditional Birth Attendants) 409 TBA’s.

For the years 2002 and 2003 there were 31 MBBS Doctors that returned to country. There were 16 new students sent for medical training. And 12 specialist doctors returned from training abroad.

The National Government spent in 1996 a total of 11.26 % of national budget on health. This decreased in 2002 to 9.44% of the national budget. Although there was a decrease in percentage points this was actually increase in the total amount by Rf 124.1 million. The Per Capita health expenditure dropped by Rf 34.4 million from 2000—2001. In 2003, 10.6% of national budget was allocated to Health expenditure. This was an increase. There was Rf 31510 million 85 % on recurrent expenses 15% on capital. A large percentage was placed on curative services. This amounted to 57% of the total health care expenditure. There were 21% for support services, and 22% on preventive health.

The Organization of Health System of Maldives is unique. A 5-tier referral system in the Department of Public Health exists. The Central Health Services, then the Regional Hospitals 35-50 beds (6 Hospitals) then the Atoll Hospitals followed by the Atoll Health Centers and Island Health posts. This is the decreasing order of the health system. In the Central institutions of the DPH, the IGMH has 236 beds. The National Thalassemia Center (NTC) is a major resource as Thalassemia is prevalent. There are also: the Maldives Water and Sanitation Authority (MWSA); the Male health Center and the Villinggili Health Center. There is an additional tier for those that are sent to other countries for definitive treatment which may or may not be available in Male’. These countries are: India, Sri Lanka, Thailand and Singapore.

The National Health Indicators show an Infant Mortality Rate in 2003 of 14/1000 live births. A Child mortality 18/1000; Crude birth rate 18/1000; Crude death rate 4/1000; Maternal Mortality 1/1000; Still birth rate 11/1000; and a life expectancy for both sexes at 73 years.

There is no organized or trained EMS in Maldives. Only 5 ambulances are available in Male. There are no water ambulances. There are trained first responders in Police and NSS but the ambulance drivers are not trained. A doctor and a nurse from the A&E usually goes with the ambulance on an emergency.
2. Integrated Emergency Medical Service (IEMS) System

2.1. The Elements of an IEMS system.

2.1.1. Laypersons

2.1.1.1. Recognize and relieve an obstructed airway
2.1.1.2. Support respirations and apply expired air resuscitation techniques
2.1.1.3. Control hemorrhage
2.1.1.4. Splint fractures and bandage wounds
2.1.1.5. Know how to transport casualties safely to hospital

Findings:

There is a lack of well organized programs for lay community to address day to day emergencies. The typical attitude is to immediately get medical care from the health system (Health post, Health Center, Atoll or Regional Hospital or IGMH if in Male) which can be quite accessible to small island population. However for more specialized medical care, it may take some time as the travel is by boat and can be quite expensive. Several NGO’s have place an effort on this gap. The German Red Cross has a training camp set up to help train in mostly water rescue.

Recommendations:

Implement a CPR First aid training program in all schools for secondary education.
Support volunteer organizations which can implement this. There is a plan to set up the Maldives Red Crescent Society. This will definitely improve lay person capabilities with training programs which they can implement.

2.1.2. The Emergency Telephone Number

A National Emergency Telephone Number (preferably a three digit number), which is easy to remember and toll free, is the most important factor in this system. This provides access to the system for the public.

Findings:

There are current three numbers for emergencies. Police is 117, Fire and Rescue is 118 and Ambulance at IGMH is 102. The NSS and the Coast Guard can be accessed through regular phone numbers.

Recommendation:
This needs to be converted to one emergency number. Since all islands are connected by cell phone sites, this can be done by the cell phone company or the government. But this requires the setting up of a central dispatching unit which may be quite costly.

2.1.3. **The Fire Brigade, Police, Security Guards, Red Cross Volunteers, Scouts**

There are people who are already available on the streets and in public buildings who have been trained to help and protect people. It is logical, then, to build on their existing skills by training them to help the injured and acutely ill.

*Findings:*

There are some trained lay persons in Male. The training is conducted by the Police and NSS (National Security Service) and the FHS (Faculty of Health Sciences) The first responder course are St. John’s Ambulance Protocols and Standards.

*Recommendations:*

Implement a First Responder Course for all Police, NSS, Coast Guard and Fire units who respond to emergency calls. Special EMS units can be established in each of these agencies that specialize in some form of Rescue.

2.1.4. **The Pre Hospital Ambulance Service**

The fire brigade, police, security guards, Red Crescent volunteers, Scouts etc can be organized into an Integrated Emergency Medical Service. Sometimes they even have their own ambulances. Even hospital-based ambulances (manned by nurses from the Emergency Dept and maintained by the hospitals) and Public Health Centre/Clinic ambulances can be included and organized into an Emergency Medical Service - with one system and one command, but different ownership.

*Findings:*

There are 7 ambulance currently available in Male’, Maldives. No water ambulances exist. The ambulances are all basic transport units.

*Recommendations:*

One or two ambulances need to be converted to advanced life support ambulance and this would entail the purchase of emergency equipment. The current existing ambulances also lack some basic equipment.
Once there is equipment, training must be conducted for permanent ambulance personnel. The suggestion is to use clinical assistant level educated persons to be trained in pre-hospital care like Emergency Medical Technician Basic Course. This can be conducted by the Life Support Training Institute based in Manila, Philippines or some other equivalent agency with the required expertise. The normal ratio for ALS ambulance is 1 ambulance per 50,000 population. Therefore Male, will need two. Water ambulances between nearby atoll islands can be established to transfer patients from health posts or Atoll hospitals to Regional Hospitals. EMT training will also be necessary here.

2.1.5. The Emergency Department of Hospitals, Public Health Centers & Clinics
The Emergency Departments, Public Health Centers and Clinics in developing countries sometimes operate independently, and that is why the care for emergency cases and multiple casualties in disasters is of a poor standard. *However good the system is, if it is inaccessible to the people, it is of no use.*
*Given their availability, they are the best candidates to be trained in the Medical First Responder (MFR) program.* They can be organized and regionalized, with each Emergency Department, Public Health Centre and Clinic responsible for an area with a system of referrals; the public health centre and clinic would be the lowest level of the system and the teaching hospitals would represent the highest level.

Findings:
The MoH is currently trying to implement something in this nature. Most of the Regional Hospitals have been set up. However, the biggest stumbling block is the fact that these can be accessed by 30-60 minutes or even more boat rides. Small islands would have only health posts. The IGMH A&E Department has also been assessed and this is reported to WHO by Dr. Teodoro Herbosa. (Accident & Emergency Department IGMH Assessment, WHO November 2005)

Recommendation:
The water type EMS which can be unique type EMS suited for Maldives.

3. Multiple Casualties Arrive at the Emergency Department
This is the most common effect of disaster -- multiple casualty situation faced by a hospital Emergency Department. The Emergency Department should plan to be able to increase its capacity to deal with more casualties than normal. This will require mutual aid arrangements with other hospitals.
3.1. Urban Disasters
Even with the Integrated Emergency Medical Service System, Emergency Departments need to undertake joint planning with the pre-hospital ambulance service on how to dispatch their personnel and equipment to a disaster area to set up a field hospital when required.

3.2. Rural Disasters
In this situation the main problem is the distance. Hospitals and the Integrated Emergency Medical Service should have contingency plans on how to respond to remote or rural area disasters. Plans should include transportation of personnel and the logistics required to establish a field hospital.

3.3. Regional & National Disasters
Regional and national disasters have the same problems:
• Distance
• Availability of transportation:
• Functioning hospital:
The best way to respond to these problems is to set up a Disaster Relief Team and a Medical Disaster Relief Team modeled.

3.4. Civil Disturbance
Civil disturbance presents unique problems for hospital personnel and emergency physicians.
• Danger for medical personnel
• Casualties may be criminals or subversives:
• Civil disturbance areas are usually sealed off, limited access:
The opposing forces may comprise the military and/or the police. Medical personnel, however, are neutral and need to communicate with all parties involved.

Findings:
The current National Health Emergency Plan is under construction. Once it is finished it will address these issues stated.

Recommendations:
A Disaster Plan that incorporates, Responders, EMS, Emergency department and Hospitals. Multi-agency Drills must be conducted once the plans and training have been conducted.
4. Emergency Plans
The fundamentals of emergency planning are covered in other lessons on this course, but it is worth emphasizing that the goals of a good IEMS plan are to be able to:
• Respond rapidly
• Assess rapidly
• Decide on the need for escalation of response
That is dependent upon the pre-hospital resources, the hospital resources and all elements of the integrated, mutual aid system (including other hospitals) working together. To achieve this, joint planning committees are necessary.

4.1. Authority: National Policy & National Guidelines
If there is no national policy or guidelines, the government, all institutions and agencies, professional organizations and personnel involved in emergency and disaster management should get together and draft their own national policy and guidelines based upon the resources available.
These should include the pre-hospital and hospital phases in emergency care and disaster management. The national policy and guidelines should address the:
• IEMS system
• Organizational structure
• Standards of care
• Standard of training
• Standard of the emergency ambulance and emergency department
• Hospital design and structure
Each city and community should have its own policy and guidelines consistent with the national ones, appropriate, of course, to their resources and to the hazards facing their communities.

Findings:
No EMS Law.
No professional organization registering and licensing of EMS personnel.

Recommendations:
Establish and EMS law and allocate government funding for it.
Establish a professional organization or governmental body to register, monitor and license EMT’s or ambulance personnel and first responders.

4.2. Communication
4.2.1. Access
A National Emergency Telephone Number for the population to report an emergency, disaster or mass casualty incident should be toll free. The problem then is that children may abuse this telephone just for fun. It may be better if the number is not toll free
until we can educate the population not to abuse this important telephone number.

4.2.2. **Pre Hospital Communication**
- Pager system
- Radio Communication
- Satellite and GPS Systems

4.2.3. **Inter-Hospital Communication**

The best inter-hospital communication is a Hot Line telephone. Sometimes this type of communication can be disrupted in an earthquake or flooding. Any communication can break down or fail during a disaster, so there must always be a back up system such as the radio communication system.

5. **Workshop Outputs:**

A workshop with the IGMH staff was conducted on November 19, 2005, Saturday. These questions were asked of the participants.

1. Do we need an EMS system?
2. What type of EMS?
3. What is the role of IGMH in this EMS?

These were there outputs:

1. All unanimously claimed that YES, Male and Maldives needs an EMS system to help saves lives and function during disasters. This is badly needed as there are now more motorbikes in male’. More construction and therefore more injuries. There are also more cars and last year stop lights were installed ion Male’.
2. Maldives needs an organized and integrated form of EMS. A static and a mobile team of personnel with ambulances and complete equipment for Male and also for the other big islands. There can be establishment of EMS with land, sea and air capabilities. Sea Planes or helicopters may be necessary aside from fast motor boats. Probably train also the taxi drivers in first response. The public must also be educated.
3. The role of IGMH is in assisting in the training of personnel. IGMH can have trained paramedics. The existing ambulance personnel need to be trained and learn how to respond quickly. IGMH can be involved in the planning, training and mobilization of the Pre-hospital EMS in Male’. IGMH can also be involved in the upgrading of the vehicles, the manpower, training of lay persons and set up of communications. It must improve its emergency room facilities as well. IGMH can also lead in conducting mock exercises. Provide the extra manpower for the EMS and the extra beds for emergencies in the EMS system. It can also improve and utilize available resources of materials and manpower nearest to the site of an emergencies. IGMH can assist the national policy development for various injuries and accidents. With the establishment of the EMS, the IGMH
needs to also strengthen its services like, emergency. ICCU, trauma and burn care. IGMH can assist in new awareness campaign on safety and injury prevention and control.
MEDICAL FIRST RESPONDER COURSE (MFR)

Lesson 1  Introduction
General information and administrative details of the course.

Lesson 2  The Emergency Medical Services System and the Medical First Responder
Components of the EMS system, pre-hospital treatment; duties of the MFR, qualities of the MFR, legal issues.

Lesson 3  Infectious Disease Precautions
Modes of transmission, signs and symptoms, pre-hospital treatment, universal precautions.

Lesson 4  The Incident
Incident, request for assistance, responding to the scene, types of incidents, scene assessment, scene safety, gaining access, personal protection equipment, medical equipment.

Lesson 5  Anatomical References
Anatomical position, reference points, divisions, cavities, systems.

Lesson 6  Initial Assessment and Physical Exam
General procedures.

Lesson 7  Basic Life Support and Cardiopulmonary Resuscitation (BLS and CPR)
Anatomy of the respiratory system; cyanosis; techniques for opening the airway; rescue breathing; obstructed airway; steps for clearing an open airway; anatomy of the circulatory system; steps for CPR; complications of inadequate CPR; initiating and terminating CPR.

Lesson 8  Oxygen Therapy
Indications, equipment and accessories, CPR mask, bag-valve mask, oxygen equipment, procedures.

Lesson 9  Haemorrhage and Shock
Review of the circulatory system, pulse locations, blood and blood volume, perfusion, shock, pre-hospital treatment, anaphylactic shock, internal and external haemorrhage.

Lesson 10  Soft Tissue Injuries
Dressings and bandages, open and closed injuries, types, pre-hospital treatment.

Lesson 11  Musculoskeletal Injuries
Skeletal system, fractures, sprains and strains, reasons for immobilising, pre-hospital treatment, manual traction, techniques for immobilization.

Lesson 12  Injuries to the Skull, Spine and Chest
Specific injuries, pre-hospital treatment.

Lesson 13 Burns and Environmental Emergencies
Burns, causes, classification, signs and symptoms, pre-hospital treatment, exposure to the elements; Cold weather injuries.

Lesson 14 Poisoning
Ingested poisons, absorbed poisons, injected poisons, alcohol abuse, drug abuse, pre-hospital treatment.

Lesson 15 Medical Emergencies: Cardiovascular emergencies and CVA
Myocardial infarction, angina pectoris, congestive heart failure, cerebral-vascular accident and hypertension; signs and symptoms and pre-hospital treatment.

Lesson 16 Respiratory Emergencies
Common causes of respiratory problems, smoke inhalation, pre-hospital treatment.

Lesson 17 Medical Emergencies: Seizures, diabetic and abdominal emergencies
Signs and symptoms, pre-hospital treatment.

Lesson 18 Childbirth Emergencies
Anatomy, stages of childbirth, assessment of the mother, pre-hospital treatment of the mother and newborn, complications.

Lesson 19 Lifting and Moving Patients
Methods for correct lifting, correct posture, handling neck and spinal injuries.

Lesson 20 Report Writing and Preparing for the Next Call
Report format, equipment decontamination, personal decontamination.

Lesson 21 Triage
Color coding, review of diagnostic signs.

Lesson 22 Course Review
Questions from participants. Review of issues recorded in the “File.”

Lesson 23 Final Practical Evaluation
Three stations: Trauma, Medical, and Childbirth.
Annex 2

EMS SYSTEM

INTRODUCTION

The history of EMS extends back to the biblical story of the Good Samaritan. Accounts of ancient wars reveal many examples of organized methods of transportation and care of the sick and injured. Historical archives suggest that Caesar designated battlefield medics among his troops. Napoleon's chief surgeons developed "les ambulances volantes," consisting of horse-drawn wagons staffed with battlefield caregivers. Similar systems, commonly operated by hospitals and funeral homes, were used in various American cities soon after the end of the Civil War.

It was not until the late 1960s to early 1970s that the modern era of EMS was created, with coordinated transport and prehospital interventions, to provide earlier, more intensive care to the community. In the late 1960s, Pantridge established mobile units staffed by physicians and nurses to extend the coronary care unit to the prehospital setting.

The 1966 National Highway Safety Act authorized the US Department of Transportation to fund communication and education for EMS services as well as purchases of ambulances and equipment. Congress enacted the Emergency Medical Services Systems Act of 1973 (public law 93-154), which funded and authorized the Department of Health, Education, and Welfare to develop EMS systems throughout the country. More than 300 regional EMS management entities were designated to develop a systematic approach to EMS care. The US EMS system trained and empowered physician surrogates (ie, paramedics) to deliver prehospital patient care.

Public law 93-154 identified the following 15 components as essential to an EMS system:

1. Communications
2. Training
3. Manpower
4. Mutual aid
5. Transportation
6. Accessibility
The initial EMS design subsequently was proven deficient in many respects, including medical direction and accountability, prevention, rehabilitation, financing, and operational and patient care protocols. EMS systems continued to be refined in the 1980s and 1990s, even after most federal funding had ended.

Successful EMS systems are designed to meet the needs of the communities they serve. The state provides laws that broadly outline what is prudent, safe, and acceptable. To be effective, EMS systems must be planned and operated at the local level.

Communities need to identify their individual needs and resources, develop funding mechanisms, and become involved on all levels in structuring the system. A governing body or council should be established to organize, direct, and coordinate all system components. The council consists of representatives from the local medical, EMS, consumer, and public safety agencies to ensure consensus in developing policies and settling disputes. The EMS system must provide equal access to all and remain protected from forces that serve the interests of only one group.

**MEDICAL DIRECTION**

Physician input, leadership, and oversight are essential in ensuring that the medical care provided is safe, effective, and in accordance with accepted standards. Physicians must be empowered and involved in planning, implementing, overseeing, and evaluating all components of the system. Medical direction is characterized as either immediate (on-line) or organizational (off-line).
On-line medical direction provides emergency medical technicians (EMTs) with clinical consultation in the field, either in person or, more commonly, via radio or telephone communication. This responsibility is delegated primarily by the medical director to physicians who staff local EDs. The base station facility providing on-line medical control is required to monitor all advanced life support (ALS) communications, provide field consultations, and notify receiving facilities of incoming patients. Physicians providing on-line direction should be trained appropriately and be familiar with the operations and limitations of the system.

The medical director assumes authority and responsibility for off-line medical direction. In cooperation with the local medical community, the medical director is responsible for developing standards, protocols, policies, and procedures; developing training programs; issuing credentials and providing evaluations; and implementing a process for continuous quality improvement.

COMMUNICATIONS

Physician input, leadership, and oversight are essential in ensuring that the medical care provided is safe, effective, and in accordance with accepted standards. Physicians must be empowered and involved in planning, implementing, overseeing, and evaluating all components of the system. Medical direction is characterized as either immediate (on-line) or organizational (off-line).

On-line medical direction provides emergency medical technicians (EMTs) with clinical consultation in the field, either in person or, more commonly, via radio or telephone communication. This responsibility is delegated primarily by the medical director to physicians who staff local EDs. The base station facility providing on-line medical control is required to monitor all advanced life support (ALS) communications, provide field consultations, and notify receiving facilities of incoming patients. Physicians providing on-line direction should be trained appropriately and be familiar with the operations and limitations of the system.

The medical director assumes authority and responsibility for off-line medical direction. In cooperation with the local medical community, the medical director is responsible for developing standards, protocols, policies, and procedures; developing training programs; issuing credentials and providing evaluations; and implementing a process for continuous quality improvement.

TRANSPORTATION AND FACILITIES

Ground vehicles provide most EMS transportation. Ambulances should be constructed according to federal standards and be equipped appropriately to provide basic or advanced care.

Air transport consists of a helicopter or airplane equipped for BLS or ALS. Aircraft are used to transport patients over great distances, decrease total prehospital
time, and reach patients in locations where access is difficult. Operational standards are established to delineate the equipment needed, the number of personnel and level of certification required, the response-time criteria, and the destination for each transport.

On-line medical direction should be obtained for all calls that result in no transport. This includes cases in which providers decide not to transport, the patient refuses care, or the patient is triaged to a lower level of care. Otherwise, the provider may be perceived as practicing medicine without a license and could be charged with such an offense.

Interfacility transportation occurs once the patient has been examined and stabilized. Patients are transported in compliance with regional protocols and federal laws (i.e., Consolidated Omnibus Budget Reconciliation Act [COBRA], Emergency Medical Treatment and Active Labor Act [EMTALA]). Legislation dictates that medically unstable patients be transferred only when the transfer is expected to have a positive effect on outcome.

Patients should be transported to the closest, most appropriate facility. Receiving facilities are required to have the capabilities to treat patients, stabilize their conditions, and improve their outcomes. Patients in stable condition may be transported to the hospital of their choice, as long as the transport meets regional point-of-entry protocols, has the approval of on-line medical control, and does not overburden the system unnecessarily.

Specialized facilities required to care for the severely injured are not available in every hospital. Local communities need to establish regional protocols to provide clear guidance for the transport of patients in unstable condition to categorized facilities. Patients who are in unstable condition because of special problems, such as trauma and burns, can be transported to regionally designated hospitals, bypassing closer facilities.

**TRAINING AND PROTOCOLS**

Providers must be trained to meet expectations and requirements in programs that comply with regional and national standards. Training includes didactic, clinical, and field components. Most states require that candidates pass written and practical examinations prior to certification. Additionally, EMTs are required to receive continuing didactic and clinical education to maintain certification.

Education also is used to reinforce proper patient care, update standards and protocols, and remedy perceived deficiencies in patient care. Physician involvement is essential to assure appropriate utilization of skills and equipment. The EMS system also provides community education, such as public courses in cardiopulmonary resuscitation (CPR), first aid, child safety, and EMS access.
Protocols are developed to deal with operational, administrative, and patient care issues. They define a standardized, acceptable approach to commonly encountered problems. Protocols should reflect regional and national standards, as well as the uniqueness and limitations of the local environment. The medical director has the responsibility to address protocols dealing with patient care, such as triage and treatment.

Triage assesses the condition of each patient, sorts patients into treatment categories, and optimizes use of field resources for treatment and transportation. In addition, triage addresses the level of provider capability and the level of response needed to care for the patient. Specific triage criteria are essential during multiple casualty incidents to facilitate the screening, prioritization, treatment, and transport of patients.

Treatment protocols describe the authority and responsibility of providers and offer guidance for medical evaluation and care. Optimal care and medical accountability require standardized protocols, algorithms, and standing orders that outline specific actions providers can take without contacting a physician for orders. Any deviation from these standing orders must be considered a breach of duty and must result in an audit. On-line medical direction is crucial in systems requiring decision making to provide guidance and assume some of the patient-care responsibilities.

CONTINUOUS QUALITY IMPROVEMENT

Continuous quality improvement (CQI) is the sum of all activities undertaken to assess and improve the products and services EMS provides. The goal is to influence patient outcomes positively by delivering timely, consistent, appropriate, compassionate, and cost-effective services. CQI ensures that the field staff provides the highest quality of care and that the system supports this goal. Quality should be monitored from within the EMS system and by an external, independent, and unbiased body that involves the consumer, government, and medical communities. Standardized protocols, policies, performance, and documentation are invaluable in constructing a successful CQI process.

Quality evaluation is prospective, concurrent, and retrospective. Prospective evaluation is the most effective process to ensure quality in EMS, because it has the potential to prevent mistakes. The system must be scrutinized constantly to determine areas requiring refinement and improvement. When goals and standards are not met, CQI staff members must identify the problem, establish and implement a corrective course of action, and measure the outcome. Concurrent evaluation occurs on-scene or on-line. Staff members observe performance, encourage positive behavior, and correct problems before bad habits develop. Retrospective evaluation is the least valuable and most time-
DISASTER PLANNING AND COMMUNITY RELATIONS

The EMS system is an integral element of disaster preparedness and planning. It plays an important role in initial response and transportation and is essential in establishing a regional disaster preparedness plan in coordination with public safety agencies, government, and the medical community. The plan should address disaster management, communication, treatment, and destination of casualties. Periodic disaster drills serve to assess performance, refine management, and educate personnel and the community.

Public support is invaluable in constructing a successful EMS system; involvement is required to plan a system that works for everyone. Consumers need to be well informed of the benefits of having an EMS system and how to gain access to it.

Public education programs are essential to inform the community on ways to access the EMS system properly. They also are important in preparing laypersons to render first aid while waiting for EMS. These programs should be coordinated with local public safety and volunteer agencies to project a unified message and achieve maximum impact.

The EMS system must have strong ties with many agencies inside and outside the community. Cooperation is essential with public safety agencies, which are most frequently the first to respond to an emergency and may provide all or part of EMS care.

Mutual aid agreements should be developed with neighboring communities to provide assistance when one system is disabled or overburdened. These arrangements ensure uninterrupted patient care in the event of natural disasters or other emergency situations.

SUMMARY

An EMS system is a comprehensive, coordinated program that delivers prompt response, appropriate care, and safe transport in medical emergencies. EMS should be designed to fulfill the needs of the local community and to provide equal access for all patients. Consumers, in conjunction with the local medical community, EMS, and public safety agencies, should help organize and govern the system. This council and the medical director must ensure the presence and function of all the systems and their necessary components.
The EMS system is only as strong as its weakest component. It should be evaluated continuously and modified to maximize quality, optimize efficiency, and minimize cost.

BIBLIOGRAPHY

Annex 3

THE FOLLOWING LIST REPRESENTS A CONSENSUS OF RECOMMENDATIONS FOR EQUIPMENT AND SUPPLIES THAT WILL FACILITATE PATIENT CARE ACTIVITIES IN THE OUT-OF-HOSPITAL SETTING.

This may be in a Land Ambulance, Boat ambulance or Helicopter or Sea Plane.

For Basic Level Providers or First Responder Trained Persons

A. Ventilation and Airway Equipment

1. Portable and fixed suction apparatus
   • Wide-bore tubing, rigid pharyngeal curved suction tip; tonsillar and flexible suction catheters, 5F–14F
2. Portable and fixed oxygen equipment
   • Variable flow regulator
3. Oxygen administration equipment
   • Adequate length tubing; mask (adult, child, and infant sizes), transparent, non-rebreathing, Venturi, and valveless; nasal cannulas (adult, child, and infant sizes)
4. Pocket mask with one-way valve
5. Bag-valve mask
   • Hand-operated, self-reexpanding bag (adult and infant sizes), with oxygen reservoir/accumulator; clear mask (adult, child, infant, and neonate sizes); valve (clear, disposable, operable in cold weather)
6. Airways
   • Nasopharyngeal, oropharyngeal (adult, child, and infant sizes)

B. Monitoring and Defibrillation

Automatic external defibrillator is strongly recommended for systems that do not have immediate availability of an advanced life support service.

C. Immobilization Devices

1. Cervical collars
   • Rigid for children ages 2 years or older, infant, child, and adult sizes (small, medium, large, and other available sizes)
2. Head immobilization device (not sandbags)
   • Firm padding or commercial device
3. Lower extremity (femur) traction devices
   • Lower extremity, limb-support slings, padded ankle hitch, padded pelvic support, traction strap (adult and child sizes)
4. Upper and lower extremity immobilization devices
   • Joint-above and joint-below fracture (adult and child sizes), rigid-support appropriate material (cardboard, metal, pneumatic, vacuum, wood, or plastic)
5. Radiolucent backboards (long, short) and
extrication device
• Joint-above and joint-below fracture site (chin strap alone should not be used for head immobilization), adult and child sizes, with padding for children, hand holds for moving patients, short (extrication, head-to-pelvis length), long (transport, head to feet), with at least 3 appropriate restraint straps

D. Bandages
1. Burn pack
• Standard package, clean burn sheets (or towels for children)
2. Triangular bandages
• Minimum 2 safety pins each
3. Dressings
• Sterile multitrauma dressings (various large and small sizes)
• ABDs, 10”×12” or larger
• 4”×4” gauze sponges
4. Gauze rolls
• Sterile (various sizes)
5. Elastic bandages
• Nonsterile (various sizes)
6. Occlusive dressing
• Sterile, 3”×8” or larger
7. Adhesive tape
• Various sizes (including 2” or 3”) hypoallergenic
• Various sizes (including 2” or 3”) adhesive

E. Communication
• Two-way radio communication (UHS, VHF) between EMT, dispatcher, and medical direction (physician)
• Two-way disaster communication
• Cellular phone

F. Obstetrical
1. Kit (separate sterile kit)
• Towels, 4”×4” dressing, umbilical tape, sterile scissors or other cutting utensil, bulb suction, clamps for cord, sterile gloves, blanket
2. Thermal absorbent blanket and head cover, aluminum foil roll, or appropriate heat-reflective material (enough to cover newborn)
3. Appropriate heat source for ambulance compartment

G. Miscellaneous
1. Sphygmomanometer (infant, pediatric, and adult regular and large, for example, thigh sizes)
2. Stethoscope (pediatric and adult)
3. Length/weight-based chart for pediatric equipment sizing
4. Thermometer with low temperature capability
5. Heavy bandage or paramedic scissors for cutting clothing, belts, and boots
6. Cold packs
7. Sterile saline solution for irrigation (1-liter bottles or bags)
8. Flashlights (2) with extra batteries and bulbs
9. Blankets
10. Sheets, linen or paper (minimum 4), and pillows
11. Towels
12. Triage tags
13. Disposable emesis bags or basins
14. Disposable bedpan
15. Disposable urinal
16. Wheeled cot (properly secured patient transport system)
17. Folding stretcher
18. Stair chair or carry chair
19. Patient care charts/forms
20. Lubricating jelly (water soluble)

**H. Infection Control**
* Latex-free equipment should be available.
1. Eye protection (full peripheral glasses or goggles, face shield)
2. Masks
3. Gloves, nonsterile
4. Jumpsuits or gowns
5. Shoe covers
6. Disinfectant hand wash, commercial antimicrobial (towelette, spray, liquid)
7. Disinfectant solution for cleaning equipment
8. Standard sharps containers (EMT-Basic, -Intermediate, and -Paramedic)
9. Disposable trash bags (identifiable color, such as red)
10. HEPA mask