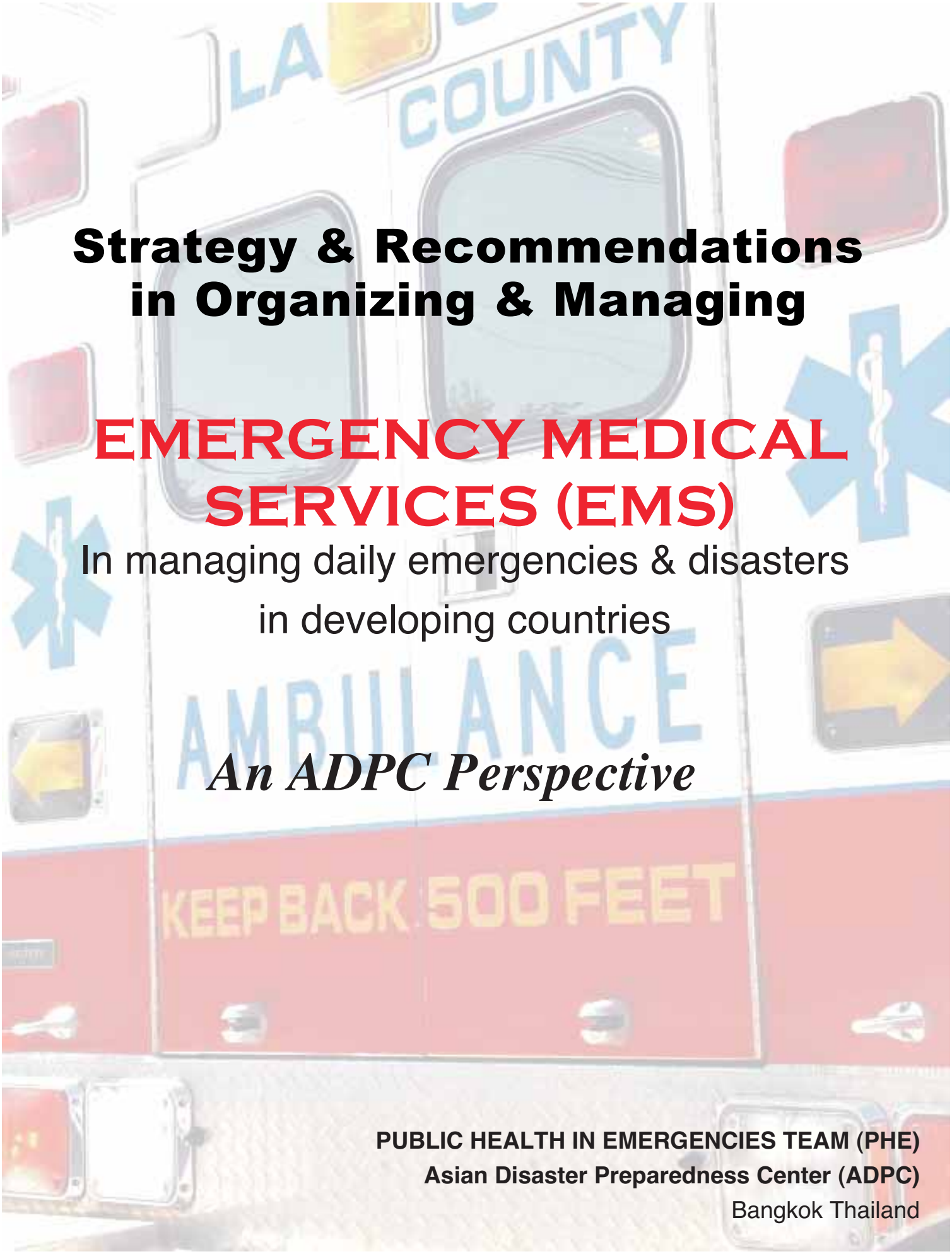
Asian Disaster Preparedness Center
Safer communities & sustainable development through disaster reduction



Strategy & Recommendations in Organizing & Managing

EMERGENCY MEDICAL SERVICES (EMS)

In managing daily emergencies & disasters in developing countries

An ADPC Perspective

PUBLIC HEALTH IN EMERGENCIES TEAM (PHE)
Asian Disaster Preparedness Center (ADPC)
Bangkok Thailand

Emergency Medical Services

Strategy & Recommendations in Organizing & Managing

EMERGENCY MEDICAL SERVICES (EMS)

In managing daily emergencies & disasters in developing countries

An ADPC Perspective

Asian Disaster Preparedness Center
PUBLIC HEALTH IN EMERGENCIES TEAM
Bangkok Thailand
July 2003

Foreword

The present publication is aimed at helping the decision makers and the policy makers to develop a comprehensive approach to deal with the creation and/or the strengthening of existing emergency medical services. The recommendations here presented have been prepared so as to have a logical sequence. In developing countries too often the lack of sufficient material resources is said to be the most important limiting factor for running efficient and effective EMS. In deed not rarely the real problem is the lack of managerial expertise in the organization of the available resources, services and the lack of trained staff. The present document will help those having to manage the development and the strengthening of EMS to select priorities and to develop an action plan that will lead to sustainability of the system and its integration into the overall organization of the services offered by the health sector. The Ministry of Health in any country has a normative role and a guidance role to play. It is far from being the only service provider when EMS are under discussion. The private sector and some major NGOs are key stakeholders for ambulances services for instance.

The integration strategy (inter-sectoral and intra-sectoral) is certainly a sound approach to enhance efficient and effective EMS. The links between the common situations such as mass accidents & mass casualty situations and rare situations such as major emergencies and disasters should receive more attention in the future. The creation of networks, of poles of competence, of best practices, of reference standards for the services offered should become a full part of the overall policy of the health sector in promoting health risk management.

The EMS are part of a wider concept that includes not only the limited response to the emergency situation of a patient but that also includes elements of mental health, psycho-social well-being and recovery after major emergencies. The EMS also play a key role in the case of disasters and should be upgraded so as to become the backbone of the medical response for they include pre-hospital as well as hospital activities. They should no longer be regarded as just limited to resuscitation and acute curative care. The EMS are part of the community based services that are governed by the conceptual framework of risk management.

Dr. Marcel R. DUBOULOZ
Director & Team Leader
Public Health in Emergencies, ADPC

Mr. Frederick John B. ABO, RN
Technical Manager
Public Health in Emergencies, ADPC

Contents

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 care-givers. Similar systems, commonly operated by hospitals and funeral homes,

It was not until the late 1960s to early 1970s that the modern era of EMS was created, with coordinated transport and pre hospital interventions, to provide earlier, more intensive care to the community. In the late 1960s, Dr. Frank Pantridge, a cardiologist from Belfast Ireland, developed the concept of mobile coronary care units (MCCU) and the first portable defibrillator. He established mobile units or “Flying Squads” staffed by physicians and nurses to extend the coronary care unit to the pre hospital setting.

Between 1963 and 1966, the National Academy of Science convened a group of experts to discuss the spiraling toll of trauma in the United States. Their findings, published in 1966, pointed out that soldiers in Vietnam received faster medical care than motor vehicle accident (MVA) victims on US highways and more people died in MVAs each year than in the entire Korean war.

The organization and the management of Emergency Medical Services (EMS) are largely dependent on the country context and on the overall organization of the delivery of medical care. No single system can be considered as the universal reference model. For each model there are specific arrangements in the various countries where the model is implemented. Nevertheless there are 2 major pre hospital care models based from the International Emergency Medicine (IEM) that has become a reference in developing EMS System:

The Anglo-American Model

Non physicians, such as Emergency Medical Technician (EMT) or paramedics (EMT-Ps), initiate emergency care in the field and transport critically ill or injured patients to hospital-based emergency departments (EDs), where emergency physicians (EPs) provide definitive emergency care

The Franco-German Model

Emergency care brings the hospital to the patient, delivering EPs and technology to the scene in hope of providing a higher level of care. In this model, EPs (often anesthesiologists) provide emergency care (usually resuscitation and pain control) in the pre hospital setting. Patients are triaged and admitted directly to inpatient services.

The models mentioned above are broad models of the type of pre hospital emergency care provided in the field. In developing countries wherein EMS System is underdeveloped or sometimes non-existent, this can be a basis in organizing the structure of emergency care in responding to emergencies. In one way or the other, there are already systems in place regarding EMS System whether it's hospital, jurisdiction directed, private or volunteer based systems that respond to emergencies. In some developing countries the two systems are developed in parallel by the government and private health sector without coordination. In the vast majority of developing countries there are no real system and no organization to deal with pre-hospital activities or/and no coordination of pre-hospital activities with hospital activities. In most of these countries the pre-hospital management of emergency medical situations is under the control of agencies from other sectors than the health sector: ambulances of Fire departments, the Civil Defense or of national Red Cross/Crescent Societies, etc. There is usually no sharing of information between these partners and the receiving hospitals. The limited number of ambulances of the health sectors is used mainly for secondary transfer of patients. In many developing countries the vast majority of patients requiring hospital medical care are brought to the hospital setting by private non-ambulance cars such as pick up trucks or taxis.

In many developing countries, as they gear towards economic development and increase urbanization of cities, there is also a parallel need and concern of the public and the international business community for enhanced public safety services. A major part of which is the role of the Emergency Medical Services (EMS) System, which is composed of a network of resources (health care facilities, police, fire department, public health, rescue groups, volunteers, etc.) linked together for the purpose of providing emergency medical care and transport to victims of sudden illness and injury. As development progress, the establishment of EMS is mostly concentrated on urban areas and most often rural areas are not covered or not within the minimum response time standard.

ADPC implements various training courses dealing with mass trauma and public health issues in natural disasters, in complex emergencies, and hospital emergency preparedness. In order to have a consistent conceptual approach for dealing with EMS issues in its various programs ADPC desires to define this conceptual framework. The present document is a pragmatic approach and it is prepared for managers of public health institutions and private sector having some kind of responsibility in the management of emergency patients. The management of emergency patients is a process that starts before the patient is in contact with qualified rescue or medical personnel (when contacting the emergency call center for instance for information or asking for assistance) and ends with the admission of the patient into the treatment unit of the hospital. Not all patients asking for emergency assistance need to be admitted in hospitals. Along the chain various actors intervene coming from various agencies or institutions from various disciplines and various sectors (police, rescue services, ambulance personnel, local paramedical personnel, hospital staff).

The Main Characteristics of Emergency Medical Services (EMS)

1 The complimentarities between Prehospital and hospital activities

In many developing countries the pre-hospital activities are not coordinated with hospital activities. Typically the patients are brought by private or by public transport (police ambulances, rescue services ambulances, mainly civil defense, etc.) without any information and without coordination among the various agencies. Often this leads to inappropriate transfer of patients to hospitals having not the technical capability (nor the capacity in the case of mass casualty situations) to treat these patients so that secondary transfer of patients is necessary. Most often all patients are brought to single hospital while the other nearby health care facility is not utilized or sometimes patients are brought to the nearest hospital to the emergency site which in most cases is unable to manage the patient properly due to lack of facilities and expertise to manage such a case. Often the receiving hospital cannot mobilize in due time its internal resources due to the lack of timely information regarding the arrival of patients in the case of mass casualty situations. The activation of emergency procedures and mobilization of available resources should start before the arrival of the emergency patients reaches the hospital.

Recommendation No. 1

Whatever the system chosen in a community for dealing with emergencies of sudden illness or injury, there must be efficient coordination mechanisms between all actors (private and public sectors, NGOs involved in the management of the patients requiring emergency medical attention in the pre-hospital stage. These mechanisms should include the coordination with the receiving hospital and/or with the medical regulation center if such a structure exists. Coordination is more than just the mere one-way exchange of information (see details under section integrated network of hospitals) but it is a tool to maximize the limited resources in the community to effectively respond to the emergency.

2 The need to promote emergency medical services / department in hospital setting

In many developing countries the vast majority of hospitals have no specific services devoted to receive and manage daily emergencies even in urban areas. Time for delivering appropriate emergency care is a crucial limiting factor that has a negative impact on the outcome. Quality of delivered care is another important factor. In many hospitals patients are not managed properly or have to wait long time before being treated so that their medical condition deteriorates dramatically even when they succeeded to reach the hospital setting in a reasonable time. In the beginning, the concept started as an “emergency room” in which it is a separate place where emergency patients are first brought in the hospital. The traditional set-up of emergency room, most often still exist in developing countries, is composed of temporary duty physicians rotated from other departments in the hospital like surgery, medicine, pediatrics, etc. As the concept evolves, there is a need to train doctors and paramedical personnel for dealing with emergency care as a separate and specialty field of expertise thus coming to birth the emergency/casualty department. More and more countries recognize the medical specialization of “emergency physicians” as a specific medical specialization and develop training curriculum accordingly.

The emergency/casualty hospital departments are too often not fully integrated into the “hospital management system” so that short observation of patients is not possible. The decision is either to admit or to discharge in a time frame of less than 24 hours.

The absence of job opportunities and career plan creates usually a high turn-over (in many developing countries: long hours on-duty, stressful work under rough environment, lack of equipment, threat by families, etc.)

Recommendation No. 2

Every hospital should develop its capacity and capability to manage emergency patients at the time of arrival to the facility and without delay or interruption in the continuity of care delivery. In order to fulfil this objective the hospitals should develop formally identified services aimed at providing immediate life saving and/or urgent care for emergency patients. In small hospitals or local medical facilities where the workload does not justify formal emergency services the activities should be defined and a management strategy developed accordingly.

The emergency medical units of hospitals should be part of the hospital activities and they should have permanent working link with the other units of the hospital. The hospital should also recognize that managing emergency cases is a separate and specialty field of its own that requires staff working in these emergency units be trained accordingly and should receive incentive so as to avoid a high turn over.

3 The appropriate management of emergency patients on site

In many developing countries, most often the emergency patients do not receive simple first-aid attention at the site where they ask for or need first assistance or even worst they are mishandled by bystanders who come to the aid of the victim that aggravates more the injuries sustained. Many patients see their medical condition deteriorate quickly because of lack of basic appropriate support such as simple stabilization of fracture, anti-haemorrhage procedure, etc. Blocked airway in trauma patients is a common cause of death although easy to prevent in many circumstances. Emergency medical conditions such as severe asthma, cardiac infarction, seizures, and stroke are not managed properly on site. This decreases the survivability of the patient.

Currently there are various levels and types of EMS training designed for physicians, nurses, allied paramedical staff and laymen (See technical Aspects for levels of EMS training). As part of ADPC's strategy in empowering the community and the general public to take an active role in emergency response and management, the center is advocating the first responder concept and level of training in the community. This can be tailor fit from as simple as managing daily emergencies up to integration to a larger emergency response system that response to mass casualty incidents.

Recommendation No. 3

First-Aid skills can save many lives and therefore this should be considered as a priority in training staff of all agencies being involved in the management of situations where emergency patients can potentially be met. This training should not be restricted to medical personnel but also extended to public safety personnel (police, fire, security, traffic enforcers), schoolteachers, community volunteer, drivers, and industrial workers. On the other hand a more appropriate level of EMS training is required for emergency response organizations like rescue groups of Civil Defense and ambulance services. As a strategy, first aid training certification can be made as a pre requisite to secure a license or part of pre employment requirement and be renewed in an annual basis for update.

In rural areas the staff of the primary health care stations should be trained in First-Aid. All medical and paramedical staff should be trained accordingly. More advanced training in ATLF, PHTLS, ACLS, PALS and AMLS should be as much as possible offered to all medical staff having a responsibility to manage emergency patients or working in the medical care delivery system as front line medical practitioners in the community.

In some mega cities with traffic jam one way to access emergency patients is to rely on first emergency medical aid provided by trained staff riding motorbikes

4 The appropriate management of emergency patients during transport

In many developing countries private cars do the transport of emergency patients or public ordinary transport means such as pick up vans. Where ambulances are available, often the ambulance crew is composed of drivers without any particular skills in the basic management of emergency patients. Many patients see their condition dramatically deteriorate during the transfer. The lack of resuscitation equipment or of essential drugs is not the only important negative factor in these situations. Too often the lack of basic skills is the limitation factor.

Ambulances can be divided into two classifications depending upon its function and purpose into Basic Life Support and Advance Life Support Ambulances. This requires setting a minimum standard in relation to life support equipment and level of training of ambulance crew for both classifications. To set a high standard for all ambulance that responds to daily emergencies requires a considerable amount of financial requirement and this is where the pitfall sets in developing countries.

e.g. if a specific budget is given to start an ambulance service it would be better to organize majority of ambulances as basic life support with only 2 or 3 advance life support ambulance to begin with. Majority of pre hospital emergency cases requires basic medical stabilization and experts say that only 3%-5% are life and death situation that requires advance life support interventions. With this in mind, it is possible to maximize the available resources (manpower and equipment) by utilizing it effectively the available resources.

It should be kept in mind that even though if someone is an experienced physician or nurse that doesn't mean this person is immediately qualified to ride the ambulance and respond to emergency cases in the field. Pre hospital care is a totally different scenario in terms of the different factors that interplays on site (time constraints, stress from various sources, safety, environment, and relation with other actors that plays a role in the emergency scene - bystanders, family members, first responders, rescue groups, etc.) compared to the controlled environment in the hospital or emergency department.

Recommendation No. 4

All ambulance crew should receive proper training in managing emergency patients at least the basic technician level as a starting point and progress to advance life support level depending on your specific role in the ambulance team (team leader, transport officer & treatment officer).

5 The regulation process of emergency calls and medical emergency patients

The management of medical emergency calls

Many countries, including developing countries, have developed a capacity to centralize emergency calls on a few agencies: rescue services (fire brigades)/ police/ medical emergency call center). One of them assumes the role of « alarm Center ». Each agency has usually its own emergency phone number (116, 119, etc.) In some countries these three services are regrouped under a single emergency phone number. Whatever the system is the basic requirements for an appropriate management of the emergency calls are the same:

- ✓Availability of qualified personnel for dealing with the nature of the call for managing:
  - ✱ reception
  - ✱ sorting out (triage of the calls)
  - ✱ orientation
- ✓Capability to provide appropriate advice / instruction on what to do until the first responder will reach the emergency patient if an intervention is needed
- ✓Capability to provide advices on how to seek local assistance or what to do if no Emergency intervention/evacuation is required
- ✓Capability to decide the level of the response required (at the medical emergency call center):

✓ Capability to decide the level of the response required (at the medical emergency call center):

- ✱ Sending/activating a team or an ambulance
- ✱ Deciding the type of ambulance (basic or advance life support)
- ✱ Deciding what resources to mobilized (fire, police, hazmat, special rescue & extrication)
- ✱ coordination with the various agencies:
  - information sharing with rescue and police
  - information with public health authorities
  - information sharing with receiving hospitals
  - Information sharing with ambulances services (Red Cross/Crescent, Civil Defense, private, etc.)

These basic requirements do not ensure full efficiency and full effectiveness of the system. It is necessary to add managerial capacity and capability, mainly in the coordination perspective. Coordination is not limited to sharing of information. It is a more proactive process, which includes decision-making and sharing of resources, and logistics and the optimal use of existing resources according to the actual needs, especially according to the condition of the patients and their requirement for medical care. In order to achieve this goal there are several key managerial issues that need to be adequately addressed:

✓ The dispatching of patients among available hospital facilities should be done according to criteria decided in advance (type of care that the hospital can deliver, availability of skilled staff, number of operating theatres, and beds available in case of mass casualty, etc.)

✓ the organization of hospitals of a geographical area in a "network" is of paramount importance:

- ✱ Complementarity and synergy
- ✱ coordination mechanisms
- ✱ sharing of logistic

✓ The members of the network must be in a position to share information at any time.

✓ The medical dispatching center (usually based near the emergency department of the major hospital) is the key for coordination of transports. The emergency medical call center can also assume the function when this structure exists as an independent unit. Anyway this function must be full part of the network

- ✓ The medical emergency call center should have a permanent capacity to link with all the facilities of the network and to make appropriate decision for transfer of patients if no medical dispatching center is in charge of that activity. In many countries these two functions (reception of emergency calls and dispatching) are under one single unit.
- ✓ Information sharing is a continuous process. All partners involved must be kept informed on the evolution of the situation in the case of mass casualty situations
- ✓ The medical emergency call center and the hospital network must have an efficient coordination mechanism with the other emergency centers (police, rescue, etc.). Agreement of partnership must be agreed upon regarding coordination, sharing of information and decision making, development of resources and training activities.

The concept of "Medical Regulation / Oversight"

MODEL A

In more and more countries the medical emergency call center is a component of the "regulation process of emergencies" and it is ensured by a regulation center. This means that most of the call can be dealt with by non medical on-duty personnel called "emergency regulators". These personnel must be in a position to get immediate expert medical opinion every time the situation requires such an expertise or when a decision must be taken for an emergency transfer of the patient(s) to hospital. Therefore more and more countries base their medical emergency call centers in the vicinity of the emergency/casualty department of a major hospital so that skilled emergency physicians can be available for decision making at any time. The emergency regulation center does not need to be "full part" of the emergency/casualty department. The evolution towards medical regulation is a general tendency of all countries as their health sector becomes more efficiently organized and more resourced.

It is a medical activity and although the on-duty staff members responding to emergency call (regulators) are not necessarily medical doctors, they must be in a position to get immediately and permanently a medical opinion regarding the request presented by a patient or any other source (family member, etc.)

In many countries the stabilisation of the medical condition of the true emergency patients or the resuscitation activities in the pre-hospital phase are done by skilled medical doctors (or emergency technicians specifically trained for that purpose) who are dispatched with ambulances to treat and collect patients on the site and during the transport.

Time is a crucial limiting factor. In order to decrease the time between the emergency call and the first transfer to hospital many cities have organized their ambulances services in such a way that the fleet is divided into several sub-units, which are located in several key areas of the city. In mega-cities suffering permanent heavy traffic jam innovative measures have been developed to reduce the time before advanced medical care can be delivered. In Athens, Greece, the emergency medical call center is located into the casualty department of a major hospital and emergency physicians are permanently available for emergency intervention. These doctors use motor bicycles for reaching the patients and are equipped for performing resuscitation measures while the ambulance is coming.

MODEL B

In other countries, the regulation of patient care or practice of medicine requires license in different levels be it as a physician or nurse. The concept of medical direction extends this license to non-physician EMS providers to practice emergency medical care.

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.

A formal relationship exists between a community's EMS providers and the physician who is responsible for out of hospital emergency care. This physician is often referred to as the system medical director he or she is legally responsible for the clinical and patient care aspect of an EMS System. Every EMS system must have a medical director. He or she must provide guidance to all emergency care and rescue personnel. The medical director is also responsible for reviewing and improving the quality of care in an EMS system (system quality management), and research to ensure the safest and highest quality care for patients.

Medical direction is characterized as either immediate (on-line) or Organizational (off-line).

"Online / Direct Medical Control"

Provides EMS providers (First responder, EMT's, Paramedics) 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 emergency 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.

"Offline / Indirect Medical Control"

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

Recommendation No. 5

The "regulation" of emergency calls and emergency pre hospital care is a complex process that requires organizational coordination mechanisms, adequate logistics and a clear policy. Legislation should define clearly the authority of the partners involved and also define roles and responsibilities. All partners should work in an organized network. Coordination is more than just sharing of information. It is an active outreach complex activity. Policy, guidelines, agreements, protocols are required whatever the system is (one single number for all emergency call or an emergency number for each major agency). When the local situation allows for medical regulation to take place this process should be considered as advisable.

In most countries, the regulation of patient care or medicine requires license in different levels be it as a physician or nurse. The concept of medical direction extends this license to non-physician EMS providers to practice emergency medical care. Having a medical direction is an essential component of an EMS system.

6 The partners of networks

In many developing countries each partner (rescue services, police, hospital services, ambulance services, private sector, etc) works in isolation. This way of managing emergency situations often leads to a tremendous loss of time, to lack of effectiveness, to waste of resources, duplication, uncoordinated and inappropriate response. Many patients are brought to hospitals were their medical situation cannot be managed satisfactorily and require secondary urgent transfer, or are transferred for administrative reasons to a hospital far away while a nearby hospital is available. Most often in such poorly organized response systems the medical sector is surprised when the patients arrive to the hospital so that no anticipatory measures can be taken to prepare to manage the emergency patients. This is particularly detrimental in mass casualty situations, which create chaos in receiving hospitals. More and more countries regroup the hospitals of major cities in a hospital network in order to use as efficiently as possible the resources of each hospital being a partner of the network. One of the aim is to develop complementarities in the city among the partners of the hospital network by creating “poles” (neuro-surgical pole developed in 2 out of 5 hospitals, cardio-vascular surgery pole developed in 3 out of the 5 hospitals, etc.). The goal is rationalization of the resources, and the development of cost-effective quality specialized care. The optimal use of the community resources become more important even in developed countries.

In rural areas the development of limited emergency/casualty department in small hospitals of lower categories is more challenging but has proven to be cost-effective for managing the vast majority of emergency patients. Only a few have to be referred to major hospitals for specific advanced treatment. As much as possible the development of these services should be linked to existing programs of the health sector, especially with the programs of primary health care. The personnel of these community services are trained to deal with minor emergencies and can received technical advice from hospital emergency services for more complex cases. This back-up is efficient in having the trained primary health care services personnel willing to deal with emergency medical patients. The role of the emergency call center is evolving with this new approach (see section interface with community).

In parallel to internal health sector networking (mainly among hospitals) there is an absolute need for a network regrouping all partners involved in the management of emergency situations, especially the private sector. The coordination of transport means from all sectors and agencies is becoming a priority in more and more countries. This process is part of the "integration strategy". This allows for mobilizing effectively and coordinating all resources in case of mass casualty situations. The inter-sectoral network must be built upon a partnership strategic approach. This requires:

- ✓ Clear policy and guidelines
  - clear definition of roles and responsibilities
  - clear definition of coordination mechanisms
  - agreements on logistic compatibility
  - agreement on resource mobilization and complementarity
- ✓ Creation of a coordinating committee regrouping all stakeholders with the mandate of proposing to the political authority recommendations for decision-making, resourcing of the partners, etc.
- ✓ Permanent link and efficient information sharing between the emergency call centers of each partners of the network (possibility to have real time communication among all partners)
- ✓ Decision making process clearly defined regarding activation of emergency plans and mobilization of resources in the case of mass casualty situations or crises
- ✓ Cross-sectoral training and exercising the geographical boundaries of the network must be clearly defined (provincial or regional)
- ✓ The various "regional networks" of a country must be integrated into an overall network (national, provincial) for cooperation in cross-border activities or in the case of mass casualty situations requiring the mobilization of a huge response capacity. This should be part of the inter-sectoral emergency response plan

Recommendation No. 6

The coordination of the activities of the various agencies dealing with medical emergency patients should be organized within an inter-sectoral network. The strategy should be of partnership in its very nature. The communication between the partners of the network should allow for permanent and immediate exchange of information, especially between the various emergency call centers (rescue, police and medical) or if a dedicated call center exists be the focal depository of significant information that is relevant to the smooth and systematic EMS operation. There must be a network committee, which assess the needs and the capacity of each various partners, proposes to the political authorities the allocation of funds, defines the policy on resource development, on coordination mechanisms, and proposes draft for training, exercising, arrangements, protocols, etc. There should be mechanisms for linking the various networks within a country or a province. The organization of daily emergencies management must be compatible with the mass casualty management plans and disasters plans.

In urban context it is recommended to develop a network of hospitals. The network should define medical care technical poles for using as effectively and as efficiently as possible the capacity and the capability of each hospital setting. The goal of poles within a network is to promote complementarity and synergy, to enhance coordination mechanisms, to foster sharing of logistics and to be prepared for dealing with mass casualty situations. The capacity to manage these exceptional situations within a hospital network will serve as a platform for developing further the capacity to manage the consequences of major disasters. The creation of networks of hospitals will contribute to more efficiently manage the daily emergencies for it will be possible to dispatch the best adapted response and the nearest one in terms of time to access the patients

7 Monitoring and Evaluation

In many countries emergency medical services are not monitored in term of services offered, resource management and human resources development, which includes training activities. Too often the activities are perpetuated the same although the context changes or new activities are added without true assessment of priority needs or changes in the context. Monitoring process includes also the assessment of the coordination mechanisms, the information sharing process and logistics development. Monitoring includes also the assessment of the capacity of each agency or each member of the network in term of authority, personnel, capacity and capability. The complexity of the emergency medical rescue chain and the multiplicity of the partners (from site to hospital ward) require strong and well defined monitoring programs. Output, impact, efficiency and effectiveness of the overall organization of the system should be assessed regularly

Recommendation No. 7

Emergency medical services require the intervention of several agencies and the contribution of professionals coming from multi-disciplinary horizon. Needs change over time. New technologies and new resources are available. The capacity and the capability of the various partners change over time. The assessment of the needs and priorities over time as well as the assessment of the capacity of the partners should be conducted on a regular basis. Monitoring of activities should be implemented to ensure that the process remains relevant, efficient and on the track. One must have a quality improvement system in place for continuing evaluation and upgrading of its EMS system.

8 Quality control, normative role, policy making, programming and accreditation process

In many developing countries various partners are active in the management of emergency medical services or in the rescue chain (ambulances run by NGOs or Red Cross/Crescent Societies, private sector, etc.) without having to undergo any quality control. These partners start activities without any accreditation. Often there are no policy, no guidelines and vague legal framework. Such a situation offers no guaranty regarding the quality, the relevance and the effectiveness of the services delivered by these partners. There is a need for a clear policy and for guidelines for the safe implementation of this policy. Quality indicators and best practice should be defined. The Ministry of Health has a normative role for policy issues and technical issues and should link with other sectors involved so that the norms defined regarding the equipment, the qualification of staff can be applicable by all agencies. There must be accreditation mechanisms covering situations from ambulances services to hospital services.

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 staffs provide 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-consuming review. It includes critique sessions and reviews of patient encounter tapes and charts.

Recommendation No. 8

The Ministry of Health should fulfil its normative role and should issue clear policy and guidelines regarding the emergency medical services and the management of medical emergency patients in consultation with other sectors that play a role in the EMS system. The Ministry of Health has a normative role and should set up quality control mechanisms as well as accreditation mechanisms. The Ministry of Health should identify best practice applicable to the health sector and by the other actors.

9 Law, Regulation and Policies

The absence of legal framework and of regulations leaves the door open for a potential anarchic situation or at least inhomogeneous or incompatible approaches. Conflicts of authority or mandate between partners of various agencies and sectors are always a source of inefficiency and are the root cause of lack of coordination between the partners. The daily emergency medical services are full part of the care delivery system. As much as possible the services offered in major emergencies should be integrated into existing programs of the health sector when applicable to avoid duplication, inefficiency and waste of resources.

Recommendation No. 9

The Ministry of Health should take a lead role revising existing legislation and propose new laws, amendments or regulations to the government departments in charge of this matter when required. The legal framework should be as much as possible clearly defined and updated. The following elements should be considered: (1) definition of roles and responsibilities of the various partners, (2) of the committees, (3) rules and norms for sanitary evacuations, (4) training of personnel, (5) organizational issues, (6) managerial issues, (7) monitoring process, (8) needs assessment process, (9) technical guidelines and protocols, (10) integration strategy internally within the health sector and externally with other sectors, (11) operational safety, (12) standard for emergency vehicles and equipment, and (13) incident command system and structure from community level to national in scope

10 The interface between the community and the private professionals

Very few countries can afford to manage all emergency calls for medical assistance by relying only on hospital-based care or by transferring all patients to hospitals for a clinical examination. Most of the emergency calls can be usually dealt with by the on-duty trained staff of the emergency medical call center. Simple advise on what to do is sufficient (treatment of fever in a flu, etc.). In many countries where efficient hospital emergency/casualty departments are set up the trend over years is toward a constant increase of the workload of these services. Usually up to 80% of the patients visiting these services could have been treated adequately by general practitioners outside the hospital. Therefore the new strategy is to include also the front line doctors (especially of the private sector) into the “emergency medical care system”. Patients can be referred to private on-duty doctors by the emergency medical call center. Agreements are developed between public health sector and private doctors for this referral services (especially for reimbursement). In other countries the hospitals developed agreements with private sector for opening a consultation room nearby the casualty department within the hospital, which is staffed with private on-duty doctors. Again agreements are made for reimbursement of the activities of the private doctors.

The regulation consists also of advising persons who call the emergency medical call center. Some countries have involved front-line on-duty private doctor who can provide medical advice from their practice and if necessary to examine the patients if the situation does not improve. Usually these on-duty doctors ensure permanence until mid-night. The fees for private doctors' services are calculated on the basis of the patient resource (mainly if he/she is not covered by insurance). The patients who cannot pay are examined by the on-duty doctors who are reimbursed at a price which is almost similar to the public sector. The goal of this referral to private sector is mainly aimed at decreasing the overload of the hospital casualty department.

In rural areas the emergency medical call center play a growing role, as they are developed to cover the entire territory of a country. They become the interface with the community and they network with primary health care services. Communication revolution is changing the rules in the rural areas. In many situations where no medical care or no ambulance services are available in the area the advising role is becoming more and more important to reassure people, to provide qualified advise, to ensure the follow-up and to select cases requiring a transfer to hospitals (usually costly and time consuming). This is a new area and much has to be invented in this field.

Education of the public on the appropriate use of hospital emergency services or of emergency medical call centers is an important aspect that is usually neglected. a

Recommendation No. 10

The collaboration between the private and the public sector in order to use efficiently and effectively available medical resources of the community should be promoted as much as possible. The policy should be not to attract all patients to casualty department of hospitals but rather to select patients requiring emergency care and referring the non-emergency patients to other services. An improved cooperation between the private and the public health sectors is desirable. Public education is a key component of the overall policy. The integration of volunteer organizations should also be considered.

11 The role of the emergency medical services management committees

Many countries have set up committees to deal with the complex aspects of the management of emergency patients. Usually there are 2 committees: a national and a regional/provincial committee

National Committee

The National Committee has the mandate to define the policy and to prepare strategic recommendations. This Committee is chaired by the Ministry of Health. Representatives of other sectors are also members (Civil Defense, rescue, police, NGOs, etc): each partner offering a service (ambulance of the Civil Defense or of the Red Cross/Crescent, etc.) in connection with the management of health issues or of the emergency patient or having a direct impact on the health of the patient

Regional / Provincial Committee

The Regional/provincial Committee, which has to translate into operational activities and practices the policy, the strategy and the guidelines elaborated at national level. All agencies involved in the response are members of this Committee. This Committee is usually chaired by the local political authority. The Committee has the responsibility to allocate public resources among the various partners dealing with emergency patients, to plan for developing the resources of the various partners, to define roles and responsibilities at local and regional levels according to the national policy, to prepare arrangements for cooperation and have them signed, to draft coordination procedures and make the follow-up, to monitor the program, etc.

Recommendation No. 11

In order to ensure effectiveness and efficiency of the overall system there is a need to create at least two different committees dealing with emergency care delivery: A national Committee having a normative and strategic responsibility and one sub-national Committee having the responsibility to implement the national policy, to assess the priorities for future local community development, to define strategies for resources development and to monitor the activities and the coordination mechanisms. Under the committees, sub committees can be subdivided depending on the focus like: (1) operational standards & protocols, (2) finance, (3) resource management, (4) human resources & training, (5) public information, education & outreach, (6) facilities, (7) communication, (8) transportation, and (9) quality assurance

12 Disaster planning and community relations

The EMS system is an integral element of disaster preparedness and planning in all levels from the simple community disaster plan up to a bigger national level disaster plan to respond to major disasters. 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, private sector, and the medical 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.

Recommendation No. 12

The plan should address the different aspects of disaster management, communication, treatment, and destination of casualties. All of its components must have a back up just in case it will not be applicable to certain scenario or the plan should have components of flexibility to adjust to the situation. Periodic disaster drills serve to assess performance, refine management, and educate personnel and the community. There are ways to conduct drills and assessment of performance, from the most simple as review of cases and lessons learnt; table top exercises; and the full scenario field exercise. There are advantages and disadvantages of each different method and you should adopt what's best suit your purpose.

Public education programs are essential to inform the community on ways to access the EMS system properly. They also are important in preparing layperson 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 major emergency situations.

EMS include also hospitals. Hospital disaster preparedness is a major element of community disaster preparedness. Hospitals should develop their disaster plans for various scenarios (including evacuation of hospital) in coordination with the other agencies of the community and with the other sectors. The role of EMS and the coordination mechanisms should be included into the community disaster response plans.

13 Adaptability to local setting to become sustainable

The EMS system is a product of countless study and analysis of data and information for the mere purpose of increasing the survival rate of patient of sudden illness and injury. Since its development in the 1960's much has been changed from the different emergency procedures, protocols, and technology in equipment and emergency vehicles. This field, just like other medical specialties, is very dynamic in a sense it s continuously evolving and changing. Nowadays there are various systems that exist and one of the well-known are the 911System of the USA and the SAMU System in Europe. Both are successful in their own right and well serves the purpose of providing quality pre hospital emergency care to its constituents with all the issues addressed in this paper.

Another issue on adaptability is the effective use of resources. With the advent of technology in the field of EMS, much has been developed in western countries be it in a form of emergency vehicles, computer technology, supplies and equipment. Technology is a two-edge sword that can work against you or for you. The issue here is the long-term effect and how can it be made sustainable that will be cost effective in the long run.

e.g. using imported high-end ambulances and expensive equipments from western countries in developing countries has only short-term benefits. A lot of factors have to be considered for it to become sustainable like cost of petrol to operate, availability of spare parts and service technicians, etc. Most of which can be developed in the country (emergency vehicles, packs, supplies, simple extrication and immobilization devices) and this will have an added boost to the economy but for some specialized equipment,. It is necessary to ensure the availability of after sales services before considering it.

Recommendation No. 13

The presence of ambulances responding to emergencies and transporting patients in developing countries already exist. Public safety personnel (fire, police, rescue groups) respond in their own capacity and layperson helping others on site whether they are trained or not is also present. In one-way or another, EMS already exists in all countries and it only differs in its organization, system set-up and coordination.

ADPC advocates that the key in establishing an EMS System is integrating the main principles and practices in its current system and not re inventing the wheel by developing a system from scratch. One has to look into their respective existing set up whether in the ministries of health or public safety services. Promoting a sense of ownership between all the organizations and stakeholders working with a common goal and objective is a strategy in which it is possible to ensure the cooperation and active participation of each member.

Technical Aspects

1. **Medical emergency call centres:**

- The medical emergency call center has the responsibility to regulate (see below comments)
- The same phone number should be used throughout the country for all emergency medical centers
- All emergency medical call centers should be able to establish immediate links with the other emergency centers (police, rescue), with the hospitals of their geographical region and with the other medical emergency call centers of the Country

2. **The regulation process consist of:**

a. listening to the person who calls
b. to assess the degree of urgency
c. to take appropriate decision for advising, orienting, referring the person who call to a medical doctor or a hospital/clinic or to mobilize resources
d. to decide on the action to be taken especially the dispatching the transport resources to the site where the patient(s) is/are or to coordinate with ambulances services (for instance private sector according to local Arrangements)
e. if the system allows for sending out medical ambulances or medical teams: to decide the type and the quantity of medical staff to mobilize
f. to liaise with other partners and agencies when necessary
g. to consult with potential receiving hospital in order to decide the final destination of the patient
h. to liaise with the receiving hospital
i. if the regulation center (which should always be part of the medical emergency call center) has "medical advisory capability" (when such a regulation center is located nearby an hospital emergency/casualty department or has on-duty doctors for medical regulation): provide medical advice to the patient or the person calling for assistance and take the decision concerning medical activities that should take place during The transfer of the patient

Technical Aspects

3. Levels of EMS Training

a. Non Medical Personnel

i. **Medical First Responder (MFR):** the first person on scene with emergency medical training. He or she may be a police officer or firefighter, a truck driver or schoolteacher, an industrial health officer, or a community volunteer. Training includes: (1) airway care and suctioning, (2) patient assessment, (3) CPR, (4) stabilization of injuries to the spine and extremities, (5) care for medical and trauma emergencies, (6) use of a limited amount of equipment, (7) assisting other EMS providers, (8) other skill and procedures as permitted by local or state regulation.

ii. **Emergency Medical Technician Basic (EMT-B):** can do all the MFR does. He or she also can perform complex immobilization procedures, restrain patients, and an entry level to become a staff and driver of ambulance

iii **Emergency Medical Technician Intermediate (EMT-I):** can do all the previous levels do. He or she can also perform a limited number of advanced techniques and administer a few medications. Other systems, the EMT-I may also be trained as cardiac technicians

iv. **Emergency Medical Technician Paramedic (EMT-P):** has the most advance EMS training. He or she can do all that the three previous levels do, plus administer more medications and perform more advanced techniques such as cardiac monitoring. Competencies on ACLS, ATLS and PHTLS is the core skills of paramedics

Technical Aspects

b. Medical Personnel

i. **Emergency Medicine:** The branch of medicine and medical specialty that deals with the recognition, stabilization, evaluation, treatment, and disposition of an undifferentiated population of patients with acute illness or injury. Emergency care is episodic and handles a full spectrum of physical and behavioral conditions.

ii. **Emergency Nursing:** a specialty in which nurses care for patients in the emergency or critical phase of their illness or injury and are adept at discerning life-threatening problems, prioritizing the urgency of care, rapidly and effectively carrying out resuscitative measures and other treatment, acting with a high degree of autonomy and ability to initiate needed measures without outside direction, educating the patient and his family with the information and emotional support needed to preserve themselves as they cope with a new reality. These activities may be carried out in a variety of settings and not necessarily in an "Emergency Room."

c. Specialty training

i. Advance cardiac life support (ACLS)
ii. Basic and Advance trauma life support (BTLS & ATLS)
ii. Paediatric advance life support (PALS)
Iv. Advance medical life support (AMLS)
v. Pre hospital trauma life support (PHTLS)
vi. Basic disaster life support (BDLS)

Technical Aspects

d. Others

i. **Emergency Medical Dispatch (EMD):** professionally trained Emergency Medical Dispatchers (also called regulators) process emergency calls that received at the emergency call center. They are responsible for providing quality, professional emergency medical dispatch services like triage of calls, dispatching the appropriate EMS service, and providing first aid instruction to Callers while waiting for EMS to arrive.

4. International Models of Emergency Care

a. Anglo-American model of emergency care

Many countries developing new Emergency Medicine (EM) systems today are following the Anglo-American model of emergency care delivery, in which patients are transported to the hospital to receive a higher level of care.

In this model, non-physicians, such as emergency medical technicians (EMTs) or paramedics (EMT-Ps), initiate emergency care in the field and transport critically ill or injured patients to hospital-based emergency departments (EDs), where emergency physicians (Eps) provide definitive emergency care. Accordingly, Emergency Medicine is an independent medical specialty controlled by Emergency Physicians.

The growing list of countries or regions adopting the Anglo-American model includes Australia, Canada, Costa Rica, Hong Kong (SAR), Iceland, Ireland, Israel, Malaysia, the Netherlands, New Zealand, Nicaragua, the Philippines, Poland, Singapore, South Korea, Taiwan, Turkey, the United Kingdom, and the US.

b. Franco-German model of emergency care

In contrast, many European countries have adopted the Franco-German model of emergency care, which brings the hospital to the patient, delivering Emergency Physicians and technology to the scene in hope of providing a higher level of care.

In this model, EPs (often anesthesiologists) provide emergency care (usually resuscitation and pain control) exclusively in the pre hospital setting. Patients are triaged and admitted directly to inpatient services. Emergency Medicine is not an independent specialty and often is controlled by anesthesiologists.

Countries that follow the Franco-German model of emergency care delivery include Austria, Finland, France, Germany, Latvia, Norway, Portugal, Russia, Slovenia, Sweden, and Switzerland.

Reference Website

A. SAMU System

1) http://en.wikipedia.org/wiki/SAMU
2) http://www.samu.org/

B. 911 System

1) National Disaster Management System (USA) http://www.ndms.dhhs.gov/
2) National Association of EMT (USA) http://www.naemt.org/

C. Mass Casualty Management

1) Establishing a Mass Casualty Management System http://www.paho.org
2) Hospital Incident Command System http://www.heics.com/

D. Emergency Medicine

1) American Acedemy of Emergency Medicine http://www.aaem.org/
2) American College of Emergency Physicians http://www.acep.org
3) Europena Journal of Emergency Medicine http://www.euro-emergencymed.com
4) Evidence Based Medical Practice http://ebmedpractice.net/