

EMERGENCY MEDICAL SERVICES: LITERATURE REVIEW

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SUMMARY

Emergency Medical Service (EMS) systems worldwide are complex systems, characterized by significant variation between countries, care pathways and quality care indicators. Therefore, analyzing and improving them is challenging. As the EMS systems differ between countries, it is difficult to provide generic rules and approaches for EMS planning. However, the common target of all countries is to offer medical assistance to patients/victims with serious injuries or illnesses in disaster/mass casualty incidents as quickly as possible. This paper presents an overview of logistical problems arising for EMS providers.

Keywords: *Emergency Medical Service (EMS), system, ambulance.*

1. INTRODUCTION

Emergency Medical Service (EMS), also known as ambulance services or paramedic services, are emergency services that provide urgent pre-hospital treatment and stabilization for serious illness and injuries and transport to definitive care. They may also be known as a first aid squad, FAST squad, emergency squad, ambulance squad, ambulance corps life squad, or by other initialisms such as EMAS or EMARS [1].

As a first resort, the EMS provides treatment on the scene to those in need of urgent medical care. If it is deemed necessary, they are tasked with transferring the patient to the next point of

care. This is most likely an emergency department of a hospital. Support for EMS includes not only drugs, supplies, and medical equipment, but also a system of means of transport such as helicopters, ambulances, and other civil vehicles.

The EMS system consists of the following components: public as well as private organizations; Transport networks and communication systems; Specialized systems such as hospitals, trauma and intensive care centers, rehabilitation facilities, Transport networks and communication systems; Professional systems such as hospitals, trauma and intensive care centers, rehabilitation facilities, professionals trained in first aid and emergency management, volunteers, healthcare workers (doctors, nurses, medical technicians), government policymakers and citizens are trained in the skills to know what to do in a medical emergency.

In the World, most EMS systems can be grouped into one of two main systems,

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the Anglo-American and the Franco-German system (Dick, 2003) [2]. However, in each country, they will have separate regulations, the difference is in the payroll (human resources, as well as drugs, supplies, medical equipment), financial support policies and management systems.

2. SOME EMSs IN THE WORLD

EMS in the United Kingdom (UK):
EMS in the UK provide free urgent care services to patients suffering from illnesses ranging from acute ailments to minor injuries 24 hours a day, 7 days a week. There are 14 ambulance services within the UK (1 in Wales, 1 in Scotland, 1 in Northern Ireland and 11 in England that are separately managed by regional Clinical Commissioning Groups). Hence it is unsurprising that there are small discrepancies in the way that they operate. Therefore, it is no surprise that there will be a small difference in the operations between the groups. The coordination of the ambulance system depends on the requirements and appointment of the doctor, who is responsible for transporting patients to hospitals that belong to their management system, as well as transporting patients between other hospitals, to ensure that coordinating victims in disasters following professional requirements.

Ambulance crews are highly skilled professionals who can stabilize patients and administer medication during transportation. The emergency ambulances (EAs) used to transport patients are themselves state of the art, furnished with a wide range of technical apparatus and typically manned by two crew members - at least one of whom must be a fully trained

paramedic. In addition to EAs, Rapid Response Vehicles (RRVs), air ambulances and emergency services co-responder (e.g. Fire and Rescue Service) vehicles may also be dispatched to select incidents. RRVs are small vehicles that allow first responders to reach the scene of serious incidents quickly to assess the condition of the patient and offer immediate medical treatment. In the case of immediately life-threatening calls, RRVs should be automatically backed up by the nearest available double-staffed EA, but for all other calls, RRV clinicians must advise the type of backup required as soon as they have made a primary assessment.

Most ambulance trusts also encompass nonemergency patient transport service (PTS) vehicles to transport non-urgent scheduled patients to and from medical facilities. However, non-urgent patient transport work is becoming increasingly sub-contracted to private companies, voluntary organizations and community resource teams. Patients will always be taken to the hospital if there is a medical need, but several recent initiatives have been launched that support alternatives to conveyance wherever possible. The schemes have led to a successful reduction in conveyance rates in England from 98% to 58% over a 12-year period, which has helped to partially offset the rise in emergency calls [3, 4].

Every time an ambulance service receives a call, emergency medical dispatchers use sophisticated software to prioritize it into one of the following categories of urgency:

- Immediately life-threatening: Such calls should receive an emergency response within 8 minutes. The target

compliance rate for this target varies locally, for example: In England, 75% of critical "Category A Red 1 calls" where patients are not breathing or do not have a pulse, should be responded to within 8 minutes. An extra 60 seconds is allowed for still serious, but less immediately time critical "Category A Red 2" incidents e.g. strokes or fits. A secondary target also applies to ensure that 95% of all life-threatening calls are responded to within 19 minutes; The monthly average performance targets for all life-threatening calls in Wales, Northern Ireland and Scotland are 65%, 72.5% and 75%, respectively.

- All other calls: For conditions that are not life-threatening, response targets are set locally. A striking decision has recently been made by NHS Wales to drop time-based targets for all but immediately life logistics for Emergency Medical Service systems Melanie Reuter-Oppermannet al Health Systems threatening calls - from October 2015, performance is instead being measured against clinical outcome indicators and patient experience information [3, 4, 5].

EMS in Germany: EMS has two tasks which are emergency rescues and patient transports. Germany has 16 federal states, each one has its own EMS law organizing the services within each state and defining rules and regulations like the response time target. This target only applies for emergency rescues and lies between 8 and 15 minutes. It is measured as the time between the call pick-up and the arrival at the scene in most of the cases and has usually to be met in 95% of the cases. Keeping this response time target is, in general, the most important goal for EMS planning in Germany.

In Germany, the EMS is deployed to districts in the city and rural areas. There are more than 250 regional EMS teams in Germany with more than 2000 headquarters. In some of the federal states, EMS regions were combined to form fewer and larger regions. Each emergency medical support area has a coordination center.

In many of the regions, the EMS system is combined with the fire brigade. In some of the regions, the fire brigade is in charge of both, while in others relief organizations like the German Red Cross or the Workers Samaritan Federation Germany are organizing the services. Support for medical support systems in Germany, there are mainly using two different types of means: Ambulances and another special car for emergency teams. For the ambulance staff, two different levels exist. Basic training leads to becoming an Emergency Medical Technician (EMT). With additional education, a position comparable to a paramedic can be reached with the main difference that by law an emergency doctor is needed for special types of treatments. An ambulance is always equipped with two staff members, for emergency rescue at least one of the two is a paramedic whereas for transport it can also be 2 EMTs. Usually, an emergency doctor works at a hospital or a private practice while being on duty as an emergency doctor.

In case of an emergency, he is either picked up by the ambulance if it is also stationed at the hospital or he is driving to the scene in a separate vehicle. In the latter case, often someone else is driving the car so that if necessary the emergency

doctor can accompany the patient in the ambulance on the way to the hospital. Sometimes, the emergency doctor is called right away and sometimes he is requested by the ambulance staff when they arrive at the scene [6].

EMT in the Netherlands: In the Netherlands in 2012, there was a total of 725 ambulances. These were divided over 207 base stations. In the Netherlands, two types of emergency call A1 and A2 are distinguished. A1 calls are the most urgent. In this case, an ambulance is required to be at the scene within 15 minutes in 95% of the cases. For urgent, but not life-threatening calls, an ambulance should be there within 30 minutes. Within the patient transports, which are called B calls, sometimes a further two categories B1 and B2 are distinguished. B1 calls involve the transportation of patients in critical conditions, for which a fully equipped ambulance is required. For B2 calls, less equipped ambulances suffice.

The Netherlands is divided into 24 ambulance actives more or less independently operating regions (RAVs), each of which is operated by a single organization. Currently, there are 19 call centers in the Netherlands. This will further reduce to 10 in the coming years. Most call centers distinguish call takers and dispatchers. Call takers are responsible for triage, while dispatchers instruct the ambulance crew. In principle, only the call taker requires medical training. However, in most call centers, call takers and dispatchers switch roles during the day, in which case both call takers and dispatchers are required to have a medical education [7, 8].

In the Netherlands, the ambulances are fully equipped and staffed by a paramedic and a driver. The paramedic is required to have completed a full nursing education and at least one follow-up study in acute care. The ambulance driver does not require a medical background. The driver is there to assist the paramedic at the scene; for this, the driver gets training in providing medical assistance. Furthermore, training in driving an ambulance is required. In case life-threatening situations might occur during transport, an ALS ambulance is required. These calls are called B1. All other transports, B2 calls, might also be executed by a Basic Life Support (BLS) ambulance. This is a lower-equipped ambulance staffed with two regular nurses.

Some regions additionally use rapid responders. This is a single paramedic that can provide care at the scene but cannot transfer a patient to a hospital. The paramedic uses, for example, a car, motorbike, or even a normal bike to get to the scene. In the Netherlands, all ambulances are equipped with GPS, call center software shows the closest available ambulance to the dispatcher [7, 8].

3. CONCLUSION

In this paper, we have reviewed some basic characteristics of three typical EMSs in the world. We also find that there are many differences between them. However, an EMS needs several criteria as follows: Medical staff, technicians and ambulance drivers must be trained in emergency skills to perform an assessment, first aid and basic/advanced treatment.

The ambulance must be fully equipped: With medical equipment, supplies and

emergency medicine, GPS, a communication system which is connected to the coordination center; It is necessary to ensure the time factor, this is a very specific goal that needs to be set out as a criterion for evaluating an EMS.

There should be a coordination center to receive and analyze emergency medical information. These centers should be equipped with modern equipment and be able to connect with each other to share information and coordinate EMTs and EMS.

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