

# International EMS systems: Portugal

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## 1. Introduction and objectives

Pre-hospital Emergency Medical Services (EMS) are a relatively recent achievement in Portugal. Starting in Lisbon in the late 1980's, systems spread rapidly to most urban centres across the country. Pre-hospital EMS is now an established patient centred system that allows rapid access, stabilisation and transport of sick patients to the most appropriate hospital. This article provides an overview of the history of EMS in Portugal to date and outlines the objectives and aims for the future. EMS system configuration is not uniform all over the country. This is often due to variable medical involvement. We also provide an overview of the system design, funding, dispatch and team training. Hospital Emergency Departments are a critical link in the chain of care and are also discussed. As with pre-hospital EMS, there is some variability in the provision of emergency department care and the structure, organization, staffing and training is also discussed. The aims and future projects, both in the EMS and Emergency Department, are stressed.

## 2. Background

Portugal has a resident population of just over ten million people distributed over a total area of 92.151 km<sup>2</sup>. The population distribution is not uniform with more than half of the population concentrated along the coast in the four main cities, Lisbon, Porto, Braga and Coimbra. The overall mortality rate in Portugal is 10.2 and the birth rate is 10.9 per 1000 inhabitants. The statistics for 2003 show a ratio of 3.2 doctors per 1000 people and 122 public hospitals [1] and [2]. Health care in Portugal is mostly a public service funded mainly through taxation. Health sub systems and insurance companies are charged retrospectively for the medical service delivered [3].

## 3. The pre-hospital EMS system

### 3.1. History

The first emergency system started in Lisbon in 1965 and its aim was to transport patients to the nearest hospital. There was a specific emergency telephone number (115) and an ambulance staffed with an unpredictably trained crew (usually consisting of policemen), was dispatched. The National Ambulance Service was created in 1971 in an effort to spread the emergency system and the common access emergency number throughout the country.

The concept of a national integrated emergency medical system was not implemented until 1980. The different elements of the system were brought together with the common simple aim of saving lives. This

is also the concept of the pre-hospital “chain of survival” [4], [5] and [6]. The National Institute for Emergency Medicine (INEM) was created at the same time. INEM is a governmental organization directly responsible to the Ministry of Health. It is funded principally by government and partially by insurance companies. One per cent of all monies spent on health, vehicle and accident insurance in Portugal is transferred to INEM [7]. It is responsible for the delivery of all aspects of pre hospital emergency care across the country.

The first dispatching centre specifically designed for this purpose was created in 1987 in Lisbon but it was not until 1989 that the first vehicle staffed with physicians and able to deliver advanced life support (ALS) became available.

This system evolved rapidly and currently caters for over 75% of the population with 4 dispatching centres and 21 physician staffed vehicles [8].

### **3.2. How the system works**

As in most European countries, 112 is now the free common telephone number to access all emergency services, including fire, police, and EMS. Most components of the system are adopted from the French ‘SAMU’ model.

When 112 is dialled the call reaches the police centre. If the call is health related it is transferred to the Dispatching Health Centre (Centro de Orientação de Doentes Urgentes—CODU). From the CODU a dispatcher technician completes a questionnaire under the supervision of a regulating doctor. The dispatcher decides what is the most appropriate action, depending on the urgency of the situation. If the situation is not urgent advice is given but a team will not be sent. In an emergency situation a vehicle will be sent immediately, staffed by a doctor and a nurse. In some specific situations, a helicopter will be used. If the situation is urgent, but not immediately life threatening, an ambulance with two technicians will attend. In all situations the patient will then be transported, accompanied by a doctor and nurse if necessary, to the most appropriate hospital.

The receiving hospital emergency department is contacted by the CODU to ascertain bed availability in specific critical areas. The clinical details are given to prepare for reception of the patient.

At present it is not possible to activate the full chain of resources in rural regions of the country. If the 112 call is made from an area that is not served by the CODU, the call is transferred to the nearest ambulance service, usually police or fire service based. An ambulance is sent with two first responders with the skills to provide basic life support (BLS) and transport the casualty to the nearest hospital. In some outlying areas the only facilities available at present are fire service response units with little equipment and crews with variable skill levels, or community volunteers with very basic skills.

INEM is also responsible for a medically supervised poisons information service telephone number which is available for both the general public and health care professional, for advice on drug overdose and poisoning emergencies [8], [9] and [10].

### **3.3. Dispatching system—CODU**

At present there are four CODU centres in Portugal based in Lisbon, Porto, Coimbra and Faro. In each CODU there are several dispatchers and at least one regulating doctor who supervises the system. The CODU dispatcher assesses all health related calls coming through the 112 number, and decides the level of expertise needed for each situation. This decision is then communicated to the unit in the field. Depending on the workload the EMS dispatcher either performs both roles or shares with another dispatcher or the dispatch room doctor. When answering calls the EMS dispatcher gathers information including call location and the nature of the problem using predefined protocols and algorithms.

Based on the triage category of the call, the EMS dispatcher can initiate one of three levels of response. If there is the suspicion of a life-threatening emergency it is mandatory to activate a hospital based rapid intervention vehicle . If the situation is urgent but not life threatening an ambulance with two technicians is tasked. The third level of response allows the dispatcher to provide the caller with advice over the telephone. He may refuse to send an ambulance and recommend contact with a general practitioner. A major effort is being made to train more full time dispatchers and to improve dispatch protocols. Communication with the on-scene pre-hospital team and receiving hospital is a major task of the CODU. In 2003, the INEM services attended 700,000 calls and transported more than 500,000 people. Each urban hospital based rapid intervention vehicle was activated more than 1500 times. These numbers show a five fold increase in calls and patients transported since 1996 [8] and [9].

The CODU plays a major role in the management of major incidents. There are national and regional disaster plans that include the activation of Civil Protection Crisis Groups (with several civil and military organisations including INEM). INEM is a partner in the Crisis Group and co-ordinates all medical interventions.

There is a specific and separate dispatch system for maritime incidents. It is called CODU-MAR. A nominated doctor provides guidance and can activate a rescue team. In these situations operations are carried out in conjunction with the Portuguese navy and air-force [8].

#### **3.4. Hospital based rapid intervention vehicle**

The hospital based rapid intervention vehicle (Viatura Médica de Emergência e Reanimação) can be sent to situations where ALS is required. Activation is always made through CODU. The vehicle is staffed with a doctor and a nurse. The nurse is also the driver of the vehicle. The standard equipment includes a manual defibrillator with monitoring and pacing capability, 12 lead ECG, equipment for advanced airway management, suction, O<sub>2</sub> therapy, IV access, fluids, fracture immobilisation, various drugs, a vital signs monitor including pulse oximetry and a portable automatic ventilator. The team can transport the patient to hospital using an INEM ambulance and their own equipment. In 2003 there were 21 such vehicles operating [8].

#### **3.5. Medical helicopter transport**

INEM has two helicopters, based in Lisbon and Porto that can respond to primary (scene) or secondary (interhospital) missions. They are requested by ground crews or a primary hospital. The helicopters are activated only by the CODU. INEM helicopters are staffed with a doctor and a nurse who are trained in intensive care and in pre-hospital care. The helicopters have all the equipment needed for ALS and are available 24 h a day. There is a third helicopter based in the middle of the country, run by the Ambulance Services that can be staffed on request with a doctor and nurse from INEM. If needed the INEM can also request the help of air-force helicopters [7].

#### **3.6. Ambulance centres**

INEM ambulances are staffed with two trained ambulance responders and have equipment for BLS and basic rescue. These INEM ambulances are based in the police headquarters, fire service departments and Red Cross facilities but can only be activated by CODU.

All the other (non INEM) ambulances of the fire service, police or Red Cross can be activated either by CODU in urgent situations when the INEM ambulances are unavailable or by their own dispatch policies to transport non urgent patients to or from hospital [11].

### **3.7. Training**

Most of the personnel working in this EMS system are volunteers, which is an important weakness of the system. There are three distinct levels of care provided by pre-hospital providers: basic first responder, ambulance technician, and medical team. The basic first responders, most commonly are police officers or fire service personnel. They undergo training in basic first-aid and BLS. First-responder programmes usually involve around 40 h training.

The national standard ambulance technician training programme is 210 h. All the ambulances from INEM are staffed by technicians with this level of certification. Technician personnel are trained in BLS, uncomplicated obstetric delivery, basic wound management, spine and fracture immobilization oxygen administration, patient extrication and transfer.

The medical team of a doctor and a nurse have the highest level of pre-hospital care capabilities. Most of the doctors are anaesthesiologists, the others being physicians, surgeons and general practitioners. The nurses usually work in the hospital Emergency Department, Intensive Care or Operating Room.

There is a national minimum curriculum and additional training is provided. The length of training is 74 h for doctors and 104 h for nurses (the extra 40 h is special driving training). The medical team working in the helicopter receives an extra 10 h of training. All of the medical teams are able to deliver ALS, paediatric advanced life support and trauma life support.

There is also specific training available for CODU dispatchers which lasts 210 h. The course for the dispatch centre doctor lasts 40 h [10].

### **3.8. EMS for newborns**

A special-system for the transport of high risk neonates has evolved since 1987. This system has nationwide coverage and provides inter hospital transport for newborns at risk. The transfer team consists of a doctor and a nurse with training in neonatal intensive care and is supported by specially equipped ambulances.

## **4. Hospital emergency departments (ED)**

There are no national standards for hospital emergency departments and individual institutions determine the organisation of their departments. There is increasing awareness that this is unsatisfactory and optimism that a common structure will emerge in the near future.

In most hospitals there is a separate emergency department that receives all acute casualties. There are usually a large number of patients, many with problems that could be dealt with at primary care level by GPs. As in many other countries the Portuguese emergency department is burdened by weaknesses in other parts of the health system.

Even though emergency departments are physically separate departments they rarely have their own medical staff. This results in a lack of continuity and commitment. There is increasing awareness of this problem and there is a national trend, supported by the health authorities, towards an increase in the full time involvement of medical staff in Emergency Medicine [12]. Nursing and non-medical staff usually belong to the ED.

The physical structure and organization of emergency departments varies considerably between hospitals. An increasing number of hospitals are using specific triage models, particularly the Manchester Triage System.

There are close relationships between hospital emergency department and the pre-hospital services. The main general hospitals have their own pre-hospital team that is activated by the EMS dispatching system—CODU. If a patient needs to go to hospital, either transported by ambulance or helicopter, the

hospital is contacted with patient details. The EMS has protocols concerning transport of specific patients e.g. for coronary disease, stroke and trauma. In these situations ambulances and the medical team can bypass smaller or less specialized hospitals and take the patient to the most appropriate centre. All hospitals can apply for a helicopter team, through CODU, to perform inter-hospital transfers [13].

## 5. Aims for the future

The challenges for the Portuguese EMS are to meet the rise in demand for emergency care and to develop comprehensive systems to provide for unscheduled care. Particular attention has to be paid to each and every component in order to achieve the desired overall performance of the system.

A major goal is to get nationwide cover with the CODU system. More than 20 new medical teams are due to be available across the country by 2005.

INEM has a young and well-motivated workforce, who are keen to adopt new professional roles.

Extension of EMS skills requires investment in training and technology. One example is the development of Exceptional Situation Intervention Teams. These teams are a group of doctors, nurses, psychologists, ambulance technicians and planning experts. They receive specific training to enable them to be capable in multiple casualty situations [14]. A process of continuous quality improvement has been introduced concerning optimization of protocols, databases and training standards.

There is increasing awareness of the variability and deficiencies of hospital emergency departments.

Full time involvement of medical staff with emergency medicine training, and the use of specific triage models hopefully will be seen in Portugal in the near future.

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