iProcureSecurity
SOLUTIONS FOR EMERGENCY MEDICAL SERVICES

# EMS Decision Maker
## Recommendations

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# Introduction

Fostering the response capacities and increasing the cooperation of the European Emergency Medical Services Systems (EMSS) is of decisive importance for strengthening the resilience of European societies in the light of multiple hazards, calling for close cooperation of public safety and health authorities on an international level.

iProcureSecurity responds to this challenge by identifying the major issues the diversity of the Emergency Medical Services (EMS) ecosystem poses to the capability of working together, stimulating R&I uptake with a focus on increasing harmonisation of operations across Europe, while delivering requirements for R&I activities to boost the development of more homogeneous EMS systems.

To enhance the response capabilities of the EMS organisations across Europe and facilitate a clear needs assessment of a major innovation procurement action, the project seeks to:

**MOBILISE** practitioners of emergency medical services, researchers and experts from the field to build synergies among existing actor constellations and initiate knowledge exchange.

**ANALYSE** the European medical emergency services ecosystem, its capability gaps, challenges, and needs, and monitor R&D initiatives to create a catalogue of innovative solutions.

**ADDRESS** legal issues, ethical and societal aspects that should be taken into account by the design, development and deployment of new solutions in the emergency medical field.

**PROVIDE** specifications about common requirements and technical tender documents for the procurement of R&D, ready-to-use by the upcoming PCP action and external procurers.

This document provides an overview of recommendations for **EMS DECISION MAKERS** against ten main areas of the EMS Ecosystem which were identified during the iProcureSecurity project. In the following each area is briefly described.

# Recommendations

## The Scene

The scene presents many challenges to emergency medical services to provide high quality medical care in emergency situations and it strongly differs from relatively controlled working environment of hospital emergency rooms. Accident environments can be dynamic, chaotic, unpredictable, uncontrolled, sometimes dangerous and there is a significant time pressure; so, it is difficult for EMS providers to oversee all aspects of the scene and make right decisions. In addition, the intervention of bystanders is essential as they are in many cases the first ones at the scene providing important information on the patient and the environment and can if properly trained can start first aid until EMS practitioners arrive.

### Recommendations

- Awareness raising on the role of the bystanders during an event of medical emergency who can make initial assessment of the situation at the scene reporting potential health and safety risks to be encountered by the arriving EMS practitioners.
- Increased use of new technologies for communication between the involved EMS organisations on national and European levels and exchange of patients' medical data to ensure a faster and better provision of emergency pre-hospital care.
- Constant monitoring and maintenance of the defibrillator network.
- Response booths equipped with technology enabling multilingual emergency calls and people with disabilities to contact the emergency call centres.

## Ambulances

An ambulance is a medically equipped vehicle which transports patients to treatment facilities, such as hospitals. In some instances, out-of-hospital medical care is provided to the patient during the transport. Ambulances can be categorized in three main areas which are ground, air and marine ambulances. Following three different types of divided road ambulances are used in prehospital care to different degrees in EU Member States.

**Ambulance Type A:** Patient transport ambulance. Ground ambulance which is designed and equipped for the transportation of the patients who are not expected to develop a critical condition.

**Ambulance Type B:** Emergency ambulance. Ground ambulance which designed and equipped for the transportation, basic treatment and monitoring of patients. (Basic life support ambulance).

**Ambulance Type C:** Mobile intensive care unit. Ground ambulance which is designed and equipped for the transportation, advanced treatment and monitoring of patients. (Advanced Life Support ambulance).

### Recommendations

- Joint trainings between EMS practitioners and ED staff, including sessions with a focus on treatment of infectious diseases.
- Training of EMS practitioners on the use of telemedicine technology to provide medical care to patients living in rural areas.
- Provision of PPE and training for transport and treatment of patients with infectious diseases
- Introduction of new types of vehicles, such as motorbikes, allowing for the EMS practitioners to reach the patient in densely populated urban areas.
- Introduction of marine based vehicles allowing for the EMS practitioners to reach patients in inland water and sea locations.
- Increased capacity of transportations (higher patient weight, more patients transported at once).

## Safety and Situational Awareness

Emergency response is dynamic by nature - in every step from taking the call to responding on the scene. Upon dispatch to an incident, responders immediately get in a search of their most valuable commodity: information. Initially, responders are provided with the key information from the person reporting the incident and upon arrival, they obtain more information about the surrounding situation at hand. While treating the patient, additional information about the situation becomes relevant. During these initial phases of information gathering, it is of utmost importance to ensure the EMS teams' safety and taking care of the patient. Situational awareness can be explained as that responders: **Understand their environment / Can determine what's happening around them / Are able to predict what can/could occur / Can respond to or withdraw from it.**

### Recommendations

- Portable communication devices for each of the ambulance crew members including cameras to broadcast in real time about the current events at the scene.
- Implementation of tools for EMS practitioners to rapidly adapt their approach at the scene.
- Exchange of information on the situation and communication between the different EMS organisations.
- Application of digital tags (e.g. QR code) in the patient routing systems to facilitate the transmission and high availability of data between the different stakeholders in the EMS system.
- Augmented Reality (AR) systems to share situational information and send/receive advice from colleagues on response options.
- Situational Awareness training as part of a wider Human Factors / Crew Resource Management support for EMS first responders and decision makers (e.g. CRM4EMS).

## Medical Treatment

Medical treatment means the management and care of a patient to combat disease or disorder. Before transporting the patient to the hospital, the diagnosis and medical treatment at the scene is one of the most relevant EMS tasks in the field. The European Resuscitation Council has identified five conditions in which EMS play a most crucial role. These are: cardiac arrest, severe respiratory difficulties, severe trauma, chest pain including acute coronary syndrome and stroke.

### Recommendations

- Increased use of AI and telemedicine on the scene and during transportation.
- Improved extraction and visualization of real-time data and its standardization including patients' vital signs for further treatment decisions.
- Application of wearables, smartphone apps and standardized scores for initial care management and monitor deterioration of patients directly at their home.
- Use of enhanced wearable technologies and sensors to protect professionals and enhance their capabilities (e.g. to make diagnosis easier).
- Increased standardization and interoperability of communication equipment throughout Europe.
- Implementation of smart alarm systems with geolocation, especially addressing the needs of disabled and older people.
- Usage of voice-activated devices to allow professionals to work hands-free.

## Emergency Medical Communication Centre

Dedicated facility to answer emergency calls immediately, to identify callers' needs and to dispatch the necessary resources wherever and whenever an emergency need occurs. Incoming calls can use audio, video or text messages. The first aid instructions must be given from the EMCC. The appropriate ambulance type with right equipment must be dispatched to the scene. The data from patients, professionals and personnel are to be sent to the relevant experts and health institutions. All data must be recorded. There are regional and city-level EMCC that cover the necessary personnel, infrastructure and technology. There is no Europe wide harmonization for EMCCs. EMCCs can be differently handled even within one country. The needs are different for islands, main lands, rural and urban areas.

### Recommendations

- Better tracking of the actual location of ambulances and availability of real-time data about the traffic on the streets.
- Automation of information about EMS crews including number of responses and case types to ensure optimal allocation of personnel who are sufficiently rested and response ready to ensure EMS professionals' well-being.
- Recurrent dispatch training simulating situations with high volume of incoming complex calls and their prioritisation.
- Implementation of multilingual personnel in EMCC.
- Ensuring data protection (e.g. by blockchain) against cyber-attacks and (tighter) controls by data protection – or other responsible authorities.
- Application/implementation of technology in command centres for widening the possibilities to be reached in an emergency case (e.g. video calls, via social media; for disabled persons).
- Active management of EMCC personnel to ensure performance standards and well-being needs.

## In Hospital EMS

In Hospital EMS refers to all subsets of medical institutions and hospitals that have the capacity to deliver uninterrupted emergency care 24/7. Emergency Department demands continue to rise in almost all high-income countries, including those with universal coverage and a strong primary treatment network. Many of these countries have been experimenting with innovative methods to reduce the demand of acute care, while at the same time providing highly needed services that can prevent emergency department attendance and later hospital admissions. A large proportion of patients in emergency departments have minor illnesses that could potentially be handled by a health care provider in a primary care setting. The increasing number of visits to emergency departments causes not only delays in urgent care provision but it also increases the overall costs.

### Recommendations

- Real time data exchange between EMS professionals, Emergency Medical Communication Centers (EMCC) and Emergency Departments (ED) regarding number of available beds, specialist physicians, technical specifications, ambulance location, updated patient condition, etc.
- Increase the use of telemedicine applications between ED physicians and EMS professionals to speed up the initiation of appropriate treatment and thus improve health outcomes.
- Implement chronic disease management programs including the use of wearables and telemedicine to reduce the need of acute care.
- Augmented Reality (AR) systems for specialist input on patients.
- Training and guidance on legal and ethical aspects of data transfer between EMS professionals.
- Introduce Point of Care (POC) testing protocols in EDs.
- More budget for equipment and trainings.

## EMS Work Force and Training

Emergency medical services (EMS) vary across Europe, with two predominant models: the Anglo-American model which uses mainly paramedics in a prehospital setting, where 'the patient goes to the doctor'; and the Franco-German model which uses mainly physicians in a prehospital setting, where 'the doctor goes to the patient'. No perfect model exists, and each country has an EMS model based upon the needs of the community and the available economic resources. The number, the types and the level of training of ambulance personnel and teams are not harmonized in European countries.

### Recommendations

- Support employees' wellbeing through an appropriate training, career plan and further education.
- Establishment of clear rules for competences for each EMS professional type.
- Provision of specialized medical personnel for patients with psychiatric disorders.
- Increased availability of flexible shifts.
- Decentralized management and financial responsibility to involve EMS personnel in the decision-making process.
- Implementation of multilingual personnel in EMCC.
- Homogenization of ambulance staff.
- Classification of staff working in ambulances.
- Early recognition of burnout and mental health problems.
- Implement Human Factors / Crew Resource Management training to support individual and organizational resilience, well-being, and safety risk management.
- Implementation of new training approaches for mass casualty incidents.
- Provision of standardized training to dispatchers on "Dispatcher Assisted CPR".
- Provision of specific training and proper equipment for Disaster Medical Teams.
- Support EMS personnel training with lifelike locations and scenarios using augmented reality, virtual reality and mannequins.
- Provide access to and training on the use of personal protective equipment (PPE).

- Certified and continuous training of volunteers that offer a national professional competence standard.
- Offering/ doing continuous medical education including basic and advanced certification programs.
- Promote the use of tele-education instead of the face-to-face format (e.g. for pandemics such as COVID-19).
- Provide decision support software for cases where more than one first response team works together in order to improve incident management and clarify responsibilities of the teams.

## Medical Equipment

Medical equipment is used for the specific purposes of diagnosis and treatment of disease or rehabilitation following disease or injury. It can be used either alone or in combination with any accessory, consumable or other piece of medical equipment.

### Recommendations

- Periodic training of EMS practitioners in usage of technological innovations so they can handle them in emergency situations.
- Periodic prospective review of medical equipment innovations vis-à-vis medical equipment needs and EMS system readiness to implement new medical equipment.
- Advanced budget planning for new medical equipment.
- Use of lighter hydraulic stretchers.
- Use the learnings of the challenges during the Corona-Pandemic to develop a crisis plan for more resilience.

## Triage Systems

Triage can be defined as “the sorting of patients into priority groups according to their needs and the available resources”. It must ensure the efficient use of available resources e.g. personnel, supplies, equipment, means of transportation and medical facilities.

### Recommendations

- Provide virtual training of triage scenarios.
- Establish common or comparable triage protocols for every disaster.
- Establish common and improved understanding of MCIs (serious & major incidents) and definition of common criteria and procedures.
- Smoothening of the gap between START and ‘triage’ systems at the receiving end.
- Availability of new triage protocols at all time for EMS practitioners.
- Development and implementation of electronic triage to enable the information exchange between hospitals and dispatch centres that is GDPR compliant.

## Other

This area subsumes all additional aspects which are horizontally relevant for all areas of the emergency medical service ecosystem including financial, legal, political and administrative issues.

### Recommendations

- Regular evaluation of the systems and personnel.
- GDPR compliant digitalization of clinical data in all EMS processes.
- Better possibilities and a higher mobility for working internationally.
- To change the existing system and the working conditions based on the needs and requirements of the EMS practitioners.
- Strategic planning (prospective five-year plans) for EMS organisations, personnel and technical resources (e.g. equipment) including legal and ethical aspects of implementation of human and technical resources.
- Enrich training courses with novel technology developments in order to provide immersive learning through augmented reality devices, 3D glasses, data from real incidents.

# Join Us!

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