



## **Identifying Needs of Medical First Responders In Disasters** *NMFRDisaster*

(FP7 – theme 10 security funded project – Grant agreement No. 218057)



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## **Background**

The objective of the European Commission's Framework Program (FP) 7 – theme 10- security, has been declared:

"The objective of the Security theme is: to develop the technologies and knowledge for building capabilities needed to ensure the security of citizens from threats such as acts of terrorism and (organised) crime, natural disasters and industrial accidents while respecting fundamental human rights including privacy; to ensure optimal and concerted use of available and evolving technologies to the benefit of civil European security; to stimulate the cooperation of providers and users for civil security solutions; to improve the competitiveness of the European security industry and to deliver mission-oriented results to reduce security gaps."

One of the key issues promoted under the security theme is the involvement of "End Users" in the processes, thus ensuring that projects funded under this theme will meet existing needs in the field, and that products emerging out of the projects will be accepted by the users, so a real impact on the Market will be achieved (as proposed by the objectives of FP-7).

FP7 – theme 10 security, also aims on promoting cooperation between the end users, researchers and technology providers, creating strong networks.

*" Topic SEC-2007-7.0-02 European Security Research Networks (incl. for standardisation)*

**Technical content / scope:** With a view to informing the Security theme as well as security research initiatives in the Member States and Associated Countries, and also to exploit opportunities outside the Community scope, the task is to establish European networks of Member States and Associated Countries, private sector security research requirement owners, operative end-users and technology supply chain experts. This will facilitate a common understanding of needs amongst research requirement owners and end-users, with the support of technology experts, so as to identify technology solutions to meet the needs (on the basis of a joint capability and technology taxonomy), and thus will ensure increased effectiveness and efficiency. Technology oriented research strategies should be complemented by society related research strategies.

Strategic R&T roadmaps should be proposed to guide, orientate and underpin European, national and private research programmes. The networks should furthermore identify possible joint programmes or projects which could be undertaken between services, Member States / Associated Countries and EC or international organisations. Eventually, the networks should address how to cooperate effectively amongst user and supply side stakeholders to deliver security capabilities, how to encourage security innovation, and how to strengthen the technology supply chains from primary research via development to procurement. They should also contribute to the definition of new standards.

Preferably the networks should be based on existing organisations and structures (e.g. the CEN for standardisation). A steering group should ensure coherence between, and across, the different stakeholders and activities. Activities could be structured by mission to achieve homogeneous networks of users and experts. Where appropriate,



they should be inter-sectoral but must have a common basis of needs and possible solutions. Within strict conditions of confidentiality, maximum use should be made of secure ICT platforms and networks to exchange relevant data.

The activities of the networks could include an advisory function to the network of Member States' / Associated Countries' security research contact points established under topic SEC- 2007-7.0-04."

### **Identifying Needs of Medical First Responders in Disasters**

**(NMFRODisaster)**, was set up specifically in order to meet this objective – to create a strong multidisciplinary multinational network that involves researchers and actual responders, with representation from the providers side. This objective goes side by side with creating a roadmap for required research and development activities.

#### **The rationale of the project:**

Medical First Responders are responding in recent years to a rapidly increasing number of threats and scenarios. This reality is directly related to the technological environment we live in, to natural phenomena, as well as to violence - domestic and conflict related.

This reality requires that the organizations responsible for the medical response to the citizens, better train and prepare their responders, as well as equip them with the appropriate protective tools.

Ensuring an effective medical response regardless of its nature (manmade or natural, involving explosives, chemical, radiological or biological agents), is one of the most basic elements, that should be in place in each and every society. The EU policies specifically target these objectives, in the policies regarding security, civil protection and health.

As result of the climate change for example an increase in severe weather phenomena and storms is noted. This example, as well as the recent outbreak of Influenza A-H1N1 is good indicators of the complex reality that medical first responders face on a daily basis.

This project targeted mapping existing knowledge, and identifying areas where new knowledge and technologies are required.

Coordination and sharing of knowledge between first responders and research institutes were also targeted by this project, thus facilitating dissemination of best practices for the benefit of the citizens.

By identifying needs for further research and development, this project provided a unique opportunity to the European industry to identify the need for new standards to be introduced in the future new products, tailored for the needs of the medical first responders.

On going research efforts target these different areas. Never the less these efforts are not always coordinated with the needs of the medical first responders on one hand and the knowledge available in the research institutes is not always available to the medical first responders. This project was a first important step towards minimizing these phenomena.



5 areas of interest were identified for investigation within the framework of the project:

- 1) Training methodology and technology used to train medical first responders for disasters.
- 2) Understanding the human impact of disaster on medical first responders.
- 3) Ethical and legal issues influencing the medical response to disasters.
- 4) Personal Protective equipment used in Chemical and Biological incidents.
- 5) Use of blood and blood products in disasters.

### **Workshop 1 - Training Methodology and Technology:**

EMS services spend a considerable amount of money and energy in preparing responders, dispatcher and managerial staff for emergency situations.

The nature of an emergency situation is that a single staff member may encounter such an emergency once in his professional lifetime. Although it might be her or his first time in such an event, she or he is required to do it right on the first time. The price of ill performance in an emergency situation is too high.

On the other hand economic considerations make a daily training on this issue impossible.

This workshop had to deal with questions (among others) such as: training intervals, the most effective mixture between frontal learning and exercises, computer simulators, eLearning, training materials.

### **Workshop 2 - The Human Impact of Disasters:**

The scene of a large emergency or disaster might be overwhelming for the responder. Freeze reactions, are well known, but at the same time unacceptable for emergency responders. Understanding the dynamics of the single person's behavior, the group's behavior and the community behavior are essential for an effective response.

The objective of this workshop was to come out with an idea of how to prepare the responders mentally and emotionally to disasters, of course identifying where do we have gaps in knowledge that should be addressed.

### **Work shop 3 - Law and Ethics:**

Law and ethics are inextricably linked to good public health practice in emergencies. Given the maxim that all disasters are "local" events, state and local public health leaders need a clearly defined set of legal and ethical principles to help them make sound, real-time decisions for allocating scarce resources in a crisis. The all-hazards model of public health preparedness requires that any public health response



framework be adaptable to a variety of emergency contexts, ranging from pandemic preparedness to terrorism response to weather-related disasters. Despite the rich literature on legal and ethical dimensions of health emergency, there is still a lack of conceptualization on the new dimension created by world globalization, asymmetric wars, terrorism and post 9/11 scenarios. In particular, the European Union needs to develop a common understanding among EU member states and neighborhood countries because health emergencies, either natural or provoked, do not know borders. In the absence of the entry into force of the EU Constitutional Treaty, the Commission has taken the decision “to focus on the respect and promotion of fundamental rights for all people and to develop the concept of EU citizenship”.

This decision implies that spaces devoted to ethical conversation become paramount in those areas where it is necessary to take forward the political agenda of the Union, this is certainly the case of preparedness to medical disasters. To address this need, the workshop will assemble leading experts to legal, social, ethical implications of health emergencies and ask them to discuss three case studies against the background of the European Charter of fundamental Human Rights (ECHR).

#### **Work shop 4 - Personal Protective Equipment (PPE):**

Medical personnel are required to care for victims that might be contaminated with chemical or radiological materials. In some instances the medical personnel might encounter themselves working in a contaminated area.

At the same time, medical personnel need PPE while dealing with patients suffering from highly contagious diseases or the outbreak of a pandemic.

The PPE used today, especially for chemical incidents is adopted from the equipment used in the chemical industry.

Questions such as: the standard of protection, heat exposure of the user, time of donning on and off the equipment, universal equipment to all hazards, chemical and physical durability of the equipment, were address among others.

#### **Work shop 5- Use of Blood and Blood components in disasters:**

Although medical technology made huge leaps forward in recent years, we still depend on human blood and components to save lives. At the same time limiting factors as the need to test the blood (for type as well as against diseases), refrigerate the units, limited time to process the units, may be a very serious constrain on the capacity to meet the needs for blood in a disaster.



This workshop addressed issues such as (among others): rapid testing techniques, how to store blood in the field for prolonged periods of time, how to transport donated units, how to protect blood units from chemical / biological / radiological contamination.

**Partners:**

No	Organization	Country
1	Magen David Adom	Israel
2	SAMUR protection Civil Madrid	Spain
3	Ambulancezorg Nederland	Netherlands
4	Danish Red Cross – Reference Center for Psychosocial Support	Denmark
5	SINGERIE	Italy
6	Fundacion Rioja Salud	Spain
7	CSSC	Italy
8	Shield Group Inc.	Netherlands
9	Charles University	Czech Republic
10	Al-Quds Nutrition and Health Research Institute	Palestinian Administered Areas

Project Coordinator: Mr. Chaim Rafalowski, Emergency Management Director, Magen David Adom Israel.

**Methodology:**

For each and every workshop a leader was assigned –

Activity	Leader
Training methodology and technology Human Impact of disasters	SINERGIE
Blood in disasters	MDA
Legal and ethical aspects	CSSC
Personal Protective equipment	Shield Group





The obligations of the leader were:

1. Conduct a preliminary research pointing out the state of the art in the subject matter and areas that should be discussed during the workshops. This document has been distributed to the participants prior to the workshop in order for the participants to better prepare for the workshop.
2. Organize the workshop, including inviting the relevant experts and medical first responders, setting up the frame for discussions and the issues to be evaluated.
3. Issue a workshop report including the issues identified as requiring further R&D efforts.

The reports are enclosed as annexes to this report. → Chaim, will you please notice that the changes in the PPE-report we reported tot the workshop coordinator are integrated? To be sure, I enclose this report including our corrections by this report.

In order to facilitate the discussions, the members of the project agreed on the following terms:

1. **Disaster:** a sudden situation that has a severe impact on the regular life routine of considerable parts of the population. The medical implication is lack of resources, resulting in the impossibility to provide the regular medical care to those in need.  
Interestingly, there is no one agreed upon definition of a disaster situation. In the medical arena, one should usually refer to the number of casualties visa VI the treatment capacities (multi / mass casualty situations). The members decided to look at a broader definition, since major infrastructure failures (water, electricity, ICT) will cause a major disruption in the response capacities of the organizations, although not necessarily related to a huge influx of patients.
2. **Medical First Responder:** a trained individual who belongs to an organization, and is involved in the medical response to disasters. Although the role of ad hoc volunteers is well recognized, this area requires a separate research, since the motivation, as well as the legal framework, liability and training requirements need to be clarified first in order to determine who is the "spontaneous medical first responder"?

The workshops were highly participatory in nature, and gave place to ample discussions between the participants.

The workshops were a unique opportunity for encounters between the medical first responders and experts that did not meet previously, this was the case in the workshop on law and ethics, were for the first time experts in ethics and responders had the opportunity to share dilemmas raised from the field work (for example regarding the level of care provided in different





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countries during disasters, or the question should ethical decisions be made at the field operations level or at headquarters level having a global view).

The different participants of the project involved numerous members from their respective organizations, receiving their comments on the subject and having them as participants in the workshops. By doing so, another objective was achieved in the area of dissemination, thus bringing to the knowledge of the members of the participating medical emergency services the existence and objectives of EU funded projects.

### **Administrative procedures:**

The project had its initial meeting in Jerusalem on May 19<sup>th</sup> 2008.

During the meeting the methodology and project procedures were agreed and the time table was set up.

The meeting report is attached in the annex 1.

Since SINERGIE identified that the participants in the 2 programmed workshops (Training methodology and Human impact) are basically the same persons, and in order to save money and time, it was agreed to conduct the 2 back to back, and to have some discussions that will be relevant for both workshops.

The final meeting was conducted in Madrid on April 16<sup>th</sup>-17<sup>th</sup> 2009, hosted by SAMUR P.C.

The meeting report attached as in annex 1.

An administrative officer was assigned (Mr. Assi Dvilanski), who managed the financial and administrative aspects of the project, with the support of internal audit.

### **Conclusions and recommendations (the final workshop reports are attached as annex 2)**

- A. Human impact of disasters:  
disasters by nature strike without previous notice, facing the medical first responders with horrible images. At the same time, by the sheer nature of the disaster medical personnel are required to react in a professional and controlled manner, regardless of how overwhelmed they are by the images, smell and sound on the scene.  
The extent of the needs on the field compared to the capacity to adequately respond to them (by the person, the team and the organization) might cause severe frustration and a sense of helplessness.  
Existing training programs focus on the technical and operational procedures. We found very little if any reference to how to prepare



the first responders to the emotional shock they may feel arriving to a disaster scene, especially for the first time.

There is a vast literature and programs dealing with preventing traumatic stress disorders among responders, but again with very little reference to how to make sure that responders at the scene will not suffer from a "freeze / flight" reaction that human beings might have in face of adverse situations, especially where there is an eminent threat to their lives.

**The need would be to develop a tailored program, in order to prepare the medical first responders to deal with their emotions during and after a disaster (building resilience and coping mechanisms).**

In order to be able to build such a program there is a need to research and better understand who are the Medical First responders: identifying enabling and limiting factors, motivation, learning styles, needs for support.

There is also a need to identify what are the core competencies and factors that make an "excellent medical first responder", in order to be able to build an evidence based recruiting training and support programs, to promote retention and be able to build psychosocial support systems that will meet both the needs but also the style of the medical first responders.

(The project identified that medical first responders who work under adverse conditions, quite often perceive themselves as "super heroes", thus making mental health assistance not accessible to them, a factor that might result in high turnover which is characteristic of such services – an issue that while dealing with the cost effectiveness of systems and programs should be taken into account, thus worthy of adequate research).

B. Training methodology and technology:

The project identified that training for disasters is a common practice among the organizations responsible for emergency medical care in disaster situations. Never the less, we could not identify any evidenced based material to explain the curriculum of the training. Part of this variety could be explained in the difference in the emergency management structures between countries, others by different treatment protocols. But even when you compare the same issue – triage of victims for example, there is no good explanation why the amount of hours devoted to the issue was decided, and why are there differences between different organizations.

This issue refers not only to the basic training programs (at their different levels in different organizations), but even more extensively to refresher trainings. The organizations devote immense effort and resources in refreshing the training of their staff members and



volunteers for the seldom occurring phenomena of disasters. The project could not identify recommendations regarding such as the required frequency of refresher training, do different skills require different training schemes, do different positions in the organization require different schemes, is experience in actual emergency situations an enabling or limiting factor?

The role of full scale simulations in training, and how to achieve more out of those highly costly enterprises is another area where very little evidence is available.

The emerge is new learning techniques (such as elearning) pose a new challenge to the old way of training personnel. The when and how to use this technology for disaster preparedness should be understood – the main issue should be to understand the applicability of learning achieved by a single person, in the comfort of a room, to performance, as part of a team in an adverse situation?

### **The need would be to set up an evidence based curriculum for disaster training.**

in order to do so, there will be a need to:

1. Identify key competencies, skills, knowledge and structures critical for successful performance of the medical response during a disaster – at the individual as well as at the systems level.
2. Identify learning styles and teaching methodologies that are most effective for emergency responders are the most effective for teaching the previously mentioned competencies, skills knowledge and structures.
3. Determine criteria for evaluation of training programs.
4. Identify the right combination of theoretical lessons, practical lessons and full scale simulations for maximum learning effect.
5. Identify the role of and right combination in the training scheme of new training techniques (such as eLearning and computerized simulations).
6. Identify the most effective training sequence including pedagogical considerations but also cost effectiveness issues.
7. The project identified that there is progress being achieved in the areas of simulation, they focus on – either the medical treatment or the management issues of the incident.

In order to achieve major effect we believe that there is a need to build a system that will incorporate all the aspects of the incident management (from the "scene" operations to the highest management levels), enable interactivity between the participants, and use of the real command and control systems. This simulation system should also enable replay of



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activities and tracking of individual learning and improvement.

- C. The role of volunteers in medical response to disasters.  
Medical first response organizations rely on volunteers to provide surge capacity during disasters. These volunteers are playing a more and more important role in the response.  
The project identified that although organizations identify the importance of the volunteers, there are no agreed upon definitions regarding the use of the volunteers. For example, the definitions used – some organizations use "professionals" versus "volunteers" while others use "paid staff" versus "volunteers". In some organizations volunteers can perform the same tasks as paid staff, depending on their training, while in other organizations, the role volunteers play is limited.  
Issues such as the right of organizations to select volunteers, to terminate their activity in the organization, as well as the rights of the volunteer in the organization should be addressed.

**The need would be to set a basic charter for participation of volunteers in organizations aimed at emergency response**

in order to do so, there will be a need to:

1. To determine minimum criteria for enrolling volunteers in organizations aimed to emergency response.
2. To determine rights and duties of volunteers involved in emergency response (including selection procedures, and "volunteer contract").
3. To determine minimum training (basic and on going) for volunteers involved in emergency response.
4. To understand the profile of the volunteer, her / his motivation to volunteer and to stay as a volunteer in the system, his / her needs (professional and emotional) and expectations.
5. To set up programs (based on the identified profile, needs and expectation) to recruit, retain and train volunteers.

- D. Personal Protective Equipment:  
The threats that the societies face in the form of chemical, biological and radiological incidents (caused by natural – as an earthquake, man made as industrial or caused by criminal and terrorist activities), force emergency medical responders to work in contaminated areas or with contaminated patients using Personal Protective Equipment (PPE).  
The involvement of emergency medical responders in this area was a process addressed by each organization at it's own pace.  
Although there are many European projects regarding CBR issues,



the projects focus mainly on fire fighters and Hazardous Materials specially trained teams.

The project identified that there are no agreed upon tasks to be performed by medical first responders regarding the work to be performed in a contaminated area or with contaminated patient, thus there is no clear standard of PPE to be used. The PPE currently used by medical first responders is industrial or military standard equipment. This equipment was not designed to be used by medical personnel, meeting their specific needs, thus causing severe limitations on the performance ability of the provider.

The lack of standards determining "how clean is clean" (what is the concentration in the air of a toxic material that people can be exposed to without adverse health effects) is a major imitating factor in the capacity to develop criteria based decontamination protocols, and pointing out the needs for new sampling methodology and equipment, as well as for decontamination agents.

**The need would be to set up a CBR response program for medical first responders.**

In order to do so there will be a need to:

1. To set agreed upon tasks, operational procedures, standards, user requirements for the PPE.
2. To solve communications problem using PPE.
3. To develop standard decontamination procedures for chemical / biological / radiological incidents (for the pre-hospital and hospital environment) for – casualties, personnel, equipment, and the required equipment and materials required for decontamination.
4. To set up curriculum for training of personnel.
5. To set up safety procedures for personnel using PPE.

**E. Use of blood and blood components:**

The world of transfusion medicine has gone a long way in recent years, providing a more specific and safe therapy to the patients. These developments that made the blood transfusion into a high tech world, depending heavily on machines to test the blood and prepare the units for transfusion, make this system also highly vulnerable during disaster. A major disruption in water supply, electricity supply, as well as a shake caused by an earthquake might hamper badly the capacity of blood banks to perform their duties. Transport of blood requires very specific conditions. A hostile environment can cause the lost of precious blood units.



The main limiting factor is the fact that there is no replacement for human blood. During a major disaster collecting, mobilizing, testing and preparing blood components might not be feasible due to a problem in any of the above parts of the chain. Since there is no replacement for human blood, but human blood, this will cause the death of patients. This fact requires further research into novel solutions for blood supply during disasters.

**The need will be to develop novel solutions to blood supply during disasters.**

In Order to do so, there will be a need to:

1. Develop new products and procedures that can be stored for longer periods of time, and used readily after a disaster ( for example: frozen blood, frozen platelets).
2. Develop new robust testing techniques, which could be used in a "no-tech" environment.
3. Understand public attitude and behavior regarding blood donations, especially in situations that put the person under risk (e.g. during a pandemic). Then develop programs that will encourage people to donate blood despite the adverse condition.

F. Legal and ethical issues:

Although the actions of medical professional are regulated by relevant legislation, and the ethical implications of the decisions taken by them are obvious, it seems that when "disaster situations" are involved, there is less regard to the legal and ethical considerations.

1. Some of the medical professions are regulated under European standards (such as Medical Doctors – physicians). Not all the medical professions exist under this framework, especially "Emergency Medical Technicians" which are major participants in the pre-hospital response in disasters. This reality might prevent cross border response (between nation states or between states in federal states).  
In order to solve this:  
Minimum training curriculum and European recognized accreditation for para-medical personnel (Emergency Medical Technicians).
2. Current legislation in EU states deals greatly with the rights of the patients. A disaster might pose severe difficulties on the fulfillment of requirements such as a complete explanation to the patient about a procedure. At the same time, these rights can not be totally ignored. In order to target this issue there is a need for reference to disasters in current laws or a "disaster legal framework" that will refer to the implications of a "disaster" on current legislation.





3. Disasters have no political boundaries. The current situation is that within one member state there are different "emergency laws" a reality that of course exists between member states. In order to address this issue, there is a need for legal frameworks that will facilitate inter regional and international assistance.
4. Disaster planners take into consideration many issues, such as operational, human resources, logistics, and transportation among others.  
At the moment, there is no ethical framework to be addressed by the planners while planning an emergency response. In order to address this issue there is a need for a framework of reference on ethical implications of emergency response that should be addressed in the planning phase.

G. Other issues that the members of the project found as worthy referring to:

1. **Understanding the impact of cultural diversity on preparedness and response (both on the responder's side as well as on the community side).**  
EU member states are more and more multi cultural. Believes of the citizens have an important impact on their willingness to be involved in mitigation and preparedness activities, to be active during the response phase. These believe might also play a role in the way responders react during and following a disaster.  
In order to meet this issue, there is a need to conduct a research identifying the enabling and disabling factors.
2. **The role of the media, and new means of communication (e.g. internet, web based social networks) in preparedness (including training – for staff, volunteers and the general public) and response.**  
The media has become a key player in disaster response. The role of the different means of communication, especially visa vi different social groups, should be better understood, in order to set up a program to better use these means of communication in favor of the preparedness and response.
3. **Cooperation between response organizations, military (including multi national forces), NGO, international organizations in preparedness and response.**  
The response to disasters involves government entities, the civil society and its organizations (such as volunteer organizations and Non Governmental Organizations). Other entities involved include multi national forces (such as military) international intervention teams and large international organizations. The role of those international mechanisms, the cooperation and coordination mechanisms





should be better understood, leading to an agreed charter of international assistance during a disaster (involving governments, UN mechanisms and large international organizations and NGOs).

4. **Need for a strong knowledge management structure and network.**

During this project we were exposed to immense amount of work and research being done in different areas of disaster preparedness and response. Amazingly, there is no one data base that could be used as a reference for the state of the art research activities and actual response.

We identify an urgent need for a database which will include – research initiatives and results, lessons learned and best practices with the possibility to compare and share them. This tool should be open both to the operations officers as well as to researchers.

The work on such a database will create standards for reporting and operations, and create a common ground for operations.

This project showed us the importance of building a strong network that includes medical first responders, researchers and the industry in order to maximize our efficiency.

5. **Since there are many issues that are cross cutting for health and security research (e.g. pandemics) a joint call of health and security should be considered.**

Many of the issues dealt with in this project are also "health issues" (e.g. the issue of a response to a pandemic which is one of the major health as well as security threats to our societies). In order to maximize the EC efficiency, we suggest considering a joint call of health and security.



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**Thanks.**

The members of the project would like to thank Ms. Eva-Maria Engdahl, the EC project officer, for her continuous and tired less support to the project and it's members.