Identifying Needs of Medical First Responders In Disasters (NMFRDisaster)

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

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Tel-Aviv, June 2009

It is my honor and privilege to present you with the final report of the project Identifying Needs of Medical First Responders in Disasters (NMFRDisasters), funded by the European Commission under FP7.
Magen David Adom was privileged as the coordinator of this project, and honored to work together with distinguished Emergency Medical Services (EMS), research institutes and the industry.

The world we live in, experiences on a daily basis emergency and disaster situations, caused by natural phenomena or man made.
The increasing challenges, and decreasing resources, force EMS providers to be more and more effective.
The expectations of the governments as well as those of the public, along with the complexity of the incidents demand that we will be more and more professional by the day.

We could not meet the needs and challenges without a scientific research that will support the activities, and the industry that will develop the required technology.

The support of a dominant entity, such as the research bodies of the European Commission is such activities, guaranties efficient Research and Development that will promote the safety and security of the citizens and societies we serve.

I would like to thank the DG Enterprise and Industry - H.4, European Security Research and Development, for their support, and commend them for their vision and work towards promoting safer communities to live in.
The involvement of end users in projects, as required by the commission, is a real step towards more effective R&D.

I would like to use this opportunity to thank the partners of the project for their high level of participation and commitment to the successes and high quality results of this project.

This project presents the needs in the field, and I'm positive that the implementation of the recommendations will have the support of the EC, so we will benefit from its results –the responding agencies as well as the citizens, who sleep well knowing that in time of need, well trained, equipped professional responders will be there on due time to help them in time of need.

With my best personal regards,

Eli Bin
Magen David Adom, Director General

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 immerging 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 (NMFRDisaster), 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 realty 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 stuff 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, hoe 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. à 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 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. Buy 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 19th 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 16th-17th 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 feet 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 eLarning 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 incidentIn 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 activities and tracking of individual learning and improvement.

C. The role of volunteers in medical response to disasters.

Medical first response organizations relay 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 limitating 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-thech" 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.
5. At the moment, there is no ethical framework to be addressed by the planners while planning an emergency response.
6. 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.

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.

Project meetings (annex I)

NMFRDisaster – Minutes of the kickoff meeting – March 19th 2008

Agenda – Attached (annex 1)
List of participants – attached (annex 2).
Greetings from MDA director general – attached (annex 3)

A. Concept of the project and workshops:

1. The project focuses on the needs of the end users – the medical first responders to disasters.
   The leading idea of the project is to identify the state of the art on the subject matter (prior to the workshop), have a workshop to identify the needs of the end users and existing overlaps with existing knowledge / products (understanding that in some cases the problem might be not lack of knowledge / products in the field, but end users not aware of the current state of the art).
   The end product, after identifying areas where real gaps exist, is a prioritized list of targets, as agreed by the members of the consortium.
2. In order to have efficient workshops, it is the responsibility of the coordinator:
   I. To make sure sufficient participation of relevant end users, from different realities among EU members (including new countries). It is the commitment of all the consortium members to assist in the processes of identifying possible qualified participants.
   The final decision about the different participants will be made by the coordinator, based on the different participants suggested, and the right equilibrium of participants in the workshop.
   II. Participation of experts is also expected in the workshop (scholars and from the industry) based on their recognized expertise and experience.
   III. Look into current projects ongoing under different European initiatives, to see not only the existing state of the art, but also current trends and activities in R&D.
   IV. Issues of cost-effectiveness of different products / interventions should be considered while addressing the different topics in the workshops.
3. During the workshops a participatory approach is expected (it is an opportunity to share and exchange ideas on the subject presented, not a seminar).
   This approach should be clear to the organizers, as well as to the participants, who must be committed to an active role in the workshop.
4. Networking and sharing of best experiences and expertise is one of the expected outcomes of the project.
   The consortium as a whole and its members should look into possibilities for future cooperation in other projects (including in the 2nd call under FP7 – security, expected this summer).

5. In order to ensure common language in the project, it is the obligation of the workshop coordinator to have a clear set of determinations to be used during the workshop, distributed to the participants prior to the workshop. Any discussions regarding the working definitions must be agreed upon prior to the workshop, so these determinations are a common basis to the work.
6. For the scope of the project – Medical First Responders are – **trained personnel** (with different levels of training from basic to the advanced level), **who belong on a long term basis to an organization** (excluding from the scope of this project spontaneous volunteers and bystanders).
7. Emergency situation or disaster are defined for this project as- **a sudden interruption of daily activities** (of the private person, society or organization) **requiring medical assistance** (including psychosocial assistance).
8. Every workshop coordinator will provide the members of the consortium with a concept paper for it's workshop, including the; basic idea of the workshop, determinations, workshop strategy. **The document will be provided no later than June 20th, for comments until July 10th.**
9. Sinergie offered to provide the members with a questionnaire in order to identify the needs and expectations of the partners from the different workshops.

B. Time line:

Workshop	Dates	Venue	Remarks
Training methodology and technology Human Impact	10-12/11/2008	Turin	
Blood in Disasters	24-25/11/2008	Israel	
Legal and Ethical Aspects	11-12/12/2008	Rome	
Personal Protective Equipment	12-14/1/2009	Holland	
Post workshops meeting	TBD		To be decided by the members
Final meeting	16-17/3/2009	Brussels	

C. Relevant procedures:

1. The signed contract is expected from the EC by early June. Along with the contract the coordinator will receive additional forms to be signed by the authorized representatives of the partners. It is the responsibility of the coordinator to distribute the forms and have them returned signed.

2. Consortium agreement:
   I. The partners decided that there is no relevant background and for ground to be included in the consortium agreement.
   II. Besides the background and for ground the partners have no other comments on the consortium agreement.
   III. The new version of the consortium agreement will be sent by the coordinator to the members with the forms regarding the Grant Agreement arriving from the EC.
   It is the responsibility of each partner to send back the signed consortium agreement (signed by the authorized representatives as identified in the project data base), within 10 days to the coordinator.
3. Shield Group generously offered the consortium the possibility to use its secure website for information sharing.
   The partners agreed to use this site for sharing documents and ideas.
4. The partners agreed on a bi-monthly report to be provided to the project coordinator.
   The report will have one part referring to activities performed and progress achieved, and a financial report.
5. All the reports will be according to the Reporting Guidelines of the EC. The coordinator will make the document available to the partners.
6. Mr. Emilio Mordini, kindly offered to prepare a reporting template to be used by the members, as well as a format to the project's documents in order to intensify our visibility as a project.
7. The coordinator will prepare a contact list of the project members. All the relevant members who did not participate in the kickoff meeting are kindly requested to add their contact information to the list provided with the participants in the meeting.
8. Eligible costs and reimbursement procedures will be according to the grant agreement and Guide on financial issues of the EC.
   The coordinator will make both documents available to the participants.
   Specific questions raised during the meeting by the members to the project officer, where answered separately. The answers provided can be found in annex 4.
9. It is agreed by the consortium members that the contacts with the Project Officer will be done through the coordinator. It is the responsibility of the coordinator to ensure a transparent communication and delivery of full and speedy replies.
10. The Project Officer made clear to the members that any changes in the terms specified in the Grant Agreement, mandate an amendment to the agreement, agreed by both the consortium as well as the EC.
11. The members agreed that as a policy, all documents produced in the framework of this project are for public domain. Any alteration of this role requires a specific consideration of the members.

D. Dissemination:

1. The coordinator will prepare a short description of the project, to be used by the members when introducing the project to others.
2. MDA will devote a section in it's website to the project, including updates. All members will refer to this website, and make sure their websites have a link to the mentioned site.
3. It is the responsibility of all members to mention that this project is under (and funded by) the Frame Work Program number 7 of the European Commission, theme Security.
4. The coordinator will provide a proposal for the project's logo for the approval of the members.
   This logo (after agreed upon) is to be used in any document regarding the project (including presentations) besides the organization's relevant logo.
5. In press releases regarding the project, the partner will mention being part of the project, and will send a copy of the press release to the members.
   Press releases sent to international forums will be agreed upon and co-signed by all the members.
6. A participant wishing to present work involved with the project in a conference / workshop will duly inform the consortium members before hand.
7. Dr. Kobi Peleg will prepare a draft of guidelines for scientific publications of material resulting from the work of this project.
8. It is the outmost interest of this project to make the general public and the professionals in the field aware of this project, it's results and support future activities.
   In order to do so, the members will provide the coordinator with contact details of professional forums who might be interested in this project and it's results.
9. The participants will provide the coordinator with ideas about languages the final report should be translated to, and ideas for organizing a short event to introduce the relevant professional community in their country with the results of the project.
   Since these activities are not in the planned budget, participants should consider allocating money to these activities.
10. All members are requested to facilitate their network, knowledge and expertise to other members in order to make this complex work easier and fruitful.

11. I would like each and every one of you for your enthusiasm, commitment and very high level of professionalism who made our meeting not only fruitful but also a very pleasant one.

Chaim Rafalowski, Coordinator

Annex 1 – Agenda of meeting

Operations Division
Emergency Management Dept.
2008-4399-790
April 28, 2008

NMFRDisaster – Kickoff meeting, Agenda

Date: May 19th 2008
Venue: Hotel "Prima Kings Jerusalem" King George No. 60, Jerusalem.

May 18th – Arrival of participants (upon the flights schedule we will organize a social event / visit to Jerusalem).

May 19th:

0830-0900	Opening
0900-0930	Discussing project objectives – Chaim Rafalowski
0945-1115	The EC perspective and objectives – Project officer, Ms. Eva-Maria Engdhal
1130-1215	Work Shop 1- Training Methodology and Technology: SINERGIE
1215-1300	Work Shop 2- The Human Impact of Disasters: SINERGIE
1300-1400	Lunch
1400-1445	Work Shop 3- Law and Ethics in Disasters: CSSC
1445-1515	Work Shop 4- Personal Protective Equipment: Shield Group (will be distributed as a document, discussed and any comments transmitted to shield group who won't be able to attend).
1530-1615	Work Shop 5- Use of Blood and Blood Components in Disasters: MDA
1615-1700	Administrative and financial procedures – Chaim Rafalowski
1715-1800	Consortium Agreement
1800-1830	Dissemination activities
1830-1900	Time line for future activities
1900	Closure

Annex 2 – Greetings from MDA's Director General

Director General
May 18, 2008

Dear Colleagues,

It is my privilege to welcome you today, on the kickoff meeting of the European project – NMFRDisaster.
Last weeks events only demonstrate the complexity of the challenges medical first responders' face in emergency situations and disasters.
The fury of Mother Nature as well as man made disasters, pose a daily challenge to our capacity to meet the needs of those who desperately require our services and to save lives.
To meet that challenge, we must stand not only in the front line of doing, but also in the front lines of technology and research. We must strive always to be better, better prepared, more professional. In order to do so, we must embark with us on the journey the latest technology, but never forget that our most important strength is our staff and volunteers, who do the hard work.

The European Commission, recognizing the importance of the work done by Medical First Responders in Disasters, and particularly, with a view that should be especially commended, that research should be focused on the needs of the end users, is contributing dramatically to the safety and well being of so many.
Emergency organizations with better trained, equipped and resilient responders, who can work with better safety, are a key component in their society's capacity to deal with disaster which may occur at any moment.

I'm proud that the European Commission recognized the capacities of Magen David Adom, Israel's National Emergency Medical Service, Blood Service and Red Cross National Society, to lead this project.
I would like to thank you all, for embarking the challenging project with us.

This is a unique opportunity for a partnership, which is not only multi-national but also a partnership between research and field personnel. I'm certain that this combination is essential to the fruitful impact expected from this project.

We are especially privileged to see here today and as part of this project, out Palestinian colleagues. Magen David Adom works day by day, our by hour jointly with the Palestine Red Crescent society, responding to the needs of every one, regardless of their nationality, religion or gender. This project is one more opportunity to demonstrate the values that are the fundamental principles of our work.

I'm positive that this project is only the first phase in future cooperation. Only vast international cooperation, involving end users, the industry and research institutions, can lead us ahead, ensuring a more professional, efficient and safer response to the disasters that the future has for us.

I can not conclude without thanking Dr. Neomy Soffer from ISERD, the mother of the idea of this project, who supported it in each and every step. Without her support this project would have never come true. Another special gratitude goes to Ms. Eva – Maria Engdhal, our project officer. She has been our right hand bringing this dream to a reality. It is my special honor and pleasure to welcome them here today.

On behalf of Magen David Adom, I welcome you today, it the most beautiful city of the world, Jerusalem.
I know that you have a busy day ahead, and that we have a lot of hard work in this project. It is not the work of a single person, but the joint work of those participating in this meeting, and the organizations you represent.

The European Commission trusts us all that we will provide them at the end of this project with a product that will enable them focus research and development efforts in directions that will provide the citizens with better response in times of need.
It is a challenge that I'm very certain we can handle not only successfully but also with great pride.

I wish a pleasant stay in Israel, fruitful discussion and a very successful project.

Eli Bin
Director General

Annex 3 - List of Participants – Kickoff meeting – Jerusalem May 19th

Name	Surname	Organization
Emilio	Mordini	CSSC
Stepan	Vymetal	CUNI University
Sabri	Zahra	El-Quds University
Ziad	Abdeen	El-Quds University
Roberto	Villaescusa	Fundacion Rioja Salud
Neomy	Soffer	ISERD
Kobi	Peleg	MDA
Assi	Dvilanski	MDA
Eilat	Shinar	MDA
Chaim	Rafalowski	MDA
Eva-Maria	Engdhal	Project officer
Nana	Wiedemann	Red Cross Reference Center for Psychosocial support
Paloma C.	Rey	SAMUR Madrid
Ety	Richman	Shield Group
Eyal	Manolovici	Shield Group
Monica	Eula	Sinergie

NMFRDisaster – Final meeting

Tel-Aviv May 3, 2009,
2009-4399-393

A. On April 16th- 17th the NMFRDisaster held its final consortium meeting, in SAMUR Protecion Civil headquarters in Madrid.

B. Participants in the meeting:

No	Organization	Name	Surname
1	SINERGIE	Monica	Eula
2	El Quds University	Sabri	Zahara
3	El Quds University	Ziad	Abdeen
4	MDA	Eilat	Shinar
5	MDA, project coordinator	Chaim	Rafalowski
6	MDA, administrative officer	Assi	Dvilanski
7	Shield Group	Eyal	Manolovici
8	Charles University	Vymetal	Stepan
9	CSSC	Holly	Ashton
10	Fundacion Rioja Salud	Roberto	Villaescusa
11	Ambulancezorg Nederland	Margreet	Hoogeveen
12	Ambulancezorg Nederland	Nicolaas	Reumer
13	Ambulancezorg Nederland	Eduard	Worm
14	SAMUPR PC Madrid	Paloma	Rey
15	Danish Red Cross – Reference center	*	
16	EC – Project officer	Eva Maria	Engdhal

* The director of the reference center – Nana Weidman informed prior to the meeting that a representative will not be able to attend, and the decisions agreed upon in the meeting are accepted by their organization.

C. Objectives of the meeting:

1. To adopt the different workshops reports and recommendations.
2. To set up the recommendations of the project to be presented to the EC.
3. To agree on the dissemination activities to be conducted.
4. To clarify the administrative procedures required to successfully conclude the project.

The objectives of the meeting and agenda were sent to the members 2 weeks prior to the meeting, with no comments.

D. Agenda:

April 16th:

1400	Welcome
1430-1600	Discussing the workshops: "training methodology and technology" "Preparing for the human impact of Disasters"
1630-1700	Administrative procedures – Assi Divilanski
1700-1745	Future Dissemination Activities
1745	Rap up
2030	Dinner

April 17th:

0830-0915	"legal and ethical aspects"
0915-1030	"Blood and blood components"
1100-1145	"Personal Protective equipment"
1145-1300	Discussion on recommendations
1300-1400	Lunch
1400-1500	Recommendations – Continued
1500-1545	Future activities / cooperation
1615-1630	Project officer
1630-1700	Closure
1700	Visit to SAMUR

Due to late arrival of flight, the agenda was adjusted. All the planned activities were achieved on due time.

E. Workshop reports and conclusions:

1. The 5 workshops conducted during the project were presented by the coordinators.

2. The presentations used to present the different activities – attached.

3. The participants provided important input to the conclusions presented, which created an interesting discussion.
   All the suggested activities were agreed by the participants.

4. A detailed document, with all the proposed activities will be sent by the coordinator shortly.

5. **The main areas identified as requiring further R&D are**:
   5.1 Who are the medical first responders – identifying enabling and limiting factors, motivation, learning styles, needs for support. Building evidence based recruiting, training and support programs, needed core competencies.

5.2 The role of volunteers in emergency response, recruitment, training, retention, "volunteer contract".

5.3 Training:

1) The need for evidence based training programs for medical first responders, effectiveness related to goals and performance. The training issue should incorporate both basic training as well as refresher trainings and trainings for managerial stuff.
2) Training should consider learning styles, the role of full scale field drills and simulation and the role of new tools such as elarning.

5.4 Personal Protective equipment –

1) The need to set agreed upon tasks, operational procedures, standards for the equipment, user requirements.
2) The need to solve communications problem using PPE.
3) The need to develop standard decontamination procedures for the chemical / biological / radiological incidents (for the pre-hospital and hospital environment) for – casualties, personnel, equipment, and the required equipment.

5.5 Use of blood and blood components:

1) Develop new products and procedures (frozen blood, frozen platelets).
2) Develop new robust testing techniques, which could be used in a "no-thech" environment.
3) Understand public attitude and behavior regarding blood donations, especially in situations that put the person under risk (e.g. during a pandemic).

5.6 Legal and ethical issues:

1) Minimum training curriculum and European recognized accreditation for para-medical personnel (Emergency Medical Technicians) medical first responders
2) Reference to disasters in current laws or a "disaster legal framework" that will facilitate inter regional and international assistance.
3) A framework of reference on ethical implications of emergency response that should be addressed in the planning phase.

5.7 Understanding the impact of cultural diversity on preparedness and response (both on the responders side as well as on the community side).

5.8 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.

5.9 Cooperation between medical response organizations, military (including multi national forces), NGO, international organizations in preparedness and response.

5.10 Need for a strong knowledge management structure, which will include – research initiatives and results, lessons learned and best practices with the possibility to compare and share them, and a strong network that includes medical first responders, researchers and the industry.

5.11 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.

F. Dissemination activities:

1. The following dissemination activities are planned by the partners:

No	Organization	Planned activities
1	**SINERGIE**	1) Will be done jointly with the publication of the RED project book. 2) Presented in a press conference (jointly with RED) 3) One day workshop (jointly with RED) with Civil protection Authorities and different forces
2	**El Quds University**	1. Presented in a seminar for health care professionals in El-Quds University. 2. Would like to have an Arabic version of the final report for dissemination.
4	**MDA**	1. Organize 1 day workshop for management. 2. Present the results in the national Blood Banks

No	Organization	Planned activities
		conference on June 25th. 3. Prepare an article to be submitted for publication in a professional Emergency Medicine Journal. 4. Will submit a presentation on the project to the International Emergency Medicine congress planned for January 2010.
7	**Shield Group**	1. The project will be presented at a US Department of Homeland Security Conference to be held in Chicago at a date yet to be determined. 2. The project will be presented at the next international training of mass casualty professionals to be held in Israel by the Institute of Terrorism Research and Response. 3. The project will be presented at an in-service for Emergency Management Personnel at Philadelphia University in July, 2009. 4. The project will be presented at a NATO conference which is tentatively scheduled for late 2009.
8	**Charles University**	1. The project will be presented in WADEM conference (as part of a larger presentation) – mid May. 2. The project will be presented to the Czech ministry of interior, psychologists association and Charles University professional forums.
9	**CSSC**	1. Organize a 1 day seminar in Rome May 29th 2009 .
10	**Fundacion Rioja Salud**	1. Try to present the project in the annual conference of the Spanish health Ministry - October. 2. Present the project in the annual meeting of Blood Banks directors – September.

No	Organization	Planned activities
11	**Ambulancezorg Nederland**	1. Organize 1 day seminar for relevant Dutch professionals. Date to be confirmed.
14	**SAMUPR PC Madrid**	1. Have a session on the project as part of the annual Disaster Conference, Madrid May 22nd-23rd, partners from the project will be invited.
15	**Danish Red Cross – Reference center**	1. To be confirmed

2. All the partners will update their respective websites regarding the project results and planned dissemination activities.

3. MDA will prepare a short video clip presenting the rationale behind the project, the project activities and its results.
   All partners are requested to support this effort with graphic material that may contribute to preparing this clip.

4. The project officer informed that the project will be presented in the FP7 conference in Prague and in the FP7 – Security research event in Stockholm.
   The updated project brochure will be sent by the project officer to the coordinator shortly.

5. MDA will prepare a book with the materials of the project and its reports, as well as a CD.
   The book will be available for the partners and relevant institutions. The CD will be available on larger quantities.

6. All partners are requested to set up a meeting with their respective National Contact Point (NCP) for FP7 – research, and present her / him with the project, results and recommendations for future activities.

G. Administrative procedures:

1. The project officer informed that the formal amendment to the GA is being prepared by the financial department, and she is personally looking into it.
   The new ending date of the project will be June 30th 2009.

2. The required forms, which were presented in the meeting – attached.

3. Due dates (as agreed in the meeting):

3.1 **Second week of May** – report on the actual expenditures of the project, as of April 3oth, and an estimation of expenditures until the end of the project.

3.2 The mentioned report should include a clear identification of the payments to external suppliers and a justification of those. These reports will be submitted to the project officer for a final clarification, should we have an amendment to the GA regarding "sub contracting". This clarification should be made after an assessment if those expenditures could be considered "minor" and none related to the key aspect of the work (in such a case the amendment is not required).

3.3 **July 15th 2009** – Final financial report. This date is a must, since there is a need to review the reports, ask for clarifications (if needed), and prepare the consortiums report, which should be submitted to the EC by August 30th. Please be advised that we will receive the remaining funds, only following the approval of our financial report by the financial officer.

H. The participants of the meeting would like to express their gratitude and appreciation to SAMUR P.C. Madrid and especially to Ms. Paloma Rey, for the organization of the meeting and their warm and welcoming hospitality.

I. I would like to use this opportunity to thank all the members of the consortium for the commitment, high level of performance and dedication to this project.
It is my believe, that this project brought to the European level the voice of the people in the field – their needs, expectations and beliefs. I'm very sure that this project is only a beginning, and that we will see the fruits of our work and cooperation in the future, also in the form of a strong networks of professionals, that will grow, and will have a real impact on the well being of the citizens and communities we serve.

With my best regards of friendship,

Chaim Rafalowski
Coordinator

Cc: Project Officer, EC

work shops reports (annex II)

NMFRDisaster

identifying the Needs of Medical First Responders in Disasters

Human impact of disasters

Training methodology and technology

Conclusions & future researches

Sinergie S.r.l.

FP7-SEC-2007-1
Grant Agreement No. 218057

NMFRDisaster

identifying the Needs of Medical First Responders in Disasters

Coordinator: Magen David Adom (ISRAEL)

Partners:

- Al-Quds Centro di Ricerca sulla Nutrizione e sulla Salute (PALESTINIAN ADMINISTERED AREAS)
- Ambulance Zorg Nederland (NETHERLANDS)
- Charles University (CZECH REPUBLIC)
- Danish Red Cross (DENMARK)
- CSSC - Centro per la Scienza, la Società e la Cittadinanza (ITALY)
- Fundacion Rioja Salud (SPAIN)
- SAMUR Servicio de Asistencia Municipal de Urgencia y Rescate (SPAIN)
- Shield Group Inc. – Security and Counter Terrorism Management (NETHERLANDS)
- SINERGIE Training and Human Resources Management (ITALY)

INTERNATIONAL WORKSHOPS: discussions and conclusions

Human impact of disasters

Training methodology and technology

Torino, November 10-12 (2008)

SEVENTH FRAMEWORK PROGRAMME

FP7-SEC-2007-1
Grant Agreement No. 218057

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Visit to UNICRI at United Nations Turin Campus
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Agenda for the workshops organized by Sinergie S.r.l. in the frame of the project NMFRDisaster

Torino, November 10-12 (2008)

Camplus – Foresteria Lingotto
Via Nizza 230 – c/o 8 Gallery
Ramp Nord 4th floor

Human impact of disasters

Training methodology and technology

10.11.2008

Understanding the human impact of disaster on first responders

9.00	**Opening** Welcome and declaration of workshop's aims • **M.Eula -** Sinergie (I) • **Ch.Rafalowski -** Magen David Adom (IL)
9.20	**Chairman: D.E. Alexander -** CESPRO (I) They debate on: - Psychological and human consequences of disasters for medical first responders - Preparation and reinforcement of resilience - Strategies for coping
9.40	• **M. Rolle / P. Rey** - Samur PC Madrid (E)
10.00	• **A. Ytre** - IFRC for Psycological support (DK)
10.25	**Coffee break**
10.45	• **J. Bartlett -** New York City Fire Dep. (USA)
11.15	• **Z. Abdeen** - Al-Quds University (Pal)
11.45	• **E. Mordini** - CSSC (I)
12.00	**Question time**
12.40	**Lunch time**
14.30	**Parallel workgroups**
16.30	WG1 Rapporteur **S. Vymetal** CUNI (CZ) / WG2 Rapporteur **Ch. Rafalowski** MDA (IL) / WG3 Rapporteur **E. Babaud** CRF (F)
16.30	**Coffee break**
17.00	**Parallel sessions** Exchange of conclusions among rapporteurs Video: key points for reflection and promoting the debate - **Samur** (E)
19.00	**Sightseeing Dinner**

11.11.2008

9.00	**Chairman: D.E. Alexander -** CESPRO (I) **Images that speak out** Videos, tools, photo exhibit for training, reinforce abilities and prepare MFRs to understand human impact of disasters
9.15	• **P. Ingrassia** - Università Piemonte Orientale Medicina di Emergenza e dei Disastri (I)
10.00	**Coffee break**
10.30	• **S. Badiali** - Maxiemergenze AUSL di Bologna (I)
11.10	• **A.Richman / M.Butler** - Shield Group (IL)
12.00	**Rapporteurs to plenary / Open debate** First conclusions by speakers
13.00	**Closing workshop**: identify needs for future R&D
13.30	**Lunch time**

Training methodology and technology used to train medical first responders for disasters

	Visit to UNICRI at United Nations Turin Campus Welcoming by **F. Cappè** **Chairman: A. Contaretti**
15.00	- Introduction to the Security Governance/ Counter Terrorism Laboratory
15.15	- Major Events Security: a case study -**IPO** Security Planning Model
15.30	**Coffee break**
	-EU-SEC I/II Research coordination methodology among EU Member States
16.15	-Training Innovation
16.30	-Networking and Exchange of information
20.00	**Gala Dinner**

12.11.2008

9.00	**Chairman: F. Della Corte** - Università Piemonte Orientale (I) They debate on: - The relationship between methodologies and goals in the training planning - Role of training in the MFRs psycho-social support - Training for medical first responders
9.30	• **J. Gimenez** - Samur P.C Madrid (E)
9.50	• **W. Gruitjers** - Ambulance Zorg Netherland (NL)
10.10	• **U. Shacham** - Magen David Adom (IL)
10.30	**Coffee break**
11.00	• **A. Richman / M. Butler** - Shield Group (IL)
11.30	• **D. Vaitkaitis** - Kaunas University of medicine (LT)
12.00	• **F. Sbatella / M. Molteni -** Università Cattolica del S. Cuore Milano (I)
12.30	**Question time**
13.00	**Lunch time & running coffee break**
14.00	**Round table & conclusions:** Roadmap for future research activities in training medical first responders area
16.00	**Closing workshop:** identify needs for future R&D

DECLARATION OF WORKSHOP'S AIMS

Good morning all of you and welcome.

I'm pleased to welcome you in Turin at the workshops we have organised within the NMFRDisaster project.

I welcome the partners we share this project with, the guests and the experts. We have invited you to have a confrontation with us and to enrich the framework of knowledge about human reactions to disasters and MFRs training.

I also give you in advance the welcome of the United Nations – United Nations Interregional Crime and Justice Research Institute – we will meet tomorrow in their campus here in Turin.

We decided to organise this visit to confront ourselves not only with the institutional and government training for big events, as the Olympic Games, but also with the methods of research and exchange of information useful for prevention.

Sinergie have conceived these 3 days as an alternation of both moments of relation, speeches during the plenary session, and group activities, focusing, by using the experience, on what the review of literature has underlined. We have decided to show you videos and images because this kind of communication has a suggestive force on human experience and training.

In this respect, I would like to thank all the people who gave them to us.

The photos you will see, provided by Maria Carmen Castillo and Daniel Gonzales, have also been awarded the prize Emilio Moreno Millan as the best photograph.

Considering the big steps made in the field of emergency and simulations having an educational purpose, some systems of training will be presented in a dynamic and interactive way.

It will give us the opportunity of discussing about it, relating to the two issues we face in these workshops and to the experience we get about the need of being supported and trained to face both events having a great human impact, and daily circumstances linked to the work organisation.

Therefore the preparation of this workshop has focused on some questions and issues:

- **What MFR and the agency they work for can do**

- **What others can do for MFR**

-**What contents and role for training**

Everything is in view of the common elaboration of proposals to submit to the European Commission in order to get more specific actions, studies in-depth, and a closer and more efficient link between the world of research and that one of emergency.

Dear Colleagues, in the future days and months for some of us we will have an interesting work to do, by taking care of this goals and using a practical approach to make progress together.

So, have a good job!

ISSUE PAPER FOR PARALLEL WORKGROUPS

This issue paper has a double purpose.

The first one is to **focus more on some topics** that the survey on existing research (background paper) has found to be central.

The second one is to determine **future directions** that should be followed both when doing research and when working on new solutions or on current practices considered missing or inadequate. In the case of organizations or studies that have progressed a lot, it will be convenient to point out their fundamental characteristics and how much these can be transferred to other contexts and organizations.

These two points will be addressed during the workshop activities, which will be held in Turin on 10th/12th November as a part of the NMFRDisaster project on human impact and training. There'll be the opportunity of an exchange of ideas between experts and practitioners during workgroups and plenary sessions and also a confrontation with other projects on security issues.

This paper, therefore, is organized according to a series of questions that will guide workgroup activity on 10th November 2008.

Workgroups are essentially made of two kinds of speakers: training and psychological support specialists (Experts), first responders (MFR). It is therefore necessary that the workgroup manager ask each question to who can better address it.

So the objective isn't getting all participants' answer for each single question, but having direct dialogues aimed at determining as best as possible what experiences are useful to complete the picture offered by the background paper.

It depends on the workgroup coordinator's personal experience the decision of making some introduction examples or others before every question, and the different modalities used for helping the dialogue.

It is important to take into consideration the following factors:

- The available hours are: 2
- You should control the discussion in order to make possible the participants having theoretical knowledge can “intimidate” those who have a more practical knowledge (e.g. using a language for specialists)
- You should support those factors coming from experience instead of extemporaneous conjectures
- Let the participants freely express their constructive criticism even if addressed to their organisation.

1) MFRs have a quite defined profile, according to US psychologists. They have a “Mission First” perspective, a “Band of Brothers mentality”, an “insider-outsider mentality”. Their attitude is “Don’t get hurt, don’t feel and don’t get off the line.” In many of the services the major barrier to seeking care for mental health issues is the stigma associated with mental health problems.

   - Do you recognize yourself in such a profile?
   - Is the insider-outsider mentality really so strong or are there people outside the group in whom rescuers trust (in the US the Chaplains appear to be very trustworthy)?
   - Is your organization marked by stigma associated with mental health problems?

2) Some practical strategies can be incorporated into the daily routine of managers and workers in order to prevent and manage stress. Workers must get a solid understanding of their roles and responsibilities, think about their own self-care (recognize and pay attention to early warning signs of stress reactions) and seek help when they need it.

   - How difficult is it for you/MFRs to become aware of the fact you/they are exceeding your/their limits? Is this difficulty the reason why the buddy system, getting co-workers to agree to keep an eye on each other's stress reactions, appears to be so important?
   - Is a clear definition of individual roles the norm while operating in emergencies?
   - Are there exit interviews and/or seminars to help workers put their experiences in perspective and is stigma-free counselling usually offered to rescuers in your organisation?
   - Do MFRs feel their agency would respond constructively if they revealed signs of stress or other difficulties?

- A first research shows sense of humour is quite common among rescuers, and has different beneficial effects on their job and well-being. Are there other confirmations?

3) Research suggests that individual factors appear to be preeminent in determining the response to a disaster, but that also the nature and scale of a disaster are important. Among individual factors, gender and pre-existing psychopathology are strong predictors of possible postdisaster psychiatric problems, together with the occurrence of other adverse life events.

- Talking about nature and scale of a disaster, is it true that "Bigger is worse than smaller. Human-caused tragedies are worse than natural ones, and terrorism is worse than engineering failures"?
- "Women exhibit twice the prevalence of PTSD, other anxiety disorders, and major depression as men". Do researchers in workshop somehow confirm this statement?
- The above mentioned factors influence the general public's response to a disaster. Do MFRs feel they are able to cope better with any of these factors, especially with the individual ones?

4) Mass media can be a useful resource as much as a big problem. E.g. responders from Katrina indicated they needed more training in how to deal with the mass media. FEMA offers rescuers a training course dedicated to crisis communication and relationship with media during a crisis. In 2003 a national Media Emergency Forum (MEF) and regional ones were established in the UK, with the objective of developing trust and confidence between the media, government and FRs.

- Do initiatives that resemble the MEF one exist elsewhere/in your organisation?
- Do MFRs in workshops consider relationship with media to be a problem?

5) Recruitment and selection of personnel are crucial processes for an organization. Based on the results of careful screening/assessments, the agency has to suitably match workers to specific assignments. Agencies should have clear written policies regulating all matters, from practices to ensure staff well-being, to issues such as work hours, communication with loved ones at home, communication and information sharing, etc.

- How much attention do recruitment and selection of rescuers usually have?

- Do MFRs feel they are too easily assigned tasks not suitable for them?
- Do MFRs think an unclear agency policy could really jeopardize their well-being and have negative consequences on their work? Are there any recurrent complaints?

6) Talking about the psycho-social support responsibility of the international agencies in case of disasters in human rights dimensions as in the Operational Guidelines and Field Manual on Human Rights Protection in Situations of Natural Disaster by IASC:

- Is it important that all MFRs receive some training and education on psychological issues?
- What are the competencies in psychological issues needed by MFRs ?
- How much is important to involve in rescue operations emergency psychologists for MFRs support in their tasks?

7) Ties between rescuers are very important (band of brothers mentality, buddy system), at least in the case of US rescuers reported in the background paper. That's why support among colleagues appears to be vital, and this also explains the success of peer support programs. The International Association of Chiefs of Police has even ratified Peer Support Guidelines (2006).

- Are MFRs familiar with peer support programs?
- Do MFRs consider colleague support as a vital resource? Are there examples of situations where there's a major tendency towards exclusively individual work and stress coping?
- Small peer group debriefings would seem easier to tolerate and less shameful than individual ones?

8) Rescuers from different organizations/countries have set up on line networks (Aid Workers Network**,** Soccorritori.it, S.O.S. 112, Les forums de discussion de Secourisme.info). Some workers also keep a blog.
   - Are MFRs in the workshop familiar with these sorts of rescuer communities?
   - If yes, do they find them beneficial? Do they feel like trusting people they don't know but that have similar jobs? Could these on line networks somehow work as a form of peer support?
   - Do MFRs in the workshop keep a blog/read other rescuers' blogs? Do they think writing about their experiences useful?

9) Training is an important way, even though it's not the only resource available, of ensuring that intervention is conducted efficiently and

promptly, and that workers intervening can work in the best possible conditions.

- What role does training have in your organization? How does training enable you to better perform your duties and how does it provide you with up to date skills, in order for you to cope with new technologies, threats and needs? How and how frequently are refresh courses organized?
- Are information technologies (simulation, e-learning, etc.) useful for learning? Are interactions and exchanges, extremely frequent among first rescue organizations during an emergency, adequately reproduced and facilitated when using training based ICTs?
- On field exercises offer something different? What?
- Please write down the 5 most important things that you think should be improved in the training for disasters

10) In some organisations is established a certified program to train company officers: this includes training cycles and refresher courses. The certification expires months/years from the date of completion, and re-certification is provided by the organisation prior to the certification's expiration. In some organisation full duty members are scheduled for training sessions on their off-duty tours and receive overtime compensation.
    - Do you have a such offer in your organisation?
    - If yes, do you think this kind of organization of training courses somehow affect workers negatively?
    - Do you resent of a work overload in case your training is provided in your free time? If yes, do you have suggestions.

The dialogue during the WGs has been very rich from every point of view.

Some aspects of the experience demonstrate that it is necessary to go beyond some visions offered by the literature or by perfect model, because we have to focus on the *man in action.*

By looking at this *man in action,* we can also understand the real needs and the direction to follow in order to achieve the goal of future research and studies.

When we speak about human needs, we have to consider them in a global way, not only accepting an aid from the different disciplines which can contribute to better know reality, but also paying attention to not to take the risk of detaching from reality.

We could summarise some key points following what emerged during the workgroups and the speeches.

For what concerns the **MFR's profile,** we can affirm different statements. Some of them linked to the reason of the choice, others to the culture and the country the person belongs to.

Another important point is how the FR is seen from the outside and how he sees himself (mission first perspective). On this topic, the theoretical and empathised vision given sometimes by the media which have exaggerated the FR's role and task.

An aspect of superhero is created, which is not human and difficult to support in human life.

Another interesting link exists between **life experience and professional experience**, in the ability of facing some situations difficult to overcome because of the human impact aspect. It is necessary to pinpoint our attention on this topic.

Another important aspect is **the reason MFR act for**, which is personal and influenced by what one believes in. Because, if what one believes in shapes life, it will be the look one will have towards everything.

It has some implications on how the danger is perceived, on the existing link between the ability of looking at disasters and not understandable situations.

Community. Often the resources for coping and overcame a difficult circumstance lie in the ability of being a support for each other and in friendship. This is the case of a colleague, family, etc.

We have heard many examples. First of all, peer support. It means that the other person, the colleague, the friend, the brother understands me because he shares the same reality with me, but it's the same for the silent love of family as a human hug.

This dynamic gives back to everyone his/her personal role: for example, we know that sometimes after a maxi emergency people don't want to have a debriefing. They would simply like to go home and have a shower. This element gives us a more appropriate framework of human and psychosocial support which can be available.

We could also conceive different forms of aid, if and wherever necessary.

In conclusion and linked to the next topic we'll have, training is strictly related to **strategies for coping**.

It is evident that training is asked to respect reality, such as helping to give bad news, clarifying the roles and the tasks of the different organisations intervening in the scene or better understanding themselves and their colleagues. But an efficient training must be targeted and seen on the base of the MFRs experience.

The question in this sense is very clear.

Conceiving experiences and verifying their efficacy must take into consideration the differences, linked to culture, gender, mistakes or difficulties and respect standards.

CONCLUSIONS & FUTURE RESEARCHES

The human impact of disasters and suffering was discussed over the course of the two NMFRDisaster Project workshops, starting from the background paper and guided by the two issues of human reaction and medical first responder (MFR) training.

The survey results highlighted several key points that were the focus of the Assembly's and WGs' activities. These discussions then allowed us to reach conclusions and to hear out the participants' suggestions on the directions research should take to provide more cogent data that is adaptable to actual emergency settings.

In fact, the current state of social research was found to be still quite distant from the actual rescue context, as it has yet to demonstrate the "permeability" and concrete benefits of its own results.

Moreover, the world of rescue work generally opts for practical approaches based on knowledge gained in the field, rather than for methods yielded by academic research: this tendency results in a knowledge-practice and communication gap between these two separate "worlds" and in a certain degree of suspicion towards any affirmation that does not appear to be sufficiently substantiated by common experience.

A typical example is that of the gender difference observed in various studies conducted by C. North—and discussed during the WG activities - who found that "Women exhibit twice the prevalence of PTSD, other anxiety disorders, and major depression as men". This statement was received and commented upon as a tendency for women to more openly manifest their distress and, in any event, to express their feelings and to recount their experiences in greater detail than men generally do. The phenomenon, however, is frequently observed in research and should be considered as such; because it can influence rescuers' coping capacities to the same extent it can impact those of female disaster victims.

Conversely, the world of academic research should start providing precise answers for specific needs.

Unfortunately, as in all human endeavours, training progress and changes occur step by step.

One cannot realistically expect, for example, that a given training course of a given duration will instil perfect trainee skills for field intervention without error or the burden of external factors.

Indications for future research therefore lie at the crossroads of the study of human reaction and MFR training.

Human impact

Multiperspective research

Of all the currently available research systems, multiperspective--and therefore multidisciplinary research-- has been found to be the most appropriate system for investigating MFRs' needs and for identifying and proposing effective response strategies. Perspectives that should always be examined are: personal and professional profile; social, cultural, and family context; gender; and the traditions and values of the organisation to which an MFR belongs.

Psychosocial support services

A key research field for determining an organisations' social responsibility and response capacity to MFR needs is one examining MFR psychosocial support services--in terms of which services are available, how they are viewed, how workers who use them are viewed by their colleagues, the ways in which these services are organised, which best practices can be adopted as a model, etc….

Pedagogical efficacy

Data are currently lacking, as are the systematic evaluation of the pedagogical efficacy of the different instruments currently used in MFR training (e.g., simulations,

table top and full scale exercises), and adequate assessment instruments for evaluating the efficacy of training for single participants and their capabilities. Further research in this field is therefore required, and instruments that can be easily used by rescuer trainers to modify training programmes and contents based on information obtained in such a way, must be developed.

Well-being research

There is also a dearth of reliable and comparative data on the long-term consequences of disasters on rescuers and on their organisations. In fact, several studies examining single disaster events in relation to rescuers' health consequences have been conducted, but general, category-aggregated reference data (which could more clearly illustrate the phenomenon and its dimensions) are virtually unavailable.

Assessment and recruitment systems.

Emergency intervention organisations generally have different policies and views on personnel selection procedures for missions or various services. Experience has shown however, the need to carefully evaluate the potential for criticality when deploying rescuers who are not in the best personal condition to support the emotional and psychological burden of a given assignment. A study of practices currently adopted, and their consequences within the various organisations, could provide helpful indications for giving due consideration to the, even temporary (e.g., recent bereavement, marital separation) personal aspects that can significantly influence a rescue worker's coping and resilience capacities. A study of this type could also provide useful information on ways to develop alternative strategies for dealing with situations in which a rescuer's inability for deployment is eventually determined—but indeed, only by avoiding the impression of being punitive or overly restrictive in his/her regard

Training methodology and technology

Training efficacy.

MFR training was found to be highly diversified, in terms of duration, methods, contents, degrees, progression, etc. Hence, there is a need to adapt training to the tasks and responsibilities that rescuers must take on, and to consistently apply effective pedagogical systems and reference standards in this process.

Shared training

Although the importance of team-coordinated emergency intervention was acknowledged, it was found that: few shared training occasions and programmes among the different bodies are held; the other forces' assignments are frequently not sufficiently clear; and that cooperation prevalently takes place by chain of command--rarely as a combined operation. This shortfall directly influences the efficacy of intervention and weakens collective competence of any organisation or group of organisations. Training plans should therefore multiply opportunities for shared training.

Awareness

To make rescuers aware of the "burdens" and therefore, the psychosocial risks they will most probably be undergoing, training must develop courses to help rescuers recognise signs in themselves and their colleagues that indicate a need to seek psychological support. Bearing in mind the highly prevalent "superhero" model among first responders, this approach should make up an integral part of each emergency intervention organisation's culture of promoting rescuers' growth and well-being.

LIST OF PARTICIPANTS

COUNTRY	ORGANIZATION	SURNAME	NAME	EMAIL
CZECH REPUBLIC	Charles University (and Ministry of Interior)	VYMETAL	Stepan	stepan.vymetal@email.cz
CZECH REPUBLIC	Ministry of the Interior	MALIKOVA	Jana	jmal@mvcr.cz ; janama@email.cz
DENMARK	International Federation Reference Centre for Psychosocial Support	YTRE	Åsta	aay@drk.dk
FRANCE	French Red Cross	BABAUD	Emmanuelle	emmanuelle.babaud@croix-rouge.fr
ISRAEL	SHEILD GROUP	RICHMAN	Aaron	ARICHMAN@ITRRINTEL.ORG
Palestine Administred authority	ALQUDS UNIVERSITY	ZAHRA	Sabri	sabri_safadi@yahoo.com
Palestine Administred authority	ALQUDS UNIVERSITY	ABDEEN	Ziad	zabdeen@planet.edu
ISRAEL	MDA	SHACHAM	Uri	uris@mdais.co.il
ISRAEL	MDA	RAFALOWSKI	Chaim	haimr@mdais.co.il
ITALY	SINERGIE S.R.L.	EULA	Monica	eula@sinergie.net
ITALY	SINERGIE S.R.L.	STERPONE	Sergio	sterpone@sinergie.net
ITALY	SINERGIE S.R.L.	SONCIN	Vilma	soncin@sinergie.net
ITALY	SINERGIE S.R.L.	ESTEBAN	Laura	project.assistance@sinergie.net
ITALY	SINERGIE S.R.L.	BELLONE	Graziella	graziella.bellone@sinergie.net
ITALY	UNIVERSITA' CATTOLICA	SBATTELLA	Fabio	fabio.sbattella@unicatt.it
ITALY	UNIVERSITA' CATTOLICA	MOLTENI	Marzia	marzia.molteni@unicatt.it
ITALY	CSSC	MORDINI	Emilio	emilio.mordini@cssc.eu
ITALY	CSSC	ASHTON	Holly	holly.ashton@cssc.eu
ITALY	AUSL di Bologna	BADIALI	Stefano	stebad@mac.com
ITALY	University of Florence CESPRO	ALEXANDER	David E.	d.alexander@virgilio.it ; david.alexander@unifi.it
ITALY	Università del Piemonte Orientale	DELLA CORTE	Francesco	fdcorte@tin.it
ITALY	Università del Piemonte Orientale	INGRASSIA	Pierluigi	pierluigi.ingrassia@med.unipmn.it
ITALY	Università del Piemonte Orientale	COLOMBO	Davide	dr.colombo.d@gmail.com
NETHERLAND	Ambulancezorg Netherland	GRUITJERS	Wiro	secretariaatbt@ambulancezorg.nl
SPAIN	SAMUR-Protección Civil	ROLLE	Mª Dolores	rollefmd@munimadrid.es
SPAIN	SAMUR-Protección Civil	GIMENEZ	Juan Jose	gimenezmjj@munimadrid.es
SPAIN	SAMUR-Protección Civil	REY	Paloma	reyppc@munimadrid.es
SPAIN	SAMUR-Protección Civil	GONZALEZ	Daniel	gonzalezrd@munimadrid.es
SPAIN	SAMUR-Protección Civil	CASTILLO	M. Carmen	may_crda@hotmail.com
SPAIN	SAMUR-Protección Civil	NAVARRO	Raquel	neferchen@hotmail.com
USA	Shield Group	BUTLER	Matthew G.	mbutler@emergencyplanonline.com
USA	New York City Firefighter	BARTLETT	John	jbart22942@aol.com

2008

Legal and Ethical Aspects of First Medical Response to Disasters – WORKSHOP REPORT

Holly Ashton
Centre for Science, Society and Citizenship
15/12/2008

For the project: Identifying the Needs of Medical First Responders in Disasters

Grant Agreement No. 218057

Coordinator: Magen David Adom (Israel)

Partners:

- *Al-Quds Centro di Ricerca sulla Nutrizione e sulla Salute* (PALESTINIAN ADMINISTERED AREAS)
- *Ambulance Zorg Nederland (NETHERLANDS)*
- *Centro per la Scienza, la Società e la Cittadinanza (ITALY)*
- *Charles University (CZECH REPUBLIC)*
- *Croce Rossa Danese (DENMARK)*
- *Fundacion Rioja Salud (SPAIN)*
- *SAMUR Servicio de Asistencia Municipal de Urgencia y Rescate (SPAIN)*
- *Shield Group Inc. – Security and Counter Terrorism Management (NETHERLANDS)*
- *SINERGIE Formazione e Consulenza Professionale (ITALY)*

Duration: 1 year (01.05.2008 – 30.04.2009)

Project Officer: Eva-Maria Engdahl

http://www.cssc.eu

Workshop on Ethical, Legal and Societal Implications of Disaster Response

11th-12th December 2008, Rome

Executive Summary

A workshop was held by the Center for Science, Society and Citizenship (CSSC), to identify and explore some of the ethical, legal and social implications of disaster response and to collaborate ideas on future topics for exploration within this field of research. The workshop was attended by over 40 participants made up of experts from academia, civil protection, military forces among which representatives of UNESCO, NATO and European Commission.

The workshop covered a range of topics including: the ethical context of disaster response; choices and challenges for decision makers in times of disasters; ethical decision making in emergencies and issues concerning citizens during disasters. It also consisted of two networking sessions in which attendees suggested proposals for new research and development for areas where further research is required.

The workshop discussion has stressed the need of sharing best practices to disaster response inside and outside Europe. Standards of care, that also include legal and ethical implications, are becoming crucial to enable first responders to face different healthcare provisions, diverse cultural realities in order to ensure an effective response to crisis management.

The NMFR Disaster project, also through its workshops, establishes the basis of a further and in-depth research at European level aimed at sharing knowledge and setting up policies on this topic.

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APPENDIX ONE – PARTICIPANT LIST .....

APPENDIX TWO - AGENDA.....

1. Background

This was the third workshop from a series of five being carried out for the project: 'Identifying the Needs of Medical First Responders in Disasters' otherwise known as 'NMFR Disaster' (grant agreement number: 218057). This is a project under the Seventh Framework Programme of the European Commission. The purpose of this workshop was to explore the ethical, legal and social implications of disaster response and to identify areas for further research and collaboration.

The workshop was considered to be important and timely. Both law and ethics are inextricably linked to good public health practice in emergencies, but despite a rich literature on legal and ethical dimensions of health emergency, there is still a lack of comprehensive guidelines concerning the new issues created by world globalization, the impact of global warming and modern-day terrorist threats. In particular, there needs to be a realization that disasters and health emergencies, whether natural or provoked, do not know borders. It was hoped that this workshop would highlight areas that need further clarification and that some of these could pave the way for future collaborations on disaster-related projects.

The workshop brought together people from universities, research centers, government institutions, NGO's and private companies whose diverse backgrounds ensured that a wide range of viewpoints were taken into consideration and led to some interesting discussions. A list of participants, along with contact details, can be found in Appendix One.

The workshop consisted of plenary sessions and networking sessions. The four themes to structure the plenary sessions were: 'Disaster Response, the Ethical Context', 'Choices and Challenges', 'Ethical Decision Making in Emergency' and 'Victims or Citizens?'. The networking sessions gave participants a chance to discuss their ideas of topics in the disaster arena that require further research. A number of ideas for future collaborations were discussed. The agenda for the workshop can be found in Appendix Two.

2. Welcome Introduction

The conference was opened by Mr. Emilio Mordini Director of CSSC. Mr. Mordini introduced the purpose of the workshop and encouraged participants to interact, stressing the importance of conversation rather than a more formal gathering. He also took the opportunity to thank contributors. He then introduced General Michele Anaclerio, of the Italian Presidency of the Council of Ministers who gave a welcome on behalf of the Italian Ministry of Defence. The General noted that in Italy, the army play an important role in incident response and that ethics are paramount. The importance of ethics was further stressed by Chaim Rafalowski of Magen David Adom (Israel). As project coordinator, Mr. Rafalowski gave a warm welcome to all present and highlighted the need for this workshop and for the sharing of many different ideas and opinions. He noted that at present, not much research is generated from the field and more is needed. He highlighted that a key aim of the workshop would be in the recognition of issues that are currently under-represented in the EU in order to create a ROADMAP for future research. Of course, ethics are closely linked to the law and one of the areas to concentrate on in future projects will be in exploring what clarifications need to be made concerning legal aspects of disaster response. Indeed there is a definite need for such a ROADMAP as reflected in the comment made by the International Federation of Red Cross and Red Crescent Societies (2000);

> *"At the core is a yawning gap. There is no definite, broadly accepted source of international law which spells out legal standards, procedures, rights and duties pertaining to disaster response and assistance. No systematic attempt has been made to pull together the disparate threads of existing law to formalize customary law or to expand and develop the law in new ways. . . . There are no universal rules that facilitate secure, effective international assistance, and many relief efforts have been hampered as a result."*
>
> **International Disaster Response Law Project – Chapter 8, p.145**

Following Mr. Rafalowski's welcome, Mr. Mordini introduced Mr. Alfredo Mantici of the Civil Protection Department of the Italian Government. Mr. Mantici, whose office deals with environmental and industrial health risks, noted that the department are used to approaching the issues from a technical viewpoint and that he was glad for the opportunity to explore ethical aspects at this conference. Monsignor Giorgio Nencini, Episcopal Vicar for the Italian Air Force then gave his message of welcome and his hopes that the conference would open a good force of change and highlight valuable lessons to be learned. He commented that the heart of the problem with disasters is the way in which they slow down opportunities for peace, and that this needs to be tackled.

Ms Gila Livnat Rosiner from the Embassy of Israel in Rome expressed her happiness to be at the workshop and the honour it is for Israel to have Magen David Adom as project coordinator. She noted that Israel is the only non-EU member of the Framework

research programmes and have been involved since the 5th FP (full members in the 6th and 7th). She commented on the relevance of the workshop; since the creation of the State of Israel, there have been many disasters to deal with and the Israeli social health system places a high priority on ethics.

2.1 Opening Speech

The Opening Speech was given by Maurizio Salvi of the Bureau of European Policy Advisors in the European Commission. Mr Salvi noted that the political line of the EC is based on the values of solidarity, justice and human dignity. Concerning disasters, the position of the European Union is that regardless of the nature of a crisis, the erosion of fundamental human rights is not excusable. In order to be better prepared for any potential crises that may occur, the Commission are implementing a number of activities to understand the ethics of issues such as epidemics and research trials. They are also promoting the sharing and creating of synergies and are advocating the relevance of fundamental values in disaster response. As such, there could indeed be interest from the Commission in the type of ROADMAP that this conference is aiming to lead towards.

Mr. Salvi stressed the importance of the binding role played by the Treaty of Lisbon (currently under ratification) which highlights human dignity as well as specifying new actions and common financial resources between countries. He said that there is a political trend to look not only at Governmental powers but also individual citizens. Mr. Salvi called for consistency at the Member States level and said that there needs to be a common platform of understanding in knowing how to react to disastrous events.

2.2 Introductory Lecture

The Introductory Lecture was given by Mr. Stefano Rodotà, Chairman of the Scientific Committee of the EU Fundamental Rights Agency. He started his talk by making the distinction between terrorism and other types of disasters. He noted that natural disasters can often be considered as a temporary situation – they can be thought of as finite and it can be seen that eventually things will improve. In comparison, terrorism carries a seemingly endless threat. Thus, whereas some changes to legislation placing limits on rights could be justified for the duration of a natural disaster, permanent changes to legislation of the 'Big Brother' genre, brought in in response to terrorism are risky and transform society into a 'nation of suspects'. He noted that whilst the US Civil Liberties Union claim that they "..want to join Europe, not to have them join us", the EU approach is contradictory and discussion is needed on how to protect rights in the era of the 'War on Terror'. He spoke of the new idea of person that has become popular: it includes the physical body AND any technological support used. Thus it is considered that technology of this nature should have the same guarantees as the physical person – this concerns data protection and communication in particular.

3. Day One

3.1 Plenary Session 1 – 'Disaster Response, the Ethical Context'

This session provided some initial insights into how we define and conceptualise the word 'disaster' and started to consider the ethics of disaster response. It was chaired by General Anaclerio. Presentations were made by;

***Vincenzo Martines**, Vice Admiral, Surgeon General of the Italian Armed Forces and Chief of the Medical Corps of the Military Italian Navy*
Vice Admiral Martines spoke of the inevitable suffering that results from disasters and noted that every war has psychological and psychiatric implications. He commented that ethic is important in the principles of the Croce Rossa (the Italian Red Cross) and for the Italian Navy who both play important roles in disaster response. His talk paved the way for further discussion concerning the role of ethics in disaster response.

***Badaoui Rouhban**, Director of the Section for Disaster Reduction, UNESCO*
Mr. Rouhban gave a presentation on UNESCO's approach to disaster risk reduction. His talk focused on natural disasters provoked by climate change which was ranked as being the fourth main human security threat/risk in the UNESCO Human Security Questionnaire, filled out by 233 people. In fact, it is undisputable that global warming will lead to an increase in the number of disasters witnessed – particularly in poorer countries – the international disaster database, EM-DAT highlights the vast increase in numbers of disasters for the period between 1900 and 2000 alone. The crux of Mr. Rouhbans' argument consisted of the fact that we need to shift from post to pre-disaster action. Currently of every $100 spent on disasters, $95 go on relief. Mr. Rouhban argued that by spending more on preparedness, the number of disasters could be lowered by reducing vulnerability. This would mean that less spending was needed on recovery efforts. A problem with this, as raised by the floor, is that it could be difficult to educate governments and the media to focus attention elsewhere.

***Laura Elena Pacifici**, Head of the International Health Cooperation and Development Unit, Italian Red Cross HQ, Rome*
Ms. Pacifici spoke of the need for flexibility in disaster response. She argued that on arrival at a disaster scene, it is common to have to change priorities because plans that were made do not reflect reality. She also highlighted the importance of data collection during disasters and the role that epidemiology could play in humanitarian aid – namely that it can provide a tool for re-assessment. As examples of this she spoke of two cases, one in Sri Lanka after the 2004 Tsunami and one in Haiti. Her examples demonstrated how effective communication and advocacy between different response groups can be vital for effective early detection of communicable diseases – they also reduce the likelihood of overlaps and wasteful use of resources. However, it was noted that every country has their own programmes for implementing change and it could be difficult to

integrate these. This is another reason why advocacy and flexibility of approach are important.

***David Alexander**, Professor of Disaster Management, CESPRO, University of Florence*
Mr. Alexander gave a presentation on the misconceptions that people have about disasters. He spoke of the fact that disaster myths prevail even amongst professionals who work in the field and that these need to be tackled in order for responses to be effective – he provided evidence for the fact that experience, knowledge and training about disaster situations led to skepticism in the myths. A question was raised concerning whether completely 'debunking' the myths could lead to complacency and it was agreed that conceptions must not go too far the other way. It was also highlighted that the 'myths' may in fact be a reality in certain instances – there can be no generic response to disasters as each is individual. One very interesting point was raised concerning the notion of 'paternal care of citizens' being needed in disasters due to the panic and chaos. Such paternal care would be the grounds for imposing various measures that might reduce the liberty and rights of people during disaster situations. However, if the panic response is largely a myth, we should consider what implications would this have on the right of governments to impose legislation of a 'paternal' nature.

***James James**, Director of the Center for Public Health Preparedness and Disaster Response, USA, Editor-in-Chief of the Journal of Disaster Medicine and Public Health Preparedness*
Mr. James gave his presentation on policy in disaster planning. He picked up from where Mr. Alexander left off and noted that disaster myths are problematic because they drive policy. He then went on to discuss the role of public health which he claims is every physicians secondary specialty. He noted the importance of a mindset of preparedness for physicians during disaster response. Currently, though 80% of medical practitioners feel that they have an ethical duty to respond during a crisis, only 20% feel trained to do so. A key message from Mr. James' talk was that whilst it may be impossible to plan for individual events, it is possible to plan for casualty types that are likely to crop up in most disaster situations. For example, respiratory problems and burns.

3.2 Networking Session 1

The first networking session was introduced by its Chair, Mr. ***Assad Ramlawi***, Director General of the Department of Primary Health Care and Public Health in the Ministry of Health, Ramallah. Mr. Ramlawi noted the importance of the conference for providing the opportunity to network and work towards achieving objectives and the goal of 'one world, one health'. He stressed that diseases don't need borders and because of globalization, anything in one part of the world can rapidly transmit to another part of the world. However, because not all countries have the same infrastructures and experience, communication and networking is needed; indeed it is vital, to ensure that humanity is able to deal with any medical disasters thrown at it.

To provide more food for thought and stimulation for discussions, short presentations were then given by:

***Aaron Richman**, Shield Group, Tel Aviv*
Mr.Richman noted that different parts of the world would have very different responses to the same disaster (e.g. a train accident or a hurricane). He posed the question of how we could go about picking out areas of success or failure in general which is made harder by the difficulties arising from attempting to compare different incidents or regions. But if it could be achieved, it would enable better preparation of 'pre-incident' measures in the future, rather than 'post-incident' response.

***Paloma C. Rey Paterna**, SAMUR, Madrid*
Ms. Rey spoke specifically about the post-incident response to the Madrid plane crash of 2004. She noted that operational response to disasters is not enough and that compassion and psychological aspects are also vital.

Following Ms. Rey's talk, discussion was opened up to the floor. This started with a follow-up to Ms. Rey asking how the responders dealt with media needs following the disaster. This was a pertinent question. Evidently, after an incident such as the Madrid crash, there will be a need for news. However, victims and relatives of the tragedy are unlikely to be comfortable with having their grief caught on camera. The issue of media was further discussed noting that it would be helpful if there were guidelines concerning media practice and organization during disasters. It was pointed out that very often, the media are intrusive, sometimes without protecting and respecting the needs of the victims of an incident. Media are crucial and are a vital tool for effectively conveying news to a wider audience, however at present, the lack of international guidelines concerning this issue means that often the media can become more of a burden than a blessing. It was asked whether there could be a way to control such coverage to avoid people being confronted with involuntary exposure to traumatic images.
Another question posed was whether SAMUR was aware of any other air-crash responses from which they could draw useful lessons and information. The consensus from the floor and Ms. Rey was that, at present, there are no mechanisms in place in Europe for the sharing of best practices. This is somewhat surprising as it is surely vital that responders are able to duplicate examples of good practice and to avoid making mistakes which have been made before. In Japan following the Kobe earthquake of 1995 there was a meeting for 'lessons learned' and 'best practice' consortiums can be found in the United States. This seems to be an important route for Europe to follow and it was agreed that it would be helpful to have a collective database of 'lessons learned'. It is also important to encourage dialogue and interaction between different disaster disciplines. For example between 'responders' and 'preventers'. Responders may be able to offer important insights to those concerned with attempting to prevent disasters in the first place and vice versa.

It was also pointed out the importance of recognizing cultural diversity during a disaster. Responders are there to help and must be aware of diverse cultural traditions to better assist. It was suggested that it could be extremely helpful to create a small manual of cultural differences concerning issues such as mourning rituals; for example, is it appropriate to look someone in the eye, touch them (provide a hug/pat on the back etc) within the norms of their culture.

Another issue that came up concerned handling sensitive data that responders could potentially come across with in the course of their duties. Is it the duty of the responders to pass this information on? Some legal reflection and guidance could be helpful for issues such as this one.

Mr. Mordini commented on the number of ideas that had been put forward from this first networking session and proposed that it could be helpful to aim at creating a larger project or enterprise in a couple of years which could incorporate several different dimensions – a 'project of excellence' to provide answers to or at least further discussion on some of these issues.

3.3 Plenary Session 2: 'Choices and Challenges'

Mr. Mordini acted as chair person for the second plenary session which consisted of a series of talks on some of the choices and challenges facing responders to disasters.

***Lennart Malmström**, Head of Emergency Medical Services, Disaster Medicine Karolinska University Hospital, Stockholm*

Mr. Malmström gave a presentation on a model of triage that is used by the UK military – in particular he concentrated on the ethical and legal aspects of using the 'blue' triage label. The blue label basically tells responders to ignore treatment as the victim is so wounded that either they cannot survive or their treatment would compromise the care of others. Clearly the question can be asked as to whether it is ethical to put these people aside. Mr Malmström spoke of one instance where relatives altered the triage labels at a site to ensure treatment for their loved ones. So far this blue label has only been used during the Falkland War but there may well come a time when it could be required again, and when that time comes, responders will need to be confident in using it being aware what the ethical and legal implications are. A point was raised as to whether in disasters treatment decisions should only be made concerning medical issues or whether other criteria such as age and social status may apply. It was felt that there was not a clear answer to this and that it would depend on issues such as what resources were available.

***Michael Colvard**, Director of Disaster, Emergency Medicine Readiness Training, University of Illinois, Chicago*

In his talk, Mr. Colvard spoke of the role that allied health professionals could play in disaster response and of the decision in the USA to select and include a number of key providers who are now legally able to contribute vital assistance in terms of disaster response. He provided a convincing example of how a dental surgery could become a useful 'alternative treatment site' in a time of disaster by providing basic medical supplies such as oxygen, inoculations, minor triage care and a bed. Mr. Colvard's main argument was that, by including allied professionals in the response who are able to provide vital lower level care, you are both increasing the number of people able to respond and simultaneously freeing up physicians and nurses to deal with more pressing and complex medical cases that require fuller attention. Overall this seems like a sensible initiative and an excellent way of increasing human resources during times when they are so needed.

***Marc Guerrier**, Vice-Director of Espace éthique/AP-HP, Paris*

Mr. Guerrier gave a presentation on whether ethics should be considered in pandemic preparedness plans and in the decisions of who to prioritise for vaccinations. He talked of the ethical considerations in developing a public health response to pandemic influenza as laid out by the World Health Organisation, in particular relating to access to healthcare/vaccinations/drugs during the pandemic (i.e. triage plans and priority setting for inoculations). One key idea is that those performing 'essential functions' should receive the vaccine but others have argued that the most ethical solution would be to set up a 'vaccine lottery'. The crux of Mr. Guerrier's talk revolved around the question of how preparedness for a pandemic challenges democratic processes. Naturally, everyone wants the chance to receive potentially lifesaving treatment. How we decide who gets priority requires a lot of ethical consideration. A comment pointed out that Avian Flu is most likely to start in Thailand or Egypt, however the majority of vaccines are developed in the USA and Europe. Should an outbreak occur, the latter are likely to vaccinate their own people first however, in terms of the overall good, surely it would make more sense to send the vaccine to where it was more needed – the point of outbreak and surrounding areas. This raises questions over issues concerning what aid should be provided to other countries and also stockpiling and border closing.

***Carlo Petrini**, Senior Researcher – Bioethics Unit, Office of the President, National Institute of Health, Rome*

Mr. Petrini gave a presentation on the public health perspective to ethical implications of disasters. He spoke of the conflict between public health emergencies and traditional bioethics and provided an impressive number of quotations and arguments concerning the values at stake in the carrying out of disaster triage. Basically, a physician has two options; to follow either the utilitarian principle, or the justice principle. Mr. Petrini then attempted a synthesis of public health and traditional bioethics via the principle of solidarity. Overall he concluded that a broad perspective could be the best attempt at resolving the ethical issues concerning emergency situations affecting large numbers of people. This would involve paying attention both to individuals and those around them.

4. Day Two

4.1 Plenary Session 3 – 'Ethical Decision Making in Emergency'

Marian Ramakers-van Kuijk acted as Chair for this session which covered various talks concerning decisions that need making for disasters/emergencies.

***Nikolaos Stilianakis**, Senior Research Fellow, Joint Research Centre, Ispra*

Mr.Stilianakis gave a presentation on tools for public health decision making. In particular he concentrated on surveillance systems, web-based information systems and epidemiological modelling. He spoke of the allure of 'real-time modelling' which would be highly useful in the case of an epidemic as it would enable up-to-date information to be used for the monitoring of hospital capacity, functioning of control methods and adaptation of strategies. Benefits include the fact that it is user friendly and effective at estimating future incidence. However, it also comes with problems such as data delays and noise. And Mr. Stilianakis pointed out that though some models come close, it is not possible to have a perfect real-time model. It is also hard to implement, particularly in terms of the creation of a European modelling system similar to the USA's 'MIDAS' as currently, not many countries in the EU are capable of carrying out the required modelling. Despite problems with this technique however, Mr. Stilianakis stressed that, used as a complementary tool to expert opinion and with surveillance and web-based medical systems, modelling can provide useful insights. European policy development and establishment of a necessary infrastructure for the European Health System need to be more driven by modelling.

***Raffaella Ravinetto**, President, Médecins Sans Frontières, Italy*

Ms. Ravinetto gave an insightful presentation on some of the ethical issues facing groups like Médicins Sans Frontières when they go in to respond to disasters. She pointed out that all operational decisions have an ethical element to them. One example given was that of how necessity can sometimes lower the quality of care in disasters. For example, the drug used to treat AIDs in Africa is no longer used in Europe as it causes bad side effects. It's use in Africa is justified by the fact that it is cheaper and so by using it, despite the side-effects, more lives can be saved. However, Ms. Ravinetto argued that we must not become blasé or complacent about such issues. We must aim to raise the standard. Another key point of her presentation was how views can differ between headquarters and the field. Due to financial or organizational issues, headquarters may order the removal of an aid team from a particular area before the team feel they should be leaving. This highlighted the need for internal organisational ethics to be considered as well as the ethics applied to the victims being assisted. It was asked whether local communities were involved in priority setting as this could assist with

some of the ethical dilemmas faced. The response was that this is being learnt over time.

***Pierluigi Ingrassia**, Centro di Ricerca Interdipartimentale in Medicina d'Emergenza e dei Disastri e di Informatica Applicata alla Didattica e alla Pratica Medica (CRIMEDIM), Turin*
Mr. Ingrassia spoke on the ethical considerations to be considered when carrying out research after a disaster. He pointed out that research is needed in order to better understand the psychological, medical, economic and social difficulties that face a community following a disastrous event, however, all disaster victims are vulnerable and thus it is vital that research is carried out in a sensitive manner. Therefore, risks should be assessed and informed consent should always be obtained from those taking part. He also spoke of the use of tools to assess the Decision Making Capacity of an individual which he recommended should ideally be included during the recruitment phase of every disaster research study. Mr. Ingrassia made a good case for the necessity of disaster research and of the ways we can make it ethically acceptable. In fact though we may be able to guess at the vulnerability of an individual (for example based on mental health problems etc), we can never truly know. And though there are potentially numerous benefits to taking part in research studies it could bring negatives including psychological discomfort. It is vital that researchers always strive to go about their work in as sensitive a manner as possible.

***Tom Sorrell**, Professor and Director of the Centre for the Study of Global Ethics, University of Birmingham*
Mr. Sorrell gave a presentation on emergency ethics particularly in relation to a potential pandemic influenza outbreak. He gave examples of various 'before' and 'after' ethical responses required in the face of such a pandemic and argued that emergency ethics of this nature are utilitarian in principle. He noted that though declarations of emergency can be opportunistic acts by governments taking advantage of a situation, they are not always sinister - particularly in relation to medical emergencies where measures are normally deemed acceptable by the public who consider welfare issues as key. Mr. Sorrell then talked specifically through the UK plans for dealing with a pandemic influenza outbreak. The notion of anti-virals for essential workers was picked up on from the floor and it was asked how you would define 'essential workers'. Mr. Sorrell noted that if the priority in a health emergency is saving lives then essential workers would be those who, quite simply, could save lives.

4.2 Networking Session 2

The second networking session was chaired by ***Stepan Vymetal*** of Charles University, Prague. He introduced the two speakers who aimed to focus the discussion towards how future projects could develop on the issues raised in NMFR Disaster.

***Sergio Sterpone**, Sinergie, Torino*

Mr. Sterpone highlighted topics from previous NMFR Disaster conferences, in particular relating to the education and training of responders. He commented on the fact that there is currently insufficient research into areas such as training efficacy and research methodologies and that there needs to be more consensus regarding the content of courses. He also stressed the importance of 'interoperability' which will be vital for raising professional standards. However, this leaves us with a question concerning how we can get different organizations to cooperate effectively. Mr. Sterpone referred to this as 'impermeability amongst structures'.

***Avi Tiger**, Magen David Adom, Jerusalem*

Mr. Tiger was not able to be present and so **Chaim Rafalowski** spoke on behalf of MDA. For the benefit of those present, Mr. Rafalowski gave an overview of the NMFR Disaster project. He also highlighted some of the issues that had arisen during the workshop on 'Use of blood and blood components in disaster' held at the end of November. This included a few ethical dilemmas including;

1) Who takes the decision to use blood that has not been tested for diseases during an emergency/disaster? The need for blood could be such that medical workers have to work with whatever supplies they can get, and in a disaster situation, there won't be time to carry out all usual sanitary checks.
2) Recruitment of blood donors. In Israel the number of men donating blood out-does women by 5:1, however in Spain, donation is equal by the two genders. Is this due to cultural differences? Could Israel learn lessons from Spain? And what are donation rates like in other countries?
3) How to time donations. In the immediate aftermath of a disaster, there is often an influx of blood donors eager to assist in whatever way they can. However, it would be far more useful to send half the willing donors away and get them to return at a later date. The problem is, how to turn them away and how to ensure that they will come back?

Mr. Rafalowski also spoke about standards of care. He noted that the differences in third world countries were obvious but he asked the consortium to consider an instance where an earthquake occurred in the sea between Italy and Albania. In such an instance, would the level of care provided differ for the two countries to match their usual state of healthcare? What would be the implications of two European countries with differing healthcare provisions being involved in a mutual disaster?

Finally Mr. Rafalowski commented that International Disaster Law must keep being developed. He noted that the SPHERE Code of Conduct, currently the most comprehensive existing document in terms of disaster guidelines, is too generic and that we need a more refined approach. We also need to consider that different guidelines may be required for different types of disasters and an important starting point is simply in defining these different types.

Following these though provoking presentations, discussion was then opened up to the floor. Concerning the issue of using untested blood in disaster situations, it was pointed out that such a decision should not be taken by 'experts' but rather, would be a good time for democracy to be used and for citizens to be asked to contribute to the decision. This seems sensible as if the public feel they have been involved in the decision making process they are more likely to accept the final decision.

Another topic that came up was the idea of training responder managers to deal with ethical issues at the scene of a disaster. However, some noted that it would be too overwhelming for responders to have to consider the ethical impact of their actions at a disaster scene and that guidance should come from organizational heads and the responders code of conduct. Thus in a disaster, the mechanics of providing the response could take over and there would be no need for pauses to contemplate the ethical rights and wrongs of actions being taken.

A key idea to emerge was that basically, ethics in disaster situations concerns the taking of decisions which could be seen as controversial. It could be useful to identify the different decisions needed relating to the different headings of the NMFR Disaster project. So for example, it could be explored in terms of the human impact decisions that need making, decisions regarding blood and equipment, those relating to legalities and key ethical dilemmas and decisions concerning training needs.

This second networking session led to the decision that it could be useful to write a consensus page of recommendations which could be passed on to the European Commission's Bureau of European Policy Advisors.

4.3 Plenary Session 4 – 'Victims or Citizens?'

This session explored various issues concerning citizens during disasters and emergencies. It was chaired by ***Gerald Dompig***, Managing Director of the Shield Group Inc., Aruba, Netherlands.

***Didier Bigo**, Professor, Science Po, Paris*

Mr. Bigo gave a presentation based around the notions of liberty and security in a 'worst case scenario'. In particular, he asked whether people are viewed as victims or citizens with choices to make. How to protect people from uncertain future events is a difficult issue, particularly when combined with the notion of human rights. Knowledge of experts can be flawed – mixing it with statistical data may provide some greater reliability but it is still risky to make recommendations. For example, if you cause a mass evacuation of a shopping centre based on a flawed premise and it later becomes clear that you were wrong, who pays for the decision? At present this is not clear. Another problem can arise from the use of simulation software leading to a false confidence relating to approaching events as if they are not unpredictable, which in fact, they are.

Mr. Bigo related this to the French language tense of 'future interior' where you talk of the future as if it is already in the past. You may be given a false confidence.

***Kobi Peleg**, Director, Israeli National Center for Trauma and Emergency Medicine Research. Head of the Department for Disaster Medicine, School of Public Health, Tel-Aviv University*

Mr. Peleg gave his presentation on whether children received a different standard of care compared to adults and the elderly. He gave details of a study which showed that physicians are more emotive about dealing with terror attacks than motor vehicle accidents, even when the injuries sustained are of equal magnitude. He then provided some compelling statistics to show that despite the elderly being the group with the highest number of head injuries caused by terrorism (61.8% compared to 55.5% of children) and highest number of body regions injured – both factors leading to a higher likelihood of mortality, a higher number of children were admitted to the Intensive Care Unit. The mortality rates for children and the elderly were 7% and 50% respectively so it would seem that the elderly population are suffering as a result of this apparent 'preference' or sensitivity to treat children. Though this could result from a 'Walt Disney Effect' (tender feelings for children), there could also be more practical reasons behind this treatment bias. Perhaps lifetime costs have an impact and perhaps there is an additional sensitivity to children because physicians and nurses are aware that they are less well emotionally developed and so require more care. More thought may need to be given to this issue to ensure fairer treatment for all. It could also be interesting to note whether there are any cultural differences in the treatment of different age groups.

***Jean Marc van Gyseghem**, Research Centre on IT and Law, University of Namur. Attorney of Law at the Bar of Brussels*

Mr. Van Gyseghem spoke on data protection in health emergencies. He said that there are two types of data relevant to health emergencies, that of the workforce and that of the patient. In times of emergency, there is the risk that 'national security' may be used as an excuse to invade the private spheres of individuals. Mr. van Gyseghem gave information on convention n°108 on data protection which is applicable to individuality and requires data processors to choose the least invasive method for using the data and to give a clear reason for their need to process the data. He spoke in depth about data protection law in Europe which revolves around Directive 95/46, Article 8. In order to work with the data it is important that any sensitive information is separated from the non-sensitive information in order for it to be impossible to identify a particular individual from their information.

***Manfred Green**, Head of the School of Public Health, Haifa University*

Mr. Green gave a presentation on the ethical and legal issues relating to infectious disease emergencies – in particular at the start of an outbreak when there is not even absolute certainty that the outbreak is happening. He discussed the timing of actions to carry out following a report of a suspected outbreak and the legal and ethical issues to be implemented (e.g. isolation with immediate effect, quarantine on day two and so on…). He also considered issues concerning first responders (i.e. 'are their legal

measures in place to force them to work?') He used the example of the spread of SARs to Canada as a look at how important it is to respond quickly to an emergency at to put effective measures in place. He highlighted that there needs to be more legislation clarifying quarantine, social distancing and travel restrictions. It was noted that there should be different protocols created for each disease as all are different and would require different measures.

***Toby L. Merlin**, Deputy Director, Influenza Coordination Unit Centers for Disease Control and Prevention, USA*

Mr. Merlin gave a very insightful talk about pandemic influenza. He said that it is not being hyped up – the virus is active and aggressive and is still evolving. Predictions based on previous pandemics such as the one of 1918 have the number of worldwide fatalities estimated at 62 million. However, this is likely to be a conservative estimate as the virus from 1918 had a 2% fatality rate in humans whilst the current virus has a 60% death rate of humans infected. Thus it seems like a much more aggressive and dangerous strain. Mr. Merlin spoke of the importance of mitigation to diminish the impact of the virus. In particular he stressed the importance of social distancing as a mitigation strategy. He also gave three excellent reasons as to why responders should be prioritized for vaccination. First, they put themselves at risk of infection just by doing their job. Second, they are a valuable resource that we don't want to lose. Third and finally, they would be capable of transferring the virus on to many people. It would seem that the public (at least in the USA) also support the priority treatment of responders. Despite some queries concerning what would happen if the responders were unwilling to take the medication, Mr. Merlin said that he didn't believe it would be an issue as most of the responders questioned were more interested in whether they could also obtain vaccines for their families.

4.4 Concluding Round Table and Closing Remarks

The concluding round table was introduced by Mr. Mordini. The purpose of the presentations for this section of the conference was to provide some sort of final framework from which to hang the rest of the workshop together.

***Simon Langdon**, Director of Cedarthree Limited, Crisis Management Specialists, Bath*

Mr. Langdon spoke of the importance of the 'Golden Hour' for disaster response. This is the time immediately after the disaster has occurred in which, if the response is positive and effective, the course of the resolution and return to normality from the disaster will be significantly positively influenced. He spoke of the importance of having an effective disaster management plan in place. It was interesting to be able to make some comparisons with the medical response needs. The most obvious is that the initial reaction to the disaster must be fast and efficient and that this means having a plan in place. When pandemic influenza hits, responders will have to be quick off the mark and may have to implement certain security/response measures before they are even sure

what they are dealing with. The other parallel comes from the need to review plans and update them according to lessons learned.

***Renzo Pegoraro**, Fondazione Lanza, Padova*

Mr. Pegoraro spoke of the effect of climate change on disasters – namely that it will lead to an increase in disastrous events which will particularly affect those in the third world and in vulnerable areas such as coasts and flood plains. He claimed that the knowledge of such disasters increasing in frequency leads to two types of ethical responsibilities; 1) immediate/urgent ones and 2) mid/long-term ones. In other words, though it is important to act now to diminish the likelihood of such events occurring by good international communications and installing measures to take better care of the planet, we must also plan for the future and look at ways to improve the long-term potential of climate change related disasters. Mr. Pegoraro emphasized the need for strong coordination between different agencies (i.e. governments/religious groups/responders) and a focus on justice and solidarity which would see richer countries assisting those less well off. He also noted the importance of including future generations in discussions.

Mr. Mordini noted that it was important to conclude with the notion of future generations: the conference had progressed from the concepts of liberty and fundamental rights at the start, to the ideas of liberty and future; between those concepts Mr. Mordini believes lays everything important to the purpose of this project.

Mr. Rafalowski thanked everyone for their presentations and said that he believed the conference had provided useful and impressive ideas for potential future projects.

5. Proposals for Future Research Development

From the general discussion, a few areas emerged as being worthy of further exploration. Below is a summary of the key points that participants felt it could be worth focusing on.

Research Development Ideas

1. MEDIA – there is the need to develop of guidelines for media practice in disasters, a form of control of the type of coverage to be shown in news reports and the need to 're-educate' the public and media providers in their ideas of disasters in order to change the mentality and the approach taken in the reporting of such events.

2. CULTURAL DIVERSITY –it could be helpful to clarify cultural differences that could have an impact on disaster response. It would be useful for responders to have some sort of manual or guide on different mourning traditions amongst various cultures in order for their response to be as appropriate and inoffensive as possible.

3. BEST PRACTICE CONSORTIUM – there is a clear need in Europe for some type of method for different organizations to share lessons, information and best practice tips with one another. To open up this necessary dialogue, it would be highly useful to set up some form of database or annual conference/report.

4. BLOOD DONATION – the topics highlighted by Mr. Rafalowski indicate some important areas concerning the issue of blood and its uses in disasters. Things such as who decides on using un-tested blood and how to encourage donors at different phases of the disaster response need further explorations.

5. STANDARDS OF CARE – is it realistic to expect the same standards of care for all? Is it possible to provide this one day? What different circumstances could impact the standard of care received? All these questions need to be investigated in greater detail.

As well as the research development ideas proposed in the box, a few more practical 'action oriented' suggestions can also be made. These will be explored over the following few paragraphs.

There is a need to develop better collaboration and partnership between different groups involved in first response issues at the planning phase of response protocols. Thus those involved in operational aspects and working in the field, need to communicate with those considering ethical issues so that the ethics of response plans are clear from the outset. If ethical matters are clear from the planning phase then problems should be easier to avoid when response is required during a disaster.

So for example, collaboration is paramount in the following areas;

- Determining culture appropriate responses. This will ensure that the response effort does not mistakenly cause offence/distress to victims of the disaster who may hold particular beliefs or practices that are different to those of the first responders. In particular concerning issues such as treatment of the dead and of the grieving but also concerning matters such as appropriate physical contact, culture appropriate methods for comforting the distressed and so on. It would be helpful if there could be an easily accessible document released by the Commission providing a cultural outline and guide for Best Practice in different countries around the world (with perhaps particular emphasis on the differing traditions in Europe where most European First Responders will be providing aid).
- Finding methods to enable disaster stricken communities to become self-reliant again. It is important that responders are able to enable a community to stand on its own feet again. Thus there needs to be some consideration in the planning phase of responding as to how responders can improve the capacity of victims to carry on the recovery phase once aid is withdrawn. Developing protocols with the goal in mind of capacity building within the disaster-stricken community will ensure a more effective long-term recovery strategy. In order to understand the areas in which a community needs to become more self-reliant and to determine best practice, first responders must communicate with organizations which have the long-term welfare and ethical interest of the stricken regions in mind.
- Consideration of responders needs. It is vital that first responders are prepared for the situations they will face. Whilst it is impossible to prepare for any eventuality and situation that a disaster may throw up, it is possible in a broad sense to imagine the distress that may hit responders in a dismal situation. It is important that a culture is built up whereby responders do not consider themselves 'weak' to seek emotional/psychological support for themselves. In order to do this, response organizations need to collaborate with organizations capable of providing psychological support.

There also needs to be careful consideration of the issue of standards of care. We need to consider existing standards (for example – those outlined by SPHERE[1] or the International Federation of Red Cross and Red Crescent Societies[2]) and their applicability to the European reality. Though both of these are extremely useful documents, they are not legally binding and as such, there is no strict imperative for the EC to adhere to the guidelines. It would be of great use if work could be undertaken to assess how relevant the guidelines provided by these two organizations are in real terms and whether the existing standards are realistic in the face of real disasters (and relevant within Europe as opposed to a more 'global' or 'third world' context). Such research could also explore whether current European disaster legislation and guidance is adequate and up-to-date with what is required (as gauged by how well it covers the topics outlined by SPHERE and the IFRC) or whether more effort is needed to reach optimum levels of preparation as outlined by SPHERE.

There is a need for a "code of conduct" for responders in disasters so that they can enter response situations with clear ideas of appropriate behaviours in mind. In return there is also a need for a commitment from society to those responders, to respect what they are there for and also to assist as they can by for example taking care of their relatives. Existing codes of conduct tend to be fairly generic whilst not providing specific guidance about situation specific behaviours. For example, the World Medical Association[3] advises physicians that in the aftermath of a disaster;

1. In the post-disaster period the needs of survivors must be considered. Many may have lost family members and may be suffering psychological distress. The dignity of survivors and their families must be respected.

2. The physician must respect the customs, rites and religions of the patients and act in all impartiality.

However, it does not provide specific guidance on *how* the physician should go about respecting these diverse customs. How is a physician entering a disaster situation necessarily to be expected to know what behavior is appropriate? A clear code of conduct that could be disseminated to all first responder groups giving clear guidance of appropriate behaviours would be beneficial. It would also enable different responder groups to come together and work in an environment, knowing that they were all following the same behavior codes and so on which could allow them to work together in harmony with a little more ease.

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[1] SPHERE (2004) Chapter 5, Minimum Standards in Health Services. The SPHERE Project Handbook; Humanitarian Charter and Minimum Standards in Disaster Response p.249-310

[2] Fisher, David. (2007) Law and Legal Issues in International Disaster Response: A Desk Study – Summary Version (International Federation of Red Cross and Red Crescent Societies)

[3] WMA - Policy : Statement on Medical Ethics in the Event of Disasters; http://www.wma.net/e/policy/d7.htm (1 of 2)12/11/2007 1.32.01

Another area requiring greater clarification is that it is important to set a legal framework that will enable cross border assistance, specifically addressing the issue of volunteers. For example, the question of how visas should be distributed to first responders is one matter that requires further attention. Would it be appropriate for certain travel requirements to be suspended in the case of volunteers providing aid after a disaster? Failure to do this could greatly inhibit a rapid and much needed response, however, it would be extremely tricky to establish what changes to the law could be acceptable and how it would be implemented. This is a matter for both national and international governments to consider. National governments need to consider their country-relevant legislation and whether they would be willing to suspend usual protocols to enable aid to enter the country in a disaster. However, at an international level, co-operation and guidelines concerning unified cross-border responses are also needed. This will provide some clarity both for the international and domestic aid organizations, and also national governments who can use the international guidelines as a starting point for considering their own position.

These issues are all ones in which the European Commission can play an important role by taking the lead and encouraging further research/projects in this field. They should provide funding to specifically explore these pertinent disaster-related/response-related issues and could perhaps assist with the setting up of networks or best practice consortiums to further advance collaboration in this field. The EC should also take an active role in reviewing current legislation on issues such as standards of care which can then be disseminated to the various response organizations operating within Europe. Overall the meeting of the Disaster project in Rome has led to several useful points for consideration regarding the European approach to Disaster response and it is hoped that these will be further built upon.

APPENDIX ONE – PARTICIPANT LIST

PARTICIPANTS LIST

NAME	EMAIL ADDRESS
ALEXANDER David Centre for Risk and Civil Protection Studies University of Florence (IT)	d.alexander@virgilio.it
ANACLERIO Michele Cabinet of the Italian Minister of Defence, (IT)	segreteria.consanmil@yahoo.it
ASHTON Holly Center for Science, Society and Citizenship (IT)	holly.ashton@cssc.eu
BALESTRIERI Valeria Center for Science, Society and Citizenship (IT)	valeria.balestrieri@cssc.eu
BIGO Didier Science Po (FR)	didier.bigo@libertysecurity.org
COLVARD Michael University of Illinois (USA)	COLVARD@uic.edu
DOMPIG Gerold Shiled Group (IL)	gerold.dompig@shieldgrp.com
GUERRIER Marc Espace Ethique (FR)	marc.guerrier@sls.aphp.fr
GREEN Manfred Green School of Public Health, Haifa University (IL)	manfred.s.green@gmail.com
INGRASSIA Pierluigi CRIMEDIM	pingrass@fsb.it
JAMES James American Medical Association Center for Public Health Preparedness and Disaster Response (USA)	James.James@ama-assn.org
LANGDON Simon CEDARthree Limited (UK)	simon.langdon@cedarthree.co.uk
MALMSTRÖM Lennart Disaster Medicin Karolinska University Hospital (SE)	lennart.malmstrom@karolinska.se
MANTICI Alfredo Italian Presidency of the Council of Minister (IT)	segreteriacd@protezionecivile.it
MARTINES Vincenzo Italian Armed Forces (IT)	dg.difesan@libero.it
MERLIN Toby L. Centers for Disease Control and Prevention (USA)	tfm5@cdc.gov
MORDINI Emilio Center for Science, Society and Citizenship	emilio.mordini@cssc.eu

(IT)	
NENCINI Giorgio Nencini Episcopal Vicar for the Italian Air Force (IT)	segreteria.vescovo@ordinariato.it
PACIFICI Laura Elena Italian Red Cross (IT)	lepacifici@hotmail.com
PEGORARO Renzo Fondazione Lanza (IT)	renzo.pegoraro@fondazionelanza.it
PELEG Kobi Israeli National Center for Trauma & Emergency Medicine Research (IL)	kobi.peleg@gmail.com
PETRINI Carlo National Institute of Health (IT)	carlo.petrini@iss.it
RAFALOWSKI Chaim Magen David Adom (IL)	haimr@mdais.co.il
RAMAKERS – VAN KUJIK Marian Ambulance Zorg (NL)	Marian.Ramakers@ggdzl.nl
RAMLAWI Asad Director General , Dept. of Primary Health Care and Public Health, Ministry of Health, Ramallah (West Bank)	ramlawi_asad@hotmail.com
RAVINETTO Raffaella Ravinetto Médecins Sans Frontières Rome	rravinetto@itg.be raffaella.ravinetto@rome.msf.org
REY PATERNA Paloma C. Samur Madrid (ES)	reyppc@munimadrid.es
RICHMAN Aaron Shield Group (IL)	arichman3@gmail.com arichman@itrrintel.org
RODOTÁ Stefano European Union Agency for Fundamental Rights	stefano.rodota@uniroma1.it
ROSINER Gila Livnat Rosiner Embassy of Israel in Rome	economyassist@roma.mfa.gov.il
ROUHBAN Badaoui UNESCO	B.Rouhban@unesco.org
SALVI Maurizio Bureau of European Policy Advisers, EC	Maurizio.Salvi@ec.europa.eu
SÁNCHEZ Mar Alonso Samur Madrid (ES)	
SORELL Tom Centre for the Study of Global Ethics, University of Birmingham (UK)	t.sorell@bham.ac.uk
STERPONE Sergio Sinergie (IT)	graziella.bellone@sinergie.net
STILIANAKIS Nikolaos Senior Research Fellow, Joint Research Centre, Ispra (IT)	nikolaos.stilianakis@jrc.it
VAN GYSEGHEM Jean Marc Research Centre on IT and Law, University of Namur Attorney at Law at the Bar of Brussels – Belgium (BE)	jean-marc.vangyseghem@fundp.ac.be
VYMETAL Stepan CUNI University (CZ)	stepan.vymetal@email.cz
ZAHRA Sabri ALQUDS University – Child Institute (West Bank)	sabri_safadi@yahoo.com

PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR FIRST MEDICAL RESPONDERS IN DISASTERS

WORKSHOP ORGANISED BY THE SHIELD GROUP and THE INSTITUTE of TERRORISM RESEARCH and RESPONSE

Amsterdam, Netherlands 12-13 January 2009

PERSONAL PROTECTIVE EQUIPMENT

On 12-13 January 2009, in Amsterdam, Netherlands, emergency medical experts representing Spain, Italy, the Czech Republic, Israel, and the Netherlands, were present at the **PERSONAL PROTECTIVE EQUIPMENT (PPE) OF FIRST MEDICAL RESPONSE IN DISASTERS WORKSHOP** organized by the Shield Group and the Institute Of Terrorism Research and Response. These experts discussed issues that occur when providing emergency medical services in the Warm Zone of a hazardous event or other disaster.

Background

Natural and man-made (both intentional and unintentional) disasters can involve a wide range of hazardous substances – from industrial chemicals to military grade chemical or biological weapons agents to radiological/nuclear materials. Transportation and treatment of patients, whether at the scene of such an emergency or at a medical care facility, can put healthcare providers at risk of occupational exposures to hazardous materials of all kinds. Having appropriate personal protective equipment (PPE) is essential in order for healthcare providers to perform their life-saving duties providing care to the injured while protecting themselves and the facilities in which they work.

Healthcare providers' need for PPE during patient care was demonstrated in the wake of the 1995 sarin nerve gas attack in the Tokyo subway system. Off-gassing from patients during and after transport to hospitals added 135 pre-hospital providers and over 100 medical providers to the list of victims (Okumura, 2000). This event also illustrated the need for decontamination capabilities and comprehensive medical response planning, training, and preparedness efforts within the healthcare community. Almost 14 years after the Tokyo attack, much of the PPE in use by healthcare providers remains incompatible with delivering patient care.

Medical personnel must wear proper PPE when working in an area known or suspected to be contaminated, or when handling patients who are or may be contaminated. Experience has shown that hospitals will receive not only those patients transported by emergency medical services (EMS). In addition, hospitals – especially those closest to the scene of the emergency – will receive a large number of self-referred casualties. In many cases, these walk-in casualties will not have undergone any field decontamination, making the need for PPE at the hospital even more acute.

Speakers

***Joel Yonkman*,** Institute of Terrorism Research and Response

From Regulation to Response: The US Perspective
In the response to hazardous materials incidents in the United States there are many organizations that provide technical guidance. This guidance is provided in order to assist first response organizations to develop a safe and efficient response to hazardous material incidents. In an attempt to understand a typical response a few of the regulatory agencies and their role in planning for, response to, and recovery from an incident were discussed.

Each standard requires independent, third party certification to ensure that the protective clothing meets its design, performance, and documentation requirements. Certification agencies, such as Underwriters Laboratories (UL) or the Safety Equipment Institute (SEI), certify the garment performance, not NFPA.

The First Receiver: The Hospitals' Expanded Role
In the fight against terrorism hospital systems, a new member of the response community. has been cast into the spotlight across the United States. In these types of incidents it is expected that hospitals will play a much more active role in the future handling of contaminated patients.

To that end organizations across the US have worked at providing guidance to healthcare facilities regarding how to respond to such incidents. This guidance focuses on classification of the first receiver, training requirements, incident command implementation and PPE selection for hospitals. The intent is to provide for a safe, organized, and coordinated response by hospital staff.

Mr. Chaim Rafalowski, MDA

"The response to a Toxicological Multi-Casualty Incident - the Israeli perspective"
Israel's planning for providing emergency medical procedures have been put to the test in the emergency response to industrial accidents. As a result of this experience, Israel has provided its Advanced Life

Israel uses a response system that includes the Police (as incident command), the Fire Department, Emergency Medical Management (MDA), hospitals, local authorities, and (in the case of industrial-type accidents) the owner of the hazardous material.

- Ambulance personnel are provided with pocket sized medical procedure cards that assist them in making correct decisions in the field
- EMS personnel have the authority to take action without receiving permission
- BLS and ALS are equipped with auto-injectors to deal with chemical agents

- The rescue of the injured starts with the area furthest from the harmful agent and working in towards the focal point of the agent.

Michael Perelman, Institute of Terrorism Research and Response

Animal Rights activists are affecting the ability of researchers to develop new and innovative equipment, procedures, and tactics for emergency medical responders to deal with terror related incidents. Research institutions, testing laboratories, and their personnel are continuously harassed by activists who are willing to use threats and fire to stop all medical testing on animals.

The Animal Rights groups are affecting research in North America, South America, and Europe. A company located in one area, that has facilities in other areas (or countries) is vulnerable to having any of facilities targeted for damage or destruction.

Dr. Irene van de Woude, Ambulance Service Netherlands

In the Netherlands, the Fire Department is responsible for issues of chemical contamination.

The Fire Department, together with the medical department, is responsible to identify whether a situation is a small scale incident with fewer than 10 casualties, or a large scale incident with up to 250 casualties. Upon arriving at an incident, the Fire Department must set up a 3 zone environment − hot, warm, and cold zones.

One ambulance, with its crew including driver and nurse, will enter the warm zone and stay in the warm zone until the end of the incident. They will stabilize patients before the Fire Department carries out the decontamination.

The Ambulance Service of the Netherlands conducted tests on decontaminating individuals within the warm zone. Among other things learned in the tests − water and wind chill become problematic in the Netherlands' weather conditions. As a result, the decontamination on-site will only be carried out in a sheltered place using warm water.

For large scale events, the Ambulance Service anticipates the use of schools or swimming pools for decontamination of ambulatory victims.

Mr. Tibor Mikes, National Institute of Nuclear, Chemical and Biological Protection

National Institute of Nuclear, Chemical and Biological Protection is a public research institution established by the State Office for Nuclear Safety pursuant. For the purposes of research and development activities in the field of chemical, biological and radioactive substances and security technical support supervisory and inspection activities conducted by the Office of Radiation Protection and the control of the prohibition of chemical and biological weapons.

The work of the National Institute of nuclear, chemical and biological protection has been involved in the measurement and evaluation of natural radioactivity with particular emphasis on the measurement of radon and its transformation products. This work was done by its predecessors, whose origins go back to 1954.

When discussing the development of PPE, the National Institute of Nuclear, Chemical and Biological Protection suggests that,

There are various doctrines, technologies and equipment to face a CBRN event in the individual EU member states. …Due to historical and economical development of member states, as well as for many other reasons, there will always be some national differences that are not feasible to supersede within few years. Hence the reports concentrate on those aspects that are more or less common in the whole EU community.

It may be declared that in each EU state, there exists “something”(Personnel, technology and equipment) applicable for CBRN events. Though such means and products were usually developed for other purposes, they more or less satisfy the imperative needs – under adverse conditions “something” is better than nothing. The basic conclusion is that technologies and equipment exist in each EU country but they are not unified, neither fully adapted to the FRs’ missions.

***Aaron Richman*,** Institute of Terrorism Research and Response

The initial moments of an incident that involves a chemical attack requires an immediate response by protected emergency services both as receivers and responders as well as command and control that is dynamic and flexible in the unified decision making. The presentation addressed considerations related to command decision making in the field based on the threat and the adversary techniques for targeting.

Command considerations include:

- Training with realistic scenarios using the equipment that will actually be used during real emergencies
- Identifying communications weaknesses in advance
- Explosives and device recognition
- Policies, procedures, and tactics

The preparations for dealing with major incidents requires not only training, but extensive exercises through the use of Table Top, Functional, and Full Scale Exercises.

Mrs.Paloma Rey, SAMUR

The Emergency Management System in Spain is based on a regional framework. Thus the **S**ervicio de **A**sistencia **M**unicipal de **U**rgencia y **R**escate (SAMUR) equipment and training standards that are in place for the SAMUR are not necessarily the standards that are in place for the rest of Spain.

In order to maintain a high level of training with their personal protection equipment (PPE) the well equipped vehicles of the SAMUR respond to numerous non-medical emergencies.

PPE Improvement Workshop

On 13 January 2009, in Amsterdam, Netherlands, emergency medical experts representing Spain, Italy, the Czech Republic, Israel, and the Netherlands, present at the PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR FIRST MEDICAL RESPONSDERS IN DISASTERS WORKSHOP organized by the Shield Group and the Institute of Terrorism Research and Response, identified the following issues relevant to The wearing of Personal Protective Equipment (PPE) while providing emergency medical services in the Warm Zone of a hazardous materials incident or event or other disaster:

- PPE must be designed that permits the fine movements required for medical care
- Breathing apparatus used by should be designed to be less scary to the public and to the wearer
- Current breathing apparatus does not permit adequate ability to communicate through existing communications equipment. The failure of the equipment to work together reduces clarity of communications or the integrity of the PPE.
- Current equipment that is used by EMS was designed for industrial applications, not EMS. Emergency medical personnel need equipment that was designed for the EMS task (e.g., reinforced knees in garments)
- The current “PPE manufacturer – EMS user relationship” does not have a feedback mechanism (to the manufacturers) for design improvements
- Current EMS PPE equipment has not been designed for the differences in gender physical structures. The failure to address these difference results in poorly fitting garments that can inhibit movement.
- Emergency Medical personnel need multi-use “everyday uniforms” that can be worn as a component of PPE within the warm zone
- The issue of heat build-up within PPE is a critical issue affecting the wearer’s ability to perform tasks over an extended period. Breathable suits that permit heat/moisture build-up to exit the suit (similar to Gore-Tex) while still permitting safe emergency medical work in the warm zone is a design request for the next generation of PPE.
- There is a confusion of standards as to when certain levels of PPE are appropriate − and when they are not. There should be 1 set of standards – civilian and military, providing guidelines on when to use PPE and at what level.
- Smart sensors in air breathing filters currently exist. However, the wearer is unable to ascertain when his/her filter requires replacement.

- Because of the civilian nature of EMS, Emergency Medical personnel have different vision correction (glasses) and some have facial hair. Breathing apparatus that will fit with beards and glasses should be designed.

- Equipment that is environmentally stable so it can be stored in vehicles
  - Example: gloves that deteriorate because of the high heat environment of Israel (current designs permit storage in storerooms, not necessarily in vehicles)

- Standards produced by manufacturers for ongoing certification of equipment in use in the field
- Different EMS organizations have different combinations of equipment. However, there is no independent validation of what equipment will provide acceptable levels of protection with other equipment.
- Emergency Medical personnel have various levels of training. Because of this fact, PPE that is designed to be intuitive ("idiot-proof") and can be used with minimal training should be developed.
- Face pieces of breathing apparatus should be designed to be anti-fogging
- Emergency Medical personnel would benefit from the standardization of
  - Training and guidelines
  - Placement of equipment on vehicles
  - Credentialing of personnel
  - Color coding of equipment for identification of personnel and to identify task

MEDICAL PPE STANDARDS WORKSHOP

Attendees

Israel	Richman,	Aaron	ITRR
Israel	Richman,	Esther	ITRR
USA	Perelman,	Michael	ITRR
Israel	Segal,	Kineret	ITRR
USA	Yonkman,	Joel	ITRR
Aruba	Dompig,	Gerold	Shield Group
Italy	Allessandra,		Diodati Italian R.C
Israel	Rafalowski, Chaim		MDA
Spain	Gimenez,	Juan	Samur Esp
Spain	Rey,	Paloma	Samur Esp
Netherlands	v.d.Woude, Irene		Ambul.Ned
Netherlands	Vullers,	Theo	Ambul.Ned
Spain	Fernandez, Ignacio		Samur Esp
Netherlands	Hoogeveen, Margreet		Ambul.Ned
Luxembourg	Steffens,	Rainer	DuPont
Czech Republic	Mikes,	Tibor	Sujchbo

Magen David Adom Blood Services

Use of Blood and Blood Products in Disasters-WP-5

Summary of the Workshop

Prof. Eilat Shinar, MDA blood services, Israel

Prof. Noga Manny, Hadassah Medical Center, Israel

Identifying the Needs of Medical First Responder in Disasters (NMFRDisaster)

Theme 10 – Security; Call – FP7-SEC-2007-1

NMFRDisaster - Identifying the Needs of Medical First Responder in Disasters

Coordinator: Magen David Adom (Israel)

Partners:

- Al-Quds Nutrition And Health Research Institute (Palestinian Administered Areas)
- Ambulance Zorg Nederland (Netherlands)
- Centro per La Scienza, La Società e La Cittadinanza- CSSC - (Italy)
- Charles University (Czech Republic)
- Croce Rossa Danese- Danish Red Cross -(Denmark)
- Fundacion Rioja Salud (Spain)
- SAMUR Servicio de Asistencia Municipal de Urgencia y Rescate (SPAIN)
- Shield Group Inc. – Security and Counter Terrorism Management (Netherlands)
- SINERGIE Formazione e Consulenza Professionale (Italy)
- Magen David Adom (Israel)

Duration: 1 year (01.05.2008 – 30.04.2009)

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BACKGROUND

As part of the NMFRDisaster project, and following our background paper (1), a workshop was held in November 24-25 of 2008, in Kfar Hamacabia, Ramat Gan, Israel (WP-5). In this meeting key problems such as the Use of Blood and Blood Products in Disasters and the need to have preparedness plans in order to meet surges in demand for blood components, needed by casualties of natural domestic disasters and acts of terrorism, were addressed (see below).

The workshop was attended by representatives from the consortium members, as well as 30 senior experts in Emergency Medicine, Blood services management and Transfusion Medicine in Israel.

WORKSHOP PROGRAM and PARTICIPANTS:

A. Following greetings from the Deputy to the Director General of the Israeli Ministry of Health, MDA president, the project's and the workshop's coordinators, the following sessions were held:

Day 1: 24th November:

1. Use of Whole blood and blood Component in Transfusion Therapy at the battle field and in field and conventional transfusion centers
2. Alternatives/additions to conventional blood components therapy

Day 2: 25th November:

1. Preparedness for Natural and Man-made disasters
2. Rapid testing techniques
3. Visit and tour of MDA blood services center

B. Participants:

The following experts sent presentations for the participation in the workshop:

1. Members of the consortium (in alphabetical order):
    a. Ambulance Zorg, the Nederland
        i. Dr. Charles Lelkens, the Netherlands Military Blood Bank
    b. El-Quds Nutrition And Health Research Institute, Palestinian Authority

i. Mr. Sabri Safadi, El Quds University

c. Charles University, Czech Republic:
   i. Lt. Col. Milos Bohonek, MD, PhD, the Central Military Hospital, Prague,
   ii. Dr. Martin Pisacka, the Reference Laboratory for Immunohematology in Institute of Hematology and Blood Transfusion in Prague

d. Fundacion Rioja Salud, Spain
   i. Dr. Roberto García de Villaescusa, MD, PhD

e. MDA blood services, Israel:
   i. Prof. Eilat Shinar, MD, director
   ii. Dr. Vered Yahalom, MD, deputy director

f. MDA project coordination:
   i. Mr. Chaim Rafalowski
   ii. Mr. Assi Devilanski

g. SAMUR Servicio de Asistencia Municipal de Urgencia y Rescate, Spain
   i. Dr. I. Rodríguez Miguel MD
   ii. Ms. Paloma C. Rey Paterna

h. Shield Group Inc. – Security and Counter Terrorism Management
   i. Mr. Aaron Richman

2. Additional Professionals from the participating members' countries
   a. Dr. Emma Castro Izaguirre, MD, The Spanish Red Cross Transfusion Center, Madrid, Spain.
   b. Dr. Eldad Dann, MD, Rambam Medical Center, Haifa, Israel
   c. Prof. Noga Manny, MD, chairperson of the Advisory Committee on Transfusion Medicine to the Israeli Ministry of Health
   d. Prof. Uri Matrinowitz, MD, Sheba Medical Center, Israel
   e. Dr. Neomi Rahimi-Levene MD, Assaf-Harofeh hospital, Israel

3. Guest professionals:
   a. Prof. Steven M. Becker, the University of Alabama, Birmingham, USA

4. Scientists Representing Israeli Biotechnology companies:
   a. Dr. Amir Arav, Core Dynamics

b. Dr. Baruch Rivetz, Orgenics LTD

5. Local professionals in Israel, such as:
    a. Representatives form the IDF (Medical Corps and Home Front Command)
    b. Members of the Israeli Consulting committee for the Organization of Blood Services during Emergency situations
    c. Senior staff of MDA blood services center

REVIEW OF THE MAJOR ISSUES PRESENTED:

1. Session 1& 3: Use of Whole blood and blood Component in Transfusion Therapy at the battle field and in field and conventional transfusion centers

The national and /or local response plans used in some of the participating members' countries (Spain, Israel and the Check Republic) were presented and discussed (2, 4-6).
All the presenting authors agreed on some common principals, regarding preparedness plans for disasters and the use of blood and blood components in such events: Blood services worldwide must be prepared to meet surges in demand for blood components, needed by casualties of domestic disasters and acts of terrorism (2).
Based on the Israeli experience during 26 years of hostility actions, suicide terrorist attacks and other Multi-Casualty events the projected use of blood units will be 3 units of blood and 3 units of blood components (plasma, platelets and cryoprecipitate) if all casualties are taken into consideration, or 8 units of blood and 9.7 units of blood components will be needed for the moderate/severely wounded patients.
Dr. Eldad Dann, the Blood Bank director of the Rambam Medical center in Haifa, Israel, presented their experience, from a point of view of a 3rd level major trauma center (3). In a study aimed to analyze the issues of patient misidentification and excessive blood request and to develop recommendations for the management of such episodes, a retrospective analysis of nine explosion attacks was performed. Out of the 450 casualties involved in the nine consecutive events 82 (18%) died on the explosion site and 368 were admitted to nearby trauma centers.
Red blood cell units were typed and cross-matched for 70 patients.
Seventy-three per cent of the blood supplied over the first 24 h was administered during the first 2h. The cross-matched/transfused ratio was
2.52 – 1.42 respectively, reflecting the overestimation of blood requirement by the Emergency Medicine experts during the mass casualty episodes. The importance of usage of error-reduction design wristbands and a designated "blood officer" from the hospital blood bank staff was emphasized, to avoid potential misidentification upon samples collection or during blood administration.

The Spanish Red Cross Blood Services put special emphasis on correctly determining blood requirements in different events, providing transport for blood from one centre to another, and sending a common message to all the country's blood centers, as well as the general public, about the situation of the blood supply in the affected area (4).

The three important lessons learned by this service were:

1) Blood collections must be controlled so as not to exceed the real requirements
2) Blood centers must always maintain sufficient stocks (5-7 working days for MDA and the Spanish Red Cross, respectively)
3) A national stock coordination plan is necessary
4) Public appeal should only be conducted at the initiative of the blood services only, to match supply with demand and prevent wastage

In addition it was stated that to satisfy the blood requirements during the initial 24 hours:

a) All blood that is initially dispatched should be type O packed red cell
b) The quantity dispatched to a centre should not exceed the amount of blood required for one day (taking all blood types into account)
c) The initial dispatch of blood products should be carried out by the centre which can most quickly deliver them

Although, currently it seems that the majority of situations do not require extensive use of platelets or plasma, which seem in severe trauma cases be only necessary in special circumstances, the workshop participants thought it could be interesting and useful to conduct a muti-center study, looking at the usage of blood components in severe trauma cases, especially in view of the new treatment regimen of component therapy (1:1:1) recommended lately in the literature (8).

Development of an emergency plan should include the following strategies:

1) Alternative means of communication with hospitals and the coordinating centre.
2) Alternative means of transportation.
3) Coordination with local, regional and national authorities. This important issue was also stressed by the participants of the Czech Republic, where a Resolution of the Czech Republic National Security Council was recently passed (Res. No 19 from April 15th. 2008), where the Ministries of Health and Defense were entrusted with the enforcement of "The Crisis Setup of Health System" - a Method of blood crisis policy. The aim is to guarantee sufficient as well as efficient supply of blood products and blood derivates in any place of the country during any crisis situation, such as mass

accident, disaster, terrorist attack or war. The responsible government institute, the Ministry of Health, cooperates with the Ministry of Defense. The system includes 7 state "blood crisis centers" (BCC), 1 military and 6 civilian and each of 7 BCCs is responsible for supplying defined territory.

4) The maintenance of equipment, testing kits and other supplies for the collection, professing and testing of blood (1).
5) Measurements need to be planned to assure attendance of an adequate number of staff numbers, since in some events it could be reduced. In such cases there should be a plan to redistribute the staff and /or hold the minimal activity needed to to ensure essential blood collection and supply (5).
6) The maintenance of power supplies, water and telephone services, as will be crucial throughout the disaster both to internal and external stakeholders with key messages being developed for different stages of the crisis (4-5).
7) A coordinated national program can stabilize in-hospital inventories during routine activities, ensure instant access to precisely defined inventories, facilitate sufficient supply in times of disasters, and minimize outdating and wastage.
8) A plan can be established, to reduce current usage of blood through appropriate use programmes, which may contribute to better control of the scarce inventory and avoided shortage, in most cases. The plan should ensure that transfusions are appropriate, and are based on national. As well as current guidelines or standards from professional bodies (Council of Europe, British Guidelines, CAT, etc.) (6).
9) The organization of blood donors and volunteers, to send appropriate messages to the public, and provide, where possible, a safe environment for donors to donate and for staff to come to work (2,5). This should also include crowd control measures (4).
10) Strategies for working with the media.
11) The participants from the Check Republic added the issue of having a 3000 units of frozen RBCs group 0, as a mean of support in times of emergencies. As this is a high resources method to maintain and operate, it will be interesting to investigate the actual use and cost-effectiveness of such components' inventory
12) Central blood services, as well as hospital blood banks should be included in drills and training exercises of different set-up of man made sot natural disasters.

SAMUR-PC is considering the possibility of implementing the use of blood and blood components in the management of patients with major trauma.

Supporting a Consensus Conference on Appropriate Use of Blood Components in Normal and in Disaster situations particularly in relation with regulatory concerns, can be an important tool for authorities and health professionals (7).

2. Session 2: ALTERNATIVES TO CONVENTIONAL BLOOD COMPONENTS

As a prelude to the session dealing with alternatives to the Transfusion Therapy using traditional blood components, a comprehensive review of the Coagulopathy which occurs during Massive Trauma was presented by Prof. Uri Martinovitch, the head of the Institute of Thrombosis and Hemostasis and the National Hemophilia center of the Israeli Ministry of Health at Sheba Medical Center, in Tel- Hashomer (9).

It was emphasized that bleeding is a major cause of preventable death in both military and civilian injury from trauma, accounting for over 40 -50% of all mortality. In recent years new insights were gained into the process of combined massive surgical bleed from large and small vessels and the development of an early complex coagulopathy, which is an independent predictor for early mortality. The modern notion is that trauma-related coagulopathy is not a state of disseminated intravascular coagulation (DIC), but a condition with excessive activation of the coagulation cascade at the sites of injury, and an accelerated consumption of both coagulation proteins and platelets, that enables the use of systemic hemostatic agents such as fibrinolytic inhibitors , recombinant activated FVII-(rFVIIa), prothrombin concentrates etc. The combination of coagulopathy, acidosis and hypothermia, recognized as the "lethal tirade" of trauma, requires an early and aggressive comprehensive "hemostatic resuscitation", together with treatment of hypothermia and correction of acidosis (to at least above 7.2 but preferably higher). The common practice for blood component therapy, including the threshold hemoglobin for transfusion is currently being revised based on new data and the experience of the American Army in Iraq, and the new protocol supports the use of a 1:1 PRBC: FFP. Other components as cryoprecipitate (or fibrinogen in Europe) and platelets should also be considered at the same time. The use of rFVIIa can probably be considered early in the course of trauma and before the deterioration of the patients into an irreversible state, despite the fact that there is still limited data from controlled trials.

It should be remembered that conventional blood tests will not provide a swift enough answer to guide decision making as they can be lengthy and do not necessarily represent the in vivo picture. As monitoring the coagulopathy treatment modalities, using "on-line" equipment, whenever possible, is an important therapeutic tool, Dr. Rahimi-Levene, director of the blood bank of Assaf Harofe hospital in Israel presented their experience using Thromboelastography (TEG), a technology able to demonstrate to the treating physicians the clot formation and strength (10) (Figure 1). The test is performed in the blood bank, allows prompt on time decision making and can be viewed online in remote sites (including the operating theater). The use for blood components (FFP, cryoprecipitate or fibrinogen and platelet concentrates can be readily assessed and the test can be repeated until the patient is stabilized and has received proper replacement therapy.

Figure 1: Thromboelastograph

Since coagulopathy is an important component in the survival of trauma patients and since most of the hemorrhagic mortality occurs even before the admission to the hospital, it seems rational to study the use of an early hemostatic resuscitation in the pre-hospital settings, with the intension to prolong the "golden hour". Emergency hemostatic packs containing chitosan hemostatic bandage (Hemcon® USA), bicarbonate, tranexamic acid, fibrinogen concentrate and rFVIIa can be used in such studies, provided interest will be shown by EMS systems.
In view of the need for more and earlier use of blood components, especially for treatment of both military and civilian trauma victims, two the interesting approaches, of The Netherlands army and an Israeli company were presented to the participants (11-12):

1) Dr Charles C.M. Lelkens, a Royal Netherlands Navy CO and Medical Director of the Netherlands Military Blood Bank presented their experience of using frozen blood components of universal donor red cells, plasma and platelets (11).

   The system includes a -80°C frozen inventory of the most essential blood components readily available after thawing (and washing if required), enables to safely reduce shipments along vulnerable supply lines and abandon the backup "walking blood bank", without compromising the availability of blood products in theater. Moreover, all thawed (washed) blood products are in compliance with international regulations and guidelines.

   Since August 2006, when the Netherlands started to participate in Afghanistan, more than 400 patients have been transfused with some 2500 units of frozen blood components, without any untoward effects.

   Further research of the quality and characteristics of such frozen blood components, both in vitro and in vivo, can be an interesting base for collaborative studies among some of the consortium members.

2) Another fascinating approach to improve the availability of cellular components was presented by Dr Amir Arav, from the company Core Dynamics, in Israel, regarding the use of Frozen and freeze dried blood in disasters (12).

   In view of the cumbersome process required for freezing and thawing RBC, and the logistic and economic challenges regarding to the transportation of and storage of such frozen units, the company is developing frozen and a freeze dried RBC single units, which is safe, easily transportable, and ready for use upon rehydration.

   The system is based on the principles of directional freezing, performed in a novel freezing device (aka MTG), which allows for improved control over ice crystals morphology during the freezing process. This freezing device enables successful freezing in the absence of cryoprotectant agents (CPAs) such as glycerol, DMSO, ethylene glycol and others. In addition, a dry thawing device (DTD) was developed which enables the thawing of 500ml samples within 2 minutes. A proprietary freezing solution based on saline supplemented with a sugar and an antioxidant, both non-toxic ingredients as been shown by early pre-clinical studies, has been developed as well. Experiments performed with RBCs units showed 100% recovery of the cells with less then 3% hemolysis after freeze thawing in the absence of CPAs using CD freezing and thawing devices. Furthermore, Autologous transfusions of fluorescent labeled 0.5L

samples performed on donkeys showed an in vivo recovery of 80% of the thawed RBCs 24 hours post transfusion and that the cells have maintained in the animals circulation for 3 months, equivalent to non frozen labels units.

Initial experiments performed on freeze drying small volumes of RBCs samples showed ATP and 2,3 DPG values similar to fresh samples but RBCs that were stored in hypothermia with CPDA-1 solution showed reduced ATP and 2,3 DPG values.

RBCs that were frozen and freeze dried had maintained their typing upon thawing or rehydration.

Further research of the quality and characteristics of such frozen blood components, both in vitro and in vivo, can be an interesting base for collaborative studies among some of the consortium members (see below).

3) Session 4: PREPAREDNESS PLANS FOR DISASTERS

In the session dedicated to preparedness for natural and man-made disasters few subjects were discussed:

a. <u>Protection gears for transfer of blood units and components:</u>

One of the major issue that has no trivial answer, to the best of the consortium members' knowledge, is the need to study the required Protective gears for whole blood units and components, during their transportation from the collection sites to the blood services, for further processing and testing, and during their shipment to the different hospitals, in scenarios with chemical, biological and/or radiological threats. A short presentation was made by Mr. Aaron Richman, from the Shield Group Inc. in the Netherlands (13), emphasizing that critical supplies, such as blood and other medical supplies, must be transferred between facilities, during a crisis incident involving a weapon of mass destruction. A thorough research must be conducted to address these matters and identify the optimal protective gears required to shield the blood units from agents that may penetrate the bags (i.e. gases and other volatile agents) without compromising the conditions necessary to preserve their function and performance, once they are transfused.

b. Blood supply during Earthquake:

Dr. Yahalom, deputy director of Magen David Adom, National Blood Services, Israel reviewed the preparedness plan required during an earthquake, which is a natural disaster that might turn into a demanding event for the local blood banks and Blood Centers, according to its location and consequences (14).

Such an event may disrupt the entire infrastructure, thus causing major damages. A careful estimation of the different risks, evaluation of the gaps, establishing a contingency plan and performing simulation of such an event will increase the preparedness of national blood services and hospital blood banks for an unexpected chaotic scenario that can not be predicted (yet) nor prevented. The different logistic issues that need to be addressed were reviewed in depth, including the need for previous knowledge of the vulnerable areas in each country, modes of construction, density and type of population, infrastructure of the Blood Center & hospitals (need for reinforcement of non constructive elements, power and water supply recovery plans) as well as the recovery plans for testing equipment and blood components processing, IT & Back up systems.

Alternative should be prepared for communication plans between the Blood Centers & the Hospitals, employees, blood donors, the integration of Volunteers in the country & abroad, and contacts between Government & other organizations in the country & abroad and the relations with the media.

Plans for alternative transportation should be in place, including evacuation plans & alternative site for blood services/ hospital blood banks including plans, establishing of SOP's, training and the need for increased personnel.

Blood Donors issues should also be taken into consideration after evaluating if there is a need for increased donations.

The amount of blood and components needed per casualty will depend on the types of injury, and unlike the needs after other severe trauma events usually occur in the following days.

Last, but not least the issues of psychological support for employees, blood donors, volunteers and their family members should be taken into consideration.

c. Blood supply during Pandemia

Prof. Shinar, director of MDA blood services reviewed the subject of blood needs and supply during Pandemic flue, as a model to a public health threat. In such event there might be sudden increases in the demand for blood, accompanied by restriction or even total elimination of the ability to collect, test, process or distribute blood. The situation may be aggravated if there will be a restriction form using the already available inventory of blood components (liquid and frozen), because it was collected during the incubation period of the disease.

Such situation may require immediate replacement or re-supply of blood from another region/country (15).

To this scenario one must add the threat for loss of critical reagents with short expiration date (RBC), difficulties in transportation of specimens to central laboratories, degradation in response time from central laboratories, loss of management and senior staff members, who need to find alternative solutions and operate accordingly (16).

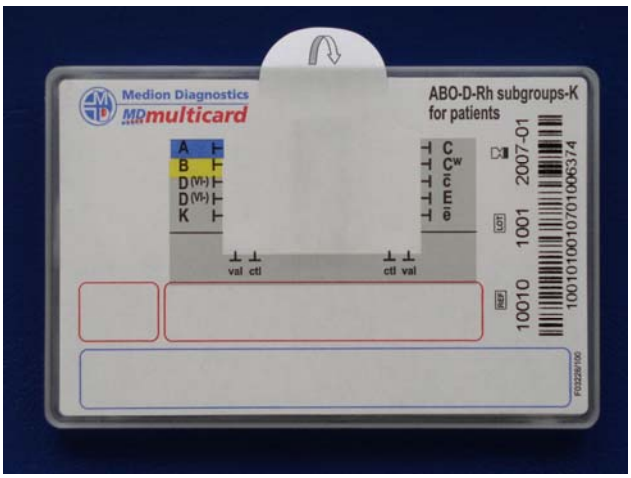
A fully developed preparedness plan should there fore be ready, that will provide response for the protection of all the medical first-responders, including the blood bank personnel, a smart and timely program to recruit eligible blood donors, assure access to supplies, preservation of the function of equipment and facilities, keeping a functioning management system all with the aim to maintain an adequate blood supply.

4) Session 5: Rapid techniques

During major disasters one may expect a partial or complete disrupt of the entire infrastructure, including power, water and IT support, a shortage or loss of critical reagents with short expiration date (RBC), difficulties in transportation of supplies needed and loss of experienced laboratory technicians. Therefore methods are needed which will enable to conduct the requested tests on the donated blood units, before their supply to the hospitals. Such tests can be grouped in 2 categories:

a. Blood type determination:

Dr. M. Písačka, from the Reference Laboratory for Immunohematology
Institute of Hematology and Blood Transfusion
Prague, Czech Republic presented their experience of Rapid Blood Grouping Using Lateral Flow Device with Stable End-Point without Centrifugation (17).
As blood grouping, especially AB0 and RhD determination, is critical for the blood transfusion compatibility, such tests must be performed on units before transfusing them into recipients to prevent acute (and sometimes lethal) and delayed post-transfusion reactions.
While in regular times transfusion service centers and hospital blood banks are performing highly accurate blood grouping tests using hemagglutination methods on precise, though complicated semi- or fully automated instruments, simple alternative/s that do not rely on computer and electricity supply will be needed in case of disaster.
Simple alternatives exist, such as slide on which mixing of drops of blood and reagents on is performed on glass, ceramic or plastic surface, however, these methods have many disadvantages /infectious risks, possible cross-contamination, dots drying, missing of weak reactions, difficult reaction identification and result documentation.
Dr. Písačka presented their experience using a new rapid method was presented which contains potent and highly sensitive monoclonal antibodies /CE certified and uses lateral flow, providing stable end-point results without centrifugation within minutes. The currently available credit- card- size "MD Multicard“provide simultaneous testing for AB0, RhD, Rh subgroups and Kell antigen determination (Figure 2)



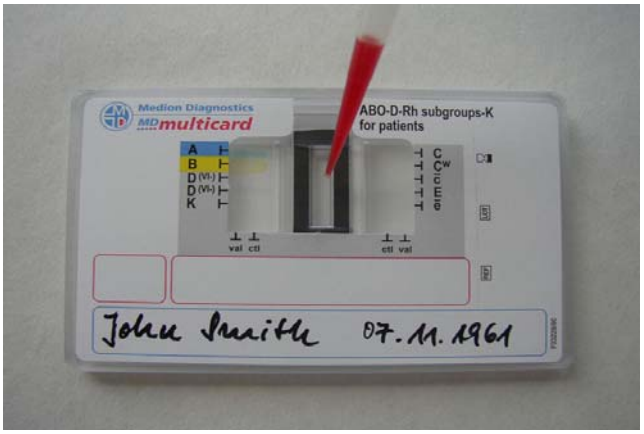


Figure 2: MD Multicard system

b. Testing for Transfusion-Transmitted Infectious Diseases:

As for blood grouping most blood services centers and major hospitals are using highly accurate Elisa and Nucleic Acid Testing (NAT) on precise, complicated semi- or fully automated instruments. Here again a simple alternative/s method that do not rely on computers and electricity supply will be needed in case of disaster.

Dr. Baruch Rivetz, a PhD from Orgenics LTD, in Yavne, Israel presented their kits of field-oriented rapid diagnostics for early diagnosis of HIV infection (18). During the scope of development of rapid in vitro diagnostics for infectious diseases, on rapid diagnostic platforms aimed at low-equipped or non-laboratory settings and point-of-care testing, the company developed two rapid 4th generation HIV test devices, which simultaneously detect antibodies and antigen and differentiate between them. The system does not require additional

instrumentation and therefore is deployable in multiple settings, from centralized laboratories and blood banks to remote point-of-care test locations. The performance of both assays, demonstrated in an extended series of clinical trials, showed the capability of detecting HIV infection earlier than HIV antibody-only tests do and of identifying those who are acutely infected with HIV.

5) Future projects for submission

In this section, some of the subjects that caused interest among the consortium members will be summarized. These members thought these issues are important to provide assistance to the Medical First-time Responders in Transfusion Medical and Trauma fields during Disasters, and have the potential to be submitted as interesting research projects for future collaboration among the participants of the workshop.

1) Monitoring the adequate usage of blood units and components in Trauma patients with severe coagulopathy and bleeding.

   Although, currently it seems that the majority of situations do not require extensive use of platelets or plasma, which seem in severe trauma cases be only necessary in special circumstances, the workshop participants thought it could be interesting and useful to conduct a muti-center study, looking at the usage of blood components in severe trauma cases, especially in view of the new treatment regimen of component therapy (1:1:1) recommended lately in the literature (8)

2) Building a training program for the medical first responders in central blood services and hospital blood banks in drills and training exercises of the various man-made and natural disasters. The Emergency department MDA can lead this program and can adapt it to the different disasters in different countries.

3) Further research is needed regarding the quality and characteristics of the frozen and a freeze dried RBC single units, developed by Core dynamics, Israel, toward a safe, easily transportable, and ready for use upon rehydration. Such a study performed both in vitro and eventually in vivo, can be an interesting base for collaborative studies among some of the consortium members.

   A more detailed suggestion is included in here:

   "Freeze thawing RBC units without Glycerol-Core dynamics

Red blood cells (RBC) save lives! RBC units are administered routinely into patients expressing a wide range of conditions (e.g. anemia, bleeding, chronic diseases, surgery, etc).

In order to answer this constant need for blood supply the blood banking system has developed. Currently, RBC units are mostly preserved in a liquid state up to a maximal duration of 42 days, depending on the preservative solution used. Less then 1% of the collected blood is being frozen. The use of frozen RBC units is limited due to the inefficiency of the current methods for long term preservation. The cumbersome process required of adding glycerol to a unit and freezing it is time consuming and expensive. Due to the toxicity of glycerol the unit has to be washed upon thawing and prior to transfusion. Thawing and washing is time consuming (between 1-2 hours). Due to the requirement to thaw and remove glycerol from the unit prior to transfusion it cannot be used in acute scenarios such as a battle field or disaster areas.

Core Dynamics has developed a freezing devise (MTG) which is based on the principles of directional freezing, thus allowing control of ice crystals morphology during the freezing process. This freezing devise has enabled us to successfully freeze in the absence of intracellular cryoprotectant agents (CPAs). Overcoming this issue has made freezing without glycerol possible. Core Dynamics also utilizes a proprietary freezing solution, named IMT-1, based on saline supplemented with Dextran 40 and a new additive named EppiGaloCatechine Gallat (EGCG) which is an antioxidant produced from green tea leaves. Furthermore, Core Dynamics has developed a dry thawing device which enables us to thaw 500ml samples within 2 minutes.

Experiments performed on freeze thawing packed RBC units with IMT-1 solution have shown 100% recovery and less then 2% hemolysis upon thawing (without any washing process). In addition, in vivo experiments were performed on donkeys. In these experiments venous blood drawn out of donkeys, the RBC were stained with FITC prior freezing and the blood was mixed with IMT-1 solution and either transfused without additional processing or after freezing and thawing using Core Dynamics technology. The transfusions were autologous. After transfusion blood samples were taken from the donkeys at the following time points: immediately, after 2 hours, after 4 hours, after 24 hours continuing with weekly sampling for up to 3 months. The results have shown that 24 hours after transfusion between 60%-80% of the transfused RBC were in circulation and that the transfused cells declined gradually in a similar manner to RBC that were not frozen over the next 3 months.

All donkeys had normal physiological performance after transfusion and none of them showed any adverse affects.

Pre-clinical studies such as genotoxicity studies, repeated dose transfusions in rabbits and increased dose transfusions in pugs showed that the antioxidant used in the solution, which is not approved for IV administration to be safe.

Further safety and in-vitro studies are required in order to finalize the frozen thawed RBC procedure and to be able to start and use it as a fully developed product which will make the use of frozen RBC in acute situations a reality. Performing these studies in the setting of a blood bank will allow the incorporation of the system into the current blood management system."

4) As monitoring the coagulopathy treatment modalities, using "on-line" equipment, whenever possible, is an important therapeutic tool, Dr. Rahimi-Levene, director of the blood bank of Assaf Harofeh Medical Center, wrote a preliminary aqbstract regarding a possible multi-center trial for the use of the Thromboelastography (TEG) technology in severly bleeding patients.

The more detailed suggestion is included in here:

"TEG – MONITORING & TREATING BLEEDING PATIENTS

Naomi Rahimi-Levene MD, MHA

Director of the Blood Bank, Assaf Harofeh Medical Center, Zerifin, Israel

The hospital Blood Bank is a transfusion service, providing blood in every day life and in extreme situations. Disasters are unexpected, their extent is unpredictable and therefore one must prepare in advance for the worst scenario. In a catastrophic event many massively bleeding patients will have to be treated simultaneously, sharing sometimes limited available resources. Once the patient is receiving blood products decisions have to be made as to which products the patient needs and how much of each. Conventional blood tests will not provide a swift enough answer to guide decision making as they can be lengthy and do not necessarily represent the in vivo picture.

Thromboelastograph (TEG) is a technology demonstrating clot formation and strength. Historically TEG has been used for monitoring open heart surgery and liver transplants. In our hospital TEG is performed in the blood bank and can be viewed online in remote sites (including the operating theater and the emergency room if needed). The anesthetists have been tutored in interpreting the TEG and in a short time the need for FFP, cryoprecipitate

(fibrinogen) and platelet concentrates can be assessed, allowing prompt ontime decision making. In an event in which communication online is cutoff the TEG can be transferred and setup in the operating theater, allowing decision making on the spot. The test can be repeated until the patient is stabilized and has received proper replacement therapy.

We propose utilizing the TEG as an aid in treatment of the acutely bleeding patient. A TEG will be performed on a prehospital sample (executed in up to one hour after taken). Repeat TEGs will be performed as long as the patient is bleeding, in parallel to conventional hemoglobin, platelet count, PT, APTT and fibrinogen.

On cessation of bleeding a TEG will be performed again.

Decision making on basis of repeat TEGs will be assessed in order to expose the patients to minimum blood products."

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18. Baruch Rivetz, Field-oriented rapid diagnostics for early diagnosis of HIV infection, Orgenics LTD, Yavne, Israel

Annexes

1. **Workshop program**
2. **Workshop abstract book**

BLOOD BANKS AND TRANSFUSIONS IN CATASTROPHES

Dra. Emma Castro Izaguirre. Centro de Transfusión de Cruz Roja Española. Madrid. Spain.

Blood Centres must have their own established plan, which is coordinated at local and national level, that allows them to respond when faced with any local disaster or terrorist acts that affect blood supplies.

To all intents and purposes, catastrophe is a situation which abruptly results in much higher than normal requirements for blood products; blockades or restrictions on the capacity to collect, process, analyze or distribute blood; or situations which create a sudden influx of donors to cover the necessities in another place.

The plan must contemplate important aspects such as: correctly determining blood requirements; providing transport for blood from one centre to another, and sending a common message to all the country's blood centres, as well as the general public, about the situation of the blood supply in the affected area.

Experience in catastrophes has taught us three important lessons:

1) Blood collections must be controlled so as not to exceed the real requirements
2) Blood centres must always maintain sufficient stocks (for seven days)
3) A national stock coordination plan is necessary

The following assertions must be accepted to satisfy the blood requirements during the initial 24 hours:

a) All blood that is initially dispatched should be type O packed red cell
b) The quantity dispatched to a centre should not exceed the amount of blood required for one day (taking all blood types into account)
c) The initial dispatch of blood products should be carried out by the centre which can most quickly deliver them

The majority of situations do not require extensive use of platelets or plasma, and will only be necessary in special circumstances.

The plan should develop the following strategies:

1) Alternative means of communication with hospitals and the coordinating centre.
2) Alternative means of transport.
3) Coordination with local, regional and national authorities.
4) The maintenance of supplies for treating blood.
5) The maintenance of power supplies, water and telephone services.
6) The organization of blood donors and volunteers. Crowd control.
7) Strategies for working with the media.

Massive bleeding in trauma and surgery:

The complex nature of traumatic coagulopathy

Uri Martinowitz MD, Head, The Institute of Thrombosis and Hemostasis and the National Hemophilia ctr., Ministry of Health ,Sheba Medical Center, Tel- Hashomer and Sackler School of Medicine ,Tel Aviv University.

uriel.martinowitz@sheba.health.gov.il

Bleeding is a major cause of preventable death in both military and civilian trauma, accounting for over 40 -50% of all mortality. The process which begins as a "surgical bleed" from injured vessels may rapidly evolve into a combined massive surgical and diffuse "coagulopathic" bleeding from large and small vessels, due to early development of a complex coagulopathy. The severity of coagulopathy is an independent predictor for early mortality, which in the presence of coagulopathy is above and beyond that expected from the severity of injury alone. In recent years we have gained new insights and significantly expended our knowledge on the complex process of trauma-related coaguloathy and its treatment. For years the convention was that trauma-related coagulopathy is a state of disseminated intravascular coagulation (DIC), a notion that blocked the use of systemic hemostatic agents such as fibrinolytic inhibitors , recombinant activated FVII-(rFVIIa), prothrombin concentrates etc. in these patients. Our animal experiments done in collaboration with the Israeli and American Armies were the first to challenge that convention. We have shown in a severe animal trauma model that despite the similarity of coagulation results to those found in DIC, there were no histological findings suggesting DIC even administration of large doses of rFVIIa . Our findings were confirmed, with and without rFVIIa, by numerous experimental trauma models. The new insight, with the improvement in the understanding of the targeted mechanism of action of rFVIIa at the site of injury and the accumulation of experience on safety of this drug in hemophilia patients, led to the introduction of rFVIIa in trauma patients. The first cases of successful use of rFVIIa in trauma patients with "inevitable exsanguinations" reported from Israel, paved the way to a rapid expansion of the research and use of rFVIIa and other hemostatic agents in trauma, which were considered contraindicated in "hypercoagulable states". Several mechanisms contribute to the complex coagulopathy in trauma and it is now clear that abnormalities in the basic coagulation tests (PT, aPTT, Fibrinogen and platelet count) are only the tip of the ice burg of a more

complex and potentially devastating process. Following trauma there is an excessive activation of the coagulation cascade at the sites of injury which causes a accelerate consumption of both coagulation proteins and platelets which in many cases are also rapidly degraded by hyperactive fibrinolytic system (Hyperfibrinolysis). The administration of large volumes of fluids and multiple packed RBC units further dilute coagulation factors and platelets ("Dilutional" coagulopathy). In that respect, the use of colloids, in particular high molecular weight starch, may directly interfere with fibrin polymerization, platelets function and clot strength. Acidosis and hypothermia, which are common in severe trauma patients, markedly impairs thrombin generation, fibrin polymerization and platelet function especially when coexist. The combination of coagulopathy, acidosis and hypothermia has long been recognized as the "lethal tirade" of trauma. Since the presence of coagulopathy correlates with early mortality, an early and aggressive comprehensive "hemostatic resuscitation" addressing its various components, must be adopted. Emphasize should be given to the prevention and treatment of hypothermia and acidosis. A more judicious use of fluid administration is recommended which should be guided by physiological parameters avoiding unnecessary high blood pressure ("permissive" resuscitation") that may cause re-bleeding due to popping out of fragile clots. This approach will also minimize dilution coagulopathy and may cut down the use of colloids. The common practice for blood component therapy, including the threshold hemoglobin for transfusion is currently being revised based on new data and the experience of the American Army in Iraq. It is suggested that component replacement therapy be given early in the resuscitation phase of severe trauma patients , in ratios of at least 1:1 FFP to PRBC (given concomitantly) and some times even higher . Other components as cryoprecipitate (or fibrinogen in Europe) and platelets should also be considered at the same time. Recent unpublished data, suggests that hyperfibrinolysis is a major challenge early in the course of trauma. The results from several controlled trials in various surgical patients, which have shown a significant reduction of blood loss, blood requirements and even mortality with the preventive use of fibrinolytic inhibitors, have convinced the European Expert Panel on the management of bleeding to apply the same approach in bleeding trauma patients. This is true for lysine analogues (tranexamic acid and EACA) but not aprotinin, which recently had been shown to cause serious and even fatal adverse events.

Recent data from animal models of dilutional coagulopathy has shown that administration of high dose of fibrinogen concenrate can normalize clot structure and firmness and decrease bleeding and mortality. Accumulating

data from cardiac surgery and obstetrics support the important role of fibrinogen in the control of massive bleeding. Preliminary animal models and clinical data raise the possibility that the hemostatic concentration of fibrinogen in such cases is much higher than recommended by various guidelines, Current recommended target of 1gr/L is probably sufficient to prevent bleeding in congenital afibrinogenemia patients or control hemorrhage in mild bleedings but it is not sufficient in massive bleeding. The natural level of fibrinogen in women before births, which is about 5gr/L, is hinting on the hemostatic concentration of fibrinogen required to control massive bleeding. This was recently supported by data from post partum hemorrhages and cardiac surgery. Fibrinogen was also effective in restoring clot structure and firmness in a pig model of severe trauma with thrombocytopenia, resulting in a decrease in bleeding and mortality. Interestingly, fibrinogen was even superior to pigs' platelet transfusion, which raise the hope that fibrinogen may replace platelets in bleeding thrombocytopenic patients. Further studies are required to prove this assumption.

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Since our first description in 1999 of the use of rFVIIa in trauma patient a growing body of evidence suggests that the drug is a safe and effective as an adjunct treatment for massive bleeding in trauma and surgery. Indeed, most recent guidelines for the treatment of massive bleeding (American Association of Anesthesiology, the European Expert Panel and the British recommendations) support its use these patients despite the limited data from controlled trials. The use of rFVIIa should probably be considered early in the course of trauma and before the deterioration of the patients into an irreversible state.

It has been shown that "last ditch" use of rFVIIa in trauma and surgery successfully controlled the bleeding in most cases but did not prevent mortality. It is important to understand that rFVIIa needs certain preconditions for its effect such as a certain level of platelets, fibrinogen and other coagulation factors .We demonstrated in animal model of trauma and also in trauma patients that rFVIIa can bypass the coagulopathic effect of hypothermia but not acidosis. The correction of acidosis (at least above 7.2 but preferably higher) restores the response to rFVIIa . The preconditions for rFVIIa administration are summarized in the Israeli guidelines published 2005 in JTH..

Finely, since coagulopathy is an important component in the survival of trauma patients and since most of the hemorrhagic mortality occurs very early, even before the admission to the hospital, it seems rational to start the hemostatic resuscitation in the pre-hospital settings. Results from animal

model of sever liver laceration in the pre-hospital setting suggest that the use of rFVIIa alone or in conjunction with hypotensive resuscitation can prolong the survival from minutes to hours. In a different fatal model of aortic laceration only the combination of the two – rFVIIa and hypotensive resuscitation – could cause prolongation of survival up to several hours. These encouraging data raise the hope that early pre-hospital hemostatic treatment may prolong the golden hour to few hours and allow for more trauma victims to be admitted to the hospital.

New protocols of combined pre-hospital hemostatic treatment are currently under evaluation by few armies. Emergency hemostatic packs containing chitosan hemostatic bandage (Hemcon® USA), bicarbonate, tranexamic acid, fibrinogen concentrate and rFVIIa are provided to IDF special operating forces of during certain missions.

Most of the recommendations for the treatment of massive bleeding in trauma are based on extrapolation from controlled clinical trials in surgical patients, limited controlled clinical trials and case series/ reports in trauma. Since controlled trials in trauma are problematic, difficult and almost impossible to perform in the pre-hospital (and especially combat) settings, good animal studies that mimic the prehospital phase are of great importance.

The Netherlands military blood supply system. Features and experiences in the Afghan theater.

Charles C.M. Lelkens, MD, SBB(ASCP)
Commander (MC), Royal Netherlands Navy
CO and Medical Director of the Netherlands Military Blood Bank

Even in the twenty-first century the major cause of death on the battlefield still is massive blood loss because of trauma. With an increasing involvement in the past two decades of the Netherlands armed forces in worldwide armed conflicts, it became very clear that having blood products available in theater at all times was of absolutely vital importance.

Shelflives of blood components under normal conditions are extremely limited. Furthermore, we have to deal with long, vulnerable supply lines and unpredictable points in time where these products are needed. Therefore, the Netherlands military blood supply was build around a system of frozen blood components of universal donor red cells, plasma and platelets.

A -80^{o}C frozen inventory of the most essential blood components readily available after thawing (and washing if required), enables us to safely reduce shipments and abandon the backup “walking blood bank”, without compromising the availability of blood products in theater. Moreover, all thawed (washed) blood products are in compliance with international regulations and guidelines.

Since August 2006, when the Netherlands started to participate in the ISAF / OEF mission in Afghanistan, more than 400 patients have been transfused with some 2500 units of frozen blood components, without any untoward effects.

Identifying the Needs of Medical First Responder in Disasters NMFRDisaster
Theme 10 – Security; Call – FP7-SEC-2007-1

WP-5: Use of blood and blood products in disasters
Coordinator: Prof. Eilat Shinar
MDA blood services director
Venue: 24-25TH November, 2008
Kfar Hamacabiya, Ramat Gan, Israel

Monday, November 24th, 2008

8.30- 9.00: Registration and material pick-up
9.00-9.15: Welcome Greetings
Dr. Boaz Lev-Deputy to the Director General of the Israeli Ministry of Health
Prof. Yehuda Skornick-MDA president
Mr. Chaim Rafalowski- NMFRDisaster project coordinator
Prof. Eilat Shinar –MDA blood services director and workshop coordinator

9.15 -11.00	**Session 1**		
Chairperson	**Prof. Eilat Shinar, Israel**		
Topic	**Use of Whole blood and blood Component in Transfusion Therapy at the battle field and in transfusion centers (1st part)**		
Time	**Subject**	**Speaker**	**Affiliation**
9.15 - 9.45	Blood Banks and Transfusions in Catastrophes	Dr. Emma Castro Izaguirre.	Centro de Transfusión de Cruz Roja Española, Madrid, Spain.
9.45-10.15	Management of a National Blood Inventory in Peace and Disasters - The Israeli Experience	Prof. Eilat Shinar	MDA blood services, Israel

10.15-10.45	Usage of Blood and blood components in a 3rd level trauma center	Dr. Eldad Dann	Rambam Medical Center, Haifa, Israel
10.45-11.00	Panel discussion		
11.00-11.30	**Coffee Break**		
11.30 - 13.30	**Session 2**		
Chairperson	**Dr. Vered Yahalom, Israel**		
Topic	**Alternatives/additions to conventional blood components therapy**		
Time	**Subject**	**Speaker**	**Affiliation**
11.30-12.00	Pathophysiology and treatment of Coagulation in Trauma	Prof. Uri Matrinowitz	Sheba Medical Center, Israel
12.00-12.10	Blood transfusion via a rapid infusion system	Dr. Murat Bahar	Assaf Harofe Hospital, Israel
12.10-12.30	The Netherlands military blood supply system. Features and experiences in the Afghan theatre.	Dr. Charles Lelkens	Netherlands Military Blood Bank
12.30-13.00	Frozen and freeze dried blood in disasters	Dr. Amir Arav	Core Dynamics, Israel
13.00-13.30	Panel Discussion		
13.30-14.30	**Lunck Break**		
14.30-16.30	**Session 3**		
Chairperson	**Dr. Emma Castro Izaguirre, Spain**		
Subject	**Use of Whole blood and blood Component in Transfusion Therapy at the battle field and in transfusion centers (2nd part)**		
Time	**Subject**	**Speaker**	**Affiliation**
14.30-15.00	The Actual Practice of Blood Crisis Policy In The Czech Republic	Lt. Col. Milos Bohonek, MD, PhD	Central Military Hospital Prague, CZ

15.00-15.30	Use of Blood and Blood Components in Out-Of-Hospital Medical Emergencies	Dr. I. Rodríguez Miguel	Emergency Medicine, SAMUR – MADRID-PC, Spain
15.30-16.00	Panel Discussion		
16.00-16.30	Exchange of blood products between nations during disasters-open Discussion		
19.00- 22.00	**Social Event and Dinner**		
25.11.2008			
8.30-10.20	**Session 3**		
Chairperson	**Lt. Col. Milos Bohonek, CZ**		
Topic	**Preparedness for Natural and Man-Made disasters**		
Time	**Subject**	**Speaker**	**Affiliation**
8.30-9.00	The threat of Terrorism Involving Radioactive materials: Challenge for the Home Front	Prof. Steven M. Becker	University of Alabama, Birmingham, USA
9.00-9.20	Protective Considerations Regarding the Transfer of Blood and Other Medical Supplies in Disasters	Aaron Richman	Shield Group Inc. Netherlands
9.20-9.40	Earthquake and blood supply – A challenge	Dr. Vered Yahalom	MDA blood services
9.40-10.00	Pandemia : Blood collection and supply	Prof. Eilat Shinar	MDA blood services
10.00-10.20	Panel Discussion		
10.20-11.00	**Coffee break**		

11.00-13.30	**Session 4**		
Chairperson	**Prof. Noga Manny, Israel**		
Topic	**Rapid testing techniques**		
Time	**Subject**	**Speaker**	**Affiliation**
11.00-11.30	Blood group and pretransfusion testing Blood grouping	Dr. Martin Pisacka,	Reference Laboratory for Immunohematology in Institute of Hematology and Blood Transfusion Prague, CZ.
11.30-12.00	Field-oriented rapid diagnostics for early diagnosis of HIV infection.	Dr Baruch Rivetz	Orgenics LTD, Israel
12.00-12.20	TEG- Monitoring and treating Bleeding Patients	Dr. Neomi Rahimi-Levene	Assaf-Harofeh hospital, Israel
12.20-12.30	Panel discussion		
12.30-13.00	"wrap up" session	Mr.Chaim Rafalowski	NMFRDisaster project coordinator, MDA
13.00-14.30	**Lunch**		
15.00-18.00	Visit to MDA Blood Services	Prof. Eilat Shinar	MDA blood services
18.00-22.00	**Social event and dinner**		

Earthquake and blood supply – A challenge

Vered Yahalom MD
Magen David Adom, National Blood Services, Israel

An earthquake is a natural disaster that turn into a demanding event for the local blood banks and Blood Centers, according to its location and consequences. Estimating the risks, evaluating the gaps, establishing a contingency plan and performing simulation of such an event will increase the preparedness of national blood services and hospital blood banks for an unexpected chaotic event that can not be predicted (yet) nor prevented. Preparations for such an event need to address many logistic issues as well as medical and psychological aspects including:

1. Knowledge of the vulnerable areas in each country
2. Modes of construction
3. Density and type of population
4. Infrastructure of the Blood Center & hospitals
    a. Need for reinforcement of non constructive elements
    b. Power supply
    c. Water supply
    d. Testing equipment
    e. IT & Back up systems
5. Alternative communication plans
    a. Blood Centers & Hospitals
    b. Different blood center sites
    c. Employees
    d. Donors
    e. Volunteers in the country & abroad
    f. Government & other organizations in the country & abroad
    g. Media
6. Alternative transportation plans
7. Evacuation plans & alternative site for blood services/ hospital blood banks including plans, establishing of SOP's, training and the need for increased personnel.
8. Donor issues:
    a. Need for increased donations
    b. Need for selective blood types donations
    c. No need for increased donations
9. Blood Supply
    a. Amount of blood /patient
    b. Components required
    c. Alternative blood suppliers
10. Supplies
    a. Supplies for blood donations (Blood bags, Hgb cue vets etc.)
    b. Testing Reagents & other laboratory supplies
    c. Food & water workers
11. Shelter & Psychological support
    a. Workers & Volunteers
    b. Workers & Volunteers Families
    c. Donors

Field-oriented rapid diagnostics for early diagnosis of HIV infection

Baruch Rivetz, PhD
Orgenics LTD, Yavne, Israel

Despite decades of aggressive prevention efforts and advances in effective treatment, HIV infection and AIDS as a sequential outcome remains a worldwide pandemic. Primary (acute) HIV infection can display as a common febrile illness with nonspecific symptoms, hence, it may lead to inadequate and misdiagnosis. Patients are typically highly infectious during the early stages of the acute phase due to enormous viral burden in blood and genital secretions. An estimated one-quarter to half of those infected patients are unaware to their status and put others at risk. These estimates are even higher in poor-resource areas with no central labs. Traditional HIV screening that is mostly aimed at detecting later stages of infection frequently fails to detect these highly infectious individuals. Therefore, establishing the diagnosis of primary HIV infection is clearly of public health importance and it is essential to enable opportunities to halt further transmission and obtain therapy that improves morbidity and mortality for infected patients.

Orgenics LTD, currently a professional diagnostics division of Inverness Medical Innovations, Inc., has 25 years of experience in the development of rapid *in vitro* diagnostics for infectious diseases. Along the years, Orgenics developed various serological assays for HIV infection on rapid diagnostic platforms aimed at low-equipped or non-laboratory settings and point-of-care testing. Recently, addressing the limitations of the existing rapid tests in detecting early infection, on one hand, and limitations of the HIV 4th-generation machine-dependent assays, on the other, Orgenics developed two rapid 4th generation test devices, which simultaneously detect antibodies and antigen and differentiate between them. One test, ImmunoComb HIV 1&2 TriSpot Ag/Ab, distinguishes between HIV-1 and HIV-2 antibodies and HIV p24 antigen. This test kit accommodates up to 36 samples, does not require additional instrumentation and therefore is deployable in multiple settings, from centralized laboratories and blood banks to remote point-of-care test locations. The second test device, Determine® HIV-1/2 Ag/Ab Combo, is an individual 4th generation HIV lateral flow assay that provides clear visual results in twenty minutes. The performance of both assays, demonstrated in an extended series of clinical trials, showed the capability of detecting HIV infection earlier than HIV antibody-only tests do and of identifying those who are acutely infected with HIV. This is achieved by detecting separately the presence of viral p24 antigen before the appearance of antibodies to the virus, a feature that most of the current 4th- generation assays fail to deliver since they provide a single combined undifferentiated signal. Moreover, the sequential use of these tests, the Determine® HIV-1/2 Ag/Ab Combo as an initial screening test and ImmunoComb HIV 1&2 TriSpot Ag/Ab as a confirmatory test, can provide a field-oriented and economical alternative laboratory based tests.

Frozen and freeze dried blood in disasters

Arav Amir, Core Dynamics, Israel

RBC units are routinely transfused as a life saving treatment for multiple clinical indications ranging from the treatment of acute bleeding during surgery or trauma, to the treatment of chronic anemia and different forms of cancer. Today, most RBC units are preserved in liquid state for a maximum duration of 42 days, depending on the additive solution used. Less than 1% of the collected blood is frozen for long term storage. The cumbersome process required for adding glycerol to a unit and the necessity to wash it upon thawing due to its toxicity is a time consuming, cumbersome and expensive process. As a result of the long washing process frozen thawed RBCs units cannot be used in acute scenarios such as a battle field or disaster areas. In addition, transportation of frozen units is expensive and introduces logistic challenges.

Core Dynamics (CD) goal is to develop a frozen and a freeze dried RBC unit which is safe, easily transportable, and ready for use upon rehydration.

CD has developed a novel freezing device (aka MTG), which is based on the principles of directional freezing. The MTG allows for improved control over ice crystals morphology during the freezing process. This freezing device enables successful freezing in the absence of cryoprotectant agents (CPAs) such as glycerol, DMSO, ethylene glycol and others. Overcoming this issue has created a new opportunity for freezing RBCs without glycerol and hopefully enabling the freeze drying of RBCs. In addition, we have developed a dry thawing device (DTD) which enables the thawing of 500ml samples within 2 minutes. A proprietary freezing solution based on saline supplemented with a sugar and an antioxidant, both non-toxic ingredients as been shown by early pre-clinical studies, has been developed as well. Experiments performed with RBCs units showed 100% recovery of the cells with less then 3% hemolysis after freeze thawing in the absence of CPAs using CD freezing and thawing devices. Furthermore, Autologous transfusions of fluorescent labeled 0.5L samples performed on donkeys that were labeled with a fluorescent marker showed an in vivo recovery of 80% of the thawed RBCs 24 hours post transfusion and that the cells have maintained in the animals circulation for 3 months, equivalent to non frozen labels units.

Initial experiments performed on freeze drying small volumes of RBCs samples showed ATP and 2,3 DPG values similar to fresh samples but RBCs that were stored in hypothermia with CPDA-1 solution showed reduced ATP and 2,3 DPG values. RBCs that were frozen and freeze dried had maintained their typing upon thawing or rehydration.

USE OF BLOOD AND BLOOD COMPONENTS IN OUT-OF-HOSPITAL MEDICAL EMERGENCIES

I. Rodríguez Miguel.
Emergency Medicine, SAMUR –MADRID-PC, Spain

ABSTRACT

SAMUR-PC is an out-of-hospital Emergency Medical Service in Madrid that deal with the medical response in emergency situations in the streets and public facilities inside the metropolitan area. This include the medical response to mass casualty incidents with seriously injured victims involved.
SAMUR-PC attended to over 120.000 emergencies in 2007. In the last 5 years, 2095 victims of major trauma (ISS>15) has been assisted.
In recent years, there has been a research effort in the knowledge of the physiopathology and treatment of hipovolemic shock. However, the basics of the treatment of these patients have changed little over the last years. They are still the control of external blood loss, to correct hypovolemia and restore tissue perfusion.
SAMUR-PC is considering the possibility of implementing the use of blood and blood components in the management of patients with major trauma.
The study makes a review of the bibliography supporting the idea and lists the technical, logistical and legal drawbacks to face.

Key Words: Shock, Resuscitation, Blood components

Management of a National Blood Inventory in Peace and Disasters - The Israeli Experience

Eilat Shinar MD[1] **,** Vered Yahalom MD[1] and Barbara G. Silverman, MD, MPH[2]
[1]Magen David Adom National Blood Services, and [2]Maccabi Healthcare Services, Israel

Blood services worldwide must be prepared to meet surges in demand for blood components, needed by casualties of domestic disasters and acts of terrorism. Israel's national blood service, operated by Magen David Adom (MDA), has extensive experience managing blood collections and supply in emergencies. This review summarizes the structure and function of MDA's national blood program, and relates its' experience to other practices that have been reported in the medical literature. Between 2000-2005, 7497 victims (85% civilians) were involved in 1645 terrorist attacks in Israel. On-site triage resulted in 967 (13%) who died at the scene, 615 (8.2%) that had severe injuries, 897 (12%) were moderate and 5018 (67%) mild. Requests for blood averaged 1.3 blood units and 0.9 components/casualty, or 6.7 units and 4.5 components/ severe and moderately injured. Public appeals for blood donations were managed centrally, to match supply with demand and prevent wastage.

This experience illustrates the advantages of a comprehensive program for managing blood operations in emergency situations. A coordinated national program can stabilize in-hospital inventories during routine activities, ensure instant access to precisely defined inventories, facilitate sufficient supply in times of disasters, and minimize outdating and wastage.

Protective Considerations Regarding the Transfer of Blood and Other Medical Supplies in Disasters

Richman Aaron, Shield Group Inc. Netherlands

During a crisis incident involving a weapon of mass destruction, critical supplies must be transferred between facilities even under such conditions. One such critical asset that must be transferred during such an incident is blood and other medical supplies. The presentation will address various personal protective considerations to enable medical personnel to transfer such lifesaving assets to their destination

Rapid Blood Grouping Using Lateral Flow Device with Stable End-Point without Centrifugation

M. Písačka
Reference Laboratory for Immunohematology
Institute of Hematology and Blood Transfusion
Prague, Czech Republic

Blood grouping, especially AB0 and RhD determination, is critical for the blood transfusion compatibility.

Correct AB0 type of the donor and recipient blood prevents acute intravascular post-transfusion hemolytic reaction which could have potential of fatal outcome in case of incompatible transfusion.

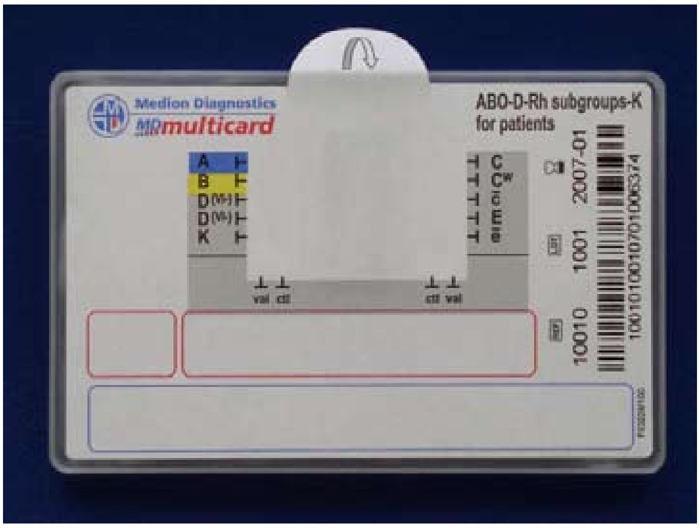
Matching for RhD /the most immunogenic antigen of red blod cell/ and eventually for other clinically important antigens /other Rh, Kell/ could prevent or reduce delayed post-transfusion hemolytic reaction /extravascular/.

Transfusion service centres and hospital blood banks are now performing the blood grouping on semi- or fully automated instruments, based on different principles /agglutination with centrifugation is the most common, others are agglutination by sedimentation, agglutination with magnetisation of red cells, column (gel) test and solid phase test/. All these test are highly accurate but dependent on complicated instrumentation, precise organisation of sampling and identifying samples and computer and electricity supply. Most of above mentioned tests are also available in manual versions, but these are also dependent on availability of electricity power at least.

On the other hand a simple alternative is long time available: slide test using mixing drops of blood and reagents on glass, ceramic or plastic surface. But this test has many disadvantages /infectious risks, possible cross-contamination, dots drying, missing of weak reactions, difficult reaction identification and result documentation/.

A new rapid method has been recently developed: lateral flow assay providing a stable end-point results without centrifugation within minutes. Currently the „MD Multicard“ for simultaneous AB0, RhD, Rh subgroups and Kell determination is available. This „credit card“ size format device contains potent and highly sensitive monoclonal antibodies /CE certified/. The typing procedure is very simple. Only blood sample and one diluent solution is needed. In first step the blood diluted in specific solution is added to application zone of the card followed by addition of the same solution after 30 seconds. Distinct results are visible during few /cca 2/ minutes and remain stable for very long time /depending on storage conditions – in 2-8°C for several months/.

This new test is highly sensitive and specific. Several evaluation studies were performed in blood transfusion centres including our institute. The test is sufficiently rapid and robust and thus suitable for emergency diagnostics and for work in conditions when electricity supply is limited.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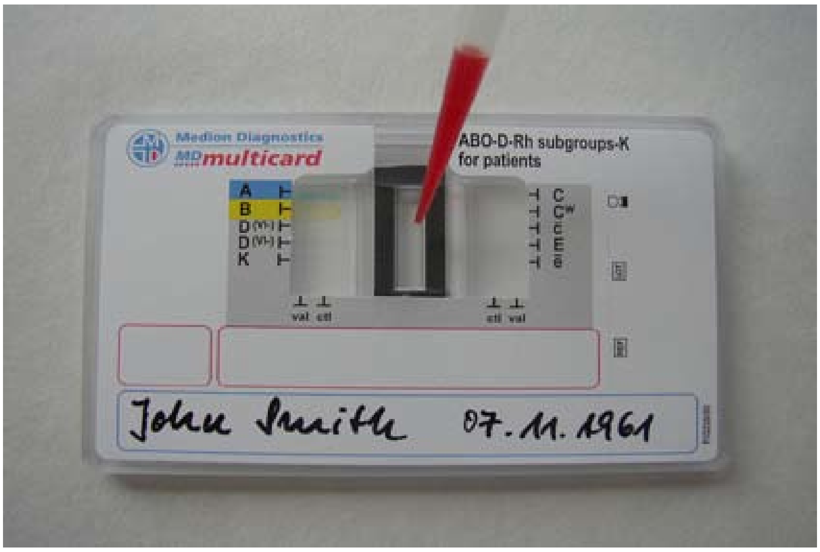
Diluent F


Medion Diagnostics
MDmulticard
ABO-D-Rh subgroups-K
for patients
John Smith 07.11.1961

1. Remove protective label.

2. To the application zone: add 2 drops (100 µl) of a suspension of Diluent F and:
   - anticoagulated whole blood
   - native blood
   - erythrocyte sediment.

3. After 30 s: Add 6 drops (300 µl) of Diluent F to the application zone.

4. After 5 min: Read and record results

TEG – MONITORING & TREATING BLEEDING PATIENTS

Naomi Rahimi-Levene MD, MHA

Director of the Blood Bank, Assaf Harofeh Medical Center, Zerifin, Israel

The hospital Blood Bank is a transfusion service, providing blood in every day life, but also in extreme situations. Disasters are unexpected, their extent is unpredictable and therefore one must prepare in advance for the worst scenario. In a catastrophic event many massively bleeding patients will have to be treated simultaneously, sharing available resources. Conventional blood tests will not provide a swift enough answer to guide decision making as they can be lengthy and do not necessarily represent the in vivo picture.

Thromboelastograph (TEG) is a technology demonstrating clot formation and strength. Historically TEG has been used for monitoring open heart surgery and liver transplants. In our hospital TEG is performed in the blood bank and can be viewed online in remote sites (including the operating theater). The anesthetists have been tutored in interpreting the TEG and in a short time the need for FFP, cryoprecipitate (fibrinogen) and platelet concentrates can be assessed, allowing prompt on time decision making. In an event in which communication online is cutoff the TEG can be transferred and setup in the operating theater, allowing decision making on the spot. The test can be repeated until the patient is stabilized and has received proper replacement therapy.

THE ACTUAL PRACTICE OF BLOOD CRISIS POLICY IN THE CZECH REPUBLIC

Lt.Col. Milos BOHONEK, MD, PhD, Central Military Hospital Prague, CZ

In the Czech Republic, which has over 10.000.000 inhabitants, there are collected and transfused about 450.000 RBC units / year. The blood collection and processing are performed on relative close system of 65 blood centres, with 2.500 – 30.000 collections of whole blood units annually.

Based on the Resolution of the Czech Republic National Security Council (Res. No 19 from April 15th. 2008) was the Ministry of Health and Ministry of Defence entrusted with the enforcement of "The Crisis Setup of Health System" - the Method of blood crisis policy. The aim is to guarantee sufficient as well as efficient supply of blood products and blood derivates in any place of the country during any crisis situation, such as mass accident, disaster, terrorist attack or war. The responsible government institute, the Ministry of Health, cooperates with the Ministry of Defence.

The system ensures 7 state "blood crisis centres" (BCC), 1 military and 6 civilian. The central role has military blood transfusion centre in the Central Military Hospital Prague, which is called "Central informative and logistic centre" (CILC). Each of 7 BCCs is responsible for supplying defined territory. BCC must have own system of contracts with local blood banks. The important part of the system is transport of blood components during the crisis situations. BCCs are responsible for transport, in case of troubles BCCs can ask the Ministry of Health for help with the transport coordination. The BCCs have duty to keep at least 200 RBCs and 200 plasma units and 2000 g of human albumin at disposal for national crisis policy program. CILC collects actual information from each BCC about available blood a plasma units. This information is updated daily in the morning. In addition, BCCs must have the emergency stocks for blood collection (blood bags, tubes) and blood testing: 2000 – 2500 sets, depending on BCC territory.

The important role in this system plays the blood bank with frozen blood in Central Military Hospital Prague, which is designed for 3000 units of frozen RBCs group 0. The closed system Haemonetics APC-215 is used, RBCs are stored in -65°C in mechanical freezers and shelf life after reconstitution in solution AS-3 (Nutricel) is evaluated to 21 days.

The crisis level could be proclaimed by central or local health care authority or by the government. Depending on crisis level the BCC solves it together with CILC on its own level or in cooperation with the Ministry of Health. Any crisis status is coordinated by CILC.

The Method is training periodically; the major accent is put on the communication.

The first experience with the real functionality of the Method we made in the September 2008 with the humanitarian supply of RBCs and FFP to Georgia.

ABSTRACT

Use of blood and blood products in disasters

Roberto García de Villaescusa MD PhD., M.L. Ruiz Ayala MD PhD. and A. Polo Escriche MD PhD.

Fundación Rioja Salud. Spain

Transfusion support is an essential component of clinical medicine, with transfusion being life-saving in many acute situations and many chronically ill individuals receiving regular transfusion therapy. It is therefore critical that national blood transfusion services (BTSs) recognize the potential impact of a disaster on their blood supply systems and put contingency plans in place to ensure the maintenance of core services in the event of such disaster. The development of a contingency plan to ensure the effective use of available blood when blood stocks have fallen to very low levels is critical to ensuring transfusion support for patients on disaster situations. The Blood Services Plan concentrates on the impact of a disaster could have on the Blood Services and the action necessary to mitigate the impact. As far as possible, the Blood Services will ensure continuity of supply but preserving life-saving supplies where necessary. Blood Services will need to provide, where possible, a safe environment for donors to donate and for staff to come to work. However it is likely that the number of blood donors able and willing to donate will be severely reduced. Staffing numbers will also be reduced and activity in some areas will be reduced to essential activity only with staff being redistributed in order to support this essential activity. Communication will be crucial throughout the disaster both to internal and external stakeholders with key messages being developed for different stages of the crisis.

Another key principle of the plan is that shortage can, in most cases, be avoided by reducing the current usage of blood through appropriate use programmes. It´s essential the appropriate use of blood and the use of effective alternatives in every clinical practice where blood is transfused, avoiding the unnecessary use of blood and blood components (fresh frozen plasma and platelets) in medical and surgical practice, ensuring that the transfusion was appropriate based on current guidelines or standards from professional bodies (Council of Europe, British Guidelines, CAT, etc.). Every effort will be made to mitigate the impact on the supply (through targeted collection, marketing and media messaging strategies). However, if stocks reduce to such an extent that life-saving demand is predicted not to be met either immediately or in the coming weeks, then it is likely that the Blood Services will have to restrict usage and conserve red cells and components to life-saving transfusions only. This may be implemented even before stocks actually fall to critical levels. This will be difficult to gauge at the beginning when the precise impact of the disaster is unclear and we therefore anticipate modeling the situation in real time. As more information is obtained at the start of the disaster, e.g. the response from donors, impact on demand etc, it will be possible to assess the emerging impact on stocks.

Supporting a Consensus Conference on Appropriate Use of Blood Components in Normal and in Disaster situations particularly in relation with regulatory concerns, can be an important tool for authorities and health professionals.