NO - FEAR

Network Of practitioners For Emergency medicAl systems and cRitical care

NO-FEAR's summary of main findings, gaps and lessons learned from M12 to M18

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1. Executive Summary

NO-FEAR project is bringing together a pan-European network of practitioners, decision and policy makers in the medical and security fields. They are collaborating to achieve a common understanding of needs, as well as - in collaboration with academia and industries – increase the EU innovation potential that could better fill the operational gaps and recommend areas for future innovations.

NO-FEAR main objectives are to:

- create a long-lasting community of practitioners, interacting with a network of suppliers and academia,
- elaborate an innovation roadmap, with practical recommendations for uptake,
- advise relevant Research and Innovation projects,
- support market uptake of EU research results,
- issue policy and regulatory recommendations enabling collective procurement,
- indicate priorities for standardisation,
- support quick wins and practical short-term results,
- implement a transactional dynamic portal providing fora, a catalogue, marketplace and flexibility to address new threats.

The findings detailed below can be found in the NO-FEAR portal, categorized in the specific sections and linked with the respective pillars.

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2. Table of Contents

3. Abbreviations

CA = Consortium Agreement

DoA = Description of the Action

EC = European Commission

GA = General Assembly

PC = Project Coordinator

PM = Project Manager

PO = Project Officer

NMB = NO-FEAR Management Board

WP = Work Package

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4. Summary of the findings in project's lines of action from M13 to M18

Work Package 1 – Ethics Requirements, Human, Social and Legal Issues

Research and Innovation Monitoring

Joint Survey

A first version A survey is in the making on security critical incidents and how scene safety is presumed by first responders was presented and discussed at the workshop in Rome. A second version of the survey is going to be tested during the IPRED conference in Tel Aviv. Timeline on dissemination is set for spring/summer 2020.

After evaluating the questionnaire, the scope of the survey was slightly changed to "subjective legal/normative uncertainty in face of large-scale emergencies and security critical incidents". As this topic addresses one of the most well-known concerns of first responders, the survey will gather empirical data in at least five different European countries, including Israel, to get to know how pressing this issue is and whether the subjective perception of legal certainty is different among countries participating in the study.

Psychosocial aspects Interviews

UIBK started to construct interview guidelines for two groups of experts:

a. Emergency first responders who have been active in emergency care after a terrorist attack or amok situation.
b. Crisis managers having been active in emergency care after a terrorist attack or amok situation.

First interviews were conducted and analysed in the course of 2019 regarding the following events

- Munich amok situation
- Paris terrorist attacks
- Kitzbühel shooting

Sample

Conducted and planned interviews

Incident	**Interviews**
Munich (shooting in shopping mall, 2016)	4
Paris (Bataclan incidents, 2015)	1 (2 to follow January)
Kitzbühel (young man shoots family of 5)	1 (4 to follow January)
Madrid (bombing)	2 (January)
Graz (amok driver in inner city)	1 (January)
Berlin (amok driver in Christmas market)	1 (January)

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Areas of Main R&D Gaps

There is a need to find clear solutions for the ethical and practical dilemma between security of staff and volunteers and duty to help in security related operations. The following micro-gaps and needs have been identified:

- Unclear security situation as main stressor for staff and volunteers during operation;
- Crisis managers in the background tend to protect staff and volunteers, whereas staff and volunteers themselves as well as operation managers at the site tend to focus more on the rescue of victims even if this means a greater risk for volunteers and staff;
- Discussion to do a short triage and fast evacuation of victims ("new" concept) versus a thorough triage and first medical support to victims (traditional concept);
- Discussion about which helper groups (firefighters, special police forces, specially trained ambulance personnel) shall do first triage and evacuation.

Common Requirements to Fill Capability Gaps

- The following requirements have been identified: Clear roles, good communication with police and regular briefings as well as good team structures are important stress reducing factors. Trainings of staff, volunteers and management must be adapted;
- Debriefings after the operations have to be well structured and adapted to the fact that many security issues are raised by the personnel only after the operation. Trainings of crisis managers and mental health professionals have to be adapted.

Priorities with Regards to Standardization

- Standardized trainings in preparation for security related events have to be adapted to the above mentioned gaps and needs;
- Standardized form of debriefing after security related operations is needed

Best Practices & Lessons Learned

- Depending on the type of the security related event, different solutions to the above mentioned gaps and needs are needed (Amok versus Terrorist attack, ….)
- Different solutions for different event types are needed, we plan to develop an event typology

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Research and Innovation Monitoring

- Active research of the newest technologies and tools present on the market to be demonstrated and used during the Demo. Focus was on tools for communication between EMS and Hospitals. A wide variety of communications systems to be used on Ambulances by EMS were identified. These new technologies are at the moment in the stage of being used by EMS services in a "leopard spot" way and validated as to effective usefulness and practicity. Different types of connectivity have been analyzed. Procedural aspects and definition of procedures and best practice still need time;

- The WP3 is supporting the Quick Wins already identified, in particular:
    - serious game tool for health care provider's awareness in the case of contaminated patients hand over in French, English, Italian and Spanish
    - Stop the Bleed ACS for European States has been refined and completed (translation and preparation of training material for Italy is in place);

- Possible new Quick Win: Open access template for reporting on Major Incidents, a worldwide register for major accident and the related medical impact in the pre-hospital phase (MRI from NorCross)[1];

- Possible new Quick Win: identification of low weight tools for Nurse Tool-Belts (Individual portable kit to stop hemorrhages worn on the thigh of doctors and nurses and containing Israeli dressings and tourniquets);

- Possible new Quick Win: interactive decision maker tool to tailor areas of treatment at the entrance of hospitals in the case of CBRN victims

Areas of Main R&D Gaps

- Tabulation and cataloguing of tools and material present on EMS vehicles and in Hospital Emergency Departments to proceed towards a common terminology and recognition of their innovative employment;

- Due to the fact that medical assistance in mass casualties is more and more for the "scoop and run" or "SCOOTER" procedure, first responders manifest the need of tools for unstable patient assistance. Portable, light weight tools are made focus to research;

[1] http://majorincidentreporting.net/

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- Study for the tailoring of wearables (suits, backpacks, tool-belts) for different sized operators.

Requirements to Fill Capability Gaps

- The concept that medical assistance in case of asymmetric threats (not CBRN and not until active shooter is present) is shifting always more towards the involvement of by standing lay population means that tools must be small portable and easy to use (e.g.auto tightening tourniquet, small easily usable respirators etc.);

- Creation of mobile well-equipped teams to anticipate second accident or multisite accidents;
- Accessible and cost-effective simulation tools for rapid training in emergency situations (i.e. cannot use costly tools for simulation).

Priorities with Regards to Standardization

- Licensing procedures and registration of medical doctors and nurses in the European Union are being reviewed based on current literature and the European Directives[2]

- Standardization of "patient hand-over" procedures is widely requested by EMS services

Best Practices and Lessons Learned

- NO-FEAR project is at the moment lacking expertise from doctors and medics of other First Responder Organizations (Fire Fighters, Police). Involvement of these practitioners is difficult and challenging.

- New communication systems are tailored on local realities (i.e. only in specific language) and are difficult to export to diverse MS

- Emergency Response and training for Hospitals and EMS requires dedicated spaces and funding. "Volounteer preparedness of operators" cannot be considered as effective.

[2]https://ec.europa.eu/growth/single-market/services/free-movement-professionals/qualifications-recognition/automatic_en

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Areas of Main R&D Gaps

- Reporting format for security related incidents, and lessons learned
  The"Utstein reporting format" was reviewed, and defined as too complicated for a sudden onset disaster, especially concerning the level of details required on the first hour after the incident. While this could be a useful tool to assess systems before a disaster, or for a comprehensive study conducted with substantial resources post disaster, this will not be fit for most of the incidents. Detailed feedback will be provided to the authors with suggested improvements.
- Communications in security related is a challenge (mainly due to overload on the system). This is while the transition to G5 cellular networks is around the corner. WP4 is in close contact with BROADWAY project (who is in the phase of choosing the consortia who will provide potential solutions for emergency service communications), to learn more about the expected solutions, and discuss their applicability to the health care providers.
- Hospital security during security related incidents was identified as a "soft target", where little knowledge sharing and information sharing on possible solutions exist. The upcoming WP4 workshop in Tel-Aviv (January 2020), will focus of different aspects of security management of hospitals during incidents: physical security, crowd management, cyber security and providing information to the public. Experts from hospitals in Madrid who attended to the casualties of the March 3rd 2013 are invited to participate to the discussion.
- While the use of drones is a "hot topic", little information is available on the use of drones by EMS. Nevertheless, WP4 identified 2 papers published on the topic, as well as good practices from Germany on the use of drones for different task (overall "scene picture" which is different from the use of drones "to identify live victims"). WP4 also identified challenges (e.g. the number of pilots required for such an operation, in services very limited with manpower on scene on the first phase of the incident). All those issues will be discussed in a webinar that will be organized in January 2020.

Common Requirements to Fill Capability Gaps

- Bystanders who provided First Aid to injured fellow citizens, were identified as a population with specific needs for psychosocial support, which has to combine the First Aid component with the Psychosocial support component. There is no current literature on this group. WP4 flagged this issue to DRIVER+ project, with their CEMINE task group dealing with "spontaneous volunteers in crisis and disasters". The results of the CEMINE work are now open for review, and WP4 partners are invited to review them and comment.

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Priorities with Regards to Standardization

- As "lessons identified" methodology is a gap, a standardized methodology on this subject is needed. Being this a common requirement, WP4 will cooperate with the STARI4Security project to find ways that can fill this gap;

Best Practices and Lessons Learned

The "revised scene safety concept" (shift from "general safety" to "identifying specific hazards in a risky situation") was presented in several discussions with emergency responders and was well received. WP4 is developing a concept paper that will be discussed in upcoming NO FEAR events with emergency responders and crisis managers in order to get specific feedback and publish it.

Work Package 5 - Education and Training of Personnel and Volunteers

Research and Innovation monitoring

The following articles were used to create the extraction tool for the systematic literature review of a core disaster medicine medical school, pharmacy, nursing, residency and EMT curriculums:

Sarin, R., Biddinger, P., Brown, J., Burstein, J., Burkle, F., Char, D., et al (2019). Core Disaster Medicine Education (CDME) for Emergency Medicine Residents in the United States. Prehospital and Disaster Medicine, 34(5), 473-480. doi:10.1017/S1049023X19004746

Ngo, J., Schertzer, K., Harter, P., & Smith-Coggins, R. (2016). Disaster Medicine: A Multi-Modality Curriculum Designed and Implemented for Emergency Medicine Residents. Disaster Medicine and Public Health Preparedness, 10(4), 611-614. doi:10.1017/dmp.2016.8

Bajow, N., Djalali, A., Ingrassia, P.L. et al. Evaluation of a new community-based curriculum in disaster medicine for undergraduates. BMC Med Educ 16, 225 (2016) doi:10.1186/s12909-016-0746-6

Wunderlich, R., Ragazzoni, L., Ingrassia, P., Corte, F., Grundgeiger, J., Bickelmayer, J., & Domres, B. (2017). Self-Perception of Medical Students' Knowledge and Interest in Disaster Medicine: Nine Years After the Approval of the Curriculum in German Universities. Prehospital and Disaster Medicine, 32(4), 374-381. doi:10.1017/S1049023X17000280

Issam Barrimah, Ishag Adam & Abdulrahman Al-Mohaimeed (2016) Disaster medicine education for medical students: Is it a real need?, Medical Teacher, 38:sup1, S60-S65, DOI: 10.3109/0142159X.2016.1142515

Markenson D, Dimaggio C, Redlener I. Preparing health professions students for terrorism, disaster, and public health emergencies: core competencies. Acad Med 2005;80:517-26

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Subbarao I, Lyznicki JM, Hsu EB, et al. A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness. Disaster Med Public Health Prep 2008;2:57-68

Association of American Medical Colleges. Training future physicians about weapons of mass destruction: report of the expert panel on bioterrorism education for medical students. https://members.aamc.org/eweb/upload/Training%20Future%20Physicians%20About%20Weapons.pdf. Published 2003. Accessed: 12 December 2019

Smith J, Levy MJ, Hsu EB, et al. Disaster curricula in medical education: pilot survey. Prehosp Disaster Med 2012;27:492-494

Kommor, M., Hodge, B., & Ciottone, G. (2019). Development and Implementation of a Disaster Medicine Certificate Series (DMCS) for Medical Students. Prehospital and Disaster Medicine, 34(2), 197-202. doi:10.1017/S1049023X19000165

Disaster Training in 24 Hours: Evaluation of a Novel Medical Student Curriculum in Disaster Medicine
Wiesner L., Kappler S., Shuster A., DeLuca M., Ott J., Glasser E.
(2018) Journal of Emergency Medicine, 54 (3) , pp. 348-353

In Press:

Gross I, Goldberg S, Liebling S, Garcia, A, Alfano A, Hasdianda M, et al.Improving Pediatric Administrative Disaster Preparedness through Simulated Disaster Huddles.Disaster Medicine and Public Health Preparedness.

Ragazzoni L, Conti A, Dell'Aringa M, Caviglia M, Macapani F, Della Corte F. A nationwide peer-assisted learning program in disaster medicine for medical students.European Journal of Emergency Medicine

Areas of Main R&D Gaps

From the analysis conducted during M 12-M18, areas of main R&D gaps were identified as follows:

- A lack core disaster medicine medical, nursing, pharmacist and EMT students curriculum;
- A lack core disaster medicine post-graduate residency curriculum;
- A lack core disaster medicine government health authority license or certificate to practice requirements;
- A lack core disaster medicine maintenance of knowledge and proficiency for first responders and first receivers;

Common Requirements to Fill Capability Gaps

In order to fill capability gaps, the WP5 identified these common requirements:

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- Define a core disaster medicine curriculum for medical, nursing, pharmacist and EMT programs;
- Define a core disaster medicine curriculum for post-graduate residency curriculum;
- Define a core disaster medicine requirement for the government health authority to grant health practitioner license or certificate to practice;Define a core disaster medicine maintenance of knowledge and proficiency for first responders and first receivers

Indicate Priorities with Regards to Standardization

1. A systematic literature review of the current curriculums of medical, nursing, pharmacist and EMT as well as post-graduate residency programs to determine if topics are currently in the curriculums. Then a strategy will be developed to recommend additional topics to be added. The topics that are not currently in curriculums, or can not be easily added will then be recommended to be added as stand-alone workshops or courses.

2. A systematic literature review of current health authority disaster medicine requirements to receive licensure or certification will commence. Data extracted will provide a framework for future recommendations for these requirements. A path similar for PALS/BLS/ACLS/ATLS requirements will be followed for health care facility practitioner requirements.

Best Practices and Lessons Learned

1. Disaster Hero is a free online game designed to teach children (grades 1 through 8), parents and teachers/caregivers how to ensure that players know what to do before, during and after a disaster. Parents and teachers are included so that the family and school are familiar with the main concepts of disaster preparedness. Emphasis is placed on three stages - make a plan, get a kit and be informed.

http://www.disasterhero.com
American College of Emergency Physicians

2. *Bombings: Injury Patterns and Care* curriculum was developed through the Linkages of Acute Care and EMS to State and Local Injury Prevention Programs project that was funded by the Centers for Disease Control and Prevention (CDC). The American College of Emergency Physicians (ACEP) served as the lead grantee for this project.
The curriculum was developed with the assistance of a task force that included representative experts from emergency medicine including physicians, surgeons, nursing, and EMS. *Bombings: Injury Patterns and Care* curriculum is designed to be the minimum content that should be included in any all-hazards disaster response training program. This content is designed to update the student with the latest clinical information regarding blast related injuries from terrorism.

https://www.acep.org/blastinjury/

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Innovation Monitoring and Uptake Plan

During the first months of the project, attempts were made to recognize the main trends in the field of prehospital patient care and emergency medicine in overall.

Few major trends were identified:

i. Emergency medical care is given more and more by lay bystanders with no or very little medical education.
ii. New wounding patterns appeared in the civilian field – Blast, burn, shrapnel and gunshot wounds. These were solely battlefield related until few years ago but with appearance of terror attacks and active shooters they are more commonly seen by civilian caregivers.
iii. The industry is adopting to the need of the responders by assembly of bleeding control kits instead of the traditional first aid kits.
iv. Designated training developed: "Stop the bleed", "Civilian aid", TECC etc. All these focus on the behavior in endangered environment and the management of trauma victim.

Products related to the trends have been searched. Most of the companies that work in pre-hospital field adopt their products to the MARCH algorithm:

- Massive hemorrhage – tactical tourniquets, hemostatic gauze.
- Airway – supraglottic airways. Compact ventilators.
- Respiratory – chest seals, chest needle decompression sets.
- Circulation – Pressure bandages, wound packing gauze. Intraosseous and venous access. Blood products (FDP).
- Hypothermia – Hypothermia prevention devices. Blood warmers.

Additional sub-trend is patient transport from endangered zones to secure treatment zone. Few companies provide lightweight and compact patient carry systems.

Figure 1 MARCH arranged designated first aid kits

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Figure 2 Tactical tourniquets. Present and next generation

Figure 3 Supraglottic airway, compact ventilator

Figure 4 Chest seals, Needle decompression kit

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Figure 5 Intraosseous access, Freeze dried plasma

Figure 6 Patient carry system combined with hypothermia prevention. Blood and fluid warmers

Gaps Identified

i. There has been a great improvement in the technology of tourniquets. Yet, according to the statement of the American college of surgeons, still the failure rate is unacceptably high. This is mainly related to insufficient training in this tool. Next generation tourniquets must eliminate the skill factor.

ii. Advanced airway remains state of the art skill for EMS responders and hospital physicians. It is very well established that advanced airway may cause increased mortality when performed by inexperienced users. Supraglottic airways are the next word in emergency management of airway. Yet they are not definitive airways, meaning that they are not occluding the trachea completely, thus allowing gastric content aspiration and air leak.

iii. According to a late report (2019) formed on a data received from military hospitals, large percent of the casualties are hypothermic upon arrival, which leads to increased mortality.

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The prevention tools are existing but not largely in use. At this stage, we relate this phenomenon to high cost of hypothermia prevention tools and lack of warmed blood and blood products in EMS setting.

iv. Hemostatic devices. The market adopted multiple types of hemostatic gauze and simulators designated for its training. These devices are impregnated with different types of substance that is promoting clotting. These bandages are considered as high type of medical device as they are designated to be inserted into body tissues and have a drug in them.

v. Medical device registration. New CE regulations (MDR) related to medical device registration are to be implemented starting from 2020 and changed from the existing MDD. This will significantly harden the requirements and the supervision of new devices and require re-evaluation of existing medical devices.

vi. Training gap. Nowadays people require different training approach. Companies offer web-based courses. One of the significant trends may be virtual reality-based simulation that will allow remote training.

vii. CBRN. Hospitals build contingency plans based on the possibility of CBRN event. Therefore, they seek for low cost, long shelf life PPE, Airway and venous access devices. The ability of performance without external power supply is important. Special attention is given to antidotes (cyanide, organophosphates etc.) and antibiotics.

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