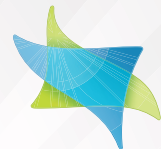




Home Front Command



Ministry of Health



State Of Israel



# IPRED VI

INTERNATIONAL PREPAREDNESS & RESPONSE  
TO EMERGENCIES & DISASTERS

12-15 JANUARY 2020  
Hilton Hotel, Tel Aviv, Israel

# Abstract eBook



***Dear Friends and Colleagues,***

It is a great privilege and an honor for us, as the Conference Chairs, to welcome you all to The 6<sup>th</sup> International Conference on Healthcare System Preparedness & Response to Emergencies & Disasters (IPRED VI). The conference, to be held on January 12–15, 2020 in Tel-Aviv will provide a unique opportunity for professionals worldwide to learn, share and present the latest findings and insights regarding health system readiness, preparedness and functioning in disasters and emergencies. IPRED VI will be hosted as in previous years by The Israeli Ministry of Health and the IDF Home Front Command.

In 2020, we will celebrate IPRED conference's 10<sup>th</sup> anniversary. Building on the success of preceding previous IPRED conferences conducted biennially since 2010, IPRED VI will provide a platform for networking with the world's leading experts. The conference will focus on assessing best practices, coping and State of the Art preparedness for emergencies and disaster events, along with non-formal joint learning, based on the experience of the participants. With a main theme of "From the Individual to the Global", the Congress will challenge the thinking of delegates drawn from all areas of health care and emergency management. We will discuss the challenges of managing emergencies in a changing reality affected by urbanization, growth of population, technology, data analysis, overuse and lack of medical resources and media flawed with "fake news".

The conference will feature a highly interactive, stimulating and multidisciplinary program including plenary sessions and workshops, as well as oral abstract and poster sessions, presentations, round-table discussions and hands-on experiences, based on advanced training tools.

One of the highlights of the conference will be a regional, Natural Disaster drill that will be conducted on the 3<sup>rd</sup> day of the conference. The drill will simulate an Earthquake, and the response, management and treatment provided for the mock casualties will be based on lessons learnt from large-scale exercises and real-life events. The drill will include Home Front Command rescue and medical teams, IDF's EMT certified Field Hospital, the Emergency Division of The Ministry of Health, civilian emergency medical services, first responders and other primary care organizations, with cooperation of both medical and non-medical professionals. The conference participants are invited to watch the exercise.

"Coming together is a beginning, staying together is progress, and working together is success"



**Col. Dr. Olga Polyakov, MD**  
Chief Surgeon  
Home Front Command  
Chairman IPRED VI



**Prof. Itamar Grotto**  
Associate Director General  
Israel Ministry of Health  
Chairman IPRED VI

***Dear Colleagues and friends,***

In January 2020, we will be celebrating a decade since the initial conference on preparedness and preparedness for dealing with emergency and disaster situations. IPRED 6 will be held in Tel-Aviv and I have the privilege to lead the scientific committee of this conference.

We intend to create a conference that will be somewhat different; content-wise, a significant part of the emphasis will be on disasters and emergencies in the era of “Fake News”, as well as new technologies in the field of disasters and emergencies, the use of blood products at the scene, cyber applications, social networks in emergency and disaster situations and more. We intend to incorporate TED-like talks, as well as pressing issues (“hot topics”) on the global agenda in the presentation formats. This will include some controversial topics from differing expert perspectives and we will present a variety of opinions and engage the audience in a meaningful discourse. In addition, we will also introduce short lectures (“5 minutes, 5 pictures, 1 idea”) that will convey a brief message on research or a leading idea in our fields of interest.

We are all well aware of the importance of building and promoting the network of participants by making meetings more accessible and encouraging interaction between participants. We will facilitate discussions between renowned leaders in the field of disasters management and disaster medicine and their peers and with young researchers and practitioners in their respective fields. We strive for collaboration between health practitioners and colleagues from other, such as emergency services, rescue teams, security and safety practitioners, communications, logistics, and more. IPRED 6 is definitely a place to visit if you plan to build a wider network in the field.

As part of the conference, a large-scale hospital evacuation exercise will be carried out. Explanations and walkthroughs will be provided to international participants for better understanding of Israeli policies and practices.

Best regards,



**Prof. Kobi Peleg PhD, MPH**

Head, National Center for Trauma & Emergency Medicine Research

Professor, Tel-Aviv University, Disaster Medicine Department

Chairman IPRED VI Scientific Committee

## **Table of contents**

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Organizing Committee Members

Scientific Committee Members

Plenary Speakers

Oral Presentations

ePoster Presentations

## Organizing Committee Members

---

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# Plenary Speakers



## Major General (Res.) Prof. Issac Ben Israel

Isaac Ben-Israel was born in Israel (Tel-Aviv), 1949.

He studied Mathematics, Physics and Philosophy at Tel-Aviv University, receiving his Ph.D. in 1988.

He joined the Israel Air Force (IAF) after graduating high school (1967) and has served continuously up to his retirement (2002).

During his service, Isaac Ben-Israel has held several posts in operations, intelligence and weapon development units of the IAF. He headed the IAF Operations Research Branch, Analysis and Assessment Division of IAF Intelligence, and was the Head of Military R&D of Israel Defence Forces and Ministry of Defence (1991-1997). In January 1998 he was promoted to Major General and appointed as Director of Defence R&D Directorate in IMOD. During his service he received twice the Israeli Defence Award.

After retirement from the IDF Isaac Ben Israel joined the University of Tel-Aviv (TAU) as a professor.

In 2003 he founded RAY-TOP (Technology Opportunities) Ltd, consulting governments and industries in technological and strategic issues.

At TAU he was the Deputy Director of the Hartog School of Government and Policy (2005-2015), head of Curiel Centre for International Studies (2002-2004), Executive Director of the Interdisciplinary Centre for Technological Analysis & Forecasting (ICTAF) (2010-2013), a member of Jaffe Centre for Strategic Studies (2002-2004) and head of the Program for Security Studies (2004-2018). In 2002 he founded and headed the Yuval Ne'eman Workshop for Science, Technology and Security at Tel Aviv University. In 2014 he founded and became the Director of the Blavatnik interdisciplinary Cyber Research Center at Tel-Aviv University.

He was a member of the Board of Trustees of Ariel University Centre (2009-2011), and a member of the advisory council of Neaman Institute for Advanced Studies in Science and Technology at the Technion (2000-2010).

Professor Ben-Israel was a member of the 17th Knesset (Israeli Parliament) between June 2007 and February 2009. During this period he was a member of the Security and Foreign Affairs Committee, the Finance Committee, the Science & Technology committee, the Chairman of the Homeland Security Sub Committee and the Chairman of the Israeli-Indian Parliamentary Friendship Association.

Isaac Ben Israel was a member of the board of directors of IAI (2000-2002), the board of the Israel Corp. (2004-2007), the R&D advisory board of TEVA (2003-2007), Chairman of the Technion Entrepreneurial Incubator (2007), and member of the board of Fisher Institute for Air and Space Strategic Studies (2000-2018).

In 2011 he was appointed by the Prime Minister to lead a National Task Force that formulated Israel national Cyber policy. Following that he led the foundation of National

Cyber Headquarters in the PM Office. In 2014 he was appointed again by the PM to lead another task force which resulted in a government decision (February 2015) to set up a new National Cyber Authority.

In June 2018 he was appointed again by the Prime Minister to lead a National Task Force to formulate Israel national Artificial Intelligence policy, and to submit a national plan to the Government that will put Israel among the top 5 countries in the world in this field.

He was the Chairman of Israel National R&D council in 2010–2016, and a member of Bank of Israel committee in charge of nominating Board members of Israeli Banks (2016–2018). Professor Ben-Israel has written numerous papers on military and security issues. His book *Dialogues on Science and Military Intelligence* (1989) won the Itzhak-Sade Award for Military Literature. His book on *The Philosophy of Military Intelligence* had been published by the Broadcast University (1999) and has been translated into French (2004). His book *Science, Technology and Security: From Soldiers in Combat up to Outer Space*, was published in 2006. His book on *Israel Defence Doctrine* was published in 2013. His book on *Cyber Security in Israel* was published by Springer in 2015.

Isaac is married to Inbal (née Marcus) and they have three sons: Yuval (1981), Roy (1984) and Alon (1988).



## **Mrs. Denise Everhart**

Denise C. Everhart has been with the American Red Cross since 2013 and has been the Division Disaster Executive for the Pacific Division since 2015. The Pacific Division consists of California, Oregon, Washington, Alaska, Hawaii, American Samoa, Guam and CNMI. Denise leads and manages the team responsible for the implementation of disaster services programs throughout the division, ensuring disaster services (Prepare, Respond, and Recover) are delivered in a rapid and accessible manner, meeting the urgent needs of clients.

In her time at the Red Cross, she has responded and led over 30 disaster operations including the Hurricanes Harvey, Irma and Michael, Typhoons Gita, Soudelor and Yutu, The 2017 and the 2018 California Wildfires, including the Camp Fire.

Prior to her time at the American Red Cross she served for 9 years as an External Affairs Officer for FEMA Region X, responsible for Congressional, Intergovernmental, Tribal, Public/Private Sector Affairs, and Community Relations. During this time she responded to Presidentially declared disasters in Alaska, Idaho, Oregon and Washington for FEMA Region X as well as nationally to over 30 disasters, including Hurricane Katrina, Hurricane Ike, Cedar Rapids flooding, Alabama Tornadoes and Hurricane Sandy.

Mrs. Everhart is also a volunteer Lieutenant Firefighter and EMT at the Molalla Rural Fire Protection District #73 in Molalla, OR.



## **Dr. Robert P. Kadlec ASPR**

Dr. Robert Kadlec is the Assistant Secretary for Preparedness and Response (ASPR) at the U.S. Department of Health & Human Services (HHS). The ASPR serves as the Secretary's principal advisor on matters related to public health emergencies, including bioterrorism. The office leads the nation in preventing, responding to and recovering from the adverse health effects of manmade and naturally occurring disasters and public health emergencies. As such, the office coordinates interagency activities between HHS, other federal agencies, and state and local officials responsible for emergency preparedness and the protection of the civilian population from public health emergencies.

Dr. Kadlec spent more than 20 years as a career officer and physician in the United States Air Force before retiring as a Colonel. Over the course of his career, he has held senior positions in the White House, the U.S. Senate, and the Department of Defense. Most recently, he served as the Deputy Staff Director to the Senate Select Committee on Intelligence.

Dr. Kadlec previously served as staff director for Senator Richard Burr's subcommittee on bioterrorism and public health in the 109th Congress. In that capacity, he was instrumental in drafting the Pandemic and All-Hazard Preparedness Bill which was signed into law to improve the nation's public health and medical preparedness and response capabilities for emergencies, whether deliberate, accidental, or natural. Dr. Kadlec also served at the White House from 2002 to 2005 as director for biodefense on the Homeland Security Council, where he was responsible for conducting the biodefense end-to-end assessment, which culminated in drafting the National Biodefense Policy for the 21st Century. He served as Special Assistant to President George W. Bush for Biodefense Policy from 2007 to 2009.

Earlier in his career, he served as the Special Advisor for Counter proliferation Policy at the Office of the Secretary of Defense, where he assisted DOD efforts to counter chemical, biological, radiological, and nuclear (CBRN) threats in the wake of 9/11 and contributed to the FBI investigation of the anthrax letter attacks. He began his career as a flight surgeon for the 16th Special Operations Wing and subsequently served as a surgeon for the 24th Special Tactics Squadron and as Special Assistant to J-2 for Chemical and Biological Warfare at the Joint Special Operations Command. He was named U.S. Air Force Flight Surgeon of the Year in 1986.

Dr. Kadlec holds a bachelor's degree from the United States Air Force Academy, a doctorate of medicine and a master's degree in tropical medicine and hygiene from the Uniformed Services University of the Health Sciences, as well as a master's degree in national security studies from Georgetown University.



## **Prof. Thomas D. Kirsch, MD, MPH, FACEP**

Dr. Kirsch is the Professor and Director of the National Center for Disaster Medicine and Public Health at the Uniformed Services University. He came to NCDMPH from Johns Hopkins University where he was a Professor of Emergency Medicine, International Health and Civil Engineering.

He has worked in disaster settings for organizations such as the CDC, FEMA, the U.S. Departments of Defense and State, the WHO, PAHO and UNICEF, and American and Canadian Red Cross; responding to U.S. events such as hurricanes Katrina, Sandy and Harvey, and the NYC 9-11 terrorist attacks and global disasters including earthquakes in Haiti, Chile, New Zealand, and Nepal; floods in Pakistan, Typhoon Haiyan in the Philippines and Ebola epidemic in Liberia.

In addition to his real-world disaster experience Dr. Kirsch is a globally recognized researcher and educator who has lectured extensively nationally and internationally on emergency medicine and disaster issues and taught numerous courses in disaster and emergency health and public health. He has authored over 140 scientific articles, editorials, and textbook chapters, and co-authored the medical textbook, Emergent Field Medicine (VanRooyen-Kirsch).

His major awards include the inaugural 'Disaster Science Award' from the American College of Emergency Physicians (2013), the Clara Barton Award for Leadership from the American Red Cross (2014) and a commendation by President Obama in the White House as one of the Nation's, 'Heroes in Healthcare Fighting Ebola'.

Tom's hobbies include walking. He has hiked over 800 miles in the Grand Canyon and completed a 1,000 mile walk through the mountains in California a couple summers ago.





## ASG Ursula Mueller OCHA

Ms. Ursula Mueller is the Assistant Secretary-General for Humanitarian Affairs and Deputy Emergency Relief Coordinator in the United Nations Office for the Coordination of Humanitarian Affairs (OCHA). Ms. Mueller was appointed by U.N. Secretary General António Guterres and began her assignment in March 2017.

Prior to her current role as Assistant Secretary-General, Ms. Mueller spent over 30 years working in international affairs, global issues and development financing. She served as the Executive Director of Germany to the World Bank Group from September 2014 to February 2017, where she was responsible for strategy, policy and budgeting, and helped to foster closer cooperation between the World Bank and the United Nations.

Ms. Mueller also served in various government and public service roles, including Director-General of Germany's Ministry of Economic Cooperation and Development (2012-2014) and Deputy Director-General of the Ministry of Foreign Affairs (2010-2012). From 2009 to 2010, she coordinated a taskforce in the German Ministry of Foreign Affairs to respond to the global financial crisis.

Ms. Mueller brings to her position significant humanitarian and field experience. As Germany's Humanitarian Coordinator from 2006 to 2009, Ms. Mueller managed Germany's multimillion-dollar humanitarian aid budget, oversaw Germany's humanitarian operations, and took forward new initiatives on landmines and conflict prevention. During this time, she also served on the Advisory Board of both the UN Central Emergency Response Fund (CERF) and the UN Relief and Works Agency for Palestine Refugees (UNRWA). Before this, Ms. Mueller was Germany's Special Envoy to Afghanistan (2001-2002) and Germany's Civil Coordinator in Kosovo (2000).

Ms. Mueller studied economics at the University of Hagen, Germany and graduated from Germany's Foreign Affairs Institute with a Master of Arts in Public Policy and Administration.



## Prof. Johan von Schreeb

Johan von Schreeb MD, PhD is a specialist in general surgery and global disaster medicine. He leads the center for research on health care in disasters. The research aims at providing scientific evidence to improve health assistance to people and populations affected by disasters worldwide. The research explores how health needs and risks vary depending on type of disaster and context. The studies also include optimal use of trauma care with limited resources and performance of emergency medical teams. He has since 25 years worked in disasters worldwide for Médecins Sans Frontières (MSF) and WHO.



# Ted-Style Presentations

## Changing Landscape in Humanitarian Aid

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### Kobi Peleg

*PhD, MPH*

*Head, National Center for Trauma & Emergency Medicine Research*

*Professor, Tel-Aviv University, Disaster Medicine Department*

*The Gertner Institute for Health Policy and Epidemiology Tel-Aviv University*

BestCurrent data suggest a global trend of increase in the number of extensive disasters per year. According to the United Nations, In the year 2020, the number of humans needing humanitarian aid will rise to 146 million, meaning that one in every 45 human beings in the world needs assistance. Global warming, urbanization, and globalization are just a few reasons for this grave prediction. Did we stop to consider the implications? Is the world ready to deal with such a gloomy future? We need to consider the past, learn from prior mistakes and get ourselves ready for this upcoming wave of troubles. Innovative thinking is needed if we wish to be triumphant.

## Emergency situations as a playground for politicians and interest groups

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### Arafat Raed

*Ministry of Internal Affairs, Secretary of State, Head of the Department of Emergency Situations, Romania*

In Romania, but in other countries as well, mass casualties and emergency situations are becoming, more than ever, the playground or better said, the battle field for politicians, NGOs, mass media and other interest groups that want to impose certain ideas or measures using the emotions, the weaknesses and the vulnerabilities associated with a major emergency situation. Examples of the manipulation and the fake news spread during tragic situations in Romania during the last few years will be presented and discussed.

## **This is not rocket science, it is just common sense: how to prepare frugally for the event that might never come**

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**Kelly Klein**

*Eastern Maine Medical Center, USA*

Most places in the world are lucky to never experience a deadly outbreak like Ebola. Today countries where these diseases are not seen, are struggling to prepare for the EVD exposed or infected patient. The costs are staggering. In one published paper from the US, the average amount spent by hospital for initial preparedness for Ebola was \$80,000 with the Netherlands spending 12.6 million Euros for response and treatment. However, successes in the diagnosis and treatment of diseases such as, HIV and hepatitis have shown that daily preparation is cost effective. The key is to understand transmission, educate the healthcare community and public, and decide what practices should implemented or strengthened to protect healthcare and the public. This is not rocket science, it is just common sense.

By adding to the daily routine safety measures, such as asking the right questions, and always having patients or providers where masks and eye protection, the risk in hospital to providers drops dramatically and the cost is negligible to the system.

## 7 Minutes – Life Saving Becomes Contagious

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### Eli Jaffe

*Magen David Adom, Israel*

Active shooter incidents are becoming more common and EMS personnel safety is a major concern. Traditionally EMS are not allowed into the scene before police have cleared it. This procedure might take several minutes which reduces the ability to save lives. MDA, Israel's national rescue organization has developed a unique program to teach communities how to act in the minutes following an incident and prior to EMS arrival. The training depends on 7 principals: safety, calling for help, crowdsourcing, triage, treatment, reporting, aiding local authorities. If these civilians would find themselves at an active shooter event, they could help save lives before EMS are able to enter the scene, not only by stopping bleeding but also by conducting initial and basic triage to point the EMS to the most urgent casualties. Over 3,200 people in over 100 communities spread over 22 countries have participated in the First 7 Minutes program.

The First 7 Minutes allows communities around the world to prepare for disasters of various scales and improves community resilience in addition to enhancing lifesaving activities in the critical minutes before emergency services arrive on scene.



# Rebound – Describing and Predicting Long-Term Disaster Recovery

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## David Abramson

*College of Global Public Health, New York University (NYU), USA*

How do individuals recover after experiencing a catastrophic event? How long does recovery take, and what individual and social factors accelerate or impede individual recovery? This presentation will highlight some of the findings of one of the longest longitudinal disaster cohorts, the Gulf Coast Child and Family Health Study, an observational study of 1,079 randomly sampled Hurricane Katrina survivors from Louisiana and Mississippi who had been displaced or greatly impacted by the hurricane. The cohort has been interviewed five times over a 12-year period, from 2006–2018. Using survival analyses, latent growth curve models, and multivariate regression techniques, the study examined a number of pathways to recovery, including movement in to stable housing for displaced populations, subsidence of mental health issues, and subjective and objective measures of individual recovery. Variation in recovery was a function of many interdependent factors, some related to individual vulnerability, others to personal and communal resilience.

1. Trajectories of time to stable housing, time to improved mental health, and time to subjectively-measured and objectively-measured recovery reveal certain common pathways and plateaus.
2. Access to resources such as economic, social, political, or human capital can accelerate recovery, and reflect resilience.
3. State-run emergency preparedness and recovery systems can be designed to support such resilience, and allow for the greatest rebound of an exposed population.

# TEAMS – Training for Emergency Medical Teams

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**Luca Ragazzoni**

*Università del Piemonte Orientale, Italy*

TEAMS is a project aimed to develop, pilot and assess a standardized, validated and cost-effective training package, focused on operational team training for Emergency Medical Teams (EMTs). Now, EMTs around the world have the option to access, free-of-charge, a validated training package to enhance their teamwork capacities for future deployments. The Training Package is comprised of a set of 8 simulation-based exercises specifically designed to improve EMTs' team performance through scenarios likely to be encountered on the field. The exercises are designed to facilitate and guide trainers on how to effectively organize and deliver the training. The 8 exercises can be delivered sequentially to form a 3-day intensive training simulating a complete humanitarian mission. Alternatively, the exercises can be performed independently to accommodate each organization's specific training needs, as well as time and resource constraints. The TEAMS Training Package is available online at no cost.

How could the international response in disasters be improved? How can the work of deployed medical teams become more effective and faster? The Answer: Training and exercising. And this is the aim of the project TEAMS – a programme designed for Emergency Medical Teams. With TEAMS Emergency Medical Teams from small to large organizations can strengthen the preparedness for deployment, improve safety and security, coordination and team dynamics with cost-effective exercises. Let's make medical assistance more effective and faster.

# KIZILAYKART Programs – lessons learned from the world’s largest cash based assistance program

**Orhan Hacımehmet**

*Turkish Red Crescent, Turkey*

## **BACKGROUND:**

KIZILAYKART is an innovative platform that allows for simultaneous implementation of large-scale cash based assistance programmes. The platform serves as an IT hub that enables the integration of different stakeholders systems into one database providing accountable, timely and cost efficient assistance to the most vulnerable foreigners in Turkey. The EU funded Emergency Social Safety Net (ESSN) which is providing monthly assistance to almost 1.7 million beneficiaries is implemented under the Kızılaykart platform and is budget and scale-wise, the biggest ever aid programme in the history of the European Union and the largest cash assistance intervention anywhere in the world.

## **STUDY QUESTION:**

Based on existing Social Safety nets the effectiveness of KIZILAYKART Platform in implementing large-scale humanitarian responses aimed to support the vulnerable population living under International and Temporary Protection in Turkey.

## **METHODS:**

Based on the national system and operating nation-wide, the KIZILAYKART Platform is functional through a strong integrated data management system, robust infrastructure for cash transfers, AAP mechanism, outreach activities and an established M&E framework.

## **RESULTS:**

The findings from the kızılaykart examples are: 1) KIZILAYKART Platform provided an increased ability to meet basic needs in dignity. 2) Ability to transfer cash assistance to high number of beneficiaries in a timely, secured, dignified and accountable manner. 3) Inclusive design that embodies strong partnerships and alignment with national safety net systems, supporting localization and strong coordination with different stakeholders. 4) Robust data management and integration system that allows for the flow, verification and analysis of data. 5) Bridging humanitarian response and resilience by supporting social inclusion and economic integration.

## **CONCLUSIONS:**

1. The successful implementation of humanitarian responses requires implementer to place the people at the center of interest.
2. Greater success and long-term sustainability of humanitarian programmes requires investment in the national capacity.
3. It is highly important to maintain smooth communication and coordination with different stakeholders (Ministry, UN, NGOs) especially in multi-partner programmes such as ESSN.
4. The successful implementation of ESSN is heavily reliant on the integration with and support for national systems as it allowed for rapid scale-up and cost-effective implementation.
5. Important focus on broader sensitization activities and accountability to affected people to maintain responsible, wide-spread humanitarian cash assistance.



**5 Minutes,  
5 Slides,  
1 Idea**

## Israel The Dark Side of the (Preparedness) Moon: Why Promoting Public Preparedness Remains Challenging

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**Moran Bodas**

*The Gertner Institute for Epidemiology & Health Policy Research, Israel*

Despite best intentions and considerable effort, promoting households' preparedness to emergencies remains insufficiently low globally. It seems that in some cases, particularly those in which populations are frequently exposed to any given threat, a more complex socio-psychological framework emerges; one in which classical motivators, such as threat perception cues, are no longer capable of turning salient belief into action. Recent studies suggest that this phenomenon, called Victimization, has considerable implications on the efficacy of risk communication efforts and could jeopardize their success in promoting public readiness. Circumventing the psychological barriers caused by this phenomenon requires innovative approaches, such as utilizing external incentives. The model and its implications are discussed.

We need to face reality - current approaches for promoting public readiness do not work;  
We need to change the paradigm - it is not about lack of awareness, it is fear and appraisal of control;  
We should employ creative thinking and come up with innovative approaches to promote preparedness.

## Are we prepared for the next communications revolution

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**Gili Shenhar**

*Tel Aviv University, Israel*

Arrival of social media over a decade ago had a major impact on emergency management . It has brought many benefits such as fast information delivery, information sharing, quick alert capability and more but has brought disadvantages like spreading rumors much more quickly than ever before.

Today we are at the beginning of a new revolution, facing the entrance of artificial intelligence and virtual reality. Technologies such as writing posts by computer, using holograms, word-entering ability in a speaker's mouth. Today computer can collect the information and create interview. At the same time, have negative effects that can impair public resilience. It can jeopardize public training such as disseminating false information. It can create disaster by fake messages to the public, allegedly by spokesperson (a maliciously-produced video, though artificially produced).

The question is whether we are preparing for those and other potential threats embodied in those new technologies today?

It's time to prepare for the effects on risk communication of new technologies that are expected and learn how to protect from negative impacts.

## How day-to-day readiness impacts your overall state of disaster preparedness

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**Raphael Barishansky**

*Pennsylvania Department of Health, USA*

One of the critical components of standing up the various pieces of what is needed in a large-scale emergency (either naturally occurring or man-made) is your overall day-to-day competence. Various areas of public health departments - surveillance, laboratories, clinical functions and even administrative areas - are operating in the background every day but need to be ramped up during a medium or large scale emergency. Hear various examples of how the speaker has prepared his Department to pivot from day-to-day operations to emergency situations in a seamless manner.

Identification of specific components/skills sets that translate from non-emergency to emergency

Focusing on which areas of your Department will have to "ramp up" in an emergency and how

Overall awareness of departmental emergency plans - and your specific role - is critical



## Hurricane Dorian: Bahamas-International Disasters, Simple Solutions?

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### Mary Showstark

*Yale School of Medicine Physician Assistant Online Program, USA*

International disasters strike at any time which sets off a wave of response teams. NGOs, church groups, humanitarians as well as government responders-USCG, DOD, and other agencies deploy. In essence all of the groups should be reporting to the federal agency in charge, i.e. NEMA in the case of the Bahamas, which includes registering with The WHO: PAHO; however, this rarely occurs. There is a communication breakdown between search and rescue teams, federal teams, NGOs, and a multitude of different core agencies. Preventable methods can be employed with liaison runners to create a reproducible concept that aids in mitigation. Here a brief synopsis will be presented of what was seen in the initial Hurricane Dorian response and what can be improved in the future.

1. NGO collaboration
2. Ease of communication with Dod contractors, military, federal agencies
3. Platform for communication or liaison
4. Creating a reproducible concept

## Tourniquet use in civilian setting – past, present and the future

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### Edward Vershilovsky

*PerSys Medical, Israel*

Tourniquets are an effective means of ceasing life-threatening external hemorrhage from limb injury. Their use has not previously been accepted and common practice for pre-hospital civilian trauma care because of significant concerns regarding the potential complications. The aim of this presentation is to survey the past methods of emergency hemorrhage control, the present situation in this field, and try to map the future trends related to prevention of death caused by exsanguination in the civilian sector.

Tourniquets were considered as last resort in situations of bleeding due to the common belief that they cause more harm to the patient than a benefit.

Nowadays this paradigm is changing and we understand more that the tourniquets may be one of the major game changers in the EMS battle for bleeding patients lives.

Still – the science and the training of tourniquets is not 100% clear and further developments are expected. These will increase the ability of the caregivers to provide medical aid to bleeding patients.

## Abortion services in humanitarian contexts

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### Einav Levy

*The Israeli School of Humanitarian Action, Israel*

Sexual and reproductive health and gender-based violence are major concerns within humanitarian contexts.

The violence can come in various forms, some of which might lead to unwanted pregnancies. Unwanted pregnancies, which result in unsafe abortion is one of the main reasons for mortality among women and children in humanitarian contexts. While it is a basic human right and a lifesaving procedure, humanitarian agencies are failing to deliver abortion services due to several reasons. The current discourse about an optional path to address this gap offers to start the discussion to deliver abortion services for women who were raped and who were forced to fall into survival sex. We are offering to see the humanitarian context as coercive as a whole, thus to conceive unwanted pregnancies in the humanitarian context as a result of coercive sex. Humanitarian agencies should address this gap with relevant cultural and security considerations.

Humanitarian agencies should struggle to offer abortion services as a medical intervention in humanitarian contexts, subject to security analysis and cultural sensitivity.

## Dilemmas in optimizing treatment of CWA casualties in the battlefield

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### Ido David Dechtman

*Israel Defense Force, Israel*

When confronting the task of optimizing the treatment of CWA casualties in the battlefield, the IDF CBRN medicine branch recognizes a range of unique characteristics. Some of these are distinct to the IDF where as others are also shared by other responders.

The lecture will deal with part of those challenges including the type of personal comprising the responders, medical treatment (recognition and treatment) budget issues regarding equipment, training, decontamination (of evacuation vehicle, non disposable medical equipment and cadavers) mental challenges.

- ◆ There are many challenges in the CBRN medical arena.
- ◆ Some challenges are unique and some are common.
- ◆ Treatment starts with preparedness
- ◆ Collaboration of knowledge is of the essence.



# Oral Presentations

## Assessing a tertiary care's hospital cyber vulnerabilities

**Dagan Schwartz**

*Rabin Medical Center, Israel*

**Co-authors:** Michal Hayat, Dorit Nagar, Ram Sagie

### **BACKGROUND:**

In recent years there has been a surge in cyber-attacks in general and specifically against health organizations. Due to the ever-increasing reliance of the health sector on computerized systems, such attacks pose a major risk to patient welfare and privacy. In 2017 Beilinson hospital launched a multi-dimensional project to evaluate and improve its cyber preparedness. As an initial step a hospital-wide cyber vulnerability assessment was carried out in 2018.

### **STUDY QUESTION:**

What are the major cyber vulnerabilities in a tertiary care hospital and how to approach them?

### **METHODS:**

The multi-step vulnerability evaluation process which included extensive onsite discussions with relevant hospital stakeholders and a round table exercise. The process and its findings are described.

### **RESULTS:**

A risk analysis survey was performed followed by hospital-wide cyber-attack table-top drill. Major risks were identified in: Electronic Medical Records and laboratory and imaging capacities. These weaknesses were assessed to have the potential to cause immediate danger to patient lives in the emergency department, intensive care units, operating rooms and imaging intensive procedure units (such as cath labs).

### **CONCLUSIONS:**

Cyber-attacks have become a major challenge for hospitals. A risk most hospitals are unfamiliar with and unprepared for. Comprehensive risk management is needed to minimize the risk of a successful attack as well as minimizing patient harm if an attack succeeds.

# Cyberthreats to Hospitals. PANACEA: A Toolkit for Cybersecurity

**Sabina Magalini**

*Università Cattolica del Sacro Cuore, Italy*

**Co-authors:** Daniele Gui, Pasquale Mari, Matteo Merialdo, Emmanouil G. Spanakis, Vangelis Sakkalis

## **BACKGROUND:**

Digitization of health processes at any level (e.g. clinical, administrative) and delivery of health services through ICT is emerging as a necessity for healthcare organizations, while digital technologies (e.g., Big data analytics, IoT/Medical-Devices, AI, High-Performance/Cloud/Mobile Computing and Block-chain) change the way healthcare services are being delivered. Furthermore, healthcare systems need to respond to the increased visibility and availability of information through digital health interventions.

## **STUDY QUESTION:**

Healthcare represents one of the most complicated and critical emergency response infrastructures. Cyberattacks or disruptive incident emergency and/or disasters, may have significant effects on the provision of health services. Thus the obligation of adopting concrete measures that will strengthen a healthcare setting's including cybersecurity structures and capabilities, not only for protecting services, data and infrastructures, but also for patient trust and safety is of paramount importance.

## **METHODS:**

The penetration of ICT and the increasing connectivity of devices leads to a growing dependency making evident that threats and potential damages to healthcare organizations require a fortification of the infrastructure taking into account the complexity of the healthcare sector related to the number and diversity of its basic components (human resources, clinical/administrative information systems and processes, and devices) and existing security policies.

## **RESULTS:**

The purpose of this work is to present a methodological cybersecurity toolkit (PANACEA) for cyber security assessment and preparedness of Healthcare ICT infrastructures and connected devices. PANACEA aims to empower the healthcare sector to respond more swiftly to risks of a complex and multi-faceted threat landscape while fostering positive behavioral changes.

## **CONCLUSIONS:**

PANACEA enables healthcare to assess the nature and severity of a threat, and sustainably decide to adopt strategies to strengthen its preparedness and response. Instead of waiting for the regulations that will be issued by central governments, HCCs can effectively be empowered to adapt their cyber resilience.



# Introducing BladeShield: The Digital Wearable Combat Casualty Card That Works For You

**Avi Benov**

*The Trauma and Combat Medicine Branch, Surgeon General's Headquarters IDF, Israel*

**Co-authors:** Ariel I. Hirschhorn, Roy Nadler, Jacob Chen

## **BACKGROUND:**

1.1 potentially preventable deaths Combat casualty care is conducted under the harshest conditions by several echelons of care. This is the reason why approximately 90% of combat-related deaths, occur prior to a casualty reaching a medical treatment facility, and that as much as 24% of deaths on the battlefield are categorized as “potentially survivable”. At the point of injury, the medical care provider must simultaneously address four consecutive efforts, usually risking his own life in the process: 1.Triage and priorities treatment. 2.Administer critical care to the casualties. 3.Call for help - arrange evacuation of the wounded to the next echelon of care. 4.Monitor vital signs and document the treatment given. 1.2 Prehospital data capture During the tactical field care phase, a TCCC (tactical combat casualty care) Card is completed by the medical or nonmedical first responder and attached to the casualty, prior to transport to the following echelon of care. This provides critical treatment information to personnel providing care during transport, and to the medical team receiving the casualty at the hospital. In a recent study, conducted in US military only 7% of military casualties which qualified for TCCC card reporting, had a TCCC card. A similar study conducted in the IDF found that TCCC card reporting rate, during operation protective edge, was as low as 11%. Documentation is conceived by the care providers, as a time-consuming procedure which defers his or her attention from the main lifesaving efforts. Hence; the care provider will usually focus on combat care & evacuation. The consequences of lack of documentation will be evident only at the following echelon of care. The combat environment has many factors that affect prehospital care, including temperature and weather extremes, severe visual limitations imposed by night operations, logistical and combat related delays in treatment and evacuation, lack of specialized medical care providers and/or equipment near the scene, and lethal implications of opposing forces. Thus, a tailored approach to prehospital military trauma care data acquisition and documentation must be used.

## **STUDY QUESTION:**

Is the BladeShield 101 applicable to mass casualty events?

## **METHODS:**

BladeShield 101 is an eco-system, which harnesses emerging technologies - Internet of Things (IoT), Near-field Communication (NFC) and cloud-based data, including an android based mobile device and a smart, automated, wearable wrist-watch-like intermediary developed for combat theatre automated digital casualty card file creation. This eco system functions as a decision support tool, aimed to assist the medical care provider, in making the right real-time treatment decision. Data are readily available to point of injury care providers - hence augmenting triage capability, central medical command - which can simultaneously arrange evacuation, following echelon of care - preparing correctly in real-time for receiving the injured and ensuring continuity in their care. Freeing the attention of the medic to be solely focused on treating the wounded.

## **RESULTS:**

Use of this data eco-system, provides an efficient mean for data transfer and mining from the combat theatre to the hospital. This revolutionary system is comprised of 3 consecutive layers: 1.Capture of data - BladeShield 101 which is placed on the casualty by the medic, captures crucial data (vital signs from sensors placed on the casualty & treatment given) in real-time. 2.Creation of valuable real time knowledge - data display on a

tactical android application used by the senior medic, enables evidence-based treatment prioritization and automatic combat casualty card creation. 3. Decision support tool - knowledge created at real-time, is readily available to the physician augmenting his ability to make the right clinical decision at the combat theatre. The system was field tested by warfighter medical staffs. Improvement of up to 40% in real time data capture at the combat theatre, in comparison to the TCCC card used was noted. The BladeShield 101 device is flexible, lightweight, inexpensive, fast and intuitive to operate; thus, it was easy to implement in the harsh combat theater. Comprehensive digital information including location of the event, nature, severity of the injury and evacuation sequence was recorded. Any instructions or special emphases by the treating medical officer or support staff were added to the system by using the application attached or verbally.

### **CONCLUSIONS:**

A real-time prehospital decision support tool is a must for global performance improvement of combat casualty care. Recent study has found that more complete and reliable data at different echelons of treatment could increase survivability of battlefield casualties by as much as 20%. As medical diagnostic failure rate is estimated to be as high as 10 to 15%, preventable and potentially preventable errors might occur in the treatment of severely injured patients. The rate is highest among specialties in which patients are diagnostically undifferentiated, such as emergency medicine. Errors in hemorrhage control and airway management are the most common human treatment errors. Improving data capture, data transfer and data mining will minimize error rate, help improve trauma care, and hence increase overall battlefield survivability. Prehospital record keeping and the availability of such data are notoriously challenging on the battlefield. However, documentation of care is an important aspect of caring for casualties and ensuring continuity of care. A TCCC card or some other durable record of care should be maintained throughout the time that the patient is receiving prehospital care and subsequently should be transported with the patient to the treating hospital. An additional and crucial layer of information is the PHTR. The primary purpose of the PHTR is to provide tactical leaders and medical care providers with near-real time trends, reports, and analysis for lessons learned, quality assurance, and performance improvements designed to immediately reduce morbidity and mortality on the battlefield. Commanders quickly make data-based decisions to optimize casualty response and force protection, resulting in rapid treatment protocol modification and body armor evolution. Resultant directed procurement of medical devices and personal protective equipment is data driven, peer reviewed, and cost-effective. The lack of adequate documentation of prehospital care is problematic in ensuring optimal care for casualties. Use of the 101 BladeShield data eco-system, provides an efficient mean for data transfer and mining. Data are readily available to following echelon of care, central medical command and receiving hospital at the same time. This revolutionary system will, improve information capture and transfer. This will reduce morbidity and mortality. Hence, improve overall survivability in the combat theatre.

# A Randomized, Controlled, Double-Blinded Evaluation of the feasibility of Remotely Telementored Ultrasound (RTMUS) versus Point of Care Ultrasound (POCUS), in inexperienced operators

**Itamar Netzer**

*Israel Defense Forces, Israel*

**Co-author:** Rubrum Coelis

## **BACKGROUND:**

Death due to trauma is characteristic the initial stages of natural or man-made disasters. These environments are characterized by lack of access to hospitals with adequate diagnosis and treatment facilities, and carry a risk of delayed diagnosis. The current medical-technological environment is rife with the accumulating presence of civilian and military wireless data networks, and increased miniaturization allowing for better access to diagnostic tools. One such tool are ultrasound devices, now smaller and cheaper than ever before. Information technology already enables global medical supervision and support through remote telementoring. The Rubrum Coelis international collaboration has undertaken to examine the possible efficacy of small ultrasound in extreme environments, whether as point of care ultrasound (POCUS) wielded by novice caregivers, or as telementored ultrasound (TMU). In addition, metrics were used to determine the differences in mental stress imposed on the caregiver in both modalities.

## **STUDY QUESTION:**

Can telementoring improve the level of POCUS and jugular catheter placement executed by novices? How does it affect their stress levels?

## **METHODS:**

Thirty seven doctors and EMTs were randomized to perform POCUS or TMU in three sonographic tasks (EFAST on a digital and live models, jugular venous access). All subjects were naïve to ultrasound and received a day-long course prior to the trial. Heart rate variability, salivary cortisol and Dundee Stress Questionnaires were used to assess operator stress. All sonographic tasks were evaluated in real time and in retrospect by medical experts.

## **RESULTS:**

On a composite score doctors succeeded in 79% of tasks, compared with 72 % for EMTs. When analyzing for mentored versus non mentored work, both groups received a score of 79%. There were no significant differences in any of the composite scores. On the jugular task, there was a statistically significant difference, with the mentored group causing 26% adverse events, compared with 44% in the nonmentored group ( $p < 0.001$ ). Stress data has not yet been analyzed at this time.

## **CONCLUSIONS:**

The ability of naïve ultrasound operators to perform EFAST exams and place jugular catheters with US guidance after a short POCUS course was shown to be adequate. Telementored support did not seem to improve their ability to correctly perform an EFAST diagnosis, but was shown to improve safety during jugular catheter insertion.

# Evaluation of the Microclimatic Conditions in the Portable Isolation Units

**Pavel Castulik**

*Dekonta JSC and Dekonta CBRN Ltd, Czech Republic*

**Co-authors:** Jiri Slabotinsky, Kamila Lunerova, Lukas Kralik

## **BACKGROUND:**

Safe handling and transportation of a patient infected with the highly contagious diseases, e.g. Ebola, SARS, MERS requires high biosafety level of biosafety measures. Portable Isolation Units (PIU) are appropriate equipment for immediate isolation of the infected patients and their transportation to authorized contagious diseases medical facility. Different design features and variety performance of the PIUs provide various microclimate conditions, affecting comfort and safety of the patients during transportation operations.

## **STUDY QUESTION:**

Impact of different negative pressure air exchange rate (AER) flow on microclimate conditions inside the PIUs was experimentally studied.

## **METHODS:**

Microclimate conditions and physiology status were evaluated by a group of volunteers placed in various designs of the PIUs. Volunteer's physiologic characteristics such as body temperature and heart rate were recorded during the stay in a PIU, as well as microclimate parameters such as external/internal temperature, humidity, AER, and CO<sub>2</sub> concentration.

## **RESULTS:**

Safe and comfortable microclimatic conditions in a PIU are significantly influenced by the AER inside the unit. Namely, the design features of some PIUs and their filter-ventilation system affects the concentration of CO<sub>2</sub> in different locations inside the PIU chamber what may represent a health risk in a case of CO<sub>2</sub> concentration exceeding the permissible exposition limit (5000 ppm) in head area. The microclimatic conditions inside the unit influence also a thermal balance of the patient and may cause growth of the body temperature.

## **CONCLUSIONS:**

It was concluded that low AERs of 12–15 time/hour in majority commercial PIUs represent the health risks to isolated infected patients in a PIU with their elevated body temperature and accumulation of CO<sub>2</sub> concentration. Presentation listed additional technical parameters required for the PIUs.

# FastBreath, a new integrated device for rapid determination the absence of vital signs (NVS) in territorial emergency and disaster medicine

**Davide Gasparino**

*Emergency Department 118 Piedmont, Italy*

**Co-authors:** Filippo Gatti, Paolo Tealdi, Gaincarlo Cardone

## **BACKGROUND:**

In out-of-hospital emergency, rapid response to verify the presence of vital signs is necessary to determine the CPR beginning by first-responders. In maxi-emergency, during primary triage it is useful a tool capable of discriminating NVS subject from the others. FastBreath measures the respiratory stroke as a basic parameter to determine the presence of vital signs.

## **STUDY QUESTION:**

Can this instrument detect and classify respiratory action and its efficacy in territorial emergency? How can this parameter be monitored and how can it be communicated to an operations center that can coordinate the response?

## **METHODS:**

We use modular technology that allows endless possibilities. The architecture is based on a rechargeable battery that powers our sensors. To measure chest excursion and respiratory rate we use an accelerometer and a gyroscope that measure accelerations and orientation on the three axes. The instrument, specifically calibrated to zero when it is turned on, can confirm the presence of an effective breath. This information is transmitted via bluetooth to a dedicated smart-app (connected to the dispatch systems of the operations center) or directly to a CLU (command&logistic unit), using LPWAN technology (eg Sigfox).

## **RESULTS:**

The breath recognition algorithm is based on the study and cataloging of the thoracic excursion of more than 1000 subjects of different ages. The system can be improved through the continuous hardware and software developments proposed by the manufacturer of the individual modules.

## **CONCLUSIONS:**

The possibility of communicating to CLUs without intermediary tools and networks, or through a dedicated app recognized by dispatch systems, open the way for innovative developments for the management of first-responders.

# Results of the DETECT enzymatic debridement multicenter randomized controlled trial and implications on mass casualty incidents

Yaron Shoham

*Soroka University Medical Center, Israel*

## BACKGROUND:

NexoBrid is an enzymatic debridement agent for burns, proven to significantly reduce the need for surgery while achieving a significantly shorter time to complete removal of burned tissues [Burns. 2014 May;40(3):466–74]. NexoBrid has been identified by the US government (BARDA) as a medical countermeasure for burn mass casualties. Its use on 39 victims during the Romanian nightclub disaster in 2015 serves as a proof of concept for its use in burn mass casualty events. NexoBrid was approved in the EU, Argentina, Russia, South Korea and Israel based on 7 clinical studies in the past. This current study was conducted as part of the approval requirements of the authorities in the US and EU.

## STUDY QUESTION:

The aim of this study was to further evaluate the efficacy and safety of NexoBrid.

## METHODS:

175 patients suffering from deep burns were included in a multicenter, multinational, randomized, controlled, assessor blinded trial. Patients were randomized to 3 arms – NexoBrid, Standard of Care (SOC), or Gel vehicle in a 3:3:1 ratio. The primary endpoint was incidence of complete debridement (NexoBrid vs Gel). Additional acute stage endpoints included the need for surgical debridement, time to complete debridement, blood loss and time to complete wound closure (NexoBrid vs SOC).

## RESULTS:

Patient demographics and wound baseline characteristics were comparable across study arms. The incidence of complete debridement was significantly higher for NexoBrid vs Gel patients (93.3% vs 4%,  $p<0.0001$ ). The need for surgical debridement was significantly lower for NexoBrid vs SOC patients (4% vs 72%,  $p<0.0001$ ). The median time to complete debridement was significantly shorter for NexoBrid vs SOC patients (1 day vs 3.8 days,  $p<0.0001$ ). Calculated blood loss was significantly lower for NexoBrid vs SOC patients (14ml vs 815ml,  $p<0.0001$ ). The median time to complete wound closure was similar for NexoBrid vs SOC patients (27 vs 28 days). The overall safety profile of NexoBrid treated patients was good, and consistent with the safety data known from previous studies. Long term follow up results are not yet available.

## CONCLUSIONS:

The results of this robust phase 3 trial demonstrate the safety and efficacy of NexoBrid, and are in line with former trials results, strengthening the notion that NexoBrid may serve as an effective solution to a burn mass casualty event.

# VR-Based Evaluation and Training System for Emergency Responders and Manager

**Michel Izygon**

*Tietronix Software Inc, USA*

**Co-authors:** William Buras, Issac Ashkenazi, Reuven Bar-On

## **BACKGROUND :**

Rapid, efficient and effective training of emergency responders serves the ultimate goal of minimizing potential catastrophic consequences of disasters. Virtual Reality may be an impactful technology to increase responder readiness. Our novel VR training platform delivers HAZMAT training while also measuring and evaluating individual and team performance in situ.

## **STUDY QUESTION:**

Can realistic HAZMAT disasters may be simulated, and appropriate responses trained for using Virtual and Augmented Reality (VR/AR) systems?

## **METHODS:**

Key contributors to performance among emergency responders and managers were identified by an extensive review of the literature and subsequent tested for association by psychometric assessment of over three hundred emergency responders. These contributors were then measurably represented in elements of a VR Training scenario of an actual historical HAZMAT event in Houston Texas (ammonia release from transport truck wreck). These performance variables can then be measured and assessed during trainings for understanding and optimizing individual or team knowledge and performance. Scenarios also can be dynamically modulated by trainer input in real-time, or by computerized Artificial Intelligence analysis of performance and trainee real-time physiological measures to rapidly optimize specific key contributor performance of individuals and teams.

## **RESULTS:**

The pilot system was successfully designed, built and is now being pilot tested with Houston Texas emergency responders. We plan to validate this system on larger, more diverse samples of emergency responders. Additionally, additional emergency response scenarios are under development.

## **CONCLUSIONS:**

Our VR system is also a configurable platform that enables the evaluation and training of a wide range of skills needed by distinct roles (police, firefighters, EMTs, etc.) in diverse scenarios such as biosafety spills, HAZMAT disasters and bioterrorism threats. The advantage of our approach is to immerse first responders in HAZMAT emergency scenarios that are realistic and also designed to focus on measurement and refinement of specific areas of performance.



# Early Multi-Casualty Incident Management in the Dispatch

**Eli Jaffe**

*Magen David Adom, Israel*

**Co-authors:** Oren Blustein, Ido Rosenblat, Ilan Klein, Uriel Goldberg, Eli Jaffe

## **BACKGROUND:**

In the first minutes following the occurrence of a Multi-Casualty Incident (MCI) the scene is usually not managed. Magen David Adom (MDA), Israel's national rescue organization is responsible for preparing and responding to MCIs. MDA has developed an app to store medical information and call for help while simultaneously transmitting information and location to dispatch. Communication through live video feed is a main feature of the app which was put to test in several MCI drills.

## **STUDY QUESTION:**

Does relay of live video to dispatch enable remote early MCI management?

## **METHODS:**

Videos of MCI drills were analyzed to assess for times, recognition of important information by the dispatcher and finding obstacles.

## **RESULTS:**

Half of videos were filmed vertically, and the caller ran quickly making many rounds around the scene. Accurate location was automatically transmitted, Entrance and Exit routes were identified ( $t < 2$  min). The number of casualties was crudely assessed ( $t < 30$  sec), more accurate number was then identified ( $t \leq 4$  min). The needs for additional forces such as fire department were identified in all videos ( $t < 30$  sec). Dangers at the scene were identified and in most cases responders were notified prior to their arrival. First responders arrived quickly ( $t < 40$  sec), with the first ambulances arriving on average 4.5 minutes after the initial call was placed. Hospitals were notified of casualties, special injuries and the ETAs.

## **CONCLUSIONS:**

Video feed allows the dispatch center to understand the situation and begin managing the incident before responders arrive on scene. Factors improving management were horizontal filming, and the following order: From far to near (zoom-in), access routes, emergent casualty survey, and casualty concentrations. The incident commander on scene received information and directions from the dispatch thus enabling rapid triage and evacuation.



# Automatic Dispatcher – Shortening Response Times by Eliminating Dispatch Center of Bottlenecks

**Ido Rosenblat**

*Magen David Adom, Israel*

**Co-authors:** Oren Blustein, Roman Sonkin, Eli Jaffe

## **BACKGROUND:**

Traditionally emergency call-takers received information, processed it in their minds, typed the information into the computer and dispatched the appropriate response. Activation of the response includes reaching out to the responding team to dispatch them, conveying the relevant information and supervising that the team is properly responding. Magen David Adom (MDA), Israel's national rescue organization has developed and implemented decision-supporting automated technology to dispatch the appropriate units. The system is based on minimal most necessary information needed to understand and decide regarding the urgency of the call. In times of disaster the system should allocate the appropriate resources to any incident thus reducing both the dispatcher's workload and freeing mental resources.

## **STUDY QUESTION:**

Whether the automatic dispatch system is more effective than traditional dispatch methods.

## **METHODS:**

We have compared the emergency call times, dispatch times and response times between the period before (January 2018) and after automatic dispatch was implemented (January 2019).

## **RESULTS:**

Times from beginning of call to dispatch were significantly shorter, times from beginning of call to ambulance en-route were also significantly shorter.

## **CONCLUSIONS:**

In addition to shortening response times, automated dispatch reduces overall call durations which increases call-taker availability. This is increasingly important during MCIs where there is an overload on the emergency dispatch centers. The system can dispatch appropriate response both distance-wise and medical-level wise.

## Decreasing Surgical Wound Care Complexity in Resource Poor Environments

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**Moris Topaz**

*Hillel Yaffe Medical Center, Israel*

Trauma is a common cause of morbidity and loss of function in resource-poor environments. Following disasters, the needs/resource gap is increased, limiting the possibility for optimal treatment in individual patients. Novel technologies are needed in order to bridge this gap. These need to be user-friendly and relatively inexpensive if to be used in resource-poor environments. This presentation will concentrate on the treatment of soft tissue loss, whether secondary to trauma or iatrogenic loss. Simple to employ tension-relief systems allows primary closure of large skin defects that otherwise would have required closure by skin grafts, flaps or tissue expanders. Irrigation accelerates evacuation of infectious material from the wound and provides a novel method for antibiotic administration. Supplemental oxygen to the wound reverses low oxygen levels in the wound's atmosphere restricting anaerobic contamination. Conventional negative-pressure-assisted wound therapy are currently expensive. However, simple modifications may lower costs without decreasing the quality of care.

Novel technologies may bridge the gap in the treatment of complex wounds, if these are simple to use and relatively inexpensive.

## Sonography and Surge Situations – Nurses & Physicians In SONOTRIAGE

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### Sanjeev Bhoi

*Director Of World Health Organization, Collaborating Center for Emergency & Trauma*  
AIIMS, India

Sonography is also termed as the visual stethoscope. Its use is now spread across all specialties in medicine. Medical schools across the world have developed curriculums to teach sonography to undergraduate medical students.

The All India Institute of Medical Sciences and the World Health Organization Collaborating Center for Emergency and Trauma (WHO-CCEMAT) has developed a clear focus in advancing the sonography agenda not only in medical care but also in community health.

Using Sonography during mass casualty events is an importance component of this effort to advance use of sonography in individual and mass casualty situation.

An innovative model of education called ULTRAMAC (ULTRAsound in MAss Casualty) has been developed by the team at All India Institute of Medical Sciences in partnership with the WHO-CCEMAT. The World Academic Council endorses ULTRAMAC for Emergency Medicine.

The presentation will focus on the curriculum and justification of this innovative model of education which can save lives in mass casualty situations. Training nurses and medical doctors is key to having this preparedness asset which can be deployed in mass casualty events.

# Strengthened regionalization and integration: the new governance structure of the EMT Regional Group for Europe

**Oleg Storozhenko**

*World Health Organization, Regional Office for Europe, Denmark*

**Co-authors:** Kristina Ronsin, Souaad Chemali, Dorit Nitzan

## **BACKGROUND:**

Since 2016 the World Health Organization (WHO) has been classifying Emergency Medical Teams (EMTs) in accordance with the WHO Classification and Minimum Standards. Currently, there are 28 EMTs classified by WHO globally, and as of October, nearly half of them in the European Region. Seven are Type 1 teams, five Type 2 teams, and one Type 3 team, and over 25 more teams are in the pipeline for mentorship and verification.

In 2018, WHO Emergency Programme (WHE) in the European Region established the EMT Regional Group for Europe (EURO RG) to ensure coordination and capacity development of the EMTs and for using the EMT Standards to spearhead the standards of care in emergency situations, through the improvement of national capacities. Specifically, implementing minimum standards for EMT and aligning EMT activities with national health systems will contribute to strengthening Universal Health Coverage (UHC). In order to accomplish this, the EMT RG needed to work through more regionally focused coordination and the first step to successfully increasing regionalization was updating the EMT RG governance structure.

## **STUDY QUESTION:**

What is a preferred governance structure that will meet the overarching objectives of the EMT Initiative and allow Regional growth while enabling a closer connection with national priorities and capacity development of WHO Member States?

## **METHODS:**

In 2019, the EURO RG Secretariat launched a consultation process with several rounds of bilateral and consensus discussions and a survey, which were open to all members of the RG. A special session served as an open forum for discussion at the EMT Global meeting in Bangkok, and follow-up Regional Chairmanship Group (RCG) meetings and ongoing consultation correspondence with RG members succeeded to agree on a final governance structure that further supported the drive for improved coordination for deeper regionalization.

## **RESULTS:**

The resulting Regional Governance structure is more inclusive and transparent, equally acknowledging the value of all stakeholders, including NGOs and focusing on National and EMT focal points. Each group and member of the RCG has clear roles, defined goals, and well-established channels of communication with the broader RG and EMT Secretariat. This new structure provides the basis for stronger regionalization and regional leadership, guiding the setting of strategic priorities for implementation of the EMT initiative in the WHO European Region. These priorities place an emphasis on strengthening intra-regional coordination, relying more closely on EMT-National Focal Points (NFP) for communication and planning, and inter-regional coordination, supporting other regions that require more assistance with EMT operations. This works to develop national capacities not only to request, train, register and coordinate EMTs or strengthen mechanisms for deployment and surge planning, but to contribute to development of UHC. Through increased implementation of standards and facilitation of activities like twinning, teams are more closely linked together for capacity building toward UHC for member states, with resilient Emergency Care Systems (ECS) and delivering a basic package of essential services in emergencies under UHC.

**CONCLUSIONS:**

The evolution of the EURO RG governance structure has proven to be a crucial step in successfully guiding the implementation and regionalization of the EMT Initiative. This regionalization has led to deeper cross-linkages between teams and all-areas of EMT work, facilitated training and mentorship programs, steered the implementation of standards, and enabled closer connection with national priorities and capacity development, which are the essence of health systems and strong ECS.

## Development Minimum Data Set of Nursing report in Disaster

### Odeda Benin-Goren

*ODRON- Emergency and Disaster Preparedness Consulting, Israel*

**Co-authors:** Nahoko Harada, Sakiko Kanbara, Mayumi Koko, Odeya Cohen

#### **BACKGROUND:**

Emergency Medical Teams (EMTs) may deploy to the affected area to supplement the capacity of local medical services and provide emergency care for patients and injured following a disaster. The ability of teams to manage their data and report using the designated daily and/or weekly reporting format is examined by the World Health Organization (WHO). However, some Ministries of Health (MOH) have no pre-existing reporting templates for such teams and the data sets and forms for reporting have not been standardized globally yet. As so an international working group establishes to standardize the Minimum Data Set (MDS) report. The collected information concentrated on clinical problems, medical interventions, and demographics data, yet, no nursing work/finding/intervention documentary. Therefore, there is a lack of information regarding nursing reports in disaster stages. Furthermore, the MDS report is related to the first phase of the disaster, but nurses work will continue through reconstruction/ rehabilitation/ mitigation that may require MDS adaptation.

#### **STUDY QUESTION:**

Nursing MDS may be different than other MDS report in disaster There is a need to identify and learn about the nursing report when disaster strike and follow it. The report may involve Emergency Nurses/ ICU Nurses / Public Health Nurses. There is a need for a systematic approach for nursing report overtime following the disaster strike.

#### **METHODS:**

Following the joint Japanese (JICA)- Israeli cooperation started in 2015 and the established of an international working group from deferent organizations from 28 countries that created the MDS report, Japanese- Israeli nursing initiative established in order to define the need for specific MDS for the nursing report in disaster. A survey referred to deferent international nursing organizations to identify the needed information.

#### **RESULTS:**

The work will present the outcome of the data collection related to nursing work information in Disaster. The objective of the nursing MDS is providing data for future planning and research. It is also connected to nursing work overload in disaster as well as cultural aspects that may impact the work and the cooperation of affected communities with health provider in disaster. All this information could improve preparation for future responses and quality of nursing care to the affected population.

#### **CONCLUSIONS:**

When disaster strikes, the needs for nursing MDS in a disaster is crucial in order to establish common “professional language”, gathering relevant information, and establishing a national database to promote the nursing care following the disaster.

# Volunteering based emergency response in Health Institutes- training process

**Mimi Cymbalista-Shmueli**

*The National Council for Volunteering in Israel, Israel*

**Co-authors:** Anat Leichter, Adva Eshel Rabinovitz

## **BACKGROUND:**

The Ministry of Health, The National Emergency Authority, Joint Israel and The National Council for Volunteering in Israel run a training program aimed at preparing health institutions for emergency response by establishing a volunteering capacity. The assumption is that in emergency times, medical and logistical staff might have different needs than those they have in routine and that those needs are essential for keeping the institute operating in sequence. The concept is that volunteers may support those issues. Furthermore, researches indicate that volunteering in time of crisis, contribute to the volunteer's resilience and to community resilience.

## **STUDY QUESTION:**

What are the lessons learned from establishing Volunteering based emergency response process in health institutes?

## **METHODS:**

A pilot plan in 10 institutes around the country.

## **RESULTS:**

1. Two days 8 hours each of group learning with representation from each institute.
2. 16 hours consultation process for each institute that was led by experts in volunteering and emergency, from the National Council for Volunteering in Israel.
3. In this process, each institute conducted needs assessments and defined the roles that volunteers might combine in an emergency. In addition, they provided a working plan for volunteers recruitment and training
4. A conclude meetup in which each institute presented its process outcomes.

## **CONCLUSIONS:**

Well-Functioning emergency response is built upon early preparation and an organized volunteering infrastructure. This preparation includes recruitment, training, initiation, arranging bureaucratic issues such as medical volunteering insurance entry pass and more. The concept is that pretraining plan for seniors in the fields of emergency and volunteering would help institutes to build and arranged a volunteering infrastructure for routine and emergency which may assist to provide various needs.

# Pediatric Disaster Preparedness: Current Dilemmas, Future Solutions

**Michael Frogel**

*National Pediatric Disaster Coalition, USA*

**Co-authors:** Arthur Cooper, John Jermyn

## **BACKGROUND:**

Children younger than 18 years constitute approximately 25% of the US population. During disasters, they are the most vulnerable population and have age-specific vulnerabilities that heighten their risks and magnify their unique needs. These include physiological vulnerability to pathogens, toxins, radioactive isotopes, and harsh conditions. Increased skin permeability, faster metabolism, more active cell division, higher respiratory rate, and higher surface area-to-mass ratio all contribute to greater susceptibility to physical threats. Behavioral/Developmental differences such as more hand-to-mouth contact, under developed sense of self-preservation, more time spent outdoors and on-the-ground, and difficulty communicating symptoms, increase vulnerabilities. Children in disasters may develop mental health problems, including acute stress disorders, post-traumatic stress disorder, and depression. Some children with disabilities are dependent on medical technology.

## **STUDY QUESTION:**

Can a coalition approach to the needs of children in disasters address planning and readiness issues related to pediatric vulnerabilities?

## **METHODS:**

A US national conference in 2015 determined that significant gaps in pediatric disaster preparedness needs include transport, space, staffing, equipment, supplies and training capabilities. To address these gaps the National Pediatric Disaster Coalition (NPDC) was established to advocate for enhanced pediatric disaster preparedness, advance community health care preparedness, mitigation, response and recovery for infants, children, and their families in disasters.

## **RESULTS:**

The NPDC consists of subject matter experts, national advisory committees, commissions, agencies, and organizations. It utilizes pediatric SME knowledge to plan for the allocation of appropriate and essential resources to address pediatric specific needs in disasters. It serves as an information clearinghouse on pediatric disaster preparedness informed by real events, research and evolving best practice. The NPDC disseminates information through organizing and participating in conferences, and web-based training.

## **CONCLUSIONS:**

Based on the special needs of children in disasters, the NPDC assessed current gaps and has established an effective advocacy platform to match resources to pediatric needs during disasters.



# First mission after EMT2 WHO certification: challenges overcome and lessons learned

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**Mario Raviolo**

*Disaster Medicine Service 118, Italy*

**Co-authors:** Daniela Sacchetto, Elhanan Bar-On

## **BACKGROUND:**

EMT2-ITA Regione Piemonte was classified by WHO as Emergency Medical Team type 2 in 2018. On March 2019, the 14th, the Idai cyclone made landfall on the coast of Mozambique causing hundreds of deaths and thousands of injuries. The Central Hospital of Beira (capital of the province of Sofala, 500000 inhabitants) was strongly damaged with all the 7 surgery rooms not working from the day of disaster. The European Civil Protection Mechanism (EUCPM) was activated and EMT2-ITA Regione Piemonte left for its first mission.

## **STUDY QUESTION:**

How a young EMT2 can perform during the first mission after WHO classification?

## **METHODS:**

Quantitative data regarding the cyclone were collected from published sources; data regarding field hospital activity were collected from EMT2-ITA Regione Piemonte clinical records; other quantitative and qualitative information was obtained from direct observations by the authors.

## **RESULTS:**

The request for assistance arrived 7 days after the Idai cyclone event. The operativity of the field hospital was declared 9 days after the call. Too long times due to long travel times (7 days). Productive collaboration with Israeli professionals, local medical staff and other EMTs. Team well balanced between logistics and medical staff, but too few nurses (22 nurses vs 20 doctors). During the 26 days of activity, 1171 patients were admitted and 63 surgical operations (27 trauma, 12 general, 18 gynecology, 6 plastic) were performed in the field hospital of Regione Piemonte. Daily reports were sent on time to Emergency Medical Team Coordination Center (EMTCC) following the Minimum Data Set (MDS).

## **CONCLUSIONS:**

EMT2-ITA Regione Piemonte successfully faced this first mission in terms of healthcare provided, self-sufficiency and capacity to cope challenges. As first mission, the experience give injects to improve the preparedness and the response basing on lessons learned.

## RDCR– Where do we stand & where are we headed?

### Philip C. Spinella, M.D.

*Director, Critical Care Translational Research program, Professor of Pediatrics, Critical Care Medicine, Washington University School of Medicine, St. Louis, USA*

The Trauma Hemostasis and Oxygenation Research (THOR) Network is an international, multidisciplinary group of clinicians and investigators focused on improving outcomes for patients with severe traumatic injuries through training, education, and research. The THOR Network has been promoting the concept of Remote Damage Control Resuscitation (RDCR), which is the prehospital or presurgical application of a bundle of care to reduce death and disability from traumatic hemorrhagic shock. Essential elements of RDCR include rapid control of bleeding, hemostatic resuscitation, avoiding hypotension and hypocalcemia, and conservative airway management until hemostatic resuscitation has been initiated. The THOR Network has also advocated the use of the term “blood failure” to describe the pathophysiological consequences of traumatic hemorrhagic shock.

Blood failure is initiated by severe traumatic injury and reduced oxygen delivery to meet metabolic demand (shock). Consequences of shock include hemostatic, immune, and endothelial dysfunction. Conceptually, hemostatic resuscitation (whole blood based that also minimizes or eliminates crystalloid administration) will address each aspect of blood failure and has the potential to improve outcomes. High quality clinical data indicates early administration of blood products and antifibrinolytics improves survival in patients with traumatic hemorrhagic shock. The use of dried plasma products improves the availability of plasma which may also improve outcomes. The future of RDCR may include dried whole blood surrogates by combining dried plasma with dried platelets and dried oxygen carriers that are both in development. The future of RDCR also includes the potential for suspended animation or hibernation techniques that will reduce metabolism and allow for increased time to get a casualty to a medical treatment facility. The future may also allow for rapid transport times with the use of autonomous unmanned transport systems, automated vascular access and airway management. With technological advancements in development to augment RDCR, we must never lose sight of the training and education in the concepts of traumatic hemorrhagic shock resuscitation that are needed for prehospital providers. If we do not continue to focus on teaching the pathophysiologic response to severe traumatic bleeding and the biologic basis for therapeutic interventions the future of improving outcomes for casualties that require RDCR is at risk.

## Prehospital Blood Transfusions around the world

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### Patrick Thompson

*Paramedic, United Kingdom*

In 2016 the resurrection of the prehospital use of whole blood started in Bergen, Norway.

This change has had a huge impact on the pre-surgical treatment of hemorrhage with other prehospital emergency services rapidly implementing this procedure.

This development did not happen in a vacuum. This practice had been previously adopted by some Special Operations Forces. The THOR Network was instrumental in the implementation of this development.

The “WHY” of this change in practice is the focus of this presentation: The identification of the scale of the problem of preventable death and hemorrhagic shock, the shocked state and “Blood Failure”, Optimal resuscitation of the bleeding casualty in the hostile, resource limited, tactical environment and The practical steps of a field transfusion.

# Filling the platelet gap in emergency response, recent evidence on safety and efficacy of Thrombosomes: a freeze-dried activated platelet product to treat or prevent bleeding

**Ben Antebi**

*Clinical Program Development Manager, USA*

*Co-authors: Anne Hale, Mike Fitzpatrick*

## **BACKGROUND:**

In the absence of an effective hemostatic platelet substitute, unnecessary deaths are occurring due to hemorrhage. A recent analysis of data from the Pragmatic Randomized Optimal Platelet and Plasma Ratios (PROPPR) trial (2018 Feb) concluded, “early platelet administration is associated with improved hemostasis and reduced mortality in severely injured, bleeding patients.” Patients who received platelets, red cells and plasma had significantly higher survival rates at 24-hour and 30-day after their injury than patients who received red cells and plasma only. Platelets are not immediately available to first responders, military medical units or disaster response support teams. A 21st century solution based on cell stabilization could provide a hemostatic platelet product that is easy to use, has a long shelf life, can be incorporated into daily use, is commercially viable, and innovative.

## **STUDY QUESTION:**

What is the current status of the development of freeze-dried platelet products? What advantages do they present over other platelet products? Are they a potential solution to treating hemorrhage in military and civilian casualties?

## **METHODS:**

Cellphire Inc., Rockville MD, has advanced a freeze-dried platelet product (Thrombosomes®) through two Phase 1 clinical trials. The results of those trials, design of Phase 2 clinical trials, and a regulatory strategy for approval will be presented.

## **RESULTS:**

Thrombosomes have demonstrated safety in mouse, rabbit, canine, nonhuman primate and in two human clinical trials. Hemostatic efficacy has been demonstrated in mouse, rabbit and canine bleeding models.

## **CONCLUSIONS:**

Thrombosomes could meet an unmet medical need. They could be stockpiled and provided to military and civilian first responders for prehospital use saving lives daily. The three-year shelf life is predicted to provide high throughput – supporting inventory levels adequate for disaster response.

# Cognitive and Physical Performance of Combatants Following a Blood Donation, A Randomized Controlled Trial

Jacob Chen

*The Trauma and Combat Medicine Branch, IDF, Israel*

## BACKGROUND:

Walking Blood Bank (WBB), or Buddy Transfusion, refers to using fellow combatants for battlefield blood donation. The donated blood is immediately transfused to their injured brother in arms. This requires pretesting combatants for infectious diseases and blood type, identifying those with type O blood and low titer of anti-A and anti-B antibodies. A fundamental prerequisite for this technique is that the donating soldier will suffer a minimal physiological and mental impact.

## STUDY QUESTION:

The purpose of the current study is to assess the effect of blood-shedding on battlefield performance.

## METHODS:

This is a double-blind randomized control trial. Forty IDF combatants volunteered for the study. All participants underwent baseline function evaluation, including repeated measurement of vital signs, cognitive evaluation (three tests), physical evaluation (five tests) and a strenuous shooting test. Three weeks after baseline measurements, subjects were randomized to either blood donation (450cc) or the control group. For blinding purposes, all subjects underwent venous catheterization for the duration of a blood donation under the auspices of the Israeli National Blood Services. Blindfolds were used to prevent subjects from realizing their assigned group. Repeated vital signs and function evaluation were then performed in a similar fashion.

## RESULTS:

36 patients were available for randomization. Baseline measurements were similar for both groups. Mean strenuous shooting score was  $80.5 \pm 9.5$  for the control group and  $82 \pm 6.6$  for the test group ( $p=0.58$ ). Mean difference in shooting scores between baseline day and test day measurements was  $3.1 \pm 9.24$  for the control group and  $3.7 \pm 7.7$  for the test group ( $p=0.81$ ). No clinically or statistically significant differences were found in tests designed to evaluate cognitive performance or physical functions. Vital signs taken multiple times were also similar between the test and control groups.

## CONCLUSIONS:

Executive, cognitive, and physical functions were well preserved after whole blood donation in healthy blood donors. This study supports the hypothesis that "Buddy transfusion" does not decrease donor combat performance.

# Impact of delayed access to medical care on enhanced use of medical services among asylum-seekers

**Bruria Adini**

*Tel Aviv University, Israel*

**Co-authors:** Maya Siman-Tov, Moran Bodas, Alex Wang, Michael Alkan

## **BACKGROUND:**

Numerous asylum-seekers from Africa that entered Israel through Sinai were exposed to torture or other traumatic events. Most of the asylum-seekers are not recognized as refugees and thus not eligible to routine medical services.

## **STUDY QUESTION:**

To examine the extent and types of healthcare services required by asylum-seekers and correlation between access to medical care to development of post-traumatic stress disorder (PTSD).

## **METHODS:**

Asylum-seekers that entered Israel between 2009–2012, that approached the Open Clinic of Physicians for Human Rights were interviewed to document their experiences while crossing the Sinai desert, their medical conditions, number of clinic visits and types of medical services. Correlations between diagnoses, exposure to stressful events and length of time until presentation to the clinic were examined.

## **RESULTS:**

Higher utilization rates of medical services were identified among male vs female asylum-seekers (24% vs 15% respectively sought >5 visits). Longer stay in Sinai and higher ransom correlated with higher demand for medical care and higher prevalence of PTSD. Asylum-seekers with PTSD compared to other medical conditions used the medical services more times (>5 visits). Asylum-seekers that delayed approach to medical services (> 18 months from arrival) versus those that approached the clinic earlier (<18 months) presented higher prevalence of PTSD (40.5% and 3.4% respectively;  $p < 0.001$ ) and higher use of medical services ( $p < 0.001$ ).

## **CONCLUSIONS:**

Contrary to previous findings, PTSD among asylum-seekers appears to be associated more with length of exposure to stressful events than the number of traumatic events. PTSD may also be associated with delay in receiving medical care. It is vital to examine risk and protective factors of asylum-seekers in relation to access of medical care, to tailor the treatment to their needs and ease their acclimatization in the receiving country. Accordingly, it may be possible to reduce their vulnerability and development of PTSD.

# Anticipating Risks and Limiting Impact: Linking Human Capacity Building with Community Resilience

## Yuval Fuchs

*MASHAV Israel's Agency for International Development Cooperation,  
Former Israel's Ambassador to Georgia, Ministry of Foreign Affairs, Israel*

### **BACKGROUND:**

It is unfortunately expected that the frequency and intensity of natural and man-made disasters will increase in years to come, exacerbated, among others, by climate change, environmental degradation, population growth, and rapid and unplanned urbanization. As a direct outcome of these global growing threats, community resilience, the sustained ability of a community to withstand and recover from adversity, has become a key policy issue and a goal both at the state and the local levels.

### **STUDY QUESTION:**

Strengthening resilience is one of the pillars of development presenting a unique intersection between emergency preparedness and management. While building up capacities for immediate humanitarian response continues to be a priority for all countries, a need arises for placing more attention on the implementation of strategies and actions prior to disasters, as well as adopting a more comprehensive approach to building national capacities in emergency preparedness and response.

### **METHODS:**

MASHAV designs and implements professional activities in this field, characterized by a long-term and holistic approach, and based on three modalities: Establishing trauma units (ICUs); National capacity building programs in disaster preparedness and response; and Humanitarian assistance.

### **RESULTS:**

MASHAV in consultation with fellow nation's governments, established trauma and intensive care units in Togo, Guinea and Tanzania. A National Capacity Building Programs in Disaster Preparedness and Response' is being conducted in Liberia. MASHAV is the body responsible for coordinating the State of Israel's official humanitarian assistance program. Drawing on Israel's vast experience in crisis response and field medicine.

### **CONCLUSIONS:**

Focusing on human capacity building and community resilience, and joining the international community's efforts of implementing the 2030 Development Agenda, MASHAV, Israel's Agency for International Development Cooperation, shares with developing nations the extensive experience accumulated in Israel in the field.

# The National Emergency Medical Service (NEMS) Project: implementing the first prehospital emergency medical system in Sierra Leone

**Marta Caviglia**

*CRIMEDIM – Research Centre in Emergency and Disaster Medicine, Italy*

**Co-authors:** Luca Ragazzoni, Paolo Rosi, Federico Merlo, Francesco Della Corte, Giovanni Putoto

## **BACKGROUND:**

Sierra Leone is one of the least developed low-income countries, slowly recovering from the effects of a devastating civil war and the Ebola outbreak. The health care system is characterized by chronic shortage of skilled human resources, equipment and essential medicines. Moreover, the referral system is weak and vulnerable, with 75% of the country having insufficient access to essential health care. Consequently, Sierra Leone has the highest maternal and child mortality rates in the world. The National Emergency Medical Service (NEMS) project aims to create the first emergency medical system in the Country. A Joint Venture of Doctors with Africa CUAMM (CUAMM), Veneto Region and Research Center in Emergency and Disaster Medicine (CRIMEDIM) was developed to support the Ministry of Health and Sanitation in designing and managing the NEMS system.

## **STUDY QUESTION:**

The implementation of NEMS system increases access to health care.

## **METHODS:**

The operational and logistical aspects of the NEMS project are supported by CUAMM, with technical and administrative resources, and Veneto Region, in charge of assisting the day-to-day operations. The in-service training program for prehospital healthcare providers is developed and delivered by CRIMEDIM.

## **RESULTS:**

In October 2018, the first training sessions were delivered in the district of Pujehun. Progressively, in a timeframe of six months, all the 14 districts have been trained and made operational. From the 27th of May 2019, the NEMS system is operative at national level, with 80 ambulances dispatched on the ground and 439 paramedics and 433 ambulance drivers. A total number of 11035 emergency calls, 10675 missions and 9353 referrals have been handled by the NEMS service.

## **CONCLUSIONS:**

After six months of activity, the implementation of the NEMS system has guaranteed the evaluation, stabilization and transport of 9353 patients to district hospitals.



# Pre-hospital Buprenorphine: A novel initiative to address an epidemic or a method to increase resiliency?

**Deena Wasserman**

*Cooper University Hospital, USA*

## **BACKGROUND:**

Mass casualties and disasters are becoming more commonplace around the world, whether man-made or natural. Proper preparedness is essential to effective response in such disasters. Full scale drills are expensive, time consuming, and require significant resource utilization and buy-in from many departments. Tabletop simulation allows for more frequent drills without the intensive resources necessary for a full-fidelity simulation, but can be poor tools to effectively model real-world events.

## **STUDY QUESTION:**

Can a low-fidelity board game model tabletop simulation effectively convey a real-world disaster scenario?

## **METHODS:**

A scenario was developed based on recent real world mass casualty events: a mass shooting at a concert in a nearby venue. Key departments were identified and agreed to participate. The numbers of participants involved was limited to the numbers of providers and other staff that would present in the hospital at the time of the disaster. Game was played on a blueprint schematic of the hospital as the game board, with providers and resources identified by various categories of game pieces, each with limited quantities based on real-world availability. Duration of the game was 30 min and meant to simulate the first 90 minutes of a disaster. Patients were represented as index cards with age, gender, level of alertness and visible wounds on the front of the card. The back of the card added a set of vital signs and a more detailed exam. Providers, resources, and patients were physically moved on the board to show where they would be located during the scenario.

## **RESULTS:**

Twenty-one physicians from the emergency and trauma departments and nine personnel from nursing and administration participated in the drill. All participants stated they would participate in a similar drill in the future. Qualitative feedback included finding the drill educational with an easy to understand format, and more interactive than a simple tabletop exercise.

## **CONCLUSIONS:**

Frequent drills are integral in ensuring appropriate preparation for disasters. Turning tabletop sim into a scale-able, reproducible game format is an easy and effective method to create low-cost simulation that can be used to better teach adequate response in disaster scenarios.

# A Checklist to Improve Health System Resilience to Infectious Disease Outbreaks and Natural Disasters

**Diane Meyer**

*Johns Hopkins Center for Health Security, USA*

## **BACKGROUND:**

Resilient health systems are critical to ensuring preparedness for all hazards, including infectious disease outbreaks, mass casualty events, and natural disasters. When fragile and vulnerable health systems are overwhelmed during emergencies it can amplify their negative effects and worsen the human, economic and political tolls. However, little guidance exists on how to build and maintain health system resilience against these crises.

## **STUDY QUESTION:**

What specific capacities should health system actors – including health facilities, clinicians, and policymakers – invest in to build health systems that are resilient to infectious disease outbreaks and natural disasters?

## **METHODS:**

A literature review and subject matter expert interviews were completed to identify 1) what capacities are needed to ensure a robust health system response to a crisis and 2) existing efforts to define and qualitatively measure health system resilience. These efforts informed the creation of a Health Systems Resilience Checklist and Implementation Guide (“the Checklist”), which was piloted in Bangladesh in partnership with icddr,b in March 2019. During the pilot exercise, stakeholders with detailed knowledge of resilience and health security helped validate the Checklist and prioritize resilience-building activities for health system actors in Bangladesh to pursue.

## **RESULTS:**

The Checklist is composed of 10 thematic categories: core health system capabilities, critical infrastructure/transportation, financing, barriers to care, communication/collaboration/partnerships, leadership and command, surge capacity, risk communication, workforce, and infection control. Specific capacities are identified within each of these categories, along with the health system actor that would likely be responsible for building said capacity.

## **CONCLUSIONS:**

Health system resilience across multiple domains is critical to executing robust responses to outbreaks, natural disasters, and other priority hazards while also maintaining routine health services. The Health Systems Resilience Checklist is an important first step in conceptualizing and measuring health system resilience to emerging, existing, and evolving threats to health and human security.

## Psychological first aid through the 'SIX Cs model'

**Einav Levy**

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**Co-authors:** Moshe Farchi, Yori Gidron, Eitan Shahaar

### **BACKGROUND:**

The Camp of Preševo, on the Southern border of Serbia, was established by the local authorities as a registration camp to monitor the migration and deliver aid to thousands of migrants have passed through the Balkans in the current migration from the Middle East to Europe. Part of this aid was psychosocial. NATAN, an Israeli non-governmental organization delivered psychosocial support to the migrants using the 'SIX Cs model'. This model focuses on cognitive and behavioral components and is based on the neuropsychology of trauma & resilience.

### **STUDY QUESTION:**

What are the ways in which the SIX Cs model can be used within a humanitarian context?

### **METHODS:**

The element of cognitive-communication was implemented through information and orientation, which was given to the migrants by a staff member. The component of control was implemented by stimulating the migrants' ability to take independent decisions through inquiring what they would like to do during their time within the camp. The staff members recommended to the adult migrants various practices concerning how they could go through their journeys with a better understanding of their next phase.

### **RESULTS:**

Models of PFA exist with the intention of addressing urgent needs, including stress-related issues among forced migrants. However, other PFA interventions tend to individuals in dire contexts possibly as victims and thus emphasize the provision of empathy and support. In contrast, the SIX Cs intervention tries to shift perceptions of those people as active coping individuals.

### **CONCLUSIONS:**

1. The SIX cs model is easy to administer and relevant also for short interventions, subject to adaptations.
2. The simplicity of the SIX Cs model enabling the beneficiaries to use the core elements of PFA without therapists.
3. Beneficiaries can apply it in a variety of contexts of emergencies, to promote resiliency and self-efficacy.

## Lessons learned on community and school disaster risk reduction

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### Tin Tun Aung

*Myanmar Red Cross Society, Myanmar*

**Co-authors:** Win Lei

#### **BACKGROUND:**

The Myanmar Red Cross Society is the largest humanitarian organization in Myanmar providing support to thousands of people affected by disasters every year. Since 2010, the Myanmar Red Cross Society is implementing community-based disaster risk reduction and school based disaster reduction activities in various parts of the country.

#### **STUDY QUESTION:**

What are the key methods and ways to enhance disaster risk reduction at the community and schools of Myanmar? What are the key lessons learned from years of experience of such disaster risk reduction activities in Myanmar?

#### **METHODS:**

Several lessons learned exercises and internal and external evaluations of the community and school-based programs and projects implemented by the Myanmar Red Cross Society have been undertaken. The oral presentation will allow to share a distilled and analyzed learning from such learning efforts carried out over the years.

#### **RESULTS:**

The key messages to be shared in the paper, among others are: 1. Introduction of the Myanmar Red Cross Society 2. Community based disaster risk reduction framework and program design of the Myanmar Red Cross Society 3. Key lessons learned to enhance the effectiveness of community based disaster risk reduction and school based programs. Some of these lessons are to i) develop a strong linkage between the school and community level activities ii) train the children to be effective Disaster Risk Reduction (DRR) champions within their families iii) ensure sustainability and community ownership is inbuilt in such programs.

#### **CONCLUSIONS:**

Results of effective community based disaster risk reduction and school based disaster risk reduction programs can be significantly enhanced by incorporating the lessons learned over the years. Such programs contribute significantly to the disaster preparedness and risk reduction efforts at the country level.

# Do you teach the way they learn? Adapting casualty care education to Millennials and Gen Z'ers

**Avishai Tsur**

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**Co-authors:** Roy Nadler, Nadav Haddad, Elon Glassberg, Jacob Chen, Avi Benov

## **BACKGROUND:**

Millennials and Gen Z'ers (MGs) have challenged the education system and the work environment. They are considered digital natives, with a short attention span, a need for immediate feedback, and a preference for flat organizations. Hierarchical military and medical organizations are slow to adapt. The Trauma and Combat Medicine Branch (TCMB) of the Israel Defense Forces (IDF) Medical Corps oversees continuing combat casualty care education of Advanced Life Support (ALS) providers – its physicians are mostly millennials, and its paramedics are mostly Gen Z'ers. In order to adapt: (a) We have made clinical practice guidelines available on a dedicated smartphone app; (b) we have initiated WhatsApp mass-groups for paramedics and physicians to allow questions, direct communication, and clinical discourse; (c) we have continuously distributed each Friday a “Doctrine Discourse” with clinical pearls via the groups, limited to 300 words; and (d) all TCMB officers have been taking an active part in answering questions, giving feedback, and discussing ideas.

## **STUDY QUESTION:**

We aimed to assess key indicators of audience engagement in those digital channels.

## **METHODS:**

Data from various digital sources were gathered together. App analytics (Apple developer and Google Play Console) were used to extract data regarding the branch dedicated app downloads, active devices, and conversion rate. Instant messaging analytics (Chat analyzer) was used to extract data from three WhatsApp groups, including the overall number of participants and active days. Data from two quarterly online quizzes (Google Forms) were used to assess the trends in audience engagement. Finally, a questionnaire (SurveyMonkey) was distributed to rate learning channels on a five-level Likert scale.

## **RESULTS:**

Overall, 1,558 app downloads, 267 WhatsApp groups members, 165 answers to the second quiz, 162 responses to the questionnaire, and 67 weekly “Doctrine Discourse” have been recorded. In the WhatsApp groups, the most active day was Friday with 25.78% of the messages, while Saturday was the least active with 1.78% of the messages. In the first quiz, 150 ALS providers participated, of them 82 paramedics (54.67%). In the second quiz, the number of paramedics rose to 102 (61.82%). Of the 124 completing the questionnaire, 68.60%, 53.72%, and 47.11% rated the “Doctrine Discourse,” dedicated app, and the WhatsApp groups, respectively, as very helpful or extremely helpful.

## **CONCLUSIONS:**

This study suggests that catering to the special characteristics of MG physicians and paramedics – such as digital accessibility, flat organizations, immediate feedback, and knowledge tidbits – could result in increased interest, active participation, and awareness to best practices. This innovative model based on direct digital channels could serve to attract, retain, and guide young military ALS providers.

## Preparing for receiving international assistance

### Chaim Rafalowski

*Magen David Adom, Israel*

#### **BACKGROUND:**

The state of Israel situated at the great Africa - Syria rift is prone to a major earthquake. According to the national framework for preparedness, the country is preparing for around 6000 victims with considerable injuries, while sustain considerable damage to the healthcare infrastructure. According to the national contingency plan the state will request Field Hospitals (EMT 2 and EMT 3) in the aftermath of the EQ. Magen David Adom in Israel, being the National Society, member of the International Movement of the Red Cross, will be the liaison for medical resources coming from the RCRC movement. MDA is working closely with the Israeli Ministry of Health Emergency Management Division to prepare for receiving the international assistance.

#### **STUDY QUESTION:**

What are the steps needed to prepare in Israel for better receiving medical units from the RC following a disaster?

#### **METHODS:**

A series of workshops, some of them with the participation of Red Cross field hospitals, with ICRC representatives, and from the Israeli side, with the respective medical associations, nursing division and hospital managements were conducted. As a result a detailed plan of action has been created.

#### **RESULTS:**

The following key aspects have been identified:

1. The term “field hospital” is understood in many different ways, thus the “receiving end” has to be educated on the capacities and the needs of the arriving units.
2. Hospitals need to plan for receiving a field hospital to support their activities (physically and in terms of procedures).
3. “Nursing in austere environments” is a set of skills that is no longer of the curricula in nursing schools.
4. Major differences in the scope of practice of health care professionals (especially nurses).
5. Import permits for medical equipment and especially drugs are specific and require understanding.

#### **CONCLUSIONS:**

The following processes have been initiated with the Ministry of Health Emergency Management Division:

1. Working with the management of hospitals, planned (according to the national contingency plan) to receive field hospitals, so they have a dedicated contingency plan to deploy a field hospital in their premises.
2. Working with the Nursing Division in the MoH on nursing schools on a “nursing in austere environments” curriculum.
3. Working with the customs authority and other government agencies on the permit and emergency procedure, allowing medical equipment, supplies and drugs to enter the country.

# Breaking the Code: Transitioning from Color Codes to Plain Language

**Curt Harris**

*University of Georgia, USA*

**Co-authors:** Kelli McCarthy, Raymond Swienton, Lindsay Flax, Jim Zerylnick, Kelly Klein, Alyssa Ragan

## **BACKGROUND:**

The coding system in hospitals is designed to be a public warning tool to increase situational awareness for staff members regarding current, or potential, issues and threats to the facility. However, many healthcare facilities struggle with conveying the most basic of information to staff members when codes are paged via the public-address system. The primary reason for this struggle is the use of non-standardized codes (i.e. color codes) to describe the emergency.

## **STUDY QUESTION:**

What are barriers to implementing plain language codes? Do clinical and non-clinical staff understand disaster codes when paged overhead?

## **METHODS:**

IRB approved survey, observational and relevant literature review

## **RESULTS:**

There is an overwhelming need for additional training and education on disaster coding systems in healthcare settings. Both clinical and non-clinical staff were woefully deficient in their understanding of what the codes meant and what their actions were to be following the code. However, when asked at the end of the survey whether or not the facility should switch to plain language, the vast majority said NO!

## **CONCLUSIONS:**

It is time that healthcare facilities in the United States utilizing antiquated communication methodologies give strong consideration to updating their protocols to plain language. By using plain language, the facility can increase response times, improve response outcomes, and generate a force multiplier via visitors and patients leading up to/during a disaster. Most facilities that continue to use plain language do so under the assumption that personnel understand the system or fear that using plain language will generate panic in certain situations. There is significant evidence that the assumption of panic is a myth and that people are actually more willing to help when they are informed of the situation.

## New trends in terror-related injury mechanisms: is there a difference in injury severity?

**Michael Rozenfeld**

*National Center for Trauma and Emergency Medicine Research  
Gertner Institute for Epidemiology and Health Policy Research, Israel*

**Co-authors:** Adi Givon, Avraham Rivkind, Miklosh Bala, Kobi Peleg

### **BACKGROUND:**

The latest wave of terror saw significant usage of mundane, "low-tech" objects, such as utility knives and civilian vehicles by the terrorists. How do the injuries they produce compare to more conventional terror mechanisms, such as use of firearms and explosives?

### **STUDY QUESTION:**

To compare injury patterns of most frequent terror-related injury mechanisms.

### **METHODS:**

A retrospective study of 1,858 patients hospitalized due to terror events recorded in the Israeli National Trauma Registry between January 1997 and December 2016. The events were divided into four groups, based on used weapon: explosions, shootings, stabbings and vehicular attacks. The groups were compared in terms of sustained injuries, utilization of hospital resources and clinical outcomes.

### **RESULTS:**

Explosion-related and vehicular terror victims had a higher proportion of multiple injuries, stabbings and shootings mostly led to isolated injuries. Victims of vehicular attack were characterized by a high proportion of severe head injuries, while stabbing events caused a high volume of vascular injuries. All mechanisms involved significant damage to extremities, however among stabbing victims those were mainly the upper extremities, while vehicle attacks mostly targeted lower extremities. The overall injury severity of compared groups was very similar, leading to similar levels of intensive care consumption and resulting inhospital mortality. Certain similarities in victims characteristic were observed between the shootings and stabbings and between explosions and vehicular attacks.

### **CONCLUSIONS:**

Despite differences between various terrorist attack mechanisms, the resulting injury severity and in-hospital mortality are very similar, with stabbings and vehicle attacks causing injuries as serious as those caused by conventional weapons.



# Stop The Bleed: Tourniquet application rates and outcomes following the introduction of the CAT

**Avishai Tsur**

*The Trauma and Combat Medicine Branch, IDF, Israel*

**Co-authors:** Roy Nadler, Jacob Chen, Maya Siman-Tov, Irina Radomislensky, Kobi Peleg, Avi Benov

## **BACKGROUND:**

Tourniquets have been shown to substantially reduce mortality from limb injuries, resulting in a surge of tourniquet education programs for immediate responders. However, the success of most programs has not been evaluated in the long term. The Israel Defense Forces Medical Corps program "My Brother's Keeper": (a) introduced advanced arterial tourniquets, (b) distributed tourniquets to every combat soldier – both active duty and reserves, (c) implemented a comprehensive education and training program, and (d) encouraged the liberal use of tourniquets for limb injuries. The program was fully implemented at the end of 2013 with the Combat Application Tourniquet (CAT Resources, Rock Hill, SC) as the standard-issue tourniquet.

## **STUDY QUESTION:**

This study's objective was to evaluate the success of the program and its effects on rates of tourniquet applications, complications, and outcomes.

## **METHODS:**

Two databases were merged: The Military Trauma Registry, which includes all injured treated by military teams, and The Israeli National Trauma Registry, which includes data on hospitalized casualties. The population of this study consisted of extremity casualties treated by military teams and hospitalized in one of the 20 hospitals who participate in the trauma registry. Two periods were defined: 2006–2013 "pre-intervention period" and 2014–2015 "post-intervention period." The study compared tourniquet application rates per extremity injury, demographics, injury data, vital signs, and outcomes between the two periods

## **RESULTS:**

A total of 1,578 extremity injuries were extracted between 2006 and 2015. Of them, 320 (20.3%) from 2014–2015. The post-intervention period did not differ in comparison to the pre-intervention period in sex, age, and injury severity score. Tourniquet application rates were higher in the post-intervention period (22.8% vs 5.5%,  $p$ -value  $< 0.001$ ). In the emergency department, systolic blood pressure was higher, and pulse was lower (122.4 vs 119.3,  $p < 0.001$ , 72.8 vs 74.2,  $p = 0.048$ , respectively). Rates of complications in tourniquet use and outcomes were similar between the two periods: in-hospital wound treatment (26.9% vs 22.9%,  $p = 0.155$ ), in-hospital amputation (1.6% vs 1.6%,  $p = 1.000$ ), outcome of death or rehabilitation facility (18.4% vs 16.4%,  $p = 0.425$ ).

## **CONCLUSIONS:**

"My Brother's Keeper" successfully increased tourniquet application rates while not aggravating complications and outcomes. The study's data suggest a slight improvement in vital signs correlated with increased prehospital tourniquet use.

## Clowns in crisis zone missions – where there are no words there can be smiles

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### Nimrod Eisenberg

*Dana Children's Hospital, Creative Consultant in 'Dream Doctors' – Israeli Medical Clowns Organization, Emotional support staff in IDF – Field Hospital, Israel*

Dream Doctors, founded in 2002, operates 110 clowns in 29 hospitals in Israel as well as running special projects of education, research, aid in therapy and crisis zone missions.

After collaborating in the 2015 Nepal earthquake mission, DD clowns were accepted as official staff in the IDF Field Hospital, taking part in all training in Israel and the 2018 MODEX in Romania.

Today a team of clowns is part of the IDF-FH mental health department as emotional support professionals, bringing art therapy techniques and clown methods to:

1. Aid in therapy – Reducing stress and anxiety in patients' emotions, allowing for better motivation and cooperation during procedures.
2. Helping the Helpers – Addressing burnout and trauma among the medical team while in the field through playfulness and creativity.
3. Mediation – Using nonverbal communication to bridge across cultural barriers between the medical team, patients, and families during missions.

# The Pediatric Disaster Mental Health Intervention: A Guide for Primary Care Providers

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**Arthur Cooper**

*Center for Pediatric Emergency Management at Maimonides Medical Center, USA*

**Co-authors:** Arthur Cooper, John Jermyn

## **BACKGROUND:**

Pediatric Disaster Mental Health Intervention (PDMHI) was developed in response to “Superstorm Sandy”. The objective was to develop training for primary care providers in PDMH and study its impact on the trainees. The effects of a disaster on mental health can persist after the physical problems from the event have passed. The pediatric population is often over-represented in disasters and prone to serious mental health disorders.

## **STUDY QUESTION:**

Can pediatric primary care providers benefit from training in Pediatric Disaster Mental Health problem recognition, treatment and referral, as well as working in disaster zones?

## **METHODS:**

A faculty of experts in pediatric mental health, psychiatry, psychology, and disaster preparedness was convened to develop the PDMHI curriculum. They developed a four-hour intervention to equip health care providers with the skills necessary to care for children with disaster related mental health problems via intervention evaluation, triage, and referral.

## **RESULTS:**

Three training sessions were held. 67 providers were trained; pre/post-tests measured knowledge before and three months post intervention. 62.5% of primary care providers made changes to their practice. 92% felt better equipped to identify, treat and refer patients. 81% would be willing to work in a disaster zone.

## **CONCLUSIONS:**

PDMHI covers psychosocial responses to disasters from normal to mental health disorders. Participants gained tools for managing pediatric mental health issues in primary care. Data showed an increase in the participants perceived knowledge and skills about pediatric disaster mental health and their willingness to participate in future disasters. This training can potentially mitigate against pediatric disaster related mental health issues and provide useful knowledge about working in disaster zones.

# Psychological Support at Brumadinho Disaster

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**Fabio Racy**

*Hospital Israelita Albert Einstein, Brazil*

**Co-authors:** Olavo Santanna Filho, Daniela Lopes, Jefferson Mizutani, Dov Smaletz

## **BACKGROUND:**

On January 25, 2019, “Córrego do Feijão” dam from “Vale” mining company broke down in Brumadinho, Brazil. The volume of mud that came down was 12,7 millions of cubic meters, reaching around 3 thousands square kilometers, including 90 kilometers over the Paraopeba River. In the days following this disaster, about 300 people were missing. The population suffered an important emotional impact due to the loss of so many lives.

## **STUDY QUESTION:**

Psychological support to the victims was performed and its results will be presented. The mission lasted 3 weeks and was developed by Hospital Israelita Albert Einstein (HIAE), Sao Paulo – Brazil.

## **METHODS:**

On January 28, Vale company requested help to HIAE to assist the affected community. A team of Psychologists specializing in emergency and disaster has been assembled which aim was not only support the survivors and relatives of the victims who had died or were missing, but also to guide local health professionals, sensitize educators and train local psychologists to better deal with that situation.

## **RESULTS:**

2,073 people were reached between employees from Vale company, public schools educators, local psychologists and from Vale company, local health professionals and the affected population.

## **CONCLUSIONS:**

The role of psychologists specializing in psychological support for emergencies and disasters was important given the impact on the community where about 1.67% of the population died, leading to lasting collective suffering. The aim of this team was to mentor local professionals (health and education) besides to guide and provide the local community with a resumption of life, collectively decompress those who experienced the disaster and prevent the development of Post Traumatic Stress Syndrome.

# Use of Community Assessments for Public Health Emergency Response (CASPER) to assess behavioral and mental health during disasters: The U.S. Virgin Island Hurricanes Irma and Maria response and recovery effort

**Amy Helene Schnall**

*Centers for Disease Control and Prevention (CDC), USA*

## **BACKGROUND:**

Two Category 5 storms hit the U.S. Virgin Islands (USVI) within two weeks during the 2017 hurricane season. Loss of power, poor living conditions (e.g., homes without roofs), continued rain, and damage to critical infrastructure (e.g., transportation, water, healthcare) led to major public health concerns, including short- and long-term mental health impacts. While the Community Assessment for Public Health Emergency Response (CASPER) is well-established in the United States to determine the needs and health status of the community, it is increasingly being piloted to assess mental and behavioral health.

## **STUDY QUESTION:**

What were the mental health impacts of the 2017 hurricane season on USVI residents?

## **METHODS:**

The USVI Department of Health conducted CASPERs between November 2017–October 2019 to assess disaster impact, including behavioral health, during the response and recovery phases. CASPER is a cluster sampling technique designed to gather household-based information from a community in a timely manner.

## **RESULTS:**

In the first three CASPERs, approximately one-third of households reported having trouble sleeping and approximately 20% reported difficulty concentrating, agitated behavior, and loss of appetite. Immediately after the hurricanes, 18.1% of respondents indicated that their mental health was “not good” for 14 or more days in the past month, which declined to 7.5% by May 2019; however, the decline was not significant. Few households (6.2%–12.4%) reported receiving behavioral health services throughout all CASPERs.

## **CONCLUSIONS:**

The CASPERs provided the USVI with information on the behavioral and mental health impact of the hurricanes and illustrated the evolving needs of the community and the progression of the recovery process. Although households reported signs of having mental health issues, few indicated they received behavioral health services.

# Assessing and Improving the Performance and Reliability of Disaster Teams

**Paul Barach**

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**Co-authors:** Donald Donahue

Deficiencies in disaster management teamwork skills have been shown to contribute to the occurrence of organizational failures, and adverse events during disaster management. Due to the sporadic and potentially catastrophic consequences of errors in disasters, the environment has been described as a low-reliability organization. However, simply bringing individuals together to perform a specified task does not automatically ensure that they will function as a team. Trauma teamwork depends on a willingness of clinicians from diverse backgrounds to cooperate toward a shared goal, to communicate, to work together effectively, and to improve. Each team member must be able to: (i) anticipate the needs of the others; (ii) adjust to each other's actions and to the changing environment; (iii) monitor each other's activities and distribute workload dynamically; and, (iv) have a shared understanding of accepted human factors, processes, and the knowledge of how events and actions should proceed.

Teams outperform individuals especially when performance requires multiple diverse skills, time constraints, judgment, and experience. This talk will discuss 15 years of research, and 12 peer reviewed papers on TeamSTEPPS program, the highly validated and internationally widely used team training program that shows the power of team psychological safety- a shared belief held by team members that the team is safe for interpersonal risk taking can have a huge impact on learning and performance by disaster teams. Nevertheless, most people in disasters overlook team-based opportunities for improvement because training and infrastructure are designed around individuals. Teams with clear goals and effective communication strategies can adjust to information with speed and effectiveness to enhance real-time problem solving. Individual behaviors change more readily on a team because team identity is less threatened by change than are individuals. Behavioral attributes of effective teamwork learned on the trauma team, including enhanced interpersonal skills, can extend to other clinical arenas.

Turning disaster experts into expert teams requires substantial planning and practice. There is a natural resistance to move beyond individual roles and accountability to the team-mindset. One can facilitate this commitment by: (i) fostering an honest awareness of each member's tasks and roles on the team through cross-training and other training modalities; (ii) training members in adaptive teamwork skills such as communication, situation awareness, leadership, ethical-followership, resource allocation, and adaptability; (iii) conducting team training in simulated scenarios with a focus on both team behaviors and technical skills; (iv) training team leaders in the necessary leadership competencies to build and maintain effective teams; and, (v) establishing and consistently utilizing reliable methods of team performance evaluation and rapid feedback.

# Preparing the Nation for Response to a Highly Pathogenic Infectious Disease: A Public-Private Partnership

**Jack Herrmann**

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**Co-author:** Christopher J. Kratochvil

The mission of the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR) is to save lives and protect Americans from 21st century health security threats. ASPR leads the nation's medical and public health preparedness for, response to, and recovery from disasters and public health emergencies. ASPR collaborates with hospitals, healthcare coalitions, biotech firms, community members, state, local, tribal, and territorial governments, and other partners across the country to improve readiness and response capabilities. The University of Nebraska Medical Center/Nebraska Medicine (UNMC/NM) serves as an example of a successful public-private partnership with ASPR. UNMC/NM, in collaboration with ASPR, has developed multiple synergistic initiatives supporting ASPR's mission, including a National Quarantine Center, a training facility for use by the National Disaster Medical System, a pilot Regional Disaster Health Response System, and the National Ebola Training and Education Center. Together, ASPR and UNMC/NM are developing resources, infrastructure, and regional models in order to advance national preparedness and response.

# Preparing a tertiary medical center for a biologic outbreak

**Dagan Schwartz**

*Rabin Medical Center, Israel*

**Co-authors:** Michal Hayat, Dorit Nagar, Ram Sagei

## **BACKGROUND:**

Hospitals worldwide are faced with the need to be prepared for extreme unexpected patient influx due to man-made and natural disasters. Since such events are rare, planning an appropriate response and disseminating it to all relevant employees is challenging. Additionally, it may be difficult to assess for planning oversites and deficiencies. To partially overcome these challenges, large scale pre-planned realistic drills can be conducted.

## **STUDY QUESTION:**

How can a pre-planned large-scale biologic scenario drill improve a hospital's preparedness for such an emergency?

## **METHODS:**

A detailed description of the planning and preparation methodology for a large-scale biologic outbreak and the after-action review and recommendations elucidated from both the exercise and the preparatory stages.

## **RESULTS:**

As part of the national multi-year hospital disaster preparedness program, a large-scale infectious disease outbreak exercise was performed at Beilinson medical center. The drill followed 6 months of preparations, which included revisions to the hospital's bio-preparedness protocols, Internal training sessions reaching over 600 hospital employees and mini-exercises. The major exercise utilized 75 simulated patients, multiple EMS vehicles and 25 reviewers from the Ministry of Health, the Home front Command and relevant managers from similar sized hospital that had undergone a similar training cycle 6 months earlier. The exercise was geared to initiate reports of suspected cases from within the hospital and combine them with reports of similar case presentations in other area hospitals and to write case definitions for suspected as harbouring the disease.

Following the identification of a suspected outbreak the hospital activated its biologic emergency protocol which included the setup of a biologic emergency care hub and designated in-patient departments for suspected cases. Following the drill and extensive after action reviews the following comments and recommendations were made: Staff activation and ED evacuation were rapid and efficient. The biohazard designated ED and in-patient sites were rapidly deployed. The initial planning was to rotate the Personnel working in these sites with protective gear every 2 hours, but during the actual drill they described exhaustion and decreased ability to function effectively already after one hour, thus leading to changes in the protocol and an updated calculation of the number of personnel and protective gear kits needed.

## **CONCLUSIONS:**

Preparing a hospital for biologically mediated outbreaks is a great challenge. Preparing for and performing large-scale realistic exercises can significantly help promote preparedness and identify planning, infrastructure and personnel deficiencies.



## Biodefense: A Case Study

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### Leonard Cole

*Rutgers New Jersey Medical School, USA*

#### **BACKGROUND:**

Introduction The 2001 anthrax attacks via the United States mail sharply increased awareness about the threat of bioterrorism. In 2015, a newly-formed body, the Blue Ribbon Study Panel on Biodefense, assessed “how much has been done to address the biological threat and what remains undone.” The Panel concluded that despite progress, “the nation is dangerously vulnerable to a biological attack.”

#### **STUDY QUESTION:**

This paper reviews the status of the Panel’s recommendations in its “National Blueprint for Biodefense” (2015).

#### **METHODS:**

Methods The Panel’s actions, assessments, and recommendations are recapitulated. The information was drawn from previous research efforts and reports, other programs related to biodefense, and meetings with relevant agencies and experts.

#### **RESULTS:**

Results The Panel’s Blueprint included 33 recommendations and action items. They range from government organizational restructuring - “Establish a Biodefense Coordination Council at the White House” - to enhancing preparedness and response capabilities - “Prioritize . . . medical countermeasures among all federal stakeholders” and “Establish a biodefense hospital system.” Recommendations for enhanced biodefense in other reports have often languished, but features of the Blue Ribbon Panel suggest greater chances for fulfillment.

#### **CONCLUSIONS:**

Conclusions The bipartisan Panel is composed of distinguished public figures. Its chairs are Joseph Lieberman, former head of the Senate Homeland Security Committee, and Tom Ridge, the first Secretary of Homeland Security. The other Panel members are also widely recognized leaders who have kept the issue in the forefront by sustained advocacy at congressional hearings and other public forums. Additionally, the Panel has introduced innovative messaging. In 2019 it injected a sense of urgency by calling for “A Manhattan Project for Biodefense.” It also promoted a 40-page comic book by novelist Max Brooks, titled *Germ Warfare: A Very Graphic History*. The book is available on-line at no charge. Such innovative advocacy and the Panel’s determined leadership and staff, are abetted by dozens of expert consultants.

## Hidden genomic engineering and potential data poisoning in publicly available life sciences reference databases

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**Sterling Thomas**

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**Co-authors:** Tyler Barrus

The CBRNE defense community utilizes scientific data for many analytical activities including modeling, RDT&E, and CONOPs. One such data set is the NCBI genomic sequence database housed by the US NIH NLM. NCBI stores “reference genomes” that have been sequenced by labs, governments, or universities. The scientific community has been using these databases for pathogen and toxin identification since their inception. As semi-automated and automated methods for identification and attribution of pathogens are deployed, it is critical to know if each genomic sequence is truly a “reference sequence” or if there are engineered sequences, or sequences that were modified by humans or because of humans. Additionally, the nature of these databases, and how data is deposited, introduces significant “data poisoning” risk. Data poisoning is a new type of cyber-attack where data is deposited into a reference dataset to obscure identification, attribution, or the behavior of machine learning classifiers.

The CBRN community needs to scrutinize and secure datasets that are used for pathogen identification and attribution. New standards for validation need to be introduced that include evolutionary modeling to correctly label what organisms have been engineered.

# HHS Region IV Operation Wesley Exercise Program - Enhancing Multi-State Ebola Preparedness Via Multi-Organization Functional and Full-Scale Exercises

**Kelli McCarthy**

*University of Georgia Institute for Disaster Management, USA*

**Co-authors:** Curtis Harris, Alyssa Ragan, Jim Zerylnick

## **BACKGROUND:**

Following the 2014 Ebola Outbreak, the Georgia Department of Public Health formed the Georgia Infectious Disease Network (IDN) to train, equip, and coordinate healthcare facilities and EMS agencies to identify, isolate, and inform when presented with a highly infectious disease (HID) patient. Five years later, the number of course offerings and clinical providers choosing to participate in Ebola Virus Disease trainings/exercises have significantly decreased. This is especially significant for frontline providers who are not as immersed in highly infectious disease preparedness as are assessment and treatment facilities.

## **STUDY QUESTION:**

Is HHS Region IV capable of coordinating processes, capabilities, and equipment needed to support intra - and interstate highly infectious disease (HID) patient movement operations?

## **METHODS:**

A Homeland Security Exercise and Evaluation Program (HSEEP) compatible exercise program including a non-traditional tabletop exercise and a five-day full-scale exercise.

## **RESULTS:**

The HHS Region IV Operation Wesley Exercise Program tested the ability of HHS Region IV Frontline (Tier III), Assessment (Tier II), and Treatment (Tier I) facilities and their associated response partners to respond to patients presenting at various facilities with clinical symptoms of Ebola Virus Disease (EVD) and suspect travel history. Coordination and interplay between the multiple agencies, jurisdictions, and emergency response disciplines was evaluated and revealed several strengths and opportunities for improvement in Tier III (Frontline), Tier II (Assessment), and Tier I (Treatment) facilities' responsibilities and response to a patient with suspected EVD.

## **CONCLUSIONS:**

The HHS Region IV Operation Wesley Tabletop Exercise Program provided an opportunity for HHS Region IV partners to review and exercise individual facility/agency HID response plans, state-level EVD coordination and transport plans, and the HHS Region IV EVD Coordination and Transportation Plan.

# Biological Risk Management in Health Care

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**Meret E. Ricklin**

*Emergency department, University Hospital of Bern, Switzerland*

## **BACKGROUND:**

The emergency department (ED) of the university hospital of Bern, Switzerland, has a catchment area of two millions inhabitants and sees yearly 50'000 patients. It is well prepared for trauma patients, but is not sufficiently prepared for biological events. For example, health care professionals (HCP) are only partially trained and processes about biological incidents defined by other emergency organizations so far exclude the ED. Furthermore, although in the Bern area many institutions including laboratories operating at biosafety level 3, reference labs, specialists for veterinary and environmental pathogens, as well as federal and cantonal institutes for public health and veterinary medicine are present.

## **STUDY QUESTION:**

can we improve our preparedness, coordinate the scattered knowhow, bundle the activities in biological risk management and make accessible the available knowledge to the people working in the field?

## **METHODS:**

For these reasons, we established the Biological Risk Management Network. The Network is located at the Swiss Institute for Translational and Entrepreneurial Medicine (sitem-Insel) under the patronage of the university ED and the Institute of Infectious Diseases (IFIK). The network coordinates knowledge in the fields of biological risk management.

## **RESULTS:**

We establish contacts to organizations and institutions in- and outside of the campus on a regional and national level. In collaboration with the federal police, we are establishing factsheets about biological incidents, with a focus on fieldwork. Furthermore, we are establishing, in collaboration with the sitem-insel school and other Swiss faculties, teaching modules to sensitize and educate HCP, staff of emergency organizations and lab personnel. In order to make existing knowledge available we are establishing a mobile app informing about handling contagious samples and people and providing a knowledge- and contact-database.

## **CONCLUSIONS:**

Conclusion: With this, we will improve our preparedness for future biological incidents and improve safety of HCP, patients, families, the population and the environment.

## Is Simulation Training an Effective Approach for Disaster Response?

### Jorie Klein

*Senior Director, Trauma, Emergency Department, Urgency Care, Disaster Management  
Parkland Health & Hospital System, USA*

Parkland Health & Hospital System is a county hospital located in Dallas, Texas. Parkland is a Level I Trauma Center, Verified Burn Center, and a Comprehensive Stroke Center. The emergency department evaluates approximately 266,000 patients annually and employs 480 nurses, techs, and health unit clerks (HUCs). The emergency department has a turn-over rate of 13%, and a current vacancy rate (Fall of 2019) 12%. The volume and staffing needs create a challenge in keeping staff knowledgeable of the disaster response procedures. A staff survey initiated on September 2, 2019 identified that 67% of the staff had not attended training specific to their role in a disaster response. A disaster response simulation board was created to facilitate the emergency response training. Disaster response notification, incident command, changes in staffing patterns, unidirectional flow, emergency equipment, and disaster standards of care, were the focus of this training along with staff roles and responsibilities. Three specific response drills were integrated into the simulation training: emergent evacuation, mass casualty response, and active shooter response. Nurses, techs, and HUCs participated in the training. Each individual placed themselves on the board and responded to each simulated event. Twenty-eight classes were held. One-hundred eighty staff members completed the training (37% of staff). On November 2, 2019, a live-full exercise of an aircraft crash at the local airport was conducted. Parkland received twenty-eight casualty patients. The immediate debrief from the treatment areas identified that staff who attended the simulation training knew their role and the processes implemented for disaster response. The immediate debriefing identified that staff were familiar with the following:

- ♦ Disaster notification process.
- ♦ Staffing changes
- ♦ Patient triage process
- ♦ Location of the disaster equipment
- ♦ POD charge identification vest
- ♦ Need to print current patient census
- ♦ Process to define patients that could be triaged out of the emergency department or moved to an alternate location
- ♦ Location of the red, yellow and green treatment areas
- ♦ Disaster standards of care
- ♦ Use of HICS Forms (254, 213, 214)

A follow-up survey was sent to the emergency department staff after the airport full exercise. Staff were asked if they attended the disaster simulation training, did you gain an understanding of the mass casualty response changes the emergency department implements to prepare for casualties. One-hundred four staff members responded to this question. 12% of the responders identified that the simulation improved their knowledge but needed additional training. 41% identified that they had a good understanding of mass casualty response changes, but wanted to participate in additional training. 39% of the responders identified that they have a strong understanding of the mass casualty response changes and would like to be considered as leaders in mass casualty response. Staff were asked if they attended the disaster simulation training, and participated in the November 2nd airport full exercise mass casualty exercise, did the simulation prepare you for the mass casualty exercise. Sixty-six staff members responded to this survey question. Results defined that following:

- ♦ 20% of responding staff identified that the simulation training significantly improved their preparedness for the mass casualty exercise.
- ♦ 47% of responding staff identified that the simulation training improved their preparedness for the mass casualty exercise.

- ♦ 27% of the responding staff identified that the simulation training somewhat improved their preparedness for the mass casualty exercise.
- ♦ 5% of the responding staff identified that the simulation training did not prepare them for the mass casualty exercise.
- ♦ 1% responded that the simulation training did not prepare them for the mass casualty exercise. Staff were asked in their opinion, should the emergency department continue the disaster simulation training. One-hundred fifteen staff responded to this survey question.
- ♦ 51% responded the training should be available to all staff with options for advanced training for identified individuals.
- ♦ 20% responded the training should be available to all staff monthly.
- ♦ 22% responded the training should be available to staff quarterly.
- ♦ 5% responded staff should attend one training annually.
- ♦ 2% responded that they do not think the training was valuable and it should not be continued.

The conclusion from this data and the post debriefings is that the disaster simulation board is an effective training tool for staff disaster response education. It can be done in small groups that allow all individuals to participate and engage and aligns with the principles of adult learning. It is cost effective with the training of approximately 60–90 minutes. The disaster simulation board allows the training to be customized to the specific environment and resources available in any facility.

# Earthquake Preparedness in the Jerusalem Region

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**Felix Lotan**

*Magen David Adom, Israel*

**Co-authors:** Abigail Klein, Roman Sonkin, Eli Jaffe

## **BACKGROUND:**

Israel sits on the Syrio–African rift, leaving it at an increased risk for earthquakes. As Israel's national rescue organization, Magen David Adom's (MDA) employees and volunteers are expected to be called to the disaster zones. MDA has a computerized command and control software with an embedded volunteer management module including their home and work addresses. MDA response to earthquakes is based on division of territories to response "polygons" and mapping of facilities and personnel in the polygon with each having a pre-set meeting point. MDA software allows to map 2000 employees and over 17,000 volunteers and to allocate them to polygons.

## **STUDY QUESTION:**

We seek to assess MDA employees and especially volunteer personnel's preparedness to respond to such events.

## **METHODS:**

An earthquake drill was held for one of the Jerusalem polygon teams on 15/07/19 primarily to assess the knowledge of MDA personnel about their specific polygon and earthquake response. A secondary goal was to refresh their knowledge about the polygon and earthquake response.

## **RESULTS:**

Within 5 minutes of the beginning of the drill, 20% of EMTs and 30% of youth volunteers were on scene. 20 minutes after the drill began, 56% of EMTs and 47% of youth volunteers were on scene. In the 10 minutes following the onset of the drill, reports were made regarding the scope of injuries and damages. At the 26 minute mark, the dispatch center received an accurate size up of the incident in the designated polygon.

## **CONCLUSIONS:**

MDA volunteers and employees are aware of the meeting points and earthquake response protocols. MDA's volunteer management module allows allocation of volunteer resources during routine and disasters enabling rapid and efficient response.

## The 5th Integrated Exercise on Disasters Management in Sao Paulo – Brasil (Public and Private forces working together on plain collaboration)

**Dov Smaletz**

*Hospital Israelita Albert Einstein , Brazil*

**Co-authors:** Fabio Jorge de Castro Racy, Jefferson Kiyoshi Segalla Mizutani, Magda Roberta, Ferreira Tatiana Cristina Gomes dos Santos, Junia Gontijo Boucinhas, Miguel Cendoroglo Neto

### **BACKGROUND:**

As Brasil and specially the state of Sao Paulo has a lack on MCE exercises and preparednes , we promoted Fifth Simulation excercise for Integration of Public and Private forces of the city of São Paulo. THIS YEAR THEME: "Bus accident on a public road, reaching athletes and passersby with multiple victims"

### **STUDY QUESTION:**

Some points were checked: \* how is the engagement and relationship between public/private forces? \* Hospital's recovery/disaster plan needs improvement? \* Can trestles improve and make triage faster? \* SAMU's doctor can replace the GRAU's doctor? \* Civilian helicopter can interact with the police air squad? \* Others...

### **METHODS:**

The method used was an MCE exercise. Approximately 450 people participating. The scene: a public transportation bus entered a street used as a training course. Driver tried do stop but ran over some passersbys and athletes. Many victims in and inside the bus. The triage was done over trestles. A pregnant robot was used.

### **RESULTS:**

Many tasks achieved. Many opportunities were detected and need improvement. Some achieved points: a) Samu's doctors and the firemen b) Civil helicopter on a MCE interacting with public forces c) The maturity gained after four MCEs drills d) The trestles showed to be very practical and usefull on a triage. they helped the triagers' ergonomy to be assertive e) Robots gives an extra dinamism to the scene ....

### **CONCLUSIONS:**

The exercise was a success! Many opportunities to be worked. Hospital, public and private forces. Hospital's recovery and disaster plan needs improvements.



# An international Search and rescue seminar – collaboration between the Home Front Command and the US National Guard

**Dan Nemet**

**Co-authors:** Felix Lotan, Diana Vinitzky- Hertzog, Olga Polyakov

## **BACKGROUND:**

Major urban search and rescue disasters pose a significant medical challenge due to the nature of injuries, the diverse populations involved, the limitations of the treatment capability and the continuous danger. The Israeli National Rescue Unit (INRU) of the Home Front Command (HFC) participated in many disaster events in Israel and abroad and gained extensive experience in the medical treatment at destruction sites. In recent years, the HFC has been cooperating with international rescue units, including the US National Guard. The need to internationally share knowledge and training led to a joint search and rescue medicine course held first in 2018 and recently in 2019.

## **STUDY QUESTION:**

To evaluate the first two international search and rescue medicine seminars, led by HFC, in the United States.

## **METHODS:**

Prospective research, based on feedback questionnaires on the medical and training aspects of the course.

## **RESULTS:**

45 First responders participated in the course. The course led to a significant improvement in a search and rescue medicine knowledge test. The training contributed significantly to improvement of knowledge and ability to treat the injured in destruction scenarios. The trainees reported that the course was of utmost importance to their training, it matched their level of knowledge and that an improvement was achieved in performing skills, medical procedures and in team work on the destruction site.

## **CONCLUSIONS:**

the international Search and Rescue Medicine course improved the knowledge, skill, and treatment capabilities of trained medical teams.

# Time trends in rate and quality of prehospital documentation in the Israel Defense Forces Trauma Registry, 2010–2018

**Avishai Tsur**

*The Trauma and Combat Medicine Branch, IDF, Israel*

**Co-authors:** Roy Nadler, Diana Levi, Avi Benov, Elon Glassberg, Jacob Chen

## **BACKGROUND:**

Eliminating preventable death is the main goal of combat casualty care. Although most deaths occur before arriving at a hospital, military prehospital data are poor in quantity and quality. The lack of data hinders efforts to improve care and save lives. The Israel Defense Forces Trauma Registry records civilian and military casualties attended by Israel Defense Forces medical teams. In 2013, a joint effort was made to increase accessibility for caregivers and simplify data entry – using an integrated, structured, and an intuitive web-based interface that allowed near-real-time recording. A dedicated staff was appointed for tracking data entry and giving immediate feedback to caregivers.

## **STUDY QUESTION:**

This study aimed to examine the time trends in the rate and quality of prehospital documentation.

## **METHODS:**

For this study, all records between the years 2010 and 2018 were extracted. To examine the trend in the rate of prehospital documentation, the number of casualties documented in the registry was compared with those in military operations logs. To examine the trend in quality, the study examined documentation of seven major vital signs: heart rate, level of consciousness, respiratory rate, blood oxygen saturation, Glasgow Coma Scale, systolic blood pressure and pain.

## **RESULTS:**

A total of 12,780 casualties were documented in the registry during the study period. The rate of any prehospital documentation rose from 56% in 2010 to 98% in 2018. The average number of documented vital signs per casualty rose by 0.41 per year (Spearman's rho = 0.92,  $p < 0.01$ ) up to 3.24 documented vital signs per casualty in 2018. Heart rate was the most reported prehospital vital sign per casualty (56.1%) in 2018, followed by the level of consciousness (54.9%), respiratory rate (51.6%), blood oxygen saturation (50.5%), Glasgow Coma Scale (47.7%), and systolic blood pressure (45.8%). Pain was the least reported vital sign (17.6%).

## **CONCLUSIONS:**

Prehospital documentation is essential for ongoing improvement of combat casualty care. This study shows a major and steady improvement in the rate and quality of prehospital documentation throughout the years and suggests valuable lessons for the architecture and management of prehospital trauma registries.

## Terrorist response... How to learn the fast way – How to deal with terrorism in an unprepared city

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**Vincent Bounes**

*France*

The Toulouse and Montauban shootings were a series of Islamist terrorist attacks committed by Mohammed Merah in France, in March 2012. In the Toulouse city, he targeted children and teachers in a Jewish school. On March 19, 8.03 am, he opened fire at the Ozar Hatorah Jewish day school in Toulouse, killing a rabbi and three children, and also wounding four others, filming his attacks with a body-worn camera.

Numerous first responder teams were sent on scene, including 3 medicalized ones (2 adults and one pediatric teams). No protocols existed concerning protection of the teams by police forces. As only few victims needed emergent care, the first responder teams and the hospital surgeons experienced no problems dealing with them. Around 80 people (mostly children) were involved in the event, all of them needed psychological support that was provided by out-of-hospital psychologists and psychiatrists.

The first SAMU physician on scene was a Jewish physician who had studied in this very school, after minutes she was identified by her fellow workers as in difficulty to care other people and she was proposed some rest. A formal debriefing by the head of the psychologists was proposed to all the caregivers, all of them were able to work again.

Two days later, the terrorist was localized, the first assault on his apartment (March 21, 3 am) was a failure, the police forces started to evacuate the neighborhood, the terrorist was finally killed 32 hours later.

This event was the prequels of the ongoing terrorist wave in France. Some lessons had to be learned the fast way (team protection, psychological support, damage control on scene), a few years later the Toulouse City was able to capitalize on this event and all the involved actors decided to create a center for disaster response which is unique in France and proposes educational, research, collaboration and innovation on all disaster response aspects.

# Models for Collaboration between Medical Teams in Disaster Response

## Elhanan Bar-On

*The Israel Center for Disaster Medicine and Humanitarian Response Sheba Medical Center, Israel*

**Co-authors:** Mario Raviolo, Yitshak Kreiss

### **BACKGROUND:**

Emergency medical teams (EMTs) deployed following disasters will often have significant gaps in medical equipment, medications, personnel, knowledge and logistic support, all limiting their operational capabilities. Due to the large variability in these capabilities, collaboration between teams may serve to fill in these gaps, complementing one team's weaknesses by other teams' strengths.

### **STUDY QUESTION:**

What are the models of collaboration between medical teams deployed to disaster areas and how can they contribute to improvement of care?

### **METHODS:**

Based on the authors' field experience and literature review, we present several models of such collaborations experienced in various disaster response scenarios: Collaboration between Foreign Medical teams and local facilities

1. India 2001 Gujarat earthquake: Local personnel incorporated into IDF field hospital.
  2. Phillipines 2013 Typhoon Haiyan: IDF field hospital deployed on grounds of small local medical facility
  3. Nepal 2015 Earthquake: IDF Type 3 EMT deployed on grounds of fully functional Nepalese military hospital.
  4. Zambia 2018 Cholera outbreak: Israeli specialty cell incorporated in Zambian government field hospital.
  5. Guatemala 2018 Fuego Volcano eruption Israeli burn specialty team deployed in local hospitals.
  6. Mozambique 2019 Cyclone Idai Piemonte Italy Type 2 EMT deployed on grounds of Beira main hospital severely damaged by the cyclone. Collaboration amongst Foreign Emergency Medical Teams
1. Haiti 2010 earthquake: Colombian Surgical specialty cell integrated into IDF field hospital.
  2. Haiti 2010 Earthquake: Collaboration between IDF EMT and other FEMTs operating in Port Au Prince.
  3. Mozambique 2019 Cyclone Idai: Israeli medical team integrated into Piemonte Italy Type 2 EMT.

### **RESULTS:**

Each of these collaborations had specific characteristics dependent on the type and magnitude of the disaster, the timing of deployment, the type and capabilities of collaborating teams, and the terms of collaboration.

### **CONCLUSIONS:**

Common to all collaborations was the augmentation of treatment capabilities resulting in improved care to the affected population. Some of these collaborations led to long term collaborative projects.

# All-Hazards Incident Management Teams: Bringing Order from Chaos

**Randal Collins**

*City of El Segundo, USA*

## **BACKGROUND:**

In the United States, All-Hazards Incident Management Teams (AHIMTs) have been used to deal with response and recovery efforts in the nation's worst disasters. Since 2000, All-Hazards Incident Management Teams have been established across the country and now serve as a critical resource to the nation's disaster management framework.

## **STUDY QUESTION:**

How can AHIMTs be leveraged to serve local, regional, and national needs, especially during times of significant impact from multiple simultaneous incidents.

## **METHODS:**

Historical review of the use of AHIMTs. Literature review. Results of a focus group held in 2018.

## **RESULTS:**

AHIMTs can be applied to a number of problems including cyber, health, terrorism, logistics, and natural disasters. AHIMTs can be applied in a number of situations and environments AHIMTs foster collaboration, leadership, and bring organizational process to incidents

## **CONCLUSIONS:**

Potential uses of AHIMTs Designation of purpose of specific IMTs (National, Regional, Local, Facility [Hospital, private facility or industry, other] Multi-discipline teams can increase benefits of collaboration and leadership.

# Providing healthcare following security-related emergencies: exploring the relationship between nurses' personal and professional characteristics and nurse-patient interactions

**Ayelet Vasl**

*Ben Gurion University of the Negev, Israel*

**Co-authors:** Aviva Simhon, Gitit Hadshi, Limor Aharonson-Daniel, Stav Shapira

## **BACKGROUND:**

Israeli hospital personnel are required to provide medical treatment following security-related emergencies both for victims and attackers. Nurses are at the forefront of the encounter between health professionals and patients. Caring for patients which may be perceived as hostile, such as security-related emergencies attackers, presents unique and complex emotional challenges which merit inquiry.

## **STUDY QUESTION:**

Which role do the personal and professional characteristics of hospital nursing staff play in shaping nurse-patient interactions with various patients including attackers in security-related emergencies.

## **METHODS:**

A cross-sectional study using an anonymous survey was conducted among nurses in two tertiary hospitals in the city of Jerusalem. The survey examined: a) sociodemographic and professional characteristics; and b) attitudes related to nurse-patient interactions from the nurses' perspective - comparing between five possible patients: a homeless person, domestic violence victim, attacker in a security-related emergency, psychotic patient and a prisoner.

## **RESULTS:**

112 nurses completed the survey. Treating attackers in security-related emergencies was associated with the highest rate of negative caring attitudes compared with other patients assessed. The participants' attitudes towards treating attackers of security-related emergencies were significantly more negative among female nurses under 35 years of age and those with less than 10 years of professional experience (compared with older and more senior nurses). In addition, nurses in management positions had more positive attitudes towards treating attackers in security-related emergencies compared to those who were not. Significant differences related to other personal and professional characteristics such as marital status, parental status, and education level did not reach statistical significance ( $p > 0.05$ ).

## **CONCLUSIONS:**

Nurse-patient interactions may be complex and require the hospital management attention. In light of the findings, it is recommended to increase awareness of this phenomenon and to dedicate interventions among targeted groups of caregivers of the relevant age group in the various hospital wards.

## **A Very Challenging Quest: Breaking Bad News by the E.R Nurses Staff in massive causality events (MCE)**

**Amran Jaber**

*Shaari Tzedek Hospital, Israel*

### **BACKGROUND:**

Breaking bad news is giving information that changes ones perspective of the future, causing emotional and behavioral problems persisting over time. nowadays we're faced with receiving injuries resulted from hostile acts and terrorism, as nurses of the medical staff, we deem it necessary to be prepared to deal with giving bad news to families of the injured and deceased. All of the above had raised the idea of passing training courses team that qualifies the nurses' staff to give bad news.

### **STUDY QUESTION:**

In this study, we examine the effectiveness of such a course on nursing staff of intensive care units and E.R nursing, who had received the courses by qualified clinical instructors from the psychiatric field.

### **METHODS:**

Prior to commencement of the course, the nurses were asked to answer a questionnaire that examined the extent and depth of their understanding of the breaking bad new and emotional trauma, their desire to deliver bad news, and the ability to speak of the topic, and after the course, they answered the same questionnaire again. We checked the courses' effectiveness and the nurses' progress.

### **RESULTS:**

50% (before the course) versus 90% (after the course) Define bad news correctly, and demonstrated knowledge of theoretical issue, 40% (before) versus 95% (after) expressed a desire to deliver bad news, 10% (before) vs. 65% (after) expressed confidence in their ability to deliver bad news.

### **CONCLUSIONS:**

These preliminary results show that this course helps understanding the complexity of breaking bad news, provides tools that help in providing it. However, in order to turn it into a national project, it has to be passed to various hospitals in the country, in order to adjust it to diversity of society, and to include other issues such as serious illness or medical condition.

## Maybe an event – task concentration

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### Michal Ezron

*Tel Aviv Sourasky Medical Center, Israel*

Following the announcement of an Emergency Landing Expedition, a very severe third-degree incident. The hospital went into emergency mode and began preparing for the injured.

The landing was expected to be another half hour, so it was an alert for the event – a topic we are not used to. Preparation was very important, as of 3:30 pm: E.R. evacuation, O.R. evacuation, and more. At the end, and after the plane landed safely, a debriefing meeting was held in which it was decided to prepare a checklist for the event alert and to coordinate all tasks to the event manager.

The checklist contains the main topics for discussion in preparing the hospital for the wounded patients. Preparing for an emergency event while managing the routine is the essence of emergency preparation.



# Leadership Selection Within Public Safety: An Evaluation Study

**Randal Collins**

*City of El Segundo, USA*

## **BACKGROUND:**

Toxic leadership can significantly disrupt an emergency response organization, whether it be fire-rescue, law enforcement, disaster management, health, or military. The disruption can be harmful to the organization during day to day operations and the disruption can be disastrous during times of emergency and disaster. This study evaluates how these destructive leaders are hired into these positions that require superior leadership.

## **STUDY QUESTION:**

The following questions will guide the evaluation study that addresses knowledge and skills, motivation, and organization elements for the public safety administrator stakeholder group. 1. To what extent are public safety administrators requiring their agencies to match job required leadership competencies with personnel that have those skills? 2. What are public safety administrator's knowledge and motivation related to selecting personnel with the proper leadership competencies? 3. What is the interaction between public safety culture and public safety administrator knowledge and motivation? 4. What are the recommendations for public safety organizations in the areas of knowledge, motivation, and organizational influences as it pertains to hiring leaders for the organization?

## **METHODS:**

This evaluation study was conducted using the following methods: 1. Literature review 2. Qualitative interviews 3. Document analysis The methods followed the Clark and Estes (2008) gap analysis model of knowledge, motivation, and organizational influences.

## **RESULTS:**

The results of the study showed that the public safety organizations studied: 1. Utilize poor hiring and promotional practices 2. Do not effectively assess candidates for the desired leadership competencies, skills, and dispositions 3. Job descriptions do not match the desired leadership competencies, skills, and dispositions 4. Organizations fail to use psychological, personality, and leadership assessments to better screen candidates

## **CONCLUSIONS:**

It is critical to hire good leaders in executive leadership positions within public safety organizations. In fact, the wrong person can damage the organization and could have life or death consequences. Organizations need to value and implement a process that identifies the right candidates with the right leadership competencies, skills, and dispositions. Organizations need to remove barriers that prevent the use of effective screening tools such as psychological tests, personality assessments, and leadership evaluations when selecting executive leaders. It is just as important to test for poor leadership attributes as it is to look for the strengths of a potential candidate.

## The Second Victim Responders as Patients

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**Paul Barach**

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**Co-authors:** Donald A. Donahue, Jr.

Research that spans different safety-critical domains - healthcare, nuclear power, aviation, rail- one of the most vexing questions is what accounts for the large differences in their safety performance. Many rely on a just and authentic organizational safety culture for example, to explain the relationships between leaders and followers, managerial openness to dissent and inquiry, individual orientation, the extent of bureaucratization of safety, and values regarding rules and procedures.

There is a likely correlation between the psychological resilience of an individual involved in a disaster and the resilience of the organization as a whole. Shifting the emphasis from stable system processes to thinking about the ambiguous and unexpected opens the individual responder to a variety of responses and sets up the conditions for mindfulness that can mitigate against the self blame.

A professional community that acknowledges its error-proneness is more likely to put safety processes in place to protect against them, while also supporting those who must work under disastrous conditions.

Formal feedback following a disaster event investigation is often limited to summary statements of the investigative team's findings and recommendations. This is not adequate for frontline clinicians and risks feeding into a blame and guilt-driven narrative. The outcome of the team's event analysis and the proposed solutions to the original problematic situation need to make sense in relation to the setting, incorporating the current state of knowledge about the variety of actions and human factors the investigation team identified.

Yet, information on second victimhood from disasters and its relationship to safety and resilience, about what is known and what organizations might need to do, is difficult to find. The talk will use the TeamSTEPPS model that the author co-developed and go through what we know about trauma, guilt, forgiveness, and how these might be felt by the second victim. We will explore how best to conduct investigations of incidents that do not alienate second victims or make them feel even worse.

# Getting the Message Out – Social Media and Word-of-Mouth as Effective Communication Methods during Emergencies in the United States

**Amy Wolkin**

*Centers for Disease Control and Prevention, USA*

**Co-authors:** Amy Schnall

## **BACKGROUND:**

Effective communication is a critical part of managing an emergency. During an emergency, the ways in which health agencies communicate warnings may not reach all of the intended audience. Communities vary, and households within communities are diverse. Because different communities prefer different communication methods, emergency planners need to know their communities' preferred methods for seeking information about an emergency.

## **STUDY QUESTION:**

What are preferred mechanisms of communication during a disaster?

## **METHODS:**

We analyzed data from 16 Community Assessments for Public Health Emergency Response (CASPERs) conducted from 2014–2019 across the United States and its territories to assess communication preferences. CASPER is a rapid needs assessment designed to gather household-based information from a community.

## **RESULTS:**

Among the 16 CASPERs conducted, 56% of households reported television (TV) as their primary source of information for specific emergency events (range = 6.6 – 83.1%). Households reporting social media as their primary source of information differed widely across CASPERs (3.2 – 41.8%). In five of the CASPERs, nearly half of households reported word-of-mouth (WoM) as their primary source of information. These CASPERs were conducted in response to a specific emergency (i.e., chemical spill, harmful algal bloom, hurricane, or flood). CASPERs conducted as part of a preparedness activity had lower percentages of households reporting WoM as their primary source of information (8.3 – 10.4%). No single communication mechanism dominated across all communities and hazard types assessed.

## **CONCLUSIONS:**

Although TV was the most commonly reported preferred source, segments of the population relied on social media and WoM. Communication preferences change over time; social media is increasing in popularity. By using multiple methods for risk communication, emergency planners are more likely to reach a broader audience.

# Correcting misinformation by health organizations during measles outbreaks: A controlled experiment

Anat Gesser-Edelsburg

*University of Haifa, Israel*

**Co-authors:** Alon Diamant, Rana Hijazi, Gustavo S. Mesch

## BACKGROUND:

During epidemic crises, some of the information the public receives on social media is misinformation. Health organizations are required to respond and correct the information to gain the public's trust and influence it to follow the recommended instructions.

## STUDY QUESTION:

(1) To examine ways for health organizations to correct misinformation concerning the measles vaccination on social networks for two groups: pro-vaccination and hesitant; (2) To examine the types of reactions of two subgroups (pro-vaccination, hesitant) to misinformation correction; and (3) To examine the effect of misinformation correction on these two subgroups regarding reliability, satisfaction, self-efficacy and intentions.

## METHODS:

A controlled experiment with participants divided randomly into two conditions. In both experiment conditions a dilemma was presented as to sending a child to kindergarten, followed by an identical Facebook post voicing the children mothers' concerns. In the third stage the correction by the health organization is presented differently in two conditions: Condition 1 -common information correction, and Condition 2 -recommended (theory-based) information correction, mainly communicating information transparently and addressing the public's concerns. The study included (n = 243) graduate students from the Faculty of Social Welfare and Health Sciences at Haifa University.

## RESULTS:

A statistically significant difference was found in the reliability level attributed to information correction by the Health Ministry between the Control condition and Experimental condition ( $\text{sig} < 0.001$ ), with the average reliability level of the subjects in Condition 2 (M = 5.68) being considerably higher than the average reliability level of subjects in Condition 1 (4.64). A significant difference was found between Condition 1 and Condition 2 ( $\text{sig} < 0.001$ ), with the average satisfaction from the Health Ministry's response of Condition 2 subjects (M = 5.75) being significantly higher than the average satisfaction level of Condition 1 subjects (4.66). Similarly, when we tested the pro and hesitant groups separately, we found that both preferred the response presented in Condition 2.

## CONCLUSIONS:

It is very important for the organizations to correct misinformation transparently, and to address the emotional aspects for both the pro-vaccination and the hesitant groups. The pro-vaccination group is not a captive audience, and it too requires a full response that addresses the public's fears and concerns.

# The Effects of Reality Television on Public Volunteering

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**Valeriya Verigin**

*Magen David Adom, Israel*

**Co-authors:** Moshe Abramowitz, Abigail Klein, Roman Sonkin, Eli Jaffe

## **BACKGROUND:**

Constant effort should be put into drafting volunteers and upholding a volunteer array as preparation for disasters. In 2018, Magen David Adom (MDA), Israel's national rescue organization in conjunction with the Israel Broadcast Authority produced a docu-reality series called "Ambulance". The show took an in depth look at the realities faced by MDA teams in the field and their interactions with their patients. Public campaigns are important for raising awareness to the important work of Emergency Medical Services (EMS) and to improve self-pride of EMS personnel. Factors which are important to both drafting new candidates and improving the sense of commitment in existing trainees and volunteers.

## **STUDY QUESTION:**

Following the success of the series, the question arose as to the impact on the public's desire to enroll in first aid training of any level and the impact on trainees.

## **METHODS:**

A survey was distributed to course participants to assess the effect of the series on the desire to do the course and commitment to volunteer.

## **RESULTS:**

The surveys showed that the majority of participants felt that viewing the series did increase their desire to take a first aid training course. Following their exposure to the work of the MDA teams, 33% of participants stated that they did the course following having viewed "Ambulance".

## **CONCLUSIONS:**

The show was found to have a positive impact on the public's desire to learn first aid. Those who attended a first aid course following viewing the series, were also found to have a higher sense of belonging and placed greater emphasis on the importance of first aid training.

## Information Overload

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### Jonathan Stewart

*DC Homeland Security and Emergency Management Agency, USA*

We live in an age of unprecedented information... news, social media, cameras, dispatch data, hospital status, weather... Most of us carry around devices that can gather and provide answers to any question we have.

Yet, during an emergency this level of information can hamper response and decision making. So how do we distill information down to a level that is useful for decision makers? Using knowledge gained from working with cities and counties across the United States, the District of Columbia has begun working towards a new approach to situational awareness using a combination of human driven data (primarily intelligence analysts) and technological driven data (primarily ArcGIS) to support decision makers at various levels. This approach is

designed to be used daily so that decision makers are familiar with the tools and so that no notice events, such as terrorism, are quickly updated to reflect the evolving situation.

The easy answer is that there is no uniform answer for managing and utilizing information, there is no magic app. This talk will look at how to work with decision makers at various levels, from the first responder on the street to the executive making decisions for a city. Methods for determining this information and intelligence needs. And while the District's solution is not applicable to everyone, the process by which we developed our approach can be useful for departments or cities as they look to improve upon their ability to utilize information and intelligence to provide situational awareness and enhance response and recovery operations.

# NO FEAR project – lessons learned on scene management in security related incidents

**Chaim Rafalowski**

*Magen David Adom, Israel*

## **BACKGROUND:**

NO FEAR is an EU funded project, that has received funding from the European Union's Horizon 2020 programme, under grant agreement no. 786670. The project's objective is to create a network of researcher, academia and suppliers, in acute care of patients in security related incidents. The objective of the project is to look for trends, gaps and better link the research, development and users. As part of the project, WP 4 is dealing with issues related to the incident management and cooperation with other rescue and security actors (together with the WP dealing with the patient care and the one dealing with training of responders).

## **STUDY QUESTION:**

NO FEAR WP4 decided to look into lessons identified by the response organizations, from security related responses in the last years, in order to identify common lessons identified.

## **METHODS:**

Lessons identified by 10 EMS services from 24 incidents were reviewed. List of common (repeated) lesson identified was created. This list was discussed in a dedicated workshop conducted in Madrid on 26–27 April 2019, with the participation of NO FEAR members, as well as members of the project's networks.

## **RESULTS:**

The following key findings from the work are: 1. No agreed upon format for collecting and reporting data from incidents makes the analysis very difficult. 2. Different EMS organizations have different understanding of the risk, 3. The famous EMS scene assessment question "is the scene safe" will always be answered in a security related incident as "scene is unsafe". 4. Some EMS services are considering "tactical EMS" as part of their operations. 5. Some hospitals did not consider issues as perimeter security, dealing with the relatives of the victims and providing them with timely information. 6. Communications on the field were hampered by environmental noise and cellular systems collapse. 7. Interaction between response organizations require a structured framework. 8. Bystanders who provided care don't have a dedicated response mechanism to attend their specific needs 9. EMS personnel are not trained in involvement of citizens in the response, while programs as "stop the bleed" call exactly for this. 10. EMS organizations are procuring Ballistics Personal Protective Equipment, designed for military / police use.

## **CONCLUSIONS:**

1. Need for standardized reporting format. 2. Creation of "generic security response scenarios" for EMS organizations, to be evaluated for preparedness purposes. 3. There is a need to redefine the thinking and training on "scene safety" to a more "hazard base" assessment and containment. 4. EMS personnel need a "mental preparation" to the scenes they are going to encounter. 5. A protocol for "Care for patients under risk" is needed. 6. Discussions with cellular providers on R&D needed. 7. Need to develop support guidelines for citizens who provided first aid as this is specific group with specific needs.

# The WHITE PLAN : a pedagogical tool for mass awareness

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**Catherine Bertrand**

*AP-HP, France*

**Co-authors:** Eric Lecarpentier

## **BACKGROUND:**

France has just updated the white plan for health establishments in order to prepare them to manage all kinds of health crisis situations. In particular, staff must be aware of countermeasures in the event of CBRN E risks

## **STUDY QUESTION:**

The objective of the educational team was to ensure the safety of staff and structures when welcoming intoxicated and contaminated victims

## **METHODS:**

The choice of a tool to raise awareness quickly and as comprehensively as possible has turned to a serious game

## **RESULTS:**

Excerpts from the serious game are presented during the session to show the playful, original and innovative nature of this simulation with virtual characters.

## **CONCLUSIONS:**

The manufacture of this serious game is the responsibility of the teacher thanks to a powerful software that allows updates and change of images for a affordable cost.



# Foresight Exercise as a Tool For Decision Making in a European Network of Medical First Responders

**Francesco Della Corte**

*CRIMEDIM, Italy*

**Co-authors:** Sabina Magalini, Luca Ragazzoni, Monica Linty, Luca Leonardi, Pasquale Mari, Morgan Abily

## **BACKGROUND:**

Healthcare in emergency situations due to asymmetric threats is under constant re-evaluation for improvement of results by operators (non-medical first responders, EMS, ER personnel, volunteers). The rapid technology push and demand in this field and the financial constraints make it useful that even in the absence of knowledge of future needs at least there is the possibility of foreseeing them.

## **STUDY QUESTION:**

NO-FEAR (Network Of practitioners For Emergency medical systems and cRitical care) started its activity with a Foresight Exercise (FEx) to frame the approach of the issues to tackle in the future evolution of the project.

## **METHODS:**

FEx consisted of 2 days, D1 horizon scanning, historical analysis and trend analysis through 6 exercises, D2 round tables, 4 exercises and relaxation on future analysis (hot debriefing). Cold debriefing was done at a two-month interval. Fifty-three participants were 32 from consortium, 21 from practitioner and supplier network.

## **RESULTS:**

Analysis of future trends and issues is reported by identified priority: 112 single digit emergency number, 5 G, Artificial Intelligence, Automated mobile universal patient monitoring, CBRN, CBRN management of wounded victims, climate change, common procedures shared among different agencies, demographic aging, development of human and material resources for mass casualties, digital transformation focused on humans and operators, education and training in emergency medicine, education and training in mass casualties, health economics, healthy aging, immersive wearable, increased need and demand for psychological support, individual initiative attacks vs centrally coordinated attacks, instabilities of governments, international (EU) operational organization (command and control practices), less qualified assistance, more frequent large scale incidents, more need for operational integration, new technologies/big data, professionalization of emergency and disaster medicine, remote monitoring, restructuring of MCI plans, safety threats, social media and speed of information, SOPs, technological support, technology intake/enabler, violence against medical personnel, vulnerability of integrated system.

## **CONCLUSIONS:**

List of identified elements may improve the impact of decision-making. The variety of outcomes can help to focus and cope with future challenges in health care of asymmetric incidents.

# Samur Madrid: Evolution on the Preparedness and Response to Security Related Incidents

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**Paloma Rey Paterna**

*SAMUR-PROTECCIÓN CIVIL, Spain*

**Co-author:** Paloma Miravet González

## **BACKGROUND:**

Terrorism constitutes one of the most serious threats to international peace and security. It is not a new phenomenon, but its modern version has become more violent. The new pattern of terrorism aims to target masses rather than individuals, challenging the competency of emergency services involved in the response. SAMUR-Protección Civil has opted for increasing its technical capacity and resources to meet this new challenge by means of a closer Civilian - Military - Security Corps cooperation, including mutual teaching activities. Training and exercises increases the reliability of the needed multidisciplinary management of major incidents. It also helps to standardize the response by creating protocols and guidelines for mutual approach and sharing information.

## **STUDY QUESTION:**

How to improve the preparedness of EMS for better response to security related incidents , specially new patterns of terrorism.

## **METHODS:**

Experience based in recent attacks in Europe and its application in the EMS training programme, PPE and medical supplies.

## **RESULTS:**

Specific training programme , PPE and materials aimed to improve the quality of emergency medical response to security related incidents such terrorist attacks lead to a better performance of the EMS responders and more confidence and security on scene

## **CONCLUSIONS:**

EMS needs to be prepared to a new way of terrorist attacks, in which fear is used as a psychological weapon, chaos and terror is spread among general population, it is aimed at social scenes and there is no call for negotiation. Cooperation between civilian, military and security corps is essential to meet this new challenge.

# NO-FEAR technologies selected for care of victim and handover to the hospital

**Daniele Gui**

*Università Cattolica del Sacro Cuore, Italy*

**Co-authors:** Sabina Magalini, Maurizio Foco, Gennaro Capalbo, Rachele Brancaleoni

## **BACKGROUND:**

Research on new technologies to manage victims of trauma is ongoing. IFAFRI (International Forum to Advance First Responder Innovation) has recently identified 6 gaps among which maintaining communication between First Responders (FR), EMS, Hospitals and Command and Control Centers in all environmental conditions. NO-FEAR, the network of practitioners for emergency medical systems and critical care of the EU has among its objectives the identification and validation of technologies from Supplier Platform.

## **STUDY QUESTION:**

Rome Live Demo was designed to address the gap of patient handover from EMS to Hospital and preparation of the Hospital in uncertain incident (radiological/CBRNe/unknown).

## **METHODS:**

During a Live Demo (LD) on Hospital Surge emergency technologies have been presented to practitioners. Practitioner feedback on tools was done in the “hot setting” of the LD and in the “cold setting” of a pre-Demo presentation and training session and post-Demo debriefing. Feedback was by questionnaires and semi-structured interviews to practitioners. Gap analysis and solution by tools was discussed.

## **RESULTS:**

NO-FEAR's practitioner network identified 12 cutting edge technologies recently or about to be introduced to the market in the context of the victim emergency care on the field and handover of the victim from EMS to Hospital. Results of analysis and demonstration showed that perceptions of the stakeholders, usability of the tools and the possible implementation in their daily activities, are greatly appreciated in a LD.

## **CONCLUSIONS:**

A great interest of all levels of participants was on the TC implementation. This resulted as the most important technology to help in the survival chain. In the handover of the patient from EMS to Hospital this seems the first gap to close. EU funding is a valid system to perform Exercises of Critical Infrastructures.

# Stop The Bleed campaign: the Italian experience by SICUT

**Rachele Brancaleoni**

*Catholic University of Sacred Heart, Italy*

**Co-authors:** Sabina Magalini, Daniele Gui, Andrea Mingoli, Giovanna Sgarzini, Alan Biloslavo, Mauro Zago

## **BACKGROUND:**

Stop The Bleed (STB) is an American College of Surgeon' (ACS) educational campaign that teaches civilians how to manage a major bleeding victim. Università Cattolica del Sacro Cuore together with practitioners of the Italian Society of Emergency Surgery and Trauma (SICUT) and the Network Of practitioners For Emergency medical systems and cRITICAL care (NO-FEAR) project adapted STB course to the Italian context.

## **STUDY QUESTION:**

US and Italian societies present some differences and also STB course should be tailored to different contexts and Countries to reach capillary diffusion. How to adjust the course to the Italian situation maintaining the standards required by ACS? Which are the questions the STB students pose at the end of the course? What can we learn from them?

## **METHODS:**

Italian instructors conducted more than 20 STB courses in less than one year. During theoretical part of the course one or more lecturers took notes on the students' reactions and on their key interests. After each course a quick debriefing was conducted to share opinions on both theoretical and practical parts.

## **RESULTS:**

The majority of the questions were related to the type of accidents in which STB principles can be applied. Other issues referred to 112, the unified emergency telephone number; tourniquet usage; blood-born infections; duty to assist a victim.

## **CONCLUSIONS:**

The analysis conducted led the SICUT steering group to add information that clarifies the doubts expressed by the students was added. An instructor course was created in order to teach to new instructors how to answer to the typical questions and how to adjust the course when the students are all from the same area (e.g. Police, Scouts, Red Cross volunteers). Tailoring of STB course for individual Member States is strongly recommended.

# Remote Monitoring in Crises Events'

## Garegin Markarian

*SME, England*

### **BACKGROUND:**

Data collection and sharing is paramount in the treatment and triage of patients during a crisis event. PRIME enables medical and non-medical staff to monitor the vital signs of multiple patients following an event which has resulted in mass casualties.

### **STUDY QUESTION:**

Can the use of new technologies focused on remote monitoring reduce and/or prioritise the number of patients being transported to hospitals?

### **METHODS:**

The standalone module collects and transmits real-time data directly to a healthcare professional via an app installed on a smart device, where it can be visualised, monitored and stored. Patients can be assessed remotely by sending their vital signs data to specialists to analyse. In addition, Algorithms to analyse the patients' data are currently under development which will further help with the prognosis of mass casualties. PRIME is a modular system consisting of: 1. SpO2 Pulse Oximeter 2. Tympanic Thermometer 3. Blood pressure monitor 4. 12 lead ECG 5. Rinicare's PRIME Hub

### **RESULTS:**

An ongoing trial in collaboration with MKM, a leading engineering company in the Ukraine, has provided key results for the use of PRIME in the post-Chernobyl crisis. Specifically, the trial has shown that the use of remote monitoring can reduce the patient submissions to hospitals and identified the patients most in need of medical attention. It has also shown the improved benefits the public (non-medical staff) can provide through utilising the system.

### **CONCLUSIONS:**

PRIME is an innovative solution that provides comprehensive and bespoke care for patients and healthcare professionals, all while ensuring greater patient satisfaction. Clinicians are able to access a complete range of real-time vital sign data that is accurate and consistent. PRIME can be deployed anywhere in the world, allowing the user unparalleled capabilities for real time monitoring, data collection and data analysis.

## TEAMS – Training for Emergency Medical Teams

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**Luca Ragazzoni**

*CRIMEDIM Università del Piemonte Orientale, Italy*

TEAMS is a project aimed to develop, pilot and assess a standardized, validated and cost-effective training package, focused on operational team training for Emergency Medical Teams (EMTs). Now, EMTs around the world have the option to access, free-of-charge, a validated training package to enhance their teamwork capacities for future deployments. The Training Package is comprised of a set of 8 simulation-based exercises specifically designed to improve EMTs' team performance through scenarios likely to be encountered on the field. The exercises are designed to facilitate and guide trainers on how to effectively organize and deliver the training. The 8 exercises can be delivered sequentially to form a 3-day intensive training simulating a complete humanitarian mission. Alternatively, the exercises can be performed independently to accommodate each organization's specific training needs, as well as time and resource constraints. The TEAMS Training Package is available online at no cost.

How could the international response in disasters be improved? How can the work of deployed medical teams become more effective and faster? The Answer: Training and exercising. And this is the aim of the project TEAMS – a programme designed for Emergency Medical Teams. With TEAMS Emergency Medical Teams from small to large organizations can strengthen the preparedness for deployment, improve safety and security, coordination and team dynamics with cost-effective exercises. Let's make medical assistance more effective and faster.

# Stockpiling of pharmaceuticals and medical devices in Germany

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## Ursula Steffens

*Federal Office of Civil Protection and Disaster Assistance, Germany*

### **BACKGROUND:**

Mass casualty incidents, resulting from for example major incidences, disasters or even war conflicts often go along with personal and/or material resource bottlenecks such as pharmaceutical and medical devices. Medical stockpiling therefore is essential for the management of mass casualty incidents.

### **STUDY QUESTION:**

The aim is to give a deeper insight in the German system of medical stockpiling and its practicability. Furthermore the jurisdictions in different scenarios will be explained.

### **METHODS:**

The way it is done in germany, will be demonstrated.

### **RESULTS:**

The presentation „Stockpiling of pharmaceuticals and medical devices in Germany” gives an insight into the Integrated Assistance System in Germany and explains the responsibilities at the different levels: stockpiling by pharma-cies and pharma-wholesaler (prescribed by law), stockpiling of municipalities, districts and cities, stockpiling of the Länder (Federal States) and the Federal Government.

### **CONCLUSIONS:**

Stockpiling is an important part of preparations for mass casualty and seems to be done completely different from country to country.

# Epidemics as Public Health Emergencies: The Case of the 2018–2019 Measles Epidemic

**Chen Stein-Zamir**

*Israel Ministry of health*

**Co-authors:** Deena Zimmerman, Hanna Shoob, Nitza Abramson

## **BACKGROUND:**

An Infectious disease epidemic is a public health emergency. Measles, a highly infectious disease, is still causing outbreaks world-wide despite the existence of a safe and effective vaccine for decades. In 2018–2019, over 4000 confirmed measles cases were reported in Israel, necessitating a rapid response.

## **STUDY QUESTION:**

How can containment of infectious disease epidemics best be prepared for?

## **METHODS:**

Measles is a mandatory reportable disease in Israel. Cases are defined clinically and confirmed by either laboratory tests (Measles PCR\IgM) or through epidemiological linkage. The Israel routine immunization schedule includes two doses of Measles Mumps and Rubella (MMR) vaccine at ages 12 months and 6 years. The first dose is provided in Maternal Child Health Clinics (MCHC) and the second through the School Health Service, in both settings free-of-charge. In the case of an outbreak, containment measures are begun immediately by the District Health Office.

## **RESULTS:**

A community-oriented crisis intervention was applied in the Jerusalem District during the 2018–2019 measles epidemic. There were 2150 notified cases in the district, primarily in the ultraorthodox Jewish neighborhoods. The emergency program targeted the socio-economic and cultural characteristics of high-incidence communities. The program included mass vaccination in Jerusalem District MCHC administered in tandem by public health and school teams. A mobile vaccination unit rotated throughout the heavily affected areas. Healthcare and community collaboration led to measles vaccination coverage rates increasing from 80% to 95% within three months in these communities. This was followed by a significant decline in measles incidence.

## **CONCLUSIONS:**

Increasing service temporal and spatial accessibility can rapidly increase immunization coverage and contain epidemics. The role of the District Health Office and the MCHC is crucial for successful implementation of crisis intervention in epidemics.



# The Social Determinants of Health in Disaster Risk Reduction

**Joseph Cuthbertson**

*Monash University, Australia*

**Co-authors:** Frank Archer, Jose Manuel Rodriguez-Llanes, Andy Robertson

## **BACKGROUND:**

The rationale for undertaking this study was to investigate how characteristics of population health relate to, and impact upon disaster risk, resilience, vulnerability, impact and recovery. The multi disciplinary environment that contextualises disaster practice has the capacity to influence determinants of health. Robust (or lack thereof) determinants of health may influence the outcomes of disaster events upon an individual and/or a community.

## **STUDY QUESTION:**

To investigate how the Social determinants of health inform community perceptions of disaster risk.

## **METHODS:**

The study used mixed methods, The study methodology utilised a questionnaire based on health elements as described/ defined by the social determinants of health and the World Health Organisation (WHO). Quantitative data describing the community was collected from the Australian Bureau of Statistics. 20 individual interviews with participants from a community of 500 were conducted, all of the participants were permanent community residents. Thematic analysis was conducted using narrative inquiry to gather first hand insights on their perceptions of how characteristics of population health relate to, and impact upon an individual's disaster risk

## **RESULTS:**

Analysis demonstrated commonality between interviewees in perceptions of the influence of the social determinants of health on individual disaster risk by determinant type. Interviewees sensed a strong correlation between low community connection and disaster risk vulnerability. Specific populations thought to have low community connection were perceived to be socially isolated resulting in low knowledge or awareness of the surrounding disaster risks and how to prepare or respond to the, and reduced access to communication and support in time of need.

## **CONCLUSIONS:**

The importance of strong social community connection was a feature of this research. Further research on how health determinants can enable disaster risk awareness and disaster risk communication is warranted.

# A modified Delphi study of Spinal Motion Restriction (SMR) in Resource Scarce Environments (RSE)

**Eric Weinstein**

*CRIMEDIM, USA*

## **INTRODUCTION:**

There is a growing body of literature supporting protection of the injured spine in the field. The majority of the settings are in resource rich environments.

## **STUDY OBJECTIVE:**

This study aims to utilize the modified Delphi method to provide statements for potential clinical guidelines to provide optimal spinal motion restriction (SMR) of patients injured in resource scarce environments (RSE): after a mass casualty incident, in lower–middle income countries; in complex humanitarian emergencies and conflict zones; and in environments with long transportation times.

## **METHODS:**

The first round of the modified Delphi study was conducted as a workshop at the World Association for Disaster and Emergency Medicine Congress in Brisbane Australia on 9 May 2019 deriving ten statements from open-ended questions. An additional ten statements were derived from Fischer (2018).

Twenty-two academic or operational experts in spinal trauma were recruited via an initial orientation email to participate.

The first expert round began with an email link for each expert to register for their unique webpage. Participants were asked to rate each statement with their level of agreement between “Strongly Disagree” to “Strongly Agree” on a 7-point semantic differential scale. Consensus amongst the experts for all survey rounds was defined as a standard deviation of less than or equal to 1.0 on the 7-point scale.

The statements reaching consensus were removed and advanced for consideration for potential clinical guidelines. Those that did not reach consensus were moved to the second survey round.

Then each expert was notified via email to log back into their unique webpage to the second round tab with the remaining statements. Their response from the previous round and the group mean response was listed for each remaining statement.

## **RESULTS:**

Nineteen participants completed the first survey round. Four statements reached consensus in this round. Sixteen participants went on to complete the second survey round. Seven additional statements reached consensus.

## **CONCLUSIONS:**

A modified Delphi method study was utilized to achieve consensus among spinal injury experts on SMR in RSE where none previously existed. Consensus was reached on eleven of twenty statements for consideration in potential clinical guidelines.

# Operational Lessons from Uganda's Response to the 2018/2019 Ebola Outbreak in the Democratic Republic of Congo

**Lucia Mullen**

*Johns Hopkins Center for Health Security, USA*

**Co-authors:** Steven Ssendagire, Jennifer Nuzzo

## **BACKGROUND:**

The ongoing Ebola outbreak in the North Kivu Province of the Democratic Republic of Congo (DRC) poses a threat to Uganda due to a shared border. To prevent Ebola importation, the Uganda Ministry of Health has implemented numerous activities. Identifying lessons learned and challenges encountered by individuals involved in Uganda's preparedness and response efforts could help inform other countries' efforts to prepare for public health emergencies.

## **STUDY QUESTION:**

What are the operational challenges encountered and proposed solutions during Uganda's Ebola preparedness and response efforts that can be shared with the wider global public health community in an effort to improve international response to public health emergencies?

## **METHODS:**

This project will be conducted as a collaboration between Makerere University in Uganda and the Johns Hopkins University in the United States. Lessons learned, challenges encountered, and solutions implemented during Uganda's preparedness and response efforts will be identified through interviews with individuals involved in operations, potentially including officials from the Ministry of Health, public health practitioners, community leaders, and local health care workers.

## **RESULTS:**

Generalizable lessons learned will be collected from the key informant interviews that can be used to improve overall preparedness and response efforts. Anticipated priority topics include border screenings, education and vaccination of frontline health workers, community engagement, and risk communication, as well as the resources required to implement these strategies or activities.

## **CONCLUSIONS:**

The ongoing Ebola outbreak in DRC and Uganda's efforts to prevent its spread within their borders provides an opportunity to document operational lessons learned and solutions proposed that can strengthen other international and national preparedness and response efforts to health emergencies.

## From Anthrax to .....

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### Raphael Barishansky

*Pennsylvania Department of Health, USA*

#### **BACKGROUND:**

Approximately 18 years ago, in the wake of 9/11 and the subsequent Anthrax attacks in the US, the traditional public health role was expanded. In addition to traditional roles such as planning for possible infectious disease outbreaks like pandemic influenza, public health now included preparedness efforts along the full spectrum of WMD threats (chemical, biological, radiological, nuclear, explosive). These planning efforts were then later expanded to have an “all hazards” approach.

#### **STUDY QUESTION:**

Do we really understand the true nature and expanded scope of public health preparedness efforts ?

#### **METHODS:**

Critical analysis of PHEP efforts – specifically in light of the global infectious disease threats brought home to North America by SARS, H1N1, Ebola and Zika – was undertaken, with an eye toward best practices and lessons learned.

#### **RESULTS:**

Public health departments of all sizes (local/city, county, regional, state) have embraced their preparedness roles. Funding from the Centers for Disease Control and Prevention (CDC) through the States – first for development of programming to address bioterrorism (BT) and then more expansive PHEP plans – has led to significant advances in various areas, including emergency response. The push to seek interaction and collaboration with traditional emergency response partners – Police, Fire, EMS and Emergency Management – have proven to be a positive influence and indication of greater organizational adoption of PHEP responsibilities by jurisdictions of all levels.

#### **CONCLUSIONS:**

Sustained funding is a critical issue. Additionally, even after more than a decade and a half later, there is still a lingering lack of an “emergency” mindset for most public health entities. As funding for even basic services and responsibilities of public health departments has become tighter in that time period, the competing priorities make public health preparedness initiatives an easy target for cuts – both in time and money.

# Restoring Environmental Health Program Capacity with Disaster Recovery Projects following the 2017 Hurricanes

## Renne Funk

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**Co-authors:** Chase Gorishek

### **BACKGROUND:**

U.S. Centers for Disease Control and Prevention's (CDC's) National Center for Environmental Health (NCEH) and Agency for Toxic Substances and Disease Registry (ATSDR) supported state, territorial and local health departments' response and recovery to the 2017 Hurricanes Harvey, Irma, and Maria. Through this effort, NCEH/ATSDR identified the need for environmental health projects to address the impacted jurisdictions' recovery efforts and better prepare for future disasters.

### **STUDY QUESTION:**

Could funding for environmental health projects encourage rebuilding public health capacity in three priority areas: Environmental Health Assessments, Restoring Capacity for Environmental Health Services, and Monitoring the Health Impact of Affected Communities?

### **METHODS:**

U.S. Congress appropriated disaster supplemental funding to CDC allowing NCEH/ATSDR to fund environmental health projects in the three priority areas to address the identified needs.

### **RESULTS:**

These environmental health projects are supporting impacted jurisdictions in addressing technological and policy barriers to health situational awareness through the development of innovative systems and tools, improved data-sharing, and improvement of operational capabilities to meet the full range of health situational awareness needs. This presentation explains the development of these two-year projects, highlighting programs and model practices that have proven effective to date in building and sustaining public health and preparedness within impacted jurisdictions; and demonstrates corresponding tools and resources to promote awareness and action in addressing environmental health concerns and disaster recovery. The presentation will also cover relevant challenges, lessons learned, and opportunities identified in disaster recovery work.

### **CONCLUSIONS:**

While the projects are ongoing, it appears that these projects have supported affected jurisdictions in the three priority areas: Environmental Health Assessments, Restoring Capacity for Environmental Health Services, and Monitoring the Health Impact of Affected Communities.

# GAMES: a tool to support pre-hospital emergency medical services in public events and mass gatherings

**Francesco Foti**

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**Co-authors:** Enzo Albergoni

## **BACKGROUND:**

Public events and mass gatherings are frequently organized in Lombardy (North Italy), in the main metropolitan areas (Milan) and in the rest of the region. Sometimes are events organized in small towns or rural areas, sometimes they have a relevant impact for the pre-hospital emergencies system (rock concerts, stadium events, car races, bike races as Giro d'Italia, EXPO2015 and others). AREU is the public company that manages all of the pre-hospital emergencies in Lombardy and "112" is the unique number for emergencies.

## **STUDY QUESTION:**

On 2014, the national guidelines for public events identified criterias, procedures and skills to ensure the same level of care during public events or mass gatherings.

## **METHODS:**

According with this principles, a new software (GAMES) has been adopted by AREU with the aims to improve the quality of management. GAMES is a tool that helps and drives the organizers to prepare an emergency plan of the event. A check list drives to mark few indicators that identify a score risk. All of the datas are recorded and transmitted to the Dispatch Centers, that finally can approve or modify the plan prepared.

## **RESULTS:**

The final results are:

Private organizers prepare a draft of the emergency plan

- ◆ The Dispatch Centers can approve or modify the plan, implementing resources (ambulances and personnel) or creating a coordination unit on site
- ◆ The Dispatch Centers know always where the events are, what resources are planned to be, which level of care can be performed, if the legal authorizations were respected

## **CONCLUSIONS:**

GAMES is a tool that helps the emergency systems to have on-time the control and the coordination of public events or mass gatherings.

# Impact of setting upon hospital triage reliability: evaluation of videos filmed during real events in Israel

**Itamar Ashkenazi**

*Hillel Yaffe Medical Center, Israel*

**Co-authors:** Roberto Faccincani, Kristina Lennquist

## **BACKGROUND:**

Triage in mass casualty incidents helps prioritize the type and urgency of care needed when many victims are encountered. Many algorithms have been developed and are in use mainly in the prehospital system. These were tested in both exercises and real events and their advantages and disadvantages are known. While most prehospital algorithms are based on physiological parameters, in-hospital triage algorithms should be based on the anatomical triage concept [1]. The data supporting different hospital algorithms is scant. Evidence shows that triage decisions made in real events missed many of those severely injured [2].

## **STUDY QUESTION:**

The objective of this study was to evaluate possible factors that may affect different reliability of hospital triage algorithms in Israel.

## **METHODS:**

Evaluation of videos filmed during real mass casualty incidents in Israel.

## **RESULTS:**

Six factors were evident upon reviewing the videos: chaos in the triage area, presence of the media, negative energy, short notice, multiple victims arriving at once, lack of appropriate infrastructure.

## **CONCLUSIONS:**

The setup of the triage areas in Israeli hospitals during mass casualty incidents is inappropriate. Until proven otherwise, it should be assumed that inadequate setup adversely influences reliable triage decision making during mass casualty incidents.

# Mass Public Shootings Among Coup Attempt in Istanbul: Our Experience in ED

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**Co-authors:** Mehmet Kocak, Gorkem Alper Solakoglu, Omer Turan, Samet Erinc, Ozgur Ekinci, Ebuzer Aydin

## **BACKGROUND:**

Turkey is an experienced country for both military and civilian mass casualties caused by explosions and shootings by various terrorist groups. In this study, we aimed to investigate the characteristics of patient flow admitted to our hospital caused by primarily gunshot wounds during a coup attempt on the 15th of July.

## **STUDY QUESTION:**

The aim of the study is to investigate the characteristics of patient flow admitted to our hospital caused by primarily gunshot wounds during a coup attempt on the 15th of July.

## **METHODS:**

This descriptive, retrospective study included a total of 50 patients who were injured during a coup attempt on the date of July 15, 2016, and admitted to our emergency department (ED). Demographic characteristics, anatomical injury sites, postoperative clinical outcomes, and hospitalization settings were recorded. The Glasgow Coma Scale (GCS), Trauma and Injury Severity Score (TRISS), Abbreviated Injury Scale (AIS), Revised Trauma Score (RTS), and Injury Severity Score (ISS) were used to measure the severity of injuries.

## **RESULTS:**

A total of 63 medical personnel voluntarily reached the ED within two hours. Extremity injuries were the most common injuries. The mean RTS, GCS, and TRISS scores did not differ significantly between the patients discharged from the ED and those who were hospitalized ( $p>0.005$ ); however, there was a statistically significant difference in the ISS scores ( $p<0.001$ , independent t-test). There was no statistically significant difference in the GCS and RTS scores between the discharged and hospitalized patients, although the ISS scores were higher in hospitalized patients ( $p>0.05$  and  $p<0.001$ , respectively). A total of 33 patients (66%) were admitted to the hospital for follow-up and/or surgical intervention. Five (10%) of the patients were hospitalized for more than 14 days.

## **CONCLUSIONS:**

The management of each disaster is unique. Armed conflicts result in gunshot wounds and preparations must be focused on surge capacity and a prolonged hospital stay of patients.



## Assessing emergency preparedness: are Emergency Medicine doctors and nurses in Singapore's pediatric tertiary hospital ready for an EPIQ mass casualty incident?

**Ronald Ming Ren, Tan**

*KK Women's and Children's Hospital, Singapore*

**Co-authors:** Joy Li Juan Quah, Gene Yong-Kwang Ong, Arif Tyebally

### **BACKGROUND:**

The occurrence of multiple mass casualty incidents and natural disasters in recent years underscores the importance of emergency preparedness. As children represent an at-risk population due to their increased susceptibility to injury in a disaster scenario, pediatric emergency medicine doctors and nurses will be called on to provide interprofessional care for pediatric casualties under austere conditions.

### **STUDY QUESTION:**

In a population of emergency medicine doctors and nurses practising at the national pediatric tertiary hospital, what is the baseline self-assessed knowledge, attitude and perception with respect to various competency dimensions of emergency preparedness and disaster medicine?

### **METHODS:**

This is a cross-sectional, self-administered, questionnaire-based descriptive study. We provided the validated Emergency Preparedness Information Questionnaire (EPIQ) tool, which is used to evaluate individual training needs regarding ten competency dimensions of emergency preparedness. These include: A) detection of and response to an event, B) incident command system, C) ethical issues in triage, D) epidemiology and surveillance, E) isolation and quarantine, F) decontamination, G) communication/connectivity, H) psychological issues, I) special populations, and J) accessing critical resources to 160 doctors and nurses actively practising in the emergency department of the national pediatric tertiary hospital over a period of 1 month and collated the following results.

### **CONCLUSIONS:**

To our knowledge, this is the first study on emergency preparedness conducted within a pediatric tertiary hospital emergency department in Singapore. Certain knowledge gaps and training needs were identified. These insights are invaluable in planning and organisation of future disaster medical responders' courses.

# CCSV, a new form of ventilation in intubated patients especially during CPR

**Leo Latasch**

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**Co-author:** Vanessa Kühn

## **BACKGROUND:**

The goals of cardiopulmonary resuscitation are to maintain a minimum circulation to enable oxygenation and to ensure the return of spontaneous circulation (ROSC). The ERC guidelines recommend ventilation with the highest possible oxygen concentration in addition to chest compressions. As soon as the airway has been secured with an endotracheal tube, the ERC recommends ventilation at a frequency of 10/min with the highest possible inspiratory oxygen concentration – however, no specific ventilation mode is recommended.

## **STUDY QUESTION:**

When performing cardiopulmonary resuscitation, the compressions and ventilations are not synchronized. The question was, if changes in the ventilation form and pattern by a respirator, would allow to synchronize the chest compressions and ventilations automatically.

## **METHODS:**

CCSV is basically a pressure-controlled ventilation mode. The gas flow directed outwards from the lungs as a result of the chest compression, is detected by the pressure and flow sensors of the ventilator and serves as an inspiration trigger. Then the ventilator produces a pressure-controlled mechanical breath. Therefore, inspiration begins almost simultaneously with the chest compression. This way, the mechanical inspiration always ends before the next chest compression. The inspiration lasts about 200 milliseconds. This way, the mechanical inspiration always ends before the next chest compression. A ventilation frequency of 100/min results from a chest compression frequency of 100/min.

## **RESULTS:**

CCSV (Chest Compression Synchronized Ventilation) is a new ventilation mode for use in cardiopulmonary resuscitation. The ventilation frequency, tidal volume, and time of inspiration differ in CCSV mode from known ventilation modes. Various studies were able to show that the gas exchange and hemodynamics can be improved considerably as a result.

## **CONCLUSIONS:**

Chest Compression Synchronized Ventilation (CCSV), has a positive impact on cardiopulmonary resuscitation. The intrathoracic pressure in the compression phase increases, improves cardiac output. The mean arterial blood pressure increases and the oxygenation of the arterial blood improves significantly.

## Chest injuries: Move the needle

### Roy Nadler

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**Co-authors:** Sami Gendler, Avishai Tsur, Jacob Chen, Avi Benov, Elon Glassberg

#### **BACKGROUND:**

According to the IDF clinical practice guidelines (CPGs), tube thoracostomy is the procedure of choice for tension pneumothorax; however, needle thoracostomy can be performed as a bridge until a chest tube is inserted. Providers are instructed to perform formal tube thoracostomy whenever needle thoracostomy fails to alleviate symptoms or when prolonged evacuation is expected.

#### **STUDY QUESTION:**

The purpose of the current study is to examine trends in the management of chest injuries.

#### **METHODS:**

All casualties treated by the IDF-MC personnel are recorded in the IDF trauma registry (ITR). Patients recorded in the ITR between January 2006 and October 2018 were included. Thoracostomy ratios were calculated as the ratio between the number of patients who underwent chest decompression and the total number of patients with injuries to the torso recorded in the ITR.

#### **RESULTS:**

During the study period, 16,478 casualties were recorded in the ITR, and of those 2,121 suffered injuries to the torso. During this period, the rate of truncal injuries fluctuated, but they rose overall from 7.4% in 2006 to 20.5% in 2018. The frequency of chest decompression dropped from 30% of all truncal injuries in 2006 to 1.5% in 2010 (Spearman's  $\rho = -0.52$ ,  $p < 0.01$ ). Between 2010 and 2014, the chest decompression ratios rose to 14% ( $\rho = 0.42$ ,  $p < 0.01$ ), which was followed by a stabilization of chest drainage ratios ( $\rho = 0.05$ ,  $p = 0.73$ ). During this period (2014–2018), the ratios for chest tube insertion declined ( $\rho = -0.3$ ,  $p = 0.02$ ) whereas the ratios for needle thoracostomy inclined ( $\rho = 0.24$ ,  $p = 0.06$ ).

#### **CONCLUSIONS:**

The substantial decline in chest tube insertion rate between 2006 and 2010 parallels the introduction of new body armor. Published in 2012, new CPGs instructed liberal chest decompression, which can explain an increase in chest decompression ratios. The seemingly stable thoracostomy ratios between 2014 and 2018 mask a rise in needle thoracostomy and a concomitant drop in tube thoracostomy. The data suggest the importance of body armor in preventing chest injuries. The unexpected outcome of new devices and clinical practice guidelines are also demonstrated.

# A Methodology to Build National Resilience Strategy

## Abraham Bachar

*CEO, IsraTeam 98 Ltd, Israel*

### **BACKGROUND:**

Mastery in understanding the modern threats and analyzing the associated weaknesses and vulnerabilities while utilizing a holistic approach. Expert in society and critical infrastructure resilience, first responders and community resilience.

### **STUDY QUESTION:**

Do we have a methodology to build the national resilience according the weaknesses and vulnerability of any country ?

### **METHODS:**

- ♦ National Vulnerability. Evaluate and analyze the specific vulnerabilities of each country, while considering, cyber, war, CBRNE, energy, food and water, medicine, media and social communications, in addition to first responders' mental resilience.
- ♦ National Resilience Strategy. Decision-making and understanding what needs be prepared in all hazards. Balancing between the threats and the resources allocated for countering the Hybrid Warfare.
- ♦ Determining minimal level of services
- ♦ Creating new concepts of operation for emergency management

### **RESULTS:**

Defining and Establishing the National Resilience Strategy - Master Plan

### **CONCLUSIONS:**

Our goal is to create "Total Resilience " with a holistic and optimal 360-degree approach, creating a synergy of first responders, military and civilian resources. Israteam offers proven strategies for emergency management preparedness and infrastructure resilience, which serve as a roadmap for securing critical assets and the entire society against a wide range of relevant threats with All Hazards Approach.

# Georgia Long Term Care Emergency Preparedness Educational Program

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## Alyssa Ragan

*University of Georgia Institute for Disaster Management, USA*

**Co-authors:** Curtis Harris, Jim Zerylnick, Kelli McCarthy

### **BACKGROUND:**

In April of 2018, the University of Georgia's Institute for Disaster Management received a 3-year Centers for Medicare & Medicaid Services (CMS) Civil Money Penalty (CMP) grant to develop an educational program that would enhance the preparedness and resiliency of Georgia's long term care community. The Georgia Long Term Care Emergency Preparedness Educational Program (LTCEPEP) is only the second program in the nation developed utilizing such a grant. Through its first two years, the program has demonstrated the need for targeted and robust educational opportunities for long term care facility staff.

### **STUDY QUESTION:**

How can emergency management systems better support and integrate with the long term care community and their emergency preparedness practices?

### **METHODS:**

In-person classes, electronic pre and post-tests, online follow-up survey

### **RESULTS:**

Attendees showed an average of a 24.79 point knowledge gain from the pre and post-tests delivered during the in-person classes.

### **CONCLUSIONS:**

Focusing on the four (4) core elements of an effective emergency preparedness (EP) program as outlined by CMS, these courses are helping long term care partners understand what EP really means and how to use the basic principles to build a safer and more prepared healthcare community.

## Unfunded mandates: Preparing for a low probability event with high consequences

**Kelly Klein**

*Eastern Maine Medical Center, USA*

**Co-authors:** Raymond E. Swienton, Lindsay Flax, E. Liang Liu, Curt Harris

### **BACKGROUND:**

Every year, the US and many other countries experience an influenza outbreak. Depending on the strain, and availability of vaccines the average number of deaths rises and falls. Public health dictated the ways to protect the healthcare community: masks for patients and staff, gloves, and required immunizations. However, our comfort and faith in the public health system changed during 2014 when the first uninvited case of Ebola viral disease left the continent of Africa and arrived in the United States. The human impact was one death (the host), two patients infected and 177 contacts. The economic impact was the almost bankruptcy of a local hospital, the full focus of a county and millions of US and EU dollars spent in preparation and prevention for a disease with a low transmission rate and a well-known transmission pathway.

### **STUDY QUESTION:**

Is there a way to decrease the cost to countries and health care communities that are mandated to prepare for a low probability events such as Ebola viral disease.

### **METHODS:**

Evaluation of after-action reports and focused literature review

### **RESULTS:**

In countries that do not have an EVD epidemic, governments are mandating that public health and hospitals prepare specifically for this one type of event. This is at great community cost and is generally unfunded by local or state governments.

### **CONCLUSIONS:**

The monetary costs to healthcare communities of low probability exposures is astronomical. Such preparations also distract from other, more probable diseases compromising the identification and treatment of these more prevalent diseases. By treating all healthcare encounters as a potential infectious threat rather than targeting specific pathogens is a better strategy that allows for continued healthcare preparedness, improves workforce protection and will in turn decrease the overall economic impact faced by the healthcare system.

# Emergency Water Supply with Limited Resources using System Dynamics Modelling

**Lisa Bross**

*Bundeswehr University Munich, Germany*

**Co-authors:** Steffen Krause, Christian Schaum

## **BACKGROUND:**

Drinking water supply is at the core of both humanitarian action in times of crisis, as well as national policies for regular and emergency supply. In countries with a continuous water supply, the population mostly relies ingenuously on the permanent availability of tap water due to high supply standards. However, an increase in both environmental determinants as well as technological hazards related to more decentralized renewable energy supply puts a strain on the water supply.

## **STUDY QUESTION:**

To be prepared for a disruption in the drinking water infrastructure, alternative supply measures (such as supply with mobile pipes or with vehicles) need to be considered, and precautionary measures need to be planned. An emergency water supply strategy represents a combination of different resources for individual process steps for water collection, treatment, distribution, and water storage. The central questions to be answered for emergency water supply is: (i) How much water do we need? (ii) Where do we need how much? (iii) When do we need it? (iv) For whom do we need how much water? (v) Where do we get the water from? (vi) How can it be distributed?

## **METHODS:**

This research uses the method of system dynamics simulation to evaluate the efficiency of various emergency supply strategies. Therefore, different supply and demand scenarios and supply strategies are modelled and analyzed according to the volume of water provided.

## **RESULTS:**

The model allows to scrutinize and compare emergency water supply strategies as well as to identify required resources. Furthermore, such method helps to prioritize strategies as well as to make decisions when planning and to provide emergency water supply.

## **CONCLUSIONS:**

Due to economic constraints, water utilities have limited financial means to hold unlimited resources (e.g., transport capacities, workforce, mobile treatment plants) to manage possible emergencies; therefore proactive planning is needed.

# Increasing Urban Resilience – Blast Protection with Plants

**Paul Warnstedt**

*Bundeswehr University Munich, Germany*

**Co-authors:** Norbert Gebbeken

## **BACKGROUND:**

Intelligent disaster preparedness starts with the protection of people before the actual event of an attack. Increasing threats of terrorist attacks therefore require the protection of urban spaces. The protective function of currently available protection systems is often clearly visible, which can even increase the perceived threat. This is acceptable for temporary solutions, but in the long run it contradicts the idea of a modern and open society. For continuous use, new solutions should be considered that are not perceived as protective elements and unfold their protective potential inconspicuously. This includes elements of street furniture and landscape architecture.

## **STUDY QUESTION:**

This contribution addresses experimental and numerical investigations on the protective potential of plants against blast loads. The aim of the presented study was to quantify this protective potential for selected needle and leaf plants and to identify the decisive parameters that contribute to the blast pressure reduction.

## **METHODS:**

The protective potential of four plant species was investigated in free-field explosion studies. Furthermore, two numerical methods have been developed and successfully applied, to determine the volume of the plants on the basis of point clouds from terrestrial laser scans. The two methods allow a mutual validation of the results.

## **RESULTS:**

All examined plants achieved significant overpressure reductions in the close range behind the hedges. Especially thujens and yew trees reduced the peak overpressure by 39 % to 45 %. It was possible to prove a direct relationship between the growth density and the reduction of the peak overpressure by the plants.

## **CONCLUSIONS:**

This shows that even such light and flexible structures can contribute significantly to blast protection.



# Impact of Stressful Events on Motivations, Self-Efficacy, and Development of Post Traumatic Symptoms among Youth Volunteers in Emergency Medical Services

**Eleni Roditi**

*Detention center for illegal immigrants in Athens, Greece*

**Co-authors:** Moran Bodas, Eli Jaffe, Haim Y. Knobler, Bruria Adini

## **BACKGROUND:**

During the last decades, Israeli emergency medical services (EMS) personnel has been exposed to different potentially traumatic events, including mass terror attacks. Magen David Adom (MDA), the Israeli national rescue organization is professionally training and utilizing 14,000 youth volunteers in both medical services and humanitarian aid services. MDA youth volunteers operate on ambulances responding to real events and are an integral part of MDA crews. During major disasters such as earthquakes, people of all ages join efforts to recover both locally and nationally. MDA youth volunteers may serve as a major force in such events.

## **STUDY QUESTION:**

The aims of the present study were to identify how potentially traumatic events affect young volunteers in their motivation to volunteer and their perceived self-efficacy while being at risk of developing post-traumatic symptoms.

## **METHODS:**

The final sample included 236 MDA youth volunteers. The study evaluated their motivational factors for volunteering, perceived self-efficacy, participation in potentially traumatic events, and post-traumatic symptoms.

## **RESULTS:**

Over two-thirds of the volunteers participated in a traumatic event on duty. Volunteers who were involved in potentially stressful events scored higher levels of post-traumatic symptoms, though still very low and subclinical. Nonetheless, participating in stressful events contributed to an increased sense of self-efficacy. No difference in post-traumatic symptom levels was observed between volunteers who partook in mass casualty incidents and those who did not.

## **CONCLUSIONS:**

The results demonstrate that MDA youth volunteers may mostly benefit from participating in situations requiring the administration of emergency medicine, even stressful ones. They may help to find ways to empower the volunteers and increase their resilience.

# Impact of Emergency Situations on Resilience and Burnout of Medical Personnel

**Bruria Adini**

*Tel Aviv University, Israel*

**Co-authors:** Maya Siman-Tov, Moran Bodas, Alex Wang, Michael Alkan

## **BACKGROUND:**

Emergency situations such as mass casualty incidents and/or wars may pose a physical and mental risk that may harm personal resilience and well-being of the population. Medical teams are even more exposed to risky situations and conditions of uncertainty, and thus may be highly susceptible to burnout and decreased resilience. In contrast, team cohesiveness and commitment to work may enhance the resilience at work and decrease burnout of medical personnel.

## **STUDY QUESTION:**

To investigate the impact of an emergency situation on the levels of resilience and burnout of medical personnel.

## **METHODS:**

Using a designated validated questionnaire, levels of burnout and resilience at work were evaluated among medical teams in a trauma center, before and after a 3-day period of missile attacks on Israeli communities.

## **RESULTS:**

The overall resilience at work score increased after the emergency period (pre-post levels were 63.5 vs 69 respectively;  $p=.004$ ) while the levels of burnout decreased (pre-post levels were 6.2 vs 4.1 respectively;  $p=.001$  for depersonalization). Pre-post levels of perceived personal accomplishment increased (12.5 vs 13.9 respectively;  $p=.001$ ) as well as perceived satisfaction (8.8 vs 9.8 respectively;  $p=.018$ ). Significant positive correlations were found between overall resilience at work score and ability to work in emergencies ( $r=.557$ ;  $p$

## **CONCLUSIONS:**

Contrary to the concern that emergency situations may increase burnout and negatively impact on resilience at work, it appears that team cohesiveness, commitment and identification with the objectives of the workplace strengthen the capacity of medical personnel to manage emergencies. Collaborations and networking that are vital during emergencies contribute to decreasing perceived feelings of depersonalization and emotional exhaustion.

# NATAL's helpline crisis intervention model: From routine to emergency and back to routine

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**Dalia Yosef**

*NATAL - Israel Trauma and Resiliency Center, Israel*

**Co-authors:** Liron Lapid Pickman

## **BACKGROUND:**

During a national crisis involving civilians, e.g., war/terror-related crisis, providing intervention via helpline to meet the public's mental health needs has many advantages, including availability, accessibility, and immediacy. We present the principles of NATAL's volunteer-based helpline crisis intervention model, within a timeline of before, during, and following emergency.

## **STUDY QUESTION:**

How to meet mental health needs and promote wellbeing during national emergency via a helpline? How to work with volunteers within a professional helpline? And how to provide continuity of care following the crisis?

## **METHODS:**

The case of the May 2019 crisis, during which more than 700 rockets in three days were fired on Israeli communities will be described, including the transition into emergency working mode, the characteristics of the calls and interventions provided, and specific case studies.

## **RESULTS:**

The May 2019 crisis illustrates the helpline's ability to transition effectively from routine to emergency mode and back again. The case studies illustrate the ways of mapping immediate needs and meeting them, and follow-up after the crisis has ended, to offer ongoing helpline intervention, clinical treatment, and more.

## **CONCLUSIONS:**

A volunteer-based helpline to meet mental health and wellbeing needs during large-scale emergency can best operate within a community preparedness approach. This includes professional training and ongoing support for volunteers; structured professional protocols for mapping the needs and intervention; administrative protocols for fast transition into emergency mode; and operation within a larger organization/system, to provide long-term treatment and enable continuity of care.

## **When preparation for emergency and post traumatic stress co-exist: Natal's Mobile unite – A model for short-term, immediate and nimble therapeutic intervention under Continuous Traumatic Stress (CTS)**

**Yuval Simon & Vivian Reutlinger**

*NATAL, Israel*

**Co-authors:** Tamar Lavi, Liron Lapid

### **BACKGROUND:**

Continuous Traumatic Stress (CTS) is defined as the experience of living in contexts of realistic, current and ongoing danger. Exposure to CTS may have unique effects beyond those of past trauma, including increased vulnerability to future potentially traumatic events. Thus, immediate and long-term mental health interventions following traumatic events under CTS should aim at both preventing the long-term pathogenic effects of the past event and simultaneously help individuals, families and communities to prepare for the next, inevitably expected, potentially traumatic event. This, taking into account that danger is a current daily life reality. The following talk aims to present a unique short-term intervention model delivered upon call in the client's home. The model was developed specifically for situations of CTS and delivered to families and individuals exposed to missile shelling along the Israeli border with Gaza.

### **STUDY QUESTION:**

How can we help reduce the pathogenic effects of exposure and increase resiliency of people exposed to CTS? And to what extent is the proposed model effective in doing so?

### **METHODS:**

The model was assessed by semi-structured interviews and self-report questionnaires, pre and post intervention. Outcome measures for children / adolescents include: posttraumatic stress symptoms, functioning impairment, and general mental health.

### **RESULTS:**

preliminary results suggest that the current intervention is effective in reducing posttraumatic stress symptoms and functioning impairment, and improve overall mental health in children / adolescent clients.

### **CONCLUSIONS:**

The current model is uniquely effective in reducing symptomatology. Practical implications for short-term intervention under CTS will be discussed.

# Clinical work with children continuously exposed to missile attacks: The special case of Netivot

**Hana Himi**

*NATAL - Israel Trauma and Resiliency Center, Israel*

**Co-authors:** Liron Lapid Pickman

## **BACKGROUND:**

Children living in the town of Netivot have been exposed to intermittent missile attacks since the early 2000's. Such continuous exposure from a young age often leads to complex symptoms, exacerbated by further exposure and by challenging socio-economic circumstances and limited access to mental health services. In many cases these conditions further lead to complex trauma. We aim to present the unique mental health needs of this population, and the therapeutic work processes by NATAL - Israel Trauma and Resiliency Center to meet those needs.

## **STUDY QUESTION:**

What are the unique mental health needs of Netivot children undergoing treatment at NATAL? What are the clinical work processes required? Are those clinical interventions effective in reducing symptomatology?

## **METHODS:**

A pre-post design was used to assess the effectiveness of those treatments. The young patient and the parent reported the level of posttraumatic stress symptoms of the patient at both time points.

## **RESULTS:**

Preliminary results (n=375) indicate a significant decrease in posttraumatic stress symptoms following treatment, according to both parent and child. Most (59%) treatments were long, i.e., More than 24 sessions. Case studies illustrating these work processes will be presented.

## **CONCLUSIONS:**

Netivot children who are continuously exposed to missile fire attacks, are characterized by typical clinical patterns. NATAL's clinical work processes in treating those patterns, result in good outcomes. Common elements for practice include tailor-made integration of treatment methods, parental guidance to identify early signs of the patient's distress as well as of other children in the family and allowing for long-term processes. Additionally, prevention efforts are required at the municipal level, e.g., establishing a resiliency center.

## Resilience and Trauma in face of Global Warming and Climate Crisis

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### Rakefet Ginsberg

*NATAL, Israel*

As exposure to traumatic events and circumstances is expanding, Trauma and psychological trauma are a growing problem posing great burden on social, economic and health institutions. However the climate crisis and the some traumatic events as part of its consequences ( such as natural disaster), bring up some new challenges.

The talk will discuss the classification of climate crisis between nature and man induced trauma and the relations between global sustainability and local trauma & resiliency. It will point to the influence of factors such as policy, modernization and distance from nature on community and individual risk and resilience. More specifically it will elaborate on the relations between climate change and self and social sense of efficacy, helplessness future orientation and communities' ability to prepare for crisis. To conclude we infer practical implication for crisis interventions.

There are reciprocal relations between global warming, climate crisis and community resilience which must be taken into consideration when planning interventions in local crisis.

# Innovative Portable Platform for Dressing Wounds

## Josef Haik

*Director the division of Plastic & Reconstructive Surgery/Burns Unit, Sheba Medical Center, The Sackler Faculty of Medicine, Tel Aviv University, Israel, College of Health and Medicine, University of Tasmania, Australia, Institute for Health Research, University of Notre Dame Australia, Fremantle, Talpiot Medical Leadership Program, Sheba Medical Center, Tel Hashomer*

**Co-authors:** Yehuda Ullmann, Eyal Gur, Moti Harats, Dani Kruchevsky, Sivan Zissman

### **BACKGROUND:**

According to WHO, 2.6B people in the last decade have been affected by natural disasters, leading to mass casualty that can overwhelm local medical resources preventing comprehensive medical care. This study evaluates a new portable, battery operated platform for the treatment of wounds producing, in real time, a transient nanofibrous epidermal layer using electrospinning technology. This layer mimics the structure of the extracellular matrix providing excellent medium for tissue integration and can deliver hemostatic, antibacterial, and other healing enhancing agents as fit.

### **STUDY QUESTION:**

Suitability, safety and effectiveness of a new easy-to-use portable battery operated system for treating wounds.

### **METHODS:**

Patients with up to 10% TBSA burns were treated in 3 medical centers. The transient epidermal layer was applied in-situ, activating the system\* activated from a distance, reducing pain and contamination risk. The layer is tailored to the shape of the wound. Opaque upon application, becoming transparent, allowing evaluation of wound bed without dressing removal. The layer can be temporarily applied or remains on the wound until full epithelialization and self-peeling occur; a dry secondary dressing may be used according to need and only in the first exuding days. Patients were allowed to shower regularly after 24 hours.

### **RESULTS:**

Twenty six (26) patients were recruited. Mean age of 43Y (18-67) with 2nd degree burns of which up to 5% TBSA were treated with the new system. Complete healing (95% epithelialization) was achieved in 92% of patients by day 14th. Pain was reduced immediately after dressing to 1.5 (VAS scale). No infections and no device-related adverse events were reported.

### **CONCLUSIONS:**

Even large, hard to dress burns are easily treated with this new portable battery operated system offering a viable treatment platform in disastrous situations. This effective, minimally painful treatment, no-touch transient skin layer has excellent adherence even in challenging contours, prevents potential infections and reduces pain.

# Development and implementation of a semi-autonomous UAV for the detection of victims buried under debris

**Lennart Landsberg**

*New technologies in disaster management, Germany*

**Co-authors:** Sebastian Schmitz, Konrad Barth, Ompe Aimé Mudimu

## **BACKGROUND:**

The collapse of buildings often presents emergency personnel with major technical and tactical challenges. On the one hand, trapped victims must be found as quickly as possible in order to save them alive; on the other hand, the emergency personnel can only move on the debris with extreme caution and under great danger. In order to solve issues of this kind, a broad consortium of universities and private companies was formed and the research project “Flying localization system for the rescue and recovery of trapped victims” (FOUNT<sup>2</sup>) was launched in 2016 with funding from the German Federal Ministry of Education and Research (BMBF).

## **STUDY QUESTION:**

The aim of the research project FOUNT<sup>2</sup> is the development of a semi-autonomously operating unmanned aerial vehicle (UAV), which can find victims trapped under debris. During the research project, fundamental research questions that contribute to a focused and user-oriented development of the system were answered.

## **METHODS:**

At first, several requirements engineering steps were carried out to determine the end-user needs. On this basis, the technical system was developed and integrated into the existing command and control structures of emergency response authorities. The technical system, as well as its implementation, was evaluated in a tabletop exercise and in a large-scale exercise.

## **RESULTS:**

In addition to the prototype of an UAV with integrated bi radar and automatic landing site detection, the project also provided implementation concepts for the UAV and evaluation approaches for technical equipment.

## **CONCLUSIONS:**

The presentation of the research project FOUNT<sup>2</sup> and of its results shows the development of a new technology in the field of disaster management. Furthermore, the project can demonstrate how new technologies can be evaluated and implemented in existing disaster management structures.



## Telehealth Technology during Medical Shelter Operations

**Lindsay Flax**

*University of Texas Southwestern Medical Center, USA*

**Co-authors:** Kelly R. Klein, E. Liang Liu, Curt Harris, Raymond L. Fowler, Raymond E. Swienton

### **BACKGROUND:**

In the aftermath of Hurricane Harvey and the continued impact from flooding, 3,829 displaced persons were transported from their homes and sheltered in the Dallas Convention Center. This large general population sheltering operation was medically supported by an onsite Mega-Shelter Medical Clinic (MMC). In this augmented out of hospital structure care environment, comprehensive multi-disciplinary medical service was offered and included the use of telecommunication for both providers consult and direct patient evaluation.

### **STUDY QUESTION:**

Can telecommunication services decrease the need for onsite/in-person provider evaluation, to refill routine medications and dispense durable medical goods?

### **METHODS:**

Retrospective chart review of medical records generated for all encounters at the MMC.

### **RESULTS:**

40.7% of registered evacuees utilized the MMC accounting for a total of 2,654 clinic visits of 1,560 unique patients representing all age groups. The majority of MMC visits, 27.2% were for medication refills followed by sequelae of lack of medications.

### **CONCLUSIONS:**

In the MMC, additional medical consult for pediatrics and psychiatric evaluation were available via telecommunication technology. Although it was not frequently utilized in this event, it has significant potential in future shelter operations. Telehealth communications could be used to augment future staffing patterns, as medical providers are volunteer. There is also potential for telehealth screening patients for easily addressed non-narcotic medication refills or durable medical goods supply. The use of remote medical evaluation has limitations as well but in a large-scale shelter operation these should be balanced with the direct impact on the local medical infrastructure.

# Naval Support of Natural Disasters

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## Itamar Netzer

*Israel Defense Force, Israel*

**Co-authors:** Filippo La Rosa

The response to natural disasters is often supported by military organizations due to their scope, organization and operational capabilities. However, the role navies can and do play in littoral disaster scenarios is often overlooked.

Our talk will include:

1. An overview of naval support in recent natural disasters around the world.
2. The implications of international military response to naval and maritime emergencies.
3. Lessons learned in Exercise Mighty Waves 2019, a multinational earthquake preparedness exercise conducted by the Israeli Navy.
4. Recommendations for increasing future international naval preparedness.

Even though limited to littoral areas, military navies are an important resource for disaster management. Advance coordination and training of naval forces can facilitate rapid response to natural disasters.

# Global Application to Relay Information to Emergency Services

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**Ido Rosenblat**

*Magen David Adom, Israel*

**Co-authors:** Oren Blustein, Roman Sonkin, Eli Jaffe

## **BACKGROUND:**

Recent years have seen a rise in incidents in which world populations are unable to reach or accurately request emergency services. In addition, in recent years there has been an increase in community emergency response teams. Such teams provide a service to the community and often must interface and coordinate their response with local emergency services.

## **STUDY QUESTION:**

The need has arose for streamlined communications between both the community and emergency services and community emergency teams and emergency services.

## **METHODS:**

Magen David Adom (MDA), Israel's national rescue organization has developed an app that serves several purposes including: calling pre-designated emergency services at the touch of a button, transmitting your GPS location, alerting emergency contacts, and coordinating the response between local emergency services and the community emergency response team. In addition, the app contains a chat module as well as the ability to transmit photo and video footage from the scene to emergency services, including photos of casualties and even suspicious people. In disaster situations such as an earthquake, the app provides emergency services with the locations of wounded, thus giving them the ability to effectively understand the extent and casualty locations.

## **RESULTS:**

The app is used for assisting communities and emergency services. Users reported improved feeling of resilience in the community.

## **CONCLUSIONS:**

Communicating information to emergency services provides a clear picture to emergency services even prior to arrival. Allows multi-agency communication and can also be used to locate and connect relatives in order to aid the casualties.

## Drones to the rescue – reaching all populations in times of need

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### Victor Bero

*Meuhedet Health Service, Israel*

#### **BACKGROUND:**

Drones are emerging as an innovative means of providing vital logistic services to patients, especially during crises. Distribution of medications or collection of medical exam-kits can be performed by drones, when routine transportation may be inaccessible due to natural and/or human-made disasters. Considering the need to maintain functional continuity both in routine care and during emergencies, Meuhedet Health Services – a healthcare provider insuring 1.2 Million Israelis.

#### **STUDY QUESTION:**

To describe the main components of the project designed to integrate drones as a means to provide effective routine medical services and at times of emergency.

#### **METHODS:**

Meuhedet is currently developing a project designed to introduce drones to distribute medications and other vital equipment to patients unable or reluctant to present to the medical clinic during crises or emergencies. Patients will be able to order medications (prescribed by physicians or nurses) as well as OTC products.

#### **RESULTS:**

The project has been approved by Meuhedet's management and will be operational by director medical quality control emergency and disaster management department. To ensure effective functionality during crises, the drones will also be used routinely to supply medications and/or other logistic services, to patients residing in rural or sparsely populated areas as well as in urban locations. The pilot study is expected to be completed by 2021 and will be evaluated in terms of safety, patient satisfaction and cost-effectiveness.

#### **CONCLUSIONS:**

Utilization of drones is expected to positively impact the capacity to provide primary care in the community, even in times characterized by transportation challenges, conflicts, or inability to reach remote populations. As was demonstrated in the 2011 Japan's Fukushima disaster or the 2017 Hurricane Harvey, utilization of drones will enhance recovery efforts and resilience of the population during emergencies.

## Using field experiments to deriving guidelines for first responders

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**Carlos Rojas-Palma**

*Belgian Nuclear Research Center (SCK•CEN), Belgium*

### **BACKGROUND:**

Radiological dispersal devices have been a wide elaborated upon in the literature. However, most of the results of field experiments in this area have been done in almost laboratory conditions. The results presented in this work have been obtained after conducting a number of trials in an area that resembles a park

### **STUDY QUESTION:**

Under the 7th framework program the European Commission funded a research project to develop, among other things, a set of first responder guidelines to enable them to be prepared and effectively respond to CBRN threats.

### **METHODS:**

this research was classified by the European Commission; however, the presentation will elaborate on the useful information resulting from these field experiments

### **RESULTS:**

The results have been cleared by the project's security scrutiny group and are intended to be used by emergency planners to best protect first responders who might be involved in a malevolent use of ionizing radiation

### **CONCLUSIONS:**

Knowledge of the three basis principles of radiation protection namely, time, distance and shielding will be more useful than sophisticated detection equipment Issues regarding contamination need to be thought of and addressed in the preparedness phase.

# Selective Shielding for Nuclear and Radiological Response Forces – Variable Condition Comparative Analysis

**Gideon Waterman**

*StemRad Ltd, Israel*

**Co-authors:** Oren Milstein

## **BACKGROUND:**

Until recently, emergency personnel lack wearable protection from gamma radiation and are therefore at risk of Acute Radiation Syndrome (ARS) or radiation-induced cancer when responding to a nuclear emergency. The 360 Gamma equipment, developed by StemRad, provides shielding arranged in the most efficient configuration to provide focused protection to the most sensitive tissue in the body, bone marrow, against gamma radiation which military and civil first responders would encounter during a nuclear event. It also concomitantly protects other organ systems which are especially sensitive to radiation-induced cancer. For high dose exposures (up to 10 Gy), bone marrow viability is the life-limiting factor for ARS which the equipment is extremely effective at mitigating. For lower dose exposures (<1 Gy), the equipment reduces the effective dose to the user by a significant margin in accordance with the radiation protection principle of keeping personnel doses As Low As Reasonably Achievable (ALARA).

## **STUDY QUESTION:**

How is the efficacy of the equipment impacted by scenario variable conditions (i.e. energy, geometry)?

## **METHODS:**

Resulting dose reductions to radiosensitive target organs were modeled using Monte Carlo n-Particle Code (MCNP) simulations with various source energies and geometries to reflect a wide range of conditions which may exist within nuclear event. ARS protection factors were defined as the factor by which the dose to a critical mass of active bone marrow is reduced by the equipment.

## **RESULTS:**

ALARA – relevant dose reductions due to the equipment were significant (41–26%). ARS protection factors were even more impressive and ranged from 2.5 to 1.6 (source energy and geometry dependent).

## **CONCLUSIONS:**

The dose reduction provided to the pelvic BM and other organs is more than sufficient to allow for hematopoietic recovery and avoidance of ARS mortality and significantly reducing stochastic effects. The analysis of the efficacy over a wider range of conditions validates the use of the equipment for any radiological response.

# FLED2 – The Forward Light Element for Decontamination of Patients and Personnel

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**Marie-Theres Pfalzgraf**

*Bundeswehr Medical Service Academy Division F – CBRN Medical Defense, Germany*

**Co-authors:** Kai Kehe, Roman Wölfel

## **BACKGROUND:**

Modern warfare, especially in CBRN settings, is characterized by the use of small and highly specialized units. Any attack on these forces will result in a limited number of CBRN casualties.

## **STUDY QUESTION:**

While CBRN decontamination capabilities for large-scale operations are well developed, particular requirements of above-mentioned sectors are not fully covered. Therefore, a novel approach for a highly mobile, all-in-one decontamination facility for patients and personnel was needed.

## **METHODS:**

Based on appropriated material, the German Bundeswehr developed a light and highly mobile prototype for decontamination of patients, personnel and personal equipment which can be rapidly deployed for small-scale operations in environments with limited resources.

## **RESULTS:**

This “Forward Light Element for Decontamination of Patients and Personnel” (FLED2) consists of two modules. The medical module is operated by seven medics including two paramedics. Up to two severely or four lightly injured and contaminated casualties can be decontaminated, medically treated and stabilized for further transport. The other FLED module may be used for decontamination of healthy personnel as well as small amounts of personal equipment and is run by seven CBRN soldiers. Both modules can be applied either separately or in a unified way as FLED2 with capability for patients, personnel and material at once. The FLED2 is run by a cooperation of four medics, including two paramedics, and three CBRN soldiers. With respect to limited personnel resources, this mixed team is able to provide a large spectrum of CBRN decon capabilities. A modular structure allows adaptation to different climate and environmental conditions.

## **CONCLUSIONS:**

The FLED2 system has been tested in several national and multinational CBRN exercises. It can be built up close to a CBRN incident or threat to implement a medical chain of rescue as well as modern opportunities for CBRN decontamination support of missions.

# **A global crisis threatening medical preparedness for nuclear and radiologic incidents is upon us, a collective voice is summoned to avert this grave danger to all people worldwide!**

**Raymond E. Swienton**

*University of Texas Southwestern, USA*

**Co-authors:** Cham Dallas, Kelly R. Klein, Lindsay A. Flax, E. Liang Liu, Curt Harris

Emergency medical personnel readiness for nuclear or radiologic incidents is in a crisis state. The in-jeopardy status of medical professionals to engage in response to a nuclear or radiologic incident was identified and published by members of our international workgroup. We established that the readiness for nuclear or radiologic incidents is deficient in several areas including an understanding of relative risk, identifying medical needs, and relevant education and training. Shockingly, many report an unwillingness to perform their professional duties. Why?

Continued investigation over the last 2 years identified an unexpected threat to medical preparedness for nuclear and radiologic incidents worldwide. Prominent publication by field-related academics touting that medical preparedness is futile and may even be dangerous are discouraging medical response preparedness. A collective voice supporting preparedness must be sounded, embraced by science and medicine. Action is needed to avert a crisis that places our citizens worldwide in grave danger!

Emergency medical personnel readiness for nuclear or radiologic incidents is in a crisis state, with many reporting an unwillingness to perform their professional duties in response to these incidents.

A new threat to readiness was identified, published claims that medical preparedness is futile and may even be dangerous in prominent publications.

A collective voice supporting preparedness must be sounded, embraced by science and medicine. Action is needed to avert a crisis that places our citizens worldwide in grave danger!



# The effectiveness of Loose Fitting Powered Air-Purifying Respirators for respiratory protection during chest compressions: A simulation study

**Soo Hyun Park**

*Samsung Medical center, South Korea*

**Co-authors:** Hee Yoon, Sung Yeon Hwang

## **BACKGROUND:**

The application of appropriate personal protective equipment for respiratory protection to health care workers is a cornerstone for providing safe health care in emergency department. We investigated the protective effect and usefulness of loose fitting Powered Air-Purifying Respirators (PAPRs) during chest compression.

## **STUDY QUESTION:**

Loose Fitting Powered Air-Purifying Respirators during chest compression are safe in high risk infectious patients in clinical situation?

## **METHODS:**

This was a single-center simulation study performed from May 2019 to July 2019 in a tertiary hospital. We measured the concentrations of ambient aerosol and particles inside the loose-fitting PAPR during chest compression, and this ratio was set as the simulated workplace protecting factor (SWPF). According to the National Institute for Occupational Safety and Health regulations, assigned protection factor (APF) of loose-fitting PAPRs is 25. Therefore, the loose-fitting PAPRs was assumed to have a protective effect when the SWPF  $\geq 250$  (APF \* 10). We measured the SWPF of PAPR in real-time during chest compression and also investigated the problems encountered during its use.

## **RESULTS:**

Ninety-one participants completed the simulation. 67% of participants were female and median age was 29 (IQR: 26–32) years. None of the participants failed with SWPF below 250 during three sessions of chest compression. The median (IQR) values of SWPF at three cycles were 17,063 (10,145–26,373), 15,683 (9,477–32,394) and 16,960 (7,695–27,279), respectively. There was no disconnection of equipment or mechanical failures during chest compression. In addition, most of participants (83%) replied that they rarely or never experienced difficulty in verbal communication and felt that loose fitting PAPR was comfortable.

## **CONCLUSIONS:**

The loose fitting PAPRs afforded sufficient respiratory protection without disturbances during chest compression.

## EU Bio-preparedness and Response: The role of ECDC

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### Vicki Lefevre

*European Centre for Disease Prevention and Control (ECDC), Sweden*

One of the core functions of ECDC is to support the European Union in preparing and responding to public health threats caused by infectious diseases, naturally spreading or deliberately released. Emergency preparedness activities support the European Commission in the implementation of Decision 1082/2013 on Serious Cross-border Threats to Health, with organization of simulation exercises, bio risk training and countries' system assessment through after-action reviews. A central activity to support the response to outbreaks includes the production of rapid risk assessments. The assistance to EU member states and third countries is also managed through deployments of experts in the field in collaboration with DG ECHO and GOARN, and by operating the ECDC Emergency Operation Centre.

# Lessons Learned from 28 Hospitals and City Agencies: Pediatric Disaster Exercise

**Michael Frogel**

*New York City Pediatric Disaster Coalition, USA*

**Co-authors:** Arthur Cooper, John Jermyn

## **BACKGROUND:**

Children are frequently victims of disasters. However, gaps remain in pediatric disaster preparedness. The New York City Pediatric Disaster Coalition (NYCPDC) is funded by the NYC Department of Health and Mental Hygiene (DOHMH) to prepare NYC for mass casualty events that involve large numbers of children. The NYC PDC conducted a functional exercise testing surge, communications, and secondary transport. Participants included 28 NYC hospitals, the NYC Fire Department–Emergency Medical Services (FDNY-EMS), NYC Emergency Management (NYCEM), NYC DOHMH and the NYC Medical Reserve Corps (MRC).

## **STUDY QUESTION:**

Will conducting a citywide pediatric disaster exercise, evaluation and after-action activities yield useful information on surge planning to assess current preparedness and to develop lessons learned?

## **METHODS:**

The hospitals and agencies participated in group and individual planning meetings. Scenario-driven, operations-based activities challenged participants to employ their facility's existing pediatric surge and secondary transport plans during an event. The Exercise assessed: Communications, Emergency Operation Plans, Surge, Patient Tracking, Patient Transfer, Supplies and Staffing. Internal and external evaluators assessed the exercise performance.

## **RESULTS:**

An After-Action Report was written based on information from evaluation data, site specific and group hot-washes, and an after-action conference. Strengths included meaningful improvement of plans before/after the exercise and doubling pediatric critical care capacity through implementation of the exercise objectives. Challenges included: gaps in communication/patient tracking, lack of sufficient sub-specialty support, the need for "baby-sitters" and inadequate supplies of blood products and ventilators.

## **CONCLUSIONS:**

Conducting a multi-hospital and agency pediatric specific exercise demonstrated current planning and produced lessons learned to address planning and training gaps that can improve citywide planning and capabilities during future full-scale exercise and real-time events.

# Epidemiological Aspects and Hospital Preparedness for Hurricanes in Florida, USA

**Mauricio Lynn**

*Ryder Trauma Center Jackson Memorial Hospital University of Miami, USA*

**Co-author:** Enrique Ginzburg

## **BACKGROUND:**

For many years, the State Florida has been affected by multiple hurricanes. Community and hospital preparedness in Florida, for this type of disaster, is considered to be among the best in the United States.

## **STUDY QUESTION:**

To learn the epidemiological distribution of hurricane-related injuries and its impact on hospital preparedness.

## **METHODS:**

Search of hospital database of hurricane-related injuries one week prior to hurricane arrival and 2 weeks after hurricane departure.

## **RESULTS:**

A hurricane disaster has three distinct phases: 1. Pre-arrival and preparation: 1–7 days prior to impact 2. Hurricane impact: 12–48 hours 3. Post hurricane rescue and recovery: 1– 4 weeks During the pre-arrival phase, injuries are related to evacuation and preparation activities. Falls from ladders during window shutter installation, interpersonal violence, and motor vehicle crash related injuries are prevalent. During the impact phase, the total number of trauma victims presenting to hospitals is actually lower, since people are sheltered and EMS suspends services due to road safety considerations. Most hurricane-related injuries occur during the post-hurricane rescue and recovery phase over a protracted period of time. Falls from height, power tool related injuries, and interpersonal violence are common. A significant number of burn injuries due to propane camping stoves and grills use during post-hurricane power outages occur as well. One third of patients with hurricane-related injuries require operative interventions with 49 % orthopedic procedures, 34 % trauma operations and 19 % other procedures. Personal and hospital planning in preparation for hurricanes, requires unique considerations. Essential medical personnel are grouped into Team A, which remains on site during the impact phase and Team B, which will relieve Team A as soon as local travel is deemed safe. Logistical planning includes: Fuel supplies for backup power generators for several days to weeks; Medical supplies to guarantee full hospital operations for 2 – 4 weeks; Food supplies and drinking water for patients, staff and families for at least 2 weeks. Gradual return to normal operations takes place over several weeks and it takes into consideration a protracted surge of trauma patients presenting with injuries related to recovery and reconstruction activities.

## **CONCLUSIONS:**

Planning for hurricanes has three distinct phases: Pre-arrival, impact, rescue and recovery. Most injuries occur during the post-hurricane rescue and recovery phase. Personal planning in preparation for hurricanes requires unique considerations. Fuel, food, water and medical supplies are the major logistical concerns for hospital planners.

# Designing a national Emergency Department patient medical record for use in Mass casualty events

**Hila Grunbaum**

*Ben-Gurion University of the Negev, Sheba Medical Center, Israel*

**Co-authors:** Dagan Schwartz, Odeya Cohen

## **BACKGROUND:**

A Mass casualty event MCE is defined as an acute event in which casualties' number and needs exceed available resources. As timing and event characteristics are usually unpredictable, the health system's response needs to be rapid, based on pre-written protocols and practices. The main challenges of managing an MCEs in hospitals, is identification of most urgent patients and administration of appropriate care while providing continuity of care for the individual patient and ensuring situational-awareness for managers. In Israel, Medical centers use dedicated ED MCE patient records (PR). Currently, these records aren't uniform

## **STUDY QUESTION:**

To examine documentation needs during MCE, aiming to design a standard national PR template for use in all Israeli hospitals during MCE's.

## **METHODS:**

A mixed-method research was conducted in collaboration with the Ministry of Health' Emergency Management Division. Qualitative phases included analysis of current PR and semi-structured expert interviews. In the quantitative stage, a questionnaire developed and distributed to MCE specialists throughout 26 medical centers. The research focused both on PR' content and form. The abstract describes the first phases of an ongoing research project.

## **RESULTS:**

20 core components were identified in currently utilized PRs. A mental health component appeared in only 34.6% of PR templates. According to the interviews, PRs need to be clear and easy to understand and use. Based on the questionnaire (N=44), patient identification components and care documentation were found to be the most important. 43% of participants ranked that using PR highly contributes to secure treatment. 45% mentioned the use of PR template assist in maintaining continuity of care. 75% stated that technological means should be implemented in future PRs.

## **CONCLUSIONS:**

A research based unified PR may assist to provide care and management during MCE, contributing to standardization. The implementation of technological means in the PR should be considered.

## Disasters and Diseases: A low-fidelity, low-cost, board game model for tabletop simulation

**Deena Wasserman**

*Cooper University Hospital, USA*

**Co-authors:** Kelly Holz, Ari Schwell

Opioid use disorder is one of the leading epidemics in North America. Pre-hospital providers interact with patients trapped in the cycle of overdose, naloxone rescue, and self-medication for withdrawal symptoms, which they are unable to break and contributes to provider burnout. New Jersey recently became the first state in the US to allow paramedics to administer buprenorphine, a form of therapy that has been shown to treat withdrawal and reduce mortality in patients with a history of opioid overdose. We developed an educational curriculum in our EMS system addressing compassion fatigue and opioid use disorder, as well as a new pre-hospital buprenorphine treatment protocol. This has given our paramedics tools to break the cycle and, in turn, increased their engagement and job satisfaction. This novel initiative is an example of how leaning-in to a challenging patient population may be part of the answer in building provider resilience and decreasing burnout.

- ♦ A program initiating treatment for opioid withdrawal by paramedics in the field is the first of its kind in the United States
- ♦ Compassion fatigue is rampant in our field, which is defined by high-stress, high-stakes environments, and is compounded in patients where we have little control over the outcome of their diseases; addiction being a prime example
- ♦ Many providers try to disengage and disconnect from these patients as a coping mechanism, but this may simply contribute to their burnout
- ♦ Program that provide opportunities to lean-in and engage challenging patients such as these as may contribute to provider resiliency, as it provides additional tools to affect the outcomes of these patients and can directly combat compassion fatigue.

# A Hospital Open Decontamination Facility for Hazardous Materials (HAZMAT) Mass Casualties

**David Teng**

*Tan Tock Seng Hospital, Singapore*

## **BACKGROUND:**

In today's modern world, there have been various threats to civilian security and safety. The use of chemical agents in Hazardous Materials (HAZMAT) incidents is one such public health issue that needs to be addressed as part of disaster preparedness and national security. A key process in management of such incidents includes that of mass decontamination of casualties who arrive at a tertiary healthcare facility.

## **STUDY QUESTION:**

To evaluate the Tan Tock Seng Hospital (TTSH) Open Decontamination Facility (ODF), which serves a tertiary healthcare facility in Singapore as part of its emergency preparedness and disaster management.

## **METHODS:**

The ODF was constructed as a part of the hospital's response to chemical incident. Special considerations included the need to manage a large crowd arriving within a short period of time, perform thorough decontamination expediently, dealing with medical emergencies during decontamination, and the ability to screen casualties to ensure they were clean prior to arrival within hospital premises. Various lanes were designed to deal with ambulatory patients and patients lying on trolleys, with each lane separated into 3 discrete sections – disrobing area for removal of contaminated clothing and personal property, decontamination, and re-robing area.

## **RESULTS:**

The ODF has 7 trolley shower lanes and 5 ambulatory shower lanes, presenting an ability to decontaminate 42 trolley patients and 100 ambulatory patients every hour when running at full capacity. There are also rooms for hasty decontamination to be conducted while set up of the ODF is being completed. Rapid deployment of the ODF facilities can be easily performed with one staff activating a control panel. Lanes are also screened off with opaque plastic screens to ensure privacy and prevent cross contamination of patients during decontamination. Challenges faced include the difficulty in ramping up manpower to cope with the increased demands within a short period of time, dealing with persistently contaminated chemical and radiation disaster casualties, ensuring good command and control with adequate communications in a large facility and staff training and education for dealing with HAZMAT incidents.

## **CONCLUSIONS:**

The Tan Tock Seng Hospital (TTSH) Open Decontamination Facility (ODF) is an important decontamination facility for contaminated casualties who present from HAZMAT disasters. It will continue to be a key part of the national and hospital disaster management and emergency preparedness plans, as we continue to ready ourselves to meet the demands of the future.

# Elephants, Dogs and People: A Story Of “One Health” In Clinical Trauma Management

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**Anne Hale**

*Cellphire, USA*

**Co-author:** Michael Fitzpatrick

Efficiencies of scale are paramount in the practice of clinical elephant medicine! When your patient is 500kg dose, administration route and ease of use are key to success. The clinical development of Thrombosomes® and StablePlate RX®, species specific activated platelet products show the benefit when veterinarians, research scientists and doctors work together. Co-development of the veterinary platelet product for elephants and dogs has demonstrated efficiencies in preclinical, regulatory and clinical application for the human product. Evaluating the similarities in physiologic response to injury as well as response to treatment, veterinarians and physicians can focus on biopharmaceutical development without sacrificing data integrity or animal life. The progression of veterinary clinical medicine allows for direct comparators when studying far forward trauma and critical care management.

What does the elephant teach us? The dose should be compact, administration must be fast and shelf stable for use when the rare elephant needs hemostatic efficacy.

Thrombosomes®, a human activated platelet product, and StablePlate RX®, an activated platelet product for dogs and elephants, demonstrate the efficiency of “One Health”.

The progression of veterinary clinical medicine allows for direct comparators when studying trauma and critical care resuscitation in field conditions.



# A New Computerized Review Tool for Use in General Hospital's Drills in Israel

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**Sergey Nazarov**

*Head of hospital preparedness sector, Medical Department, Home Front Command, Israel*

## **BACKGROUND:**

The Hospital Preparedness Branch at the Home Front Command is responsible to teach, train and test general hospitals in Israel to respond to various emergencies, and this is done by large scale drills that are done every year. Those drills are viewed and reviewed by a control team consists of personnel from the HFC, the MOH, and a colleague hospital. However, due to a large set of parameters on the review questionnaires, at the end of the drill, it is hard to evaluate the overall performance of the hospital.

## **STUDY QUESTION:**

Can a computerized questionnaire be implemented? Will it help to reflect the overall performance at the end of the drill?

## **METHODS:**

The Hospital Preparedness branch (with support with information system professionals) developed a system of computerized questionnaires for each of the practiced scenarios in hospitals. Those questionnaires are accessed and filled via Google Forms on every cellphone and at the end of the drill all the information is gathered and analyzed on a designated system (TIBCO Spotfire based).

## **RESULTS:**

The computerized questionnaires were implemented during 2019's drills, and nowadays, all of the drills are reviewed and scored in real-time by the review team. At the summary of the drill, a colored scheme is presented to the practicing hospital, showing its strengths and its weaknesses.

## **CONCLUSIONS:**

We presented a simple computerized tool that helps to improve the effectiveness of the feedback that is presented to the practicing hospital teams.

# Implementation of Novel Remote Damage Control Resuscitation Techniques

**Roy Nadler**

*The Trauma and Combat Medicine Branch, SurgeonGeneral's Headquarters IDF, Israel*

**Co-authors:** Avishai Tsur, Jacob Chen, Avi Benov, Elon Glassberg

## **BACKGROUND:**

Care protocol for a bleeding casualty has changed substantially in the past decade. In the prehospital setting, remote damage control resuscitation focuses on limiting crystalloids' volume while providing available blood products. The Israeli Defense Forces Medical Corps (IDF-MC) adopted tranexamic (TXA) acid in 2012 as a bleeding control adjunct and Freeze-Dried Plasma (FDP) as the resuscitation fluid of choice in 2013 used by physicians and paramedics, thus alleviating the need for crystalloids transfusion.

## **STUDY QUESTION:**

Did the Clinical Practice Guidelines change prehospital treatment?

## **METHODS:**

Casualties treated by the IDF-MC personnel are recorded in the IDF trauma registry (ITR), a unique prehospital trauma registry. All records in the ITR between January 2013 and October 2018 were included.

## **RESULTS:**

Data were extracted for 10,442 trauma casualties between January 2013 and October 2018. During this time, 202 patients were transfused with FDP as a resuscitation fluid, 530 patients were treated by TXA, and 1,273 patients received Hartmann's solution. During the study period, the ratio of patients transfused with FDP gradually rose from 1% (16/1470) in 2013 to 5% (34/740) in 2018 ( $p<0.01$ ). The ratio of patients transfused with crystalloids dropped from 17% (245/1470) in 2013 to 8% (63/740) in 2018 ( $p<0.01$ ). For patients treated with crystalloids, mean volume decreased from  $667 \pm 402$  ml during 2013 to  $469 \pm 206$  ml during 2018 ( $p<0.01$ ). TXA use did not change significantly during the study period, from 7% (98/1470) during 2013 to 5% 40/740 during 2018 ( $p=0.29$ ).

## **CONCLUSIONS:**

Accumulated data suggest the beneficial effects of early plasma transfusion as well as the harmful effect of crystalloids. The IDF-MC has adopted RDCR paradigms with widespread implementation of prehospital point-of-injury FDP transfusion as the resuscitation fluid of choice for advanced life support providers, thus replacing other volume expanders. The current study demonstrates the slow yet persistent implementation of RDCR principles throughout the IDF.

# Using machine learning tools to provide real-time casualties information during mass casualty incidents

**Yuval Bitan**

*Ben-Gurion University of the Negev, Israel*

**Co-authors:** Aharon Bar-Hillel, Omer Perry, Adi Meidan, Ana Yakovlev, Eli Jaffe

## **BACKGROUND:**

Reliable information about the amount of casualties is a critical for EMS (Emergency Medical Service) team leaders during MCI (Mass-Casualty incident). Lessons learned from past MCI's indicate that information gaps could increase mortality.

## **STUDY QUESTION:**

To improve the information available during MCI we are developing a new instrument that can analyse MCI scene in real-time, and provide reliable information both to MCI team leaders at the scene, and to the managers at the command center.

## **METHODS:**

To achieve this goal we developed a deep-learning algorithm that analyse video feed that is captured from a small drone that will hover above the MCI scene. The algorithm is trained using Mask R-CNN neural-network to learn from images of casualties in MCI scene. The trained algorithm will be able to analyse the images captured from the drone, and provide information about the amount of casualties it identifies at the scene.

## **RESULTS:**

We have tested the algorithm on images captured by a small drone during MCI simulation drills that Magen-David-Adom performed together with Ben-Gurion University of the Negev.

## **CONCLUSIONS:**

Once available for operational use, this algorithm can be used on autonomous drones that can be carried by EMS ambulances.

# How we deal with pediatric patients in earthquake: A comparison of four triage methods

**Run Lin**

*West China Hospital of Sichuan University, China*

**Co-authors:** Enjiang Lai, Kexin Zhou, Hai Hu

## **BACKGROUND:**

The main contradiction of emergency medical rescue in disaster is the mismatch between the limited medical resources and mass casualties. A simple, accurate and fast triage method is supposed to be a feasible solution to this problem. However, compared with predictable natural disaster like hurricane and flood, earthquake, with its unpredictability, tends to cause more damage to people, especially to pediatric patients who have a lot of anatomy and physiology differences from adults. Therefore, a special triage method for pediatric patients is quite important to reduce casualties.

## **STUDY QUESTION:**

This research aims to evaluate the values of four triage methods in evaluating trauma pediatric patients and to find an effective triage method for pediatric patients in earthquake.

## **METHODS:**

retrospective analysis was conducted on 1259 trauma pediatric patients from the Earthquake Casualty Database. The pediatric patients were assigned to a triage level or score respectively using several methods including PPATS, PHI, and JumpSTART. These triage methods are then assessed based on the severity of the pediatric patients appraised through ISS (Injury Severity Score) and ICU acceptance, using area under the receiver-operator curve (AUC). Correlation analyses were also conducted among these triage methods and ISS score of the patients.

## **RESULTS:**

For the injury severity based on ISS score (ISS<sup>315</sup>), AUC of PPATS, PHI, and JumpSTART reflected as 0.564, 0.581, 0.503. The AUC of JumpSTART is significant different from that of PHI and PPATS. (P=0.43) However, there is no significant different between the AUC of PHI and PPATS. (P=0.19) For ICU acceptance, AUC of PPATS, PHI, JumpSTART and ISS revealed as 0.713, 0.606, 0.514, 0.739. These were no significant differences between ISS and PPATS(P=0.63), PHI and JumpSTART (P=0.06). All other comparisons proved significant differences.

## **CONCLUSIONS:**

PPATS is potential to be the triage method for pediatric patients in earthquake.

## Aviation Disaster Response – Maximal Response and Maintained Routine

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**Eli Jaffe**

*Magen David Adom, Israel*

**Co-authors:** Roman Sonkin

### **BACKGROUND:**

Magen David Adom (MDA), Israel's national rescue organization is responsible for preparing and responding to national disasters including aviation disasters. MDA protocols state that in preparation to extreme aviation emergencies the initial response will be the maximal response. At 14:30 on 01/07/2019 MDA received notice from the Israeli Airports Authority (IAA) about an airplane carrying over 150 passengers which had taken off from Germany and left part of its tire on the runway. The IAA stated that the airport is preparing for an airplane crash. The full MDA response was automatically dispatched to the airport to begin preparing for an airplane crash and the corresponding MCI.

### **STUDY QUESTION:**

Does the MDA protocol for aviation disaster response impede its response to routine emergencies?

### **METHODS:**

A Mann-Whitney test was conducted to compare response times to routine emergencies in the regions surrounding the airport between aviation disaster response period (since the declaration of the emergency at 14:30 and until its resolution at 16:30) and compared them to a control period.

### **RESULTS:**

There was no significant difference in response times between aviation disaster period ( $H(2)=0.43$ ,  $p=0.51$ ).

### **CONCLUSIONS:**

The protocol implemented by MDA in Israel during aviation disasters is designed to maximize lives saved during disasters. MDA first responders and inter-regional aid allow routine to be maintained effectively even though over 80 ambulances were dispatched to the airport in preparation to a potential aviation disaster.

## Wearable Drills – Sometimes Low-tech is High-tech, High-Fidelity Cost-Effective Injury Simulation in Multi-Casualty Incident Drills

**Raphael Herbst**

*Magen David Adom, Israel*

**Co-authors:** Roman Sonkin, Eli Jaffe

### **BACKGROUND:**

Drills create an environment which provides the closest feeling to real-life Multiple-Casualty Incident (MCIs). Makeup is used to create a good simulation of reality but is expensive and time consuming.

### **STUDY QUESTION:**

Is Printed clothing better than makeup in MCI drills.

### **METHODS:**

Magen David Adom (MDA), Israel's national rescue organization, has printed images of injuries and vital signs on shirts, pants and hats to be used as simulation. These were used in drills as part of the international First 7 Minutes project, in which MDA instructors are teaching communities around the world how to act during the first minutes of MCIs. MDA instructors were debriefed afterwards and answered a survey by using Likert scale (1-7).

### **RESULTS:**

MDA instructors reported clothing drills as easier to prepare compared to makeup drills ( $x=6.86$ ) and take less time to prepare ( $x=7$ ) – up to 3 minutes for distribution and wearing of the clothing in a drill of up to 20 participants, compared to makeup of 20 people in over 90 minutes. The cost of one clothing item is \$10 and the cleaning costs are negligible, and they reported being able to easily relate to the clothing ( $x=6.42$ ).

### **CONCLUSIONS:**

Makeup is limited to external accessible parts usually limbs and not torso or over disposable clothing. Compared to printed clothing, which can be worn below one's clothing to simulate hidden injuries. While makeup is more realistic, it requires injury tags matched to appropriate makeup. Clothing is cost-effective as it can be used multiple times while makeup needs to be purchased and created each time. Unlike makeup, clothing does not require redoing and allows for multiple drills in the same session.

## Train accident in the middle of nowhere

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**Mario Di Gennaro**

*German Red Cross - Frankfurt am Main, Germany*

**Co-authors:** Leo Latasch, Markus Jenki

### **BACKGROUND:**

As part of a federal research project (SIKET) which deals with the safety in railway tunnels, a simulation of a train accident was carried out in a tunnel with approx. 150 passengers. The train was stopped in the middle of the tunnel and a wall of smoke was used to simulate a starting fire. Approximately 70% of the passengers evacuated themselves. The rest was actively rescued by emergency services.

### **STUDY QUESTION:**

How do passenger react in case of a fire after being alerted and told to evacuate the train ? How do rescue workers interact with passengers under the conditions inside a tunnel (dark, loud, fire) ? What information is available in the rescue chain at different times and places ? If leadership deficits occur, can observers recognize them ?

### **METHODS:**

The exercise was carried out on the basis of the existing tunnel rescue concept of the state of Thuringia for the Flachberg Tunnel. Tunnel rescue concepts differ from each other in the construction and localization of the tunnels.

### **RESULTS:**

It is still evident that the self-rescue of the lightly injured passengers represents the largest proportion of rescued patients. It also shows that abroad of bigger cities where it can take up to 60 minutes to bring appropriate forces to the point of damage, supply deficits occur. If possible problems occur in the communication chain, the result will be an extremely delayed care and treatment of seriously injured persons.

### **CONCLUSIONS:**

Only through full scale exercises with standardized observation and evaluation, deficits in already existing concepts can be discovered and adapted. In a full scale exercise including fire in a train and stopping in a tunnel, significant deficits in the care of those affected and injured were visible. Problems were mostly seen in the chain of command and weakness of leadership which accumulated to a delay of treatment of injured passengers.

## **ACSo – Acute Care–Sorting Prioritization of care–measures for affected in the acute–phase of disaster–relief situations**

**Carola Behling**

*Federal Ministry of Education and Research, Germany*

**Co–author:** Jürgen Schreiber

### **BACKGROUND:**

Major disasters nowadays cause a huge amount of affected persons. Natural disasters like floods, storms or snow disasters, industrial breakdowns like blackouts, etc., but also civil protection situations determine spontaneous threats and damages which poses harm to persons concerned. They need immediate help and support and often mid- and long-term assistance. Obviously all the affected persons need the support simultaneously – according to their specific needs.

### **STUDY QUESTION:**

Currently there is no classification system to priorities the performance of care which occurs during the acute phase of a major damage situation. Because of this, the DGKM e.V. started in 2017 at the European Civil Protection congress in Berlin, a project under the direction of the general secretary.

### **METHODS:**

Based on research which demonstrated the deficit, a procedure was developed with an algorithm and a victim card.

### **RESULTS:**

In general, the bigger the emergency situation and the amount of affected persons, as bigger is the supply gap in the acute phase of the situation. We realize that most of the persons concerned have a requirement of care which could not be more differently. A reasonable care even in the acute phase must be ensured for the persons concerned.

### **CONCLUSIONS:**

With the development of a classification system, containing the key questions, a sorting algorithm and the prioritization in our care performance catalogue, all providers of care service in civil protection, in social welfare work and social work will receive an evaluation tool for the acute phase as a professional situation assessment and for the organization of the entire mission with a huge amount of affected persons.



# Experts' Views on the Gaps in Public Health Emergency Preparedness in Israel: A Qualitative Case Study

**Anat Gesser-Edelsburg**

*University of Haifa, Israel*

**Co-authors:** Ricky Cohen, Alon Diamant

## **BACKGROUND:**

Despite the significant improvement in all components of preparedness in the past decade, there are still gaps between the guidelines and the reality on the ground.

## **STUDY QUESTION:**

The purpose of this study is to explore how Israeli public health and emergency medicine experts perceive the demands for health organization emergency preparedness and the actual situation on the ground.

## **METHODS:**

Qualitative phenomenological research. We interviewed 23 Israeli public health and emergency medicine experts face-to-face and conducted a content analysis.

## **RESULTS:**

The findings revealed barriers in the following areas: preparation and readiness of hospitals, preparedness and readiness in the community, connection between the community and the hospital, inter-agency coordination and interface, interdisciplinary integration, preparedness resources, post-crisis evaluation, assimilating smart technologies, information accessibility and communication.

## **CONCLUSIONS:**

In order to reduce the gap between theory and practice, retrospective research and evaluation must be included in order to learn in depth what strategies and resources should be used during a health crisis. Likewise, profiles should be constructed and the community should be segmented in order to design resilience programs and accommodate information to sub-populations.

# Emergencies Preparedness and Response Capacities- Spearheading National Public Health Functions

**Dorit Nitzan**

*Division of Health Emergencies and Communicable Diseases, WHO Regional Office for Europe, Denmark*

**Co-authors:** Nicolas Isla, Tanja Schmidt, Ardita Tahirukaj, Haris Hajrulahovic

## **BACKGROUND:**

There is a recognized need for resilient health systems built on the integration of health security, emergency preparedness and health system strengthening efforts. However, operationalizing this integration remains a challenge. The capacities required to implement the International Health Regulations (IHR) (2005) are embedded into all Essential Public Health Functions (EPHFs). Therefore, accelerating activities aimed at health emergencies prevention, preparedness, response and recovery could lead and guide the actions needed to strengthen the health systems towards universal health coverage (UHC). Maintaining resilient and well-prepared health systems, with robust emergency policies supported by strong public health functions, is critically linked to UHC and meeting the health-related SDGs.

The State Parties Annual Reporting (SPAR) on the status of core capacity implementation, which is obligatory under IHR, and the package of voluntary tools, such as the Joint External Evaluation (JEE) provide valuable data on countries' status and progress to prevent, detect and respond to public health threats.

While, post JEE planning and conceptual analysis show clear entry points to operationalize health systems and health security integration. For health security investment to co-benefit health systems requires meaningful joint planning.

## **STUDY QUESTION:**

How can countries be guided by the results of the IHR (2005) monitoring and evaluation tools to improve their EPHFs and health system performance towards UHC?

## **METHODS:**

Data on IHR (2005) core capacities included in SPAR from the 53 Member States in the WHO European Region, will be used to examine the association with findings from EPHFs assessments and other available assessments of health system functions and UHC. In countries where both SPAR and JEE scores are available, the lowest scores will be used.

## **RESULTS:**

The data collected on the IHR (2005) capacities provide important information relevant to some elements of the health systems' functions.

## **CONCLUSIONS:**

Investment in health security and health systems strengthening should be a single integrated package for countries, reflected in all relevant legislation and strategic documents. The SPAR and the voluntary IHR (2005) assessments are necessary to diagnose the gaps present in a health system related to the prevention, response and recovery from an emergency with health consequences. However, areas that are found to be weak would require the use of specific, in-depth evaluations.

## Children as Bellwethers of Disaster Readiness and Recovery

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**Irwin E. Redlener**

*Columbia University, USA*

Children are not "small adults" and require different strategies through all stages of disasters including planning for, responding to and recovering from large-scale disasters. Material differences from adults are physiological, medical and psychological/ developmental. This presentation will (a) highlight the important differences between adults and children, and (b) assert that the more effective the recovery from disasters from the perspective of children returning to normal or a "new normal", the more likely it is that the whole community is recovering appropriately.

1. It is essential that disaster planners and responders appreciate the fact that "generic planning" not accounting for the needs of vulnerable populations, including children, is far less likely to be successful than planning that incorporates the needs of vulnerable people from the onset.
2. Monitoring recovery progress would be substantially enhanced by focusing on how rapidly and effectively stability and return to "normal" is manifesting for children.

# Creating an Outbreak Observatory to Facilitate the Conduct of Operational Research

**Lucia Mullen**

*Johns Hopkins Center for Health Security, USA*

**Co-authors:** Diane Meyer, Jennifer Nuzzo

## **BACKGROUND:**

Operational research conducted during outbreaks and other health emergencies can help capture important, ephemeral data that can improve future preparedness and response efforts; however, this data is often not collected as responders must focus limited resources on response operations.

## **STUDY QUESTION:**

What are the operational challenges, lessons learned, and proposed solutions encountered during responses to public health emergencies, and how can these be shared with the broader public health community? What are the resources required to conduct outbreak preparedness and response activities, and how can we better advocate for them?

## **METHODS:**

The Johns Hopkins Center for Health Security's Outbreak Observatory partners with organizations involved in outbreak preparedness and response activities to collect, analyze, and share operational lessons learned with the broader public health community to improve international and national response plans and practices and to support efforts to advocate for the resources needed for robust response activities. Observations are conducted either in person or remotely via telephone. Collaborators have included health departments, national governments, and universities.

## **RESULTS:**

Current and completed observations include Uganda's Ebola preparedness and response activities, Candida Auris outbreaks in New York State, and the seasonal influenza mass vaccination program in Taiwan. Areas of interest have included: strategies to limit disease transmission, surveillance, public communication and engagement, medical countermeasure dispensing, and the resources and infrastructure required to maintain and implement preparedness and response programs.

## **CONCLUSIONS:**

Outbreak Observatory fills gaps in existing health security literature by sharing experiences, challenges faced, lessons learned, and solutions implemented of practitioners involved in responses to public health emergencies.

# The Importance of "Coordination Headquarter for Healthcare and Medical Support"

**Tomoki Nakamori**

*Japanese Trial for Disaster Response, Department of Disaster Medicine, Japan*

**Co-authors:** Tatsuhiko Kubo, Yoshihisa Kondo

## **BACKGROUND:**

In Japan, since Hanshin-Awaji Earthquake in 1997, we had focused to bring the emergency medical team (EMT) as soon as possible to the affected area. However, after the Great East Japan Earthquake in 2011 and Kumamoto Earthquake in 2016, the importance of supporting the healthcare systems in the affected area has been realized.

## **STUDY QUESTION:**

In 2017, the Ministry of Health, Labor and Welfare decided to establish "Coordination Headquarter for Healthcare and Medical Support Needs" transiently in the affected area. The expected role of this headquarter is the "Coordination" for the disaster response team including EMTs, the public health nurse, and the healthcare systems.

## **METHODS:**

In 2018, Japan had heavy rain and flood in Okayama and Hiroshima prefecture. Under the "Coordination Headquarter for Healthcare and Medical Support", EMTs and public health teams gathered the information for medical, health, water, sanitary and hygiene.

## **RESULTS:**

The headquarter analyzed and used these data for following response. Especially, J-SPEED (Japan - Surveillance in Post Extreme Emergencies and Disasters), which is also introduced into WHO as the name of MDS (Minimum Data Set), is demonstrated to be quite useful for gathering and analyze both medical and public health data. By using this J-SPEED, we can decide how many and what kind of teams we should mobilize and how long we should operate these teams.

## **CONCLUSIONS:**

Thus, the "Coordination Headquarter for Healthcare and Medical Support Needs" plays the important roles to improve the shelter circumstances and reduces the psychological problems.

# Georgia Infectious Disease Transportation Network

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## Alyssa Ragan

*University of Georgia Institute for Disaster Management, USA*

**Co-authors:** Curtis Harris, Jim Zerylnick, Kelli McCarthy

### **BACKGROUND:**

Following the 2014 Ebola Outbreak, the Georgia Department of Public Health formed the Georgia Infectious Disease Transportation Network (IDTN) to train, equip, and coordinate emergency medical services (EMS) agencies to transport highly infectious disease (HID) patients. Georgia has identified 15 IDTN services across the state who are responsible for maintaining trained teams. The IDTN training program includes four different levels of courses available to all EMS responders in Georgia. These include an online Awareness Course, a one-day Operations-Level Course, a two-day Technician-Level Course, and a one-day team-based, Advanced Skills Course. Each course trains EMS responders how to safely identify and care for HID patients through classroom lectures and practical hands-on skills training. In addition to the courses, IDTN services are required to conduct drills and trainings to hone the skills of their teams and ensure a state of operational readiness.

### **STUDY QUESTION:**

How do first responders prepare for and prevent the spread of highly infectious diseases?

### **METHODS:**

In-person classes, written pre and post-tests

### **RESULTS:**

Since 2014, over 500 first responders across the state of Georgia have received hands-on training from clinicians and subject matter experts.

### **CONCLUSIONS:**

The IDTN courses incorporate both classroom lectures and practical hands-on skills training including proper donning/doffing techniques, disease precautions, and team building activities. All of these processes are crucial in the preparation for transport, during transport, and following the transport of a highly infectious disease patient.

# Increasing Emergency Department Surge Capacity in an Infectious Disease Outbreak

Fua Tzay-Ping

*Singapore General Hospital, Singapore*

**Co-authors:** Juliana Poh, Sanda Thangarajoo, Chiu Peng Cheong, Muqtasidatum Binte Mustaffa, Ivy Tay, Chin Siah Lim

## **BACKGROUND:**

The Department of Emergency Medicine (DEM), Singapore General Hospital, is a tertiary hospital with an average daily attendance of 350 patients. The DEM is always functioning at almost full capacity. After the SARS outbreak in 2003, all emergency departments in Singapore established “fever zones” within existing clinical space to attend to patients presenting with flu-like symptoms. However, due to its limited capacity, there is concern that the fever zone will not be sufficient to handle patients in an infectious disease outbreak.

## **STUDY QUESTION:**

Can the DEM capacity be expanded for clinical operations in an infectious disease outbreak?

## **METHODS:**

A team comprising representatives from Hospital Preparedness & Response, Nursing, Operations, Infectious Diseases, Infection Prevention and Epidemiology, and DEM studied various locations of the hospital campus for suitable DEM expansion sites. A public multi-storey parking facility 750 metres away from DEM was finally chosen. Conceptualisation, renovation and validation of the infrastructure and workflow was carried out over a period of two years. Quality of care, staff and patient safety in an outbreak were emphasized in planning. Examples are adequate ventilation, minimum distance between patients and assigned staff rest areas. Additional medical support from inpatient teams was drafted to augment DEM’s existing manpower. The processes were then validated with tabletop exercises and full-scale exercises.

## **RESULTS:**

A multi-storey clinical area can be set up within three days when there is an infectious disease alert. With repeated drills, staff were familiarized with the clinical processes from triage, specimen taking, radiological imaging, dispensing medication, to admission and discharge.

## **CONCLUSIONS:**

The peacetime multi-storey parking facility serves well as a separate clinical area in infectious disease outbreaks. This effectively boosts DEM surge capacity. Staff training and familiarization with workflow must be conducted regularly for smooth execution.

# Hazard Identification and Risk Assessment – Analysis of a Risk Assessment Process in Emergency Preparedness

**Katarina Garpenfeldt**

*University of Gavle, Sweden*

## **BACKGROUND:**

A crucial yet challenging component of emergency planning is to identify relevant hazards and assess their risk levels as they relate to support resource allocation. Risk assessment methodology requires subject matter expertise. The lack of knowledge among decision and policy makers can negatively impact the quality of hazard and risk management, further exacerbating the associated challenges. In Ontario, Canada, legislation requires governmental emergency management stakeholders to use the Hazard Identification and Risk Assessment (HIRA) process to meet legislative compliance. The risk matrix, utilized by the HIRA, faces many inherent challenges. As a result, the HIRA itself may lead to a poor risk assessment with poor quality results.

## **STUDY QUESTION:**

What are the weaknesses, strengths, and gaps in the Provincial HIRA process, as implemented in the Regional Municipality of York. The review aims to provide insight into potential issues related to hazard identification and risk assessment processes in the emergency management context.

## **METHODS:**

To review the Ontario Provincial HIRA process, as it is implemented in the Regional Municipality of York, based on relevant scientific sources, mainly related to risk matrices.

## **RESULTS:**

The HIRA demonstrates many of the issues suggested in the literature to impair the quality of risk assessment processes using risk matrices. Additionally, the HIRA process has been designed and developed without proper insight into the capacity and resources of the target audience, which further decreases the potential quality of the output.

## **CONCLUSIONS:**

The HIRA process does not support its objectives and does not provide the user with an accurate quantitative risk ranking with capacity to distinguish between the risk levels of different hazards in a way that supports the allocation of resources.



## Pediatric Outpatient/Urgent-care Emergency and Disaster Planning

### Arthur Cooper

*New York City Pediatric Disaster Coalition, USA*

**Co-authors:** Michael Frogel, John Jermyn

#### **BACKGROUND:**

Children are frequently victims of disasters; however, important gaps remain in pediatric disaster preparedness planning. This includes a lack of resources for disaster planning for patients in pediatric outpatient/urgent-care facilities. The New York City Pediatric Disaster Coalition (NYC PDC) is funded by the New York City (NYC) Department of Health and Mental Hygiene (DOHMH) to improve NYC's pediatric disaster preparedness. The PDC has created disaster plans in pediatric long-term care facilities, hospital departments, pediatric and neonatal intensive care units and obstetric/newborn services.

#### **STUDY QUESTION:**

How can we incorporate pediatric outpatient/urgent-care facilities in to overall disaster planning?

#### **METHODS:**

The NYC PDC partnered with leaders and experts from outpatient/urgent-care facilities and created the Pediatric Outpatient Disaster Planning Committee (PODPC). The PODPC includes physicians, nurses, administrators and emergency planning experts in outpatient care. There were 21 Committee members from 8 organizations (the NYCPDC, Department of Health and Mental Hygiene (DOHMH), Community Healthcare Association of New York State, New York State Department of Health (DOH), multiple hospitals, and healthcare networks. The PODPC's goal was to create guidelines and templates for use in disaster planning for outpatient/urgent-care facilities. The committee met six times over a four-month period and shared information to create disaster planning tools that meet the specific pediatric challenges in the outpatient/urgent-care setting. The participants utilized an iterative process that included a literature review, participant presentations and review and improvement of the working documents.

#### **RESULTS:**

The final guidelines and templates for surge and evacuation were created in February 2018. With the assistance of the NYC PDC, pediatric plans were completed and implemented at five NYC outpatient/urgent-care facilities. In 2019 a self-use toolkit was developed and utilized to create four model plans at four sites.

#### **CONCLUSIONS:**

The NYC PDC has created an effective model self-use toolkit for outpatient/urgent-care surge and evacuation planning that can be utilized to expand preparedness to the healthcare community.

## Dengue SURGE CAPACITY TRIAGE at AIIMS

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### Praveen Aggarwal

*Head of Emergency Medicine, AIIMS, India*

Dengue outbreaks are common in India. The growing population and the breeding of mosquitoes outsmart the mosquito control measures. Every year hundreds of patients show up at the Emergency Department of the All India Institute of Medical Sciences with complaints of high fever and fear of dengue. Human factors of herding and hysteria also dominate the arrival of these patients at AIIMS.

Surge capacity management and implementing an effective triage, diagnosis and treatment protocol is key to this biological annual event.

AIIMS has years of experience in managing the dengue outbreaks and over the years have improvised on processes for diagnosis, admission and discharges. The presentation will cover these aspects of surge capacity management which have wide spread implications in hospital response to biological mass casualty events.

## **Building the largest BIG DATA network using an Organized Medicine Network across medical schools**

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**Sagar Galwankar**

*Florida State University Emergency Medicine Residency Program, USA*

Preparedness involves surveillance as its core component. Global Health Security engages nations across the world in their fight against infectious diseases which don't honor nations and their borders. India is a signatory to the Global Health Agenda and is an active member of the GHS network.

An attempt was made in India to first create a Unified Organization of all Professional Associations in Medicine. This Unified organization connected to all the specialist physicians via member organizations and thus became a one-stop junction to communicate with the government. Dissemination of information from Government to Organizations and from Organizations to its member physicians (G2O2P) is now possible.

The next step involves bringing data back to the government for taking action and observing trends, which is termed as (P2O2G). Medical school hospitals are ideal locations for creating data gathering centers.

Developing a strong epidemiological information system across medical schools in India and engaging sentinel centers using this organized network will effectively build a strong epidemiological data initiative which is very crucial in Emergency preparedness. We are planning to use medical schools in this effort and this presentation will focus on the efforts taken in this regard.



# ePoster Presentations

## Transition from routine to emergency

**Wisam Araidy**

*Pade-Poria Medica Center, Israel*

**Co-authors:** Eran Tal-Or

### **BACKGROUND:**

The provision and preparation of a medical center on a daily routine is of great importance to its functioning during an emergency situation and disaster. The Baruch Padeh Medical Center prepared a program for emergency situations including Terror attacks and Earthquakes. Drills and exercises are mandatory for real life scenarios. In order to respond well to an emergency situation, it is important to teach and train the medical teams routinely. Although such preparation is important, it is difficult to maintain the knowledge of the staff especially when real scenarios are rare. We prepared several programs of exercise to enhance the awareness and readiness of our teams so that whenever there will be a real-life event they will be ready to help and will function properly.

### **STUDY QUESTION:**

Raising awareness and readiness of the staff of the Medical Center for emergency/disaster situations.

### **METHODS:**

- ◆ Building a Quality Index containing 9 measurable elements and divide the score into 3 preparedness levels: low, medium and high preparedness.
- ◆ Setting up emergency kit contains checklists for various emergencies.
- ◆ Customizing training Program.
- ◆ Preparing a "measurable" report that could assess performance of a specific team/department
- ◆ Preparing a measureable "Executive Report" that enables comparing between preparedness of different team.

### **RESULTS:**

- ◆ An increase in the qualification of the Medical Center's departments in the emergency field (86% compared to 62% in the past).
- ◆ An increase in the participation in training and exercises - from 84% of in 2017 to 90% in 2019 Increase staff responsiveness during an emergency.

### **CONCLUSIONS:**

- ◆ Creating a competition between the various departments is an effective tool for performing the necessary tasks and for raising the readiness to emergency situations.
- ◆ In this method, the process has raised the training rate for the various scenarios and that a tailored training organization is necessary.
- ◆ Setting up emergency kit and using check lists shortens the department's response time to the different scenarios.
- ◆ Orientation of the various teams contributes greatly in improving emergency work processes.
- ◆ The hospital's and the departments management involvement is essential to the improvement in team readiness.

# Medical Response for Major Incidents Education and Exercises – A rational approach

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**Itamar Ashkenazi**

*Hillel Yaffe Medical Center, Israel*

**Co-authors:** Roberto Faccincani, Kristina Lennquist

## **BACKGROUND:**

Mass casualty incidents are increasingly encountered due to the increased vulnerability of the population. In the event of a major incident with many injured and killed, an integrated and efficient response is necessary in order to achieve optimal results. This can only come about if the personnel involved are educated and trained in the unique procedures forethought to be necessary for the response to these incidents.

## **STUDY QUESTION:**

What is the relevance of current educational and training projects for mass casualty incident management in enhancing local preparedness?

## **METHODS:**

Screening of PUBMED on published literature on educational and training projects for the medical response in mass casualty incident management. Applicability variables examined were the target audience, skills taught and relevance to local needs.

## **RESULTS:**

Many educational ventures exist and are reported in the published literature. Almost all of these offer education of specific skills and most are aimed at specific sectors. Only a few of the courses available focus on introducing the students to the whole chain of the medical response and even less can be targeted towards local needs.

## **CONCLUSIONS:**

Whether courses published in the professional literature really benefit the preparedness of the system is questionable. A rational approach to mass casualty incident education and training is needed. Educational efforts should be linked with the regional plan. It should train the whole chain of response. This effort is then supplemented by the education of specific skills needed by specific sectors. Skills that are not performed routinely should be determined and these should be emphasized in education and training.

## Blackout in parts of Berlin from Feb 19th to 20th 2019

**Andre Baumann**

*Berlin Fire and Rescue Academy, Germany*

### **BACKGROUND:**

On February 19th and 20th 2019 there has been a blackout in parts of the Berlin district of Treptow-Köpenick which lasted 31 hours. Affected were 30,000 households, 2000 commercial operations, two hospitals and multiple nursing homes. To manage the situation more than 700 firefighters and members of disaster relief organizations were needed.

### **STUDY QUESTION:**

Organization of disaster management

### **METHODS:**

Case report

### **RESULTS:**

At 2:10 PM two 110 kV lines were cut during construction works. The Berlin Fire Department was informed immediately. Minutes later there were the first calls due to the incident. First affected were nursing homes including nursing homes for intensive care patients which were ventilated. In the affected area there was no electricity at all. An emergency power supply could not be established at all places. Therefore, the whole infrastructure was affected: There was no long-distance heating, no cellphone communication, no landline communication available in the area. Traffic lights and street lighting was affected as well. The Berlin Fire Department established their command and control structure at the Berlin Fire Department communication center after it was clear that the problem will not be solved immediately. All volunteer fire departments in the area were alarmed and their vehicles staffed. Disaster relief organizations were alarmed and assisted the Berlin FD during the incident. During the incident the following core areas were identified:

- ◆ A private owned nursing home for ventilated patients
  - ◆ Evacuation auf an intensive care unit of a larger hospital where the emergency power system failed
  - ◆ A second hospital
  - ◆ Six nursing homes
  - ◆ Welfare check for patients with heart problems or artificial heart systems
  - ◆ A fire in an emergency generator
  - ◆ A fire in a residential building
- During the blackout they were 112 incidents due to the blackout. On February 20 at 9 PM the power was reestablished in the whole area and the incident was closed.

### **CONCLUSIONS:**

The incident showed again that the critical infrastructure is extremely dependent on electrical power. Overall the crisis management system worked but there is still room for improvement. It also showed that the citizens must prepare for such incidents and information of the citizens is crucial. The reaction of the citizens was quiet, and they were supporting each other. We assume that this is due to the rural structure of the area. We need to improve the database especially concerning the whereabouts of patients with artificial heart systems, dialysis and so on and so forth. In addition, we need more preparation and training, not only for disaster relief organisations but also for the general public.



# Multi Casualty Incident Management Module

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**Oren Blustein**

*Magen David Adom in Israel*

**Co-authors:** Ido Rosenblat, Roman Sonkin, Eli Jaffe

## **BACKGROUND:**

Traditionally, Multi Casualty Incident (MCI) management begins when the first ambulance arriving on scene and assuming command. Early understanding and management of the scene may improve efficiency of management, times of treatment and evacuation and resolution of the incident. Magen David Adom (MDA), Israel's national rescue organization, has developed and implemented a module in it's command and control software to help manage MCIs.

## **STUDY QUESTION:**

Effects of an MCI management module and improved allocation of resources and dispatch operations.

## **METHODS:**

Dispatch officers at the National Operations Center (NOC) were surveyed about their opinions of the software. A Likert Scale (1-7) was used to assess their answers.

## **RESULTS:**

The NOC officers reported that the module allows the officer to control resources ( $x=6.33$ ), they did not believe the module can significantly shorten evacuation times ( $x=3.8$ ), They moderately believe that the module can prevent problems in management of the event ( $x=4$ ). They strongly believe that the module is compatible with MCI protocols ( $x=6.66$ ), and that the module improves their confidence in managing MCIs ( $x=5.5$ ).

## **CONCLUSIONS:**

The MCI management module reduces the manual aspect of MCI management which reduces mental load off the officer and displays all available and occupied resources live in front of the officer. It is highly compatible with the Israeli MCI protocols thus may reduce mistakes in the decision-making process. Another advantage of the module is improving the confidence of the dispatcher, thus it may reduce stress-related mistakes.



# Ethical Monitoring of EU Project NO-FEAR

**Saverio Caruso**

*Università Cattolica del Sacro Cuore, Italy*

**Co-authors:** Sabina Magalini, Rachele Brancaleoni, Daniele Gui, Nils Ellebrecht

## **BACKGROUND:**

NO-FEAR is a Coordination Supporting Action for a Network Of First rEsponders and CriticAl CaRe financed by Horizon 2020. Ethical Monitoring is intended in this case as the identification of ethical issues that might arise during project activities to provide partners the appropriate recommendations. Partners in the project come from different domains and all have different necessities. In case of personal data processing the nomination of a Data Protection Officer is necessary.

## **STUDY QUESTION:**

Ethical monitoring in this complex setting requires personalized partner follow-up and an array of solutions to be implemented at the beginning of the project. UCSC responsible for the Ethical Monitoring reflected on how to help partners identify their required duties stated in the Grant Agreement early on in the project.

## **METHODS:**

Ethical monitoring usually requires only the analysis of documents produced during the project unfolding. A new model for ethical monitoring called Early Alarm System (EAS) was designed. EAS provides a system to preventively analyse future partner activities in the project. This analysis was performed by submitting to the partners a generic document on Ethical requirements (Ethics Summary Report) and a questionnaire structured as an Ethics Checklist. Ethics Checklist is a multiple choice questionnaire composed by 11 questions. Early circulation of questionnaire consented to identify single partner criticalities and allowed all 18 to comply with Grant Agreement Requirements.

## **RESULTS:**

As results of this methods, 2 partners obtained approvals request for the use of humans during demos, 4 partners provided to submit informed consent to humans, 2 partners nominated Data Protection Officer and 3 partners proceeded to obtain approvals for data processing.

## **CONCLUSIONS:**

Traditional ethical monitoring is probably insufficient for Networking activities with long time span. Preventive analysis of partner characteristics is necessary to allow all to comply with Grant Agreement requirements.

# EVALUATION OF DECONTAMINATION EFFICACY OF THE RSDL® KIT AGAINST INCAPACITATING AGENTS (PEPPER SPRAY (OC), MACE™ (CN), AND CS)

**Laura Cochrane**

*Emergent BioSolutions, United Kingdom*

**Co-authors:** Mulu Gebremedhin, Messele Fentabil

## **BACKGROUND:**

The RSDL® (Reactive Skin Decontamination Lotion) Kit is comprised of a sponge impregnated with an active lotion packaged in an easy-to-open impermeable pouch. The lotion is formulated with an active ingredient responsible for the neutralization of chemical warfare agents (CWAs) and organophosphate pesticides (OP). The mode of action for decontamination efficacy using the RSDL Kit is a function of both removal of the contaminant from the skin and neutralization of the chemical compound by the active lotion impregnated in the sponge. In vivo and in vitro assessments have previously demonstrated RSDL's efficacy in destroying a broad spectrum of traditional CWAs. However, application of RSDL to decontaminate dermal-acting riot agents commonly used in first responder and military operations had not been previously tested.

## **STUDY QUESTION:**

**Objective:** The purpose of this study was to evaluate the efficacy of the RSDL® Kit in decontaminating the incapacitating agents capsaicin (OC), commonly referred to as Pepper Spray ; 2-chloroacetophenone (CN), commonly referred to as Mace™; and 2-chlorobenzalmalononitrile (CS), typically used in military training exercises.

## **METHODS:**

The current study was a follow-on of a previous in vitro study that examined the successful 99.8% removal of OC but designed to specifically investigate the reactivity component of the RSDL lotion with OC, CN, and CS. The RSDL lotion was mixed with each incapacitating agent at different molar ratios of the lotion's active ingredient. The reactivity of the lotion with the incapacitating agent was observed for one hour, while 10 µL samples were quenched and analyzed for residual incapacitating agent using liquid chromatography-mass spectrometry.

## **RESULTS:**

It was observed that at a molar ratio of 2:1 (active lotion:compound), CN was effectively degraded at 90% within 2 minutes. Degradation of more than 68% of CS was achieved at a 20:1 molar ratio within 1 hour reaction time. Despite highly effective decontamination attributed to physical removal using the RSDL Kit in previous work, no degradation of OC was observed with the lotion, irrespective of the relatively higher molar ratios of up to 20:1 and longer reaction time of up to one hour.

## **CONCLUSIONS:**

**Conclusion:** This study evaluated the direct effect of the liquid phase reaction of the incapacitating agents with the RSDL lotion in the absence of any physical removal action by the sponge. The lotion was highly effective in degrading CN and moderately effective in degrading CS. The lack of reactivity of OC by the lotion alone suggests that physical removal by the sponge plays a significant role in achieving decontamination.

## **Dream Doctors – Clowns in humanitarian emotional aid**

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### **Nimrod Eisenberg**

*The Dream Doctors project, Israel*

#### **BACKGROUND:**

For the last 17 years, the Dream Doctors Project (RA) has been developing and integrating therapeutic medical clowning into the health care system, a unique concept worldwide. With a focus on improving patient well being and advancing care, Dream Doctors works in partnership with 29 hospitals across the State of Israel and in Humanitarian missions abroad . Our team of over 100 Dream Doctors medical clowns are recognized as integral parts of the hospitals' medical teams, offering specialized care hundred of thousands patients each year without prejudice to religious, racial, gender or other differences.

#### **STUDY QUESTION:**

Why do we need Medical Clowns in disaster zone mission organizations?

#### **METHODS:**

The information presented will be based on Dream Doctors experience in many missions in the last 15 years and on published research: Disaster zones – should we be clowning around? Authors : Uri Ilan, Avigail Davidov, Joseph Mendlovic, Giora Weiser, European journal of pediatrics. [www.link.springer.com/article/10.1007/s00431-017-3018-5](http://www.link.springer.com/article/10.1007/s00431-017-3018-5) We have a lot of photos and visual material that presents our work

#### **RESULTS:**

After more than 10 years of collaboration with the IDF in humanitarian missions, medial clowns are officially recognized as part of the EMT3 IDF Field Hospital Unit staff.

#### **CONCLUSIONS:**

Trained medical clowns have a positive impact both on the medical teams and patients and should be integrated as part of humanitarian teams in disasters zones.

# **A Global Gap; Communication and information sharing assessment from the field in Mozambique in the early aftermath of Cyclone Idai**

**Lindsay Flax**

*University of Texas Southwestern Medical Center, USA*

**Co-authors:** Kelly Klein, E. Liang Liu, Curt Harris, Raymond E. Swienton

## **BACKGROUND:**

Many countries have daily communication challenges which, during a disaster response become amplified. This was felt first-hand during the immediate aftermath of Cyclone Idai in Mozambique, providing a unique perspective of communication gaps. The category 3 cyclone made landfall on March 14, 2019 off the coast north of Beira, Mozambique, crossing Madagascar, Mozambique, Zimbabwe and Malawi resulting in massive devastation. As a robust response was initiated locally, news of the destruction spread rapidly through the humanitarian aid organizations, but was delayed throughout regions of the world. Who was disseminating information, was it on social media platforms? Was the world listening? Did the “West” know this occurred?

## **STUDY QUESTION:**

What is the etiology to the communication and reporting gaps among the international community, in the aftermath of a disaster?

## **METHODS:**

Observational and literature review.

## **RESULTS:**

Information sharing utilized in impacted areas was anecdotal initially, from satellite phone calls. However, as the response developed there was local awareness through app technology, telephone service and internet communications. Observations demonstrated effective local information sharing and coordination, but unexpected was the delay in both acknowledgement and inaccuracy of reporting by foreign media sources. It was unexplainable to witness local sources communicating eye-witness accounts; then hearing delayed, filtered accounts from Western media outlets.

## **CONCLUSIONS:**

The dissemination of information about impending or ongoing disasters events worldwide has been primarily through media outlets, which places the burden of communication on journalists and can be limited by the ability to be on the ground during an event. However, as the world becomes ‘smaller’ with easier, more frequent travel, there is an increasingly large network of expatriates, medical providers and travelers abroad. Through social media and internet communications, the global community no longer relies on journalists only for news reporting. Perhaps there is a role for social media and internet technology to fill the communication gaps and provide real-time accurate information to the global community to coordinate a larger and quicker response.

# A Comprehensive Coalition Based Regional Approach to Pediatric Disaster Planning

**Michael Frogel**

*New York City Pediatric Disaster Coalition, USA*

**Co-authors:** Arthur Cooper, John Jermyn

## **BACKGROUND:**

Children, who comprise 25% of the US population, are frequently victims of disasters and have special needs during these events. Since 2009, New York City Pediatric Disaster Coalition (NYCPDC) has worked with an ever-increasing number of providers and agencies. Through a cooperative team approach, stakeholders now include local public health, emergency management, and emergency medical services agencies, 28 hospitals, community-based providers, and the NYC Medical Reserve Corps (MRC).

## **STUDY QUESTION:**

What are the accomplishments of the NYCPDC toward the goal of improving disaster response for NYC's children?

## **METHODS:**

The NYCPDC utilized an inclusive iterative process model whereby a desired plan was achieved by stakeholders reviewing the literature and current practice through repeated discussion and consensus building. NYCPDC used this model to develop critical components of a comprehensive regional pediatric disaster plan from disaster scene triage (adapted for pediatric use) to transport (with prioritization) to surge and evacuation.

## **RESULTS:**

Site-specific plans utilizing guidelines and templates now include pediatric long-term care facilities, hospital pediatric departments including pediatric and neonatal intensive care services and outpatient/urgent care centers. A force multiplier course in critical care for non-intensivists has been provided. An extensive pediatric exercise program has been used to develop, operationalize and revise plans based on lessons learned. This initially included pediatric tabletop, functional and full-scale exercises at individual hospitals leading to citywide exercises at 13 and subsequently all 28 hospitals caring for children. The NYCPDC has responded to real time events (H1N1, Haiti Earthquake, Superstorm Sandy, Ebola), and participated in local (NYC boroughs and executive leadership) and nationwide coalitions (including the National Pediatric Disaster Coalition).

## **CONCLUSIONS:**

Involving a wide range of stakeholders in pediatric disaster planning was an effective method for developing a comprehensive pediatric disaster planning and response model.



# Lessons Learned from an OB/ Newborn/Neonatal Intensive Care Full-Scale Exercise

**Michael Frogel**

*New York City Pediatric Disaster Coalition, USA*

**Co-authors:** Arthur Cooper, John Jermyn

## **BACKGROUND:**

Children are frequently victims of disasters. However, gaps remain in disaster planning for pediatric patients. The New York City Pediatric Disaster Coalition (NYCPDC) is funded by the NYC Department of Health and Mental Hygiene (DOHMH) to prepare NYC for mass casualty incidents that involve large numbers of pediatric victims. On April 26, 2018, the PDC conducted a first in NYC, full-scale exercise with the NYC Fire Department testing evacuation, patient tracking, communications, and emergency response of the obstetrics, newborn and neonatal units at one hospital in NYC. The goal of the exercise was to evaluate hospital obstetric/newborn/neonatal plans and assess the ability to evacuate patients during an emergency situation.

## **STUDY QUESTION:**

Will a full-scale evacuation exercise of an obstetric/newborn/neonatal unit identify current gaps and provide lessons learned to improve disaster planning and response?

## **METHODS:**

The exercise planning process included a review of existing Ob/newborn/neonatal plans, four group planning meetings, targeted specific area meetings and plan revisions. The exercise incorporated scenario-driven, operations-based activities which challenged participants to employ the existing evacuation plans during an emergency. The exercise assessed the following: communication, emergency operation plans, evacuation, patient tracking, supplies and staffing. Evaluators completed an exercise evaluation guide (EEG) based on the MSEL. An after-action report was written based on the information from the EEG, participant feedback forms, hot-wash session, and after-action review meeting.

## **RESULTS:**

Strengths included the meaningful improvement of plans before the exercise and successful evacuation of the unit. Lessons learned included: addressing gaps in effective internal and external communications, adequate supplies of space, staff, and equipment needed for vertical evacuations; and providing staging and alternate care sites with sufficient patient care and electrical-power resources.

## **CONCLUSIONS:**

The PDC's exercise demonstrated the ability for the hospital to identify important areas for improvement in planning and response for Ob/newborn/maternal units.

# Disaster Nursing and Perceptions of Preparedness: The Role of Training and Perceived Competency

**Eugenia Fuenzalida**

*OU Center of Intelligence and National Security, United States*

## **BACKGROUND:**

Nurses often serve as first-responders and are typically tasked with triage in response to mass-casualty events. Post 9/11, preparedness protocols were updated and widely implemented, incorporating training and evaluation of key competencies in disaster management. Independent assessments indicate these training paradigms are efficacious, however, nurses continue to report suboptimal preparation. While these disparate findings indicate a potential disconnect between training and perceptions of preparedness, few studies have systematically evaluated this relationship. Given the increasing number of manmade disasters (e.g., mass shootings, and terrorist activities) a careful and systematic evaluation of preparedness perceptions and their implications on performance is warranted.

## **STUDY QUESTION:**

The primary purpose of the present study was to explore the possible disconnect between receiving specialized training and perceptions of preparedness in nurses.

## **METHODS:**

A descriptive, cross-sectional study was conducted using a large sample of nurses recruited via targeted sampling. Following consent, participants completed a questionnaire designed to assess the level of training received, the degree of perceived competence, and disaster preparedness.

## **RESULTS:**

Results did indicate that despite receiving specialized training, nurses still report feeling ill-equipped to respond to a mass-casualty event.

## **CONCLUSIONS:**

Findings of this study indicated that while most nurses receive disaster-specific training, this training is perceived to be sub-optimal, suggesting a potential disconnect in knowledge transfer. Given the importance of perceptions of self-efficacy to performance, it is imperative not only that nurses be optimally trained, but also that they feel adequately prepared.

## 7 Minutes – Life Saving Becomes Contagious

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**Raphael Herbst**

*Magen David Adom, Israel*

**Co-authors:** Roman Sonkin, Abigail Klein, Eli Jaffe

### **BACKGROUND:**

Active shooter incidents are becoming more common and EMS personnel safety is a major concern in such situations. Traditionally EMS are not allowed into the scene before police have cleared it. This procedure might take several minutes which reduces the ability to save lives. Magen David Adom (MDA), Israel's national rescue organization has developed a unique program to teach communities how to act in the minutes following an incident and prior to EMS arrival. The training depends on 7 principals: safety, calling for help, crowdsourcing, triage, treatment, reporting, aiding local authorities. Emphasis is placed on safety, triage, stopping bleeding. If these civilians would find themselves at an active shooter event, they could help save lives before EMS are able to enter the scene, not only by stopping bleeding but also by conducting initial and basic triage to point the EMS to the most urgent casualties.

### **STUDY QUESTION:**

Whether civilians trained in 7 minutes project feel that they are able to triage casualties before EMS arrive.

### **METHODS:**

Over 3,200 people in over 100 communities spread over 22 countries have participated in the First 7 Minutes program. Participants of the program are required to answer a survey using Likert scale (1-7).

### **RESULTS:**

The participants of the seminar reported that their level of self-confidence and self-efficacy on how to act in the face of disaster was moderate ( $X=3.7$ ), they also reported that they would moderately be able to assist wounded in disaster ( $X=4$ ).

### **CONCLUSIONS:**

The First 7 Minutes allows communities around the world to prepare for disasters of various scales and improves resilience.



## Staff activation and call-back during a disaster. How many will show up?

**Weng Hoe Ho**

*National University Health System, Singapore*

### **BACKGROUND:**

Most disaster drills are pre-planned exercises utilising pre-deployed manpower. Hospital activation is usually initiated by the emergency department with senior management and the call centre notified. The call centre activates pre-designated key staff via a hospital messaging system (SMS). Senior management and key staff will then activate staff using call trees.

### **STUDY QUESTION:**

During unannounced hospital activations, how many staff will receive the message and report for duty within 2 hours?

### **METHODS:**

Staff in NUH were informed that there would be an unannounced recall exercise taking place after office hours in May 2019. Key staff and minimum staff numbers required to manage a disaster incident were identified. 809 key staff were activated via SMS, and 2149 staff across 26 departments were recalled on a Saturday morning.

### **RESULTS:**

809 key staff were activated by SMS. 414 responded within 20min, 132 responded after 20 min. 69% of staff activated responded to the SMS. 26 departments recalled a projected 2149 staff for duty. 2050 staff reported for duty within 2 hours. Some departments recalled more staff than was required. Capping each department's numbers based on their projections, the reporting rate was 78.83%.

### **CONCLUSIONS:**

SMS activation may be missed by the recipient. Redundancies (concurrent activation via a call tree) must be put in place, especially for key staff. NUH is exploring utilising robocalls to activation staff. NUH is able to recall sufficient staff within to manage a disaster incident. During an actual incident, other forms of activation (e.g. social media, radios, TV) will ensure that recall rates will be higher.

## Nothing will hurt me on The perception of Israeli Arabs citizens of the rocket attacks on Israeli territory

**Amran Jaber**

*Kfar Shaul Mental Health Center, Sharei Zedek Hospital, Israel*

### **BACKGROUND:**

The perception of Israeli Arabs citizens of the rocket attacks on Israeli territory. Some will argue that the attacks will not hurt me ""some will be scared and unable to act"" another part believes in state of Israel's ability to provide protection. Most believe in what God desire, few believe that the terrorist organization have the accuracy and they will not hurt their communities.

### **STUDY QUESTION:**

what is The perception of Israeli Arabs citizens of the rocket attacks on Israeli territory?

### **METHODS:**

A survey included a100 participants 50 students and on of their parents Using a structural anonym questionnaire.

### **RESULTS:**

In the presentation, I will share the result of survey of Israeli Arab students on the subject of rocket attacks on Israel territory while comparing to their parents. The opinions were divided to three , although it did not present the whole community due to the lack of participation of the aimed community. One opinion was the elderly perspective that what will happen is not in their control and that it is a decision from GOD and they accept it as it is. Another perspective from the younger citizens was split to two opinions: 1. They believe that it could harm them and they would take actions to prevent the harm. 2. Another party believe that the rockets accuracy is better than the old times and the terrorists would not attack the Arab localities.

### **CONCLUSIONS:**

These preliminary results show that these findings are interesting by the way that the younger Arab community way of thinking is differing from their elderly, the results of the survey is not final yet and further investigating should take place in the future, the results are going through further statistic processing .

## Booth Drills – Multi-Casualty Incident Training Sessions Conducted in a Booth Improve Skills

**Eli Jaffe**

*Magen David Adom, Israel*

**Co-authors:** Omer Perry, Roman Sonkin, Raphael Herbst, Yuval Bitan

### **BACKGROUND:**

Magen David Adom (MDA), Israel's national rescue organization is responsible for preparing and responding to Multiple-Casualty Incidents (MCIs). Training and preparing EMS personnel to operate during and commanding MCIs can be challenging and expensive. Drills are expensive and time consuming both in terms of preparation and execution. MDA is implementing an MCI booth practice mode to improve personnel preparedness to operate in and to command MCIs.

### **STUDY QUESTION:**

Whether booth MCI training is an effective tool to improve MCI incident commanding capabilities.

### **METHODS:**

MDA instructors who trained groups about MCI response during 2018–2019 have conducted booth MCI training sessions and evaluated the participants. Participants answered a survey based on the Likert scale (1–5).

### **RESULTS:**

Participants in the booth drills reported that it benefited them ( $x=3$ ), it improved their ability to function in the concluding real-life drill ( $x=3$ ), it improved their knowledge of protocols ( $x=3.1$ ), and their incident management skills ( $x=3.2$ ). MDA instructors reported that participants in the booth sessions practiced their decision-making skills, organizational communication skills, command and control, and working under stress. Simulated incident commanders improved their awareness of available resources and ability to allocate of new resources becoming available as time proceeds. With each session participants improved both their operational and medical skills.

### **CONCLUSIONS:**

Booth MCI training sessions allow to practice multiple commanders and participants with investment of less resources than drills. It deepens knowledge and improves relevant skills in MCI operation and command.

## **Black Cloud 2” - lessons for the future**

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### **Eli Kabakov**

*Medical Forces HQ, Israel Defense Forces, Israel*

“Black Cloud 2” was an enormous drill in order to practice and prepare all the major emergency services in Israel for a terror attack with a “dirty bomb” in the center of the country in the area of Tel Aviv. The emergency services that participated in the drill are the EMS services, Fire department, IDF, Ministry of health, hospitals and the police forces. The preparation process initiated in 2018 while the drill was planned to November 2018. In this presentation I will describe the preparation process and the lessons we learned from it. The major part of this presentation will present the drill itself and what are the main points we want to improve for the future. I will talk about the pitfalls and what should be learned from them for future drills and real events. I will put emphasize on the medical service as hospitals, ministry of health and EMS providers. The take home message would be addressed to policy makers and management of the health system.

# Climate Change and EMS

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**Abigail Klein**

*Magen David Adom, Israel*

**Co-authors:** Raphael Herbst, Eli Jaffe

## **BACKGROUND:**

Extreme climate changes directly impact the Emergency Medical System's (EMS) ability to function properly and provide optimal services to the public during extreme weather events. The most common challenges that EMS face include extreme call volume, impaired ability to move resources, decreased hospital capacity and additional factors which inhibit the EMS's ability to provide optimal and efficient services to the public. In the past 10 years, Magen David Adom (MDA), Israel's national rescue organization has faced several extreme weather periods.

## **STUDY QUESTION:**

As climate change is a prevalent issue and topic of conversation on the global stage, the question has arisen as to how this affects EMS and the ability to deliver services during extreme weather events.

## **METHODS:**

Data was collected from MDA databases over the same period in consecutive years and used to examine trends influenced by extreme weather. The case study examined for this research paper was the snowstorm that occurred in Jerusalem in December 2013.

## **RESULTS:**

In recent years, Israel's climate change has been significant and has suffered from extreme weather events. It is because of this that MDA as a system has developed a concrete plan of operations based on experience and how to operate ambulances in such situations. This paper examines the impacts of the climate change on EMS and will give recommendations on how the EMS can improve their response during extreme weather events.

## **CONCLUSIONS:**

It was determined that due to the rising demand, during ongoing weather, it is more difficult to provide effective services to the public as the equipment and the medical personnel is less available as the incident persists. As a result of the case study, recommendations have been made.

# What is missing from our knowledge for radiation exposure training? The basics

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**Kelly Klein**

*Eastern Maine Medical Center, USA*

**Co-authors:** Raymond E. Swienton, Lindsay Flax, E. Liang Liu, Curt Harris

## **BACKGROUND:**

In 2013, a multinational collaboration met to improve the global and nation specific preparedness and response in managing the casualties from a nuclear and radiological disaster perspective. The result of the meeting and surveys illustrated a lack of understanding about radiation and the risks to the health care provider when dealing with patients during a radiological event.

## **STUDY QUESTION:**

Does the healthcare community have the tools and the background education to deal with radiologically affected patients?

## **METHODS:**

Analysis of an IRB approved survey analysis (published) and an in-depth literature review.

## **RESULTS:**

The survey was created to gauge from the health personnel who responded, what their knowledge regarding radiation, human exposure, treatment and personal risk was. These questions were formulated to address the following topics: immediate medical needs, willingness to come to work, type of PPE required, types of trauma, and type of decontamination needed. Based on the survey, healthcare providers are not proficient or comfortable with patients that may have been traumatized during or exposed to a radiological event.

## **CONCLUSIONS:**

Fear from the unknown is always a concern when dealing with the public and the medical community. As seen with HIV/AIDS and most recently in the explosion which released radioactive material in Russia, the news inflates the danger, causing fear and most likely poorer health care. The treatment is basic education which is needed to be developed to protect the affected, the healthcare.

# Are we training the wrong people?

**Kelly Klein**

*Eastern Maine Medical Center, USA*

**Co-authors:** Raymond E. Swienton, Lindsay Flax, E. Liang Liu, Curt Harris

## **BACKGROUND:**

Like never before, our world is being affected, changed by natural and human fashioned tragedies. These incidents run the gambit of direct impact from short-lived events like bombings and shootings to geographically vast catastrophes with widespread and indirect effects like flooding and earthquakes. A common theme taught in disaster training courses worldwide is that the local government will be augmented by the national and international community, therefore waiting for a coordinated response is the best course of action. In reality, the first on scene is the local people, who are geographically closest to the event and already rendering aid and lifesaving interventions to those who are injured or trapped.

## **STUDY QUESTION:**

How to create a training framework for an international audience for citizens to be able to assist safely in life saving interventions during the initial stages of a traumatic event or medical emergency.

## **METHODS:**

Observational and in-depth literature review

## **RESULTS:**

Reports from the field from nearly every response phase of a disaster cite the efforts of the immediate responder, with at least three critical, lifesaving interventions that the public performs: stopping bleeding, opening an airway and providing timely lifts, carries and transportation to emergency health care.

## **CONCLUSIONS:**

This gap in readying the most accessible help to those in dire need of immediate lifesaving intervention must be addressed. During traumatic events, it is the first people on the scene, not prehospital "professionals," that are providing rescue and care for the those immediately affected. In larger events that overwhelm the local response network, citizens may be expected to provide medical care for their family and neighbors outside of the hospital setting (such as in the event of a nuclear event in which there are a massive number of survivors with burns). The premise that the government is here to help is true but waiting for help should not be relied upon. Taking into account cultural norms, citizens should be taught at an early age to be able to stop bleeding, provide basic life support, and safely transport the injured to help empower citizens and build community resilience.



## New CBRN protective materials and methodology for their testing

**Lukas Kralik**

*National Institute for NBC Protection, Czech Republic*

**Co-authors:** Jakub Vanek, Jiří Slabotinský, Jan Cupák

### **BACKGROUND:**

Despite the Chemical Weapon Convention and ongoing chemical weapons stockpiles destruction the Chemical warfare agents (CWA) still pose a significant threat to civil population, law enforcement and military personnel, currently coming mainly from the terrorist actions. Regarding toxicity the most dangerous among toxic chemicals are organophosphorus nerve agents (military G and V series) and pesticides acting as acetylcholinesterase (AChE) inhibitors. The use of proper, efficient and user-friendly protective equipment is necessary especially during military operations in the battlefield or First responders' actions at the accident scenes.

### **STUDY QUESTION:**

The need of new material with high overall protection efficiency and low user physiological burden. Combination of recent research findings and new technology.

### **METHODS:**

The National Institute for NBC Protection is involved in the development of new types of protective textile materials and new methods and analytical approaches for testing and evaluation of their protective characteristics against CWAs, their mimics and toxic industrial chemicals.

### **RESULTS:**

Newly prepared air permeable textile materials containing various adsorbents and catalysts undergo several intensive testing procedures focused mainly on the chemical vapor and aerosol resistance, hydro and oleophobic surface properties and catalytic degradation of adsorbed chemical compounds.

### **CONCLUSIONS:**

New types of nano composite textile protective materials were developed in order to maintain or enhance the protective efficiency together with the high air permeability to minimize the physiological burden of the user. The new testing instrumentation and methodology of was developed and optimized to perform intensive tests with correct and reliable results.



## Operational Nuclear Defense Model (ONDM)

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**Ori Nissim Levy**

*Nuclear and Radiology, ONDM, Israel*

### **BACKGROUND:**

The copyrighted ONDM thoroughly and systematically addresses the entire life cycle of a nuclear event from the preparations stage, the management and handling of the event, and rehabilitation. In the light of the research findings and the researcher's experience, the conclusions and findings have been assimilated to create a model to cope with a nuclear event. The current research found that countries' preparedness is deficient in a number of aspects and existing models do not provide an appropriate response to the problem, according to interviews with experts, analysis of past events and the researcher's experience, as demonstrated at various research stages.

### **STUDY QUESTION:**

(H0) Current preparedness plans for nuclear events are inadequate and do not properly assimilate new scientific knowledge and lessons learned from previous failures in nuclear event management.

### **METHODS:**

Research Design and Methodology The research is applied multiple methods research, combining the researcher's experience, interviews with experts, field research and document analysis. It was carried out using the qualitative research method and employed a multi-stage method, which includes a variety of methods collecting information from a number of different sources (data and methodological triangulation).

### **RESULTS:**

The countries of the world are partially prepared and only for minor nuclear failures. The superpowers: USA, the Soviets and Japan failed to deal with major nuclear failures (Three Mile Island 1976, Chernobyl 1986 and Fukushima 2011).

### **CONCLUSIONS:**

Incorrect disaster management turns the nuclear incident into catastrophic scale incident.

# Treatment and transportation of severe compound wounded persons in special area- prospective thoughts of Peacekeeping Force

Yinying Lu

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**Co-authors:** Feihu Zhou, Xinglong Yang

## **BACKGROUND:**

Medical support plays an important role in peacekeeping missions of the United Nations (UN). Efficient scientific treatment and transportation are necessary for ensuring the continuity of medical care at different levels. The operating strategies for the treatment and transportation for severe compound wounded persons under different scenarios in special areas were of great challenge for all international peace keeping forces.

## **STUDY QUESTION:**

How to make efficient scientific operating strategies for the treatment and transportation for severe compound wounded persons under different scenarios in special areas

## **METHODS:**

In the last decades, Chinese military medical teams (such as the general hospital of PLA) had actively participated in innumerable international medical rescue missions with complex, dangerous scenario. Using their years of experience in these field, they've formulated the following strategies

## **RESULTS:**

1. Focus on the primary objectives of the response: to provide early, life-sustaining medical care to the patients and to limit further casualties. This includes basic management plans for evaluation and treatment of wounded in different phases, such as care under fire and evacuation care. For care under fire, applying tourniquet and transferring the wounded to a safe location should be prioritized. In tactical care, although patients are not directly attacked by enemy fire, treatment is still limited due to the lack of medical supplies. Therefore, it is still centered on individual self-help and mutual care.
2. The faster, safer, and more effective the battlefield analgesia, antibiotics implementation which are recommended for all open wounds, communication (if possible) with casualties, tactical leadership, and evacuation system (patient evacuation coordination unit) the better. During evacuation care, it is very important to have an effective evaluation and treatment. Measures including maintaining unimpeded airways, sealing any open chest wounds, treating other wounds, and administering pill pack must be employed. We also need to take measures to prevent shock if possible. It is essential to improve fluid resuscitation techniques for patients in hemorrhagic shock. The increased use of intraosseous vascular access is necessary if needed. When the number of casualties who need to be transferred from the battle field to the rear medical ambulance agency was quickly increased, the monitoring and treatment of the wounded during transit are particularly important. The intensivist should be responsible for those on the way, and the health workers who received professional training should be involved in first-aid and the other situations.
3. The informatization in medical service for the wounded during the treatment and transfer must be utilized. Through modular design of the informatization, all medical staffs can exchange information in time. Furthermore, the flexibility and maneuverability of field medical equipment, the rapid transmission

of casualty information at all levels of rescue institutions. and the accuracy of treatment needs to be improved. Professional training will be beneficial to increase the survival rate of the wounded.

**CONCLUSIONS:**

Primary objectives driven, faster, safer, and more effective the battlefield analgesia, antibiotics implementation, as well as informatization and professional training were key points to increase the survival rate of the severe compound wounded.

# Gaps in medical assistance in disasters: The Emergency Process Framework

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**Co-authors:** Rachele Brancaleoni, Catherine Bertrand, Paloma Covadonga Rey Paterna, Paloma Miravet Gonzales, Morgan Abily

## **BACKGROUND:**

The Network Of practitioners For Emergency medical systems and cRitical care (NO-FEAR) project has as one of its main objectives the identification of the gaps in the area of victims' assistance during disasters; In particular Work Package 3 is dedicated to the acute care of the patient. NO-FEAR project inherited the STACCATO taxonomy, mainly used from security related projects.

## **STUDY QUESTION:**

Due to its specificity at a first glance the STACCATO taxonomy fits with difficulty with the NO-FEAR area of interest. How to introduce elements related to NO-FEAR without cancelling the legacy from the previous projects? How to use this taxonomy to organize gaps from WP3 and the whole project?

## **METHODS:**

A literature analysis and few brainstorming sessions were organized by the WP3 together with its main contributors. Deep comprehension of the STACCATO taxonomy was necessary to understand where to add the NO-FEAR elements.

## **RESULTS:**

The Emergency Process Framework (EPF) was added in the top-level section VA - Mission Capabilities. Within Mission Capability 504A: Protection of Citizens, a sub-Capability '504A-7 Trauma response to civilian high threat mass casualty incidents' was added. The EPF structure is flexible and 23 steps were identified so far (from access to the scene up to the governance). Gaps are also connected to the responders, divided in 7 categories.

## **CONCLUSIONS:**

In the framework of the NO-FEAR project the EPF is a powerful system in which gaps connected to disaster management can be organized and analyzed and, hopefully, covered in a systematized way. The extensive use of EPF can help decision makers to exchange, discuss and solve the gaps identified.

# Preparedness and Response to an Emerging Health Threat – Lessons Learned from *Candida Auris* Outbreaks in New York State, USA

**Diane Meyer**

*Johns Hopkins Bloomberg School of Public Health, United States*

**Co-authors:** Syra Madad, Jennifer Nuzzo

## **BACKGROUND:**

*Candida auris* is an emerging threat that can cause illness and death in hospitalized patients and has been associated with nosocomial outbreaks across the globe. Outbreaks of *C. auris* are difficult to control, often requiring the closure of hospital units to prevent further transmission. As health systems across the globe face this threat, it will become important to share lessons learned, challenges faced, and novel solutions implemented that could help other health systems prepare for and prevent *C. auris* outbreaks.

## **STUDY QUESTION:**

What are the lessons learned, challenges faced, and novel solutions implemented that have been encountered in a health system's preparedness and response efforts for *C. auris* outbreaks and how can these be shared with global public health and healthcare communities?

## **METHODS:**

The United States has reported over 700 cases of *C. auris*, nearly half of which have been from New York. To identify challenges faced and lessons learned in preparing for and responding to outbreaks of *C. auris*, we are interviewing healthcare facilities throughout New York. These semi-structured interviews will be conducted in September–October 2019 and will include individuals who have been directly involved in preparedness or response efforts for outbreaks of *C. auris*, including in acute, post-acute, and ambulatory settings.

## **RESULTS:**

We expect to collate generalizable lessons learned that other health systems can use to improve preparedness and response for outbreaks of *C. auris*. Themes will likely include surveillance, contact tracing, public communication, multi-sectoral collaboration, and infection prevention and control.

## **CONCLUSIONS:**

The ongoing outbreaks of *C. auris* in New York present an opportunity to collect lessons learned and challenges faced that will be useful to other health systems preparing for similar outbreaks.

# Cross- Border Disaster Nursing, how to deal with big complexity situations

**Paloma Miravet González**

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**Co-author:** Paloma C. Rey Paterna

## **BACKGROUND:**

Nursing performance, in addition to the usual functions, today is present in situations of great complexity and develops its work with great skill. Part of this complex work in nursing takes place in disaster situation. We are used to perform our work in the daily environment, where we know the facilities, the material, the procedures, and even the most complicated actions that we have to face, we see them as part of our day to day. This is totally different in the case of disaster abroad, in which we can find a hostile environment, either because of the previous situation of the country or because of the disaster itself and the lack of basic resources, also It influences the language, culture or religion of the country, as well as the different work systems. All this, added that we are going to meet with victims in mass makes the work much more complicated than normal and that, at least at the beginning, generates some lack of control. The aim of this lecture is to explain the different phases of the management and work of the nurse in disaster situations, based in the experience in two big disasters as Haiti earthquake and Philipines typhoon Hayan. The previous phase before going to the disaster, what to do there, management of unforeseen events, until we make the responsibility transfer to local institutions.

## **STUDY QUESTION:**

How to deal from nursing prospective in cross border disasters

## **METHODS:**

Experience based in two big disasters as Haiti earthquake, and Philippines Typhoon

## **RESULTS:**

Structured plan from the beginning, before traveling, till the end, when we make the responsibility transfer to local institutions.

## **CONCLUSIONS:**

We should be open minded and be prepared to work in group and in very different kinds of duties. Its important to make daily meetings, and take care of the psychological needs of the coworkers it would be interesting to make a list of material to take with us, and a final memory with lessons learned for further missions.



# Special Shape-Memory-Alloy Damper Configuration for Improving the Resilience of Buildings against Earthquake and Explosions

**Nissan Mulay**

*Ben-Gurion University of the Negev, Israel*

**Co-author:** Assaf Shmerling

## **BACKGROUND:**

The SMA dampers consist of Nitinol wires with Martensite component that may undergo large deformations with the capability to return to their original shape by the removal of the stress.

## **STUDY QUESTION:**

This research deals with upgrading structural towers for tanks and vessels to withstand strong earthquakes and explosions using Shape-Memory-Alloy (SMA) based dampers.

## **METHODS:**

A literature survey of the different SMA configurations is carried out to emphasize its abilities in limiting structural damage when subjected to dynamic loading. A unique and ideal configuration of the SMA damper is adopted by this research, in which the damper is constructed from nonstressed and prestressed Nitinol wires. The nonstressed wires make use of the superelastic properties of the Nitinol material in restoring the structure to its' equilibrium state, while the prestressed wires dissipate the structural energy in the plastic range. The structural analysis is carried out using the MATLAB© platform for a self-made time-history analysis script based on the Newmark- $\beta$  method for nonlinear systems.

## **RESULTS:**

The case-study employs a realistic communication structural tower of 24 meters long subjected to the El-Centro 1940 ground motion record showing the efficiency and capabilities of the SMA damper in dissipating energy and improving the resilience of the structure.

## **CONCLUSIONS:**

The employed SMA configuration is unique since it is equivalent to combining friction damper and buckling restraint braces in one single device.

# Orientation rounds in the emergency room for hospital teams as a method to improve performance in MCI

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**Co-authors:** Jlal Bathish, Lara Kesselman, Meitav odeni, Oshrat Fono Yativ

## **INTRODUCTION:**

A Multiple Casualty Incident (MCI) is defined as an event wherein the hospital may receive a number of casualties that exceeds its ability to absorb and handle as part of its regular functioning.

These events constitute an administrative challenge in real time in terms of event operations as well as communication and information management.

The outlines of a multiple casualty incident, include a plan to receive about 50 patients at the hospital. The treatment will be done by the standard team of emergency room personnel and reinforcement teams from the other hospital departments.

In order to provide the maximum effective treatment, it is important that the reinforcement team feels confident and independent to provide optimal treatment.

Previous familiarity with the emergency room structure, storage areas, principles of treatment of trauma victims and the work processes, will contribute to the sense of confidence and independence of reinforcement teams in real time.

## **PURPOSE:**

Improve the sense of confidence and independence of reinforcement team on CRA

## **METHOD:**

An organized training program geared to each individual is done by emergency room team including orientation in the emergency room, equipment location, professional training in trauma patient treatment, personal acquaintance with the teams, and acquaintance with trauma room. Each training session takes about two hours. In order to maintain competency, the trainings are repeated every year.

## **RESULTS:**

In an analysis of the responses to a survey that was sent to about 70 people on the team, it was found that there is a difference between people who got the training and those who did not receive the training, in the following table:

Control group	Training group	Statement
93%	7%	I feel uncertainty about everything regarding my actions in a MCI in CRA
23%	65%	Did the training in CRA prepare you to the real event?
47%	53%	I think that I know what to do in case of MCI in CRA

## **CONCLUSIONS AND RECOMMENDATIONS:**

Participation of reinforcement teams in orderly training in CRA contributes to the knowledge level and to the sense of confidence. Trainings should be repeated at regular intervals, in order to maintain professional competence, especially when it comes to hospital that doesn't deal with MCIs regularly.



## Trends and risk factors for mortality in elderly burns patients: A retrospective review

**Hagit Ofir**

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**Co-authors:** Moti Harats, Matan Segalovich, Rachel Kornhaber, Adi Giv'on, Kobi Peleg, Josef Haik

### **BACKGROUND:**

People over 65 years is an ever-growing part of the population. According to studies, by the year 2025, nearly a third of the western population will be over age 65, a phenomenon termed "the silver tsunami". There is a greater risk of burn injuries in this population due to impaired vision, decreased coordination, limited mobility and a prolonged response time, etc. there is also an increase in morbidity and mortality rate as compare to the younger population following a burn injury of the same kind. In an attempt to identify prognostic indicators in burns among the elderly, a number of scoring systems have been developed. The existence of a large number of indexes is very problematic and implies to the limitations of each individual model, making it harder to predict the outcome in this population.

### **STUDY QUESTION:**

As doctors, we aim to treat all patients regardless of age, depth of burn, extent of burn or comorbidities. Is this valid when treating elderly patients with extensive burns?

### **METHODS:**

This epidemiological study reviewed records of all admitted elderly burn patients collected from five burns facilities in Israel between 1997-2016. Collected data was limited to the population aged 20+, focused on the population aged 60+.

### **RESULTS:**

Mortality rates for elderly patients increased with TBSA and increases with age. Regression analyses demonstrated a decrease in mortality of 2.9% ( $p = 0.013$ ) per 5 years, an overall decrease of 11.6% over the 20-year study period, with the decline more significant for older age groups. This decrease in mortality was much larger than that observed for all burns patients over this period. The most common cause of injury in the elderly population was fire, with mortality rate highest for this cause. There was no effect of gender on mortality rate. Mortality increased when smoke inhalation was present for TBSA<20%, with mortality unaffected by the presence of smoke inhalation for higher TBSA. The need for surgery correlates with high mortality rates

### **CONCLUSIONS:**

This study identified key factors that impact mortality and demonstrated a large decrease in mortality in the elderly patients over the study period.

# Damage assessment of elasto-plastic structural systems exposed to shock and impact based on a new analytical single degree of freedom solution

**David Ornai**

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## **BACKGROUND:**

Structures and critical infrastructures like hospitals and power stations might be exposed to extreme dynamic events. The events we are focusing on include man made events such as accidental or deliberate air plane crash, explosions, artillery, rockets and missiles hits. This events are determined by typical dynamic functions of pressure loading versus time applied on the object e.g. the hospital facade wall. The current solution of a real elasto-plastic structural system with a single degree of freedom (SDOF) requires in most cases time consuming numerical methods while there is a great need for analytical solutions, which are not existed. It will identify accurately the structural damage by calculating the maximum dynamic deflection and the supports rotation.

## **STUDY QUESTION:**

Analytical formulation and solution procedure of a single or a sequence of various dynamic loading functions (linear variation, constant, exponential, etc.), while considering a possible stiffness change from elastic to plastic regime.

## **METHODS:**

- ◆ Analytical formulation and solution of a 2nd degree differential equation for each typical loading in the elasto-plastic regimes.
- ◆ Analytical formulation and solution of a sequence of dynamic loadings.
- ◆ Comparison to literature and to numerical (finite difference) solutions.

## **RESULTS:**

The new analytical formulation and solution fit the literature and to numerical solutions while presenting the dynamic structural motions (displacement, velocity, acceleration), and support rotations.

## **CONCLUSIONS:**

1. The new analytical formulation and solution enables reliable and fast damage assessment of structures and critical infrastructures exposed to various threat scenarios, based on SDOF elasto-plastic response.
2. The resilience can be improved by updating the design or retrofitting the existing structures.
3. Additional friction device with stick-slip mechanism may be implemented in the analytical formulation. A fast and accurate way to analyze anstructural systems of single degree of freedom.

# Challenges in the Management of Public Health Events and Emergencies – An Integrated Operations Hub (IOH), Singapore’s experience

**Yun-Keng Pang**

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## **BACKGROUND:**

Inadequate/weak surveillance and response capacity in a single country can endanger the public health security of national/ world population; hence, a need to strengthen a formal national level all-source reporting and all-hazard management platform in the Ministry of Health (MOH), Singapore to facilitate multiagency/ international surveillance, risk management, coordination and response to all-hazards incident/crisis within the Singapore healthcare system.

## **STUDY QUESTION:**

This paper describes the formation of the Integrated Operations Hub (IOH), a unified receptacle at MOH Singapore; its challenges faced and strategies implemented for a more effective /efficient platform on surveillance, risk management, incident management processes amongst the healthcare system in both local and global aspect.

## **METHODS:**

Strategies were developed with principles of the WHO International Health Regulations (IHR), 2005 in mind. 1) A whole-of-government approach is used with robust legal, policy and financing frameworks to safeguard public health security. 2) Strengthening the command/control mechanism for better coordination/ communications and transition from peacetime to crisis; integration/coordination mechanisms within the MOH Singapore were setup, e.g. Integrated Operations Management Group and MOH Contingency Taskforce; the structures are scalable, leveraging on multisectoral mechanisms like Homefront Crisis Management System/ IHR NFP network, to handle all-hazards scenarios.

## **RESULTS:**

The MOH Singapore – IOH was formed in July 2016; it has managed 540 incidents, including 4 high severities – Zika outbreak in Singapore, imported monkeypox case– since its inception. For these, IOH has collaborated extensively with both local/international agencies/bodies during the management/response and communications processes.

## **CONCLUSIONS:**

With the setup of IOH, the response to public health incidents was well-coordinated from an all hazards perspective; it leads the running of Emergency Ops Centre for better coordination of inter-agencies operations to facilitate the whole-of-government approach.

## Education and training in NO-FEAR – the work done and what's next

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### **BACKGROUND:**

Education and training are key components in the disaster management; in the NO-FEAR project they have a dedicated Work Package (WP5) in which trends, gaps, new technologies and theories are discussed to improve the disaster resilience.

### **STUDY QUESTION:**

It is more than two years from the proposal delivery to the European Commission: new gaps and needs manifested themselves as well as new solutions appeared on the market. The research aim is to find innovative solutions, best practices and lessons learned recommending them to stakeholders.

### **METHODS:**

Research is conducted in different ways: literature analysis; organizing focus groups with partners of the consortium; interview with selected high-level stakeholders and through some trainings in the framework of the European Master in Disaster Medicine (EMDM). The research will last for 4 more years and will continue using questionnaire and organizing workshops with external practitioners.

### **RESULTS:**

As already stated the results are partial since the activity of the project will continue. The innovative solutions already identified and analyzed are 4: ISEE hospital, XVR, DSS and high-fidelity mannequins; best practices were recognized in the area of disaster education for volunteers and students of the medical area, hospital and pre-hospital exercises, debriefing standardization; lessons learned concerned mainly the use of virtual reality and other technologies that are cost-effective as well as the use of medical students as mock victims.

### **CONCLUSIONS:**

The project itself and the WP5 have as one of the main objectives to create networks of practitioners and suppliers that can interact and share gaps, technologies and ideas. The project will continue its research and all the results will be disseminated through the website and other communication channels, supporting the activities of the responders in case of disaster scenario.

# Toxins and Bioterrorism. An Emerging Global Health Threat

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## **BACKGROUND:**

Research in medical defence against intentional biological threats has become a growing priority. Biological warfare is defined as the intentional use of living organisms such as bacteria, viruses and fungi with the intent to cause disease, death, or environmental damage. Toxins represent a specific new category of possible bio-terror agents owing their high toxicity, ease of production and ease of dissemination. Most of bacterial toxins are large proteins that affect either the nervous system (neurotoxins) or damage cell membranes. Some of these compounds are used for military purposes, other are less known and used but have the potential for use in terrorist -designed biological weapons.

## **STUDY QUESTION:**

The authors would like to analyze and reviewing these toxins, discussing the structure, symptoms, toxicity and treatment, along with their potential malevolent use.

## **METHODS:**

Toxins are and heterogeneous groups of compounds, that share commonalities both with biological and chemical agents. The detection of "biological toxins" is often very difficult as the illness can take anywhere from several hours to week, depending of the agent. Different technologies for toxin detection have been established, but hardly any universally agreed reference methods or reference materials are available. Understanding the mechanism of structure, action and toxicity represent the starting approach to develop adequate and timely medical countermeasures.

## **RESULTS:**

The aim is to provide specific information to enhance specific medical preparedness and response, to enable further understanding of these toxins and their potential role as biological weapons.

## **CONCLUSIONS:**

The need to understand the hazard profile of these toxins is crucial for the risk assessment in order to develop effective medical countermeasures.



## Use of rapid needs assessments (RNAs) for public health disaster preparedness, response, and recovery

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**Co-authors:** Joseph Roth, Amy Wolkin, Emanuele Bruni, Boris Pavlin

### **BACKGROUND:**

With every emergency, there is a need for public health data to establish priorities, allocate resources, provide situational awareness, assess needs, and facilitate activities. Rapid needs assessments (RNAs) can provide this evidence. An RNA should be timely and methodologically sound. They can take place throughout the disaster cycle. Failing to conduct or conducting inadequate RNAs may lead to poor planning decisions, an insufficient response, or ineffective recovery efforts. There are many ways to conduct RNAs and a “one-size-fits-all” approach may not work

### **STUDY QUESTION:**

What tools are available to successfully assess community needs before, during, and after emergencies in a variety of settings?

### **METHODS:**

We identified three toolkits that provide guidance for conducting emergency-related community-based RNAs and reviewed their strengths and weaknesses.

### **RESULTS:**

The U.S. Centers for Disease Control and Prevention (CDC) developed the Community Assessment for Public Health Emergency Response (CASPER) toolkit to guide jurisdictions in conducting RNAs throughout the disaster cycle. CASPER recommends a two-stage cluster sampling design modeled after the World Health Organization's (WHO) Expanded Programme on Immunization survey technique for estimating vaccination coverage. While the 30x7 design has been successful in most areas of the continental U.S., the territories and associated pacific islands found it difficult. Therefore, CDC tested a separate design for these areas with limited resources. Similarly, WHO is currently developing a Rapid Health Assessment tool that will provide even more flexibility for international settings.

### **CONCLUSIONS:**

We identified three toolkits to conduct emergency-related RNAs. Each has strengths and weaknesses, which are dependent on several variables such as emergency type, location, and resource availability. A decision matrix is provided to determine the best method for each situation.

# Preparing and evaluating a tertiary medical center's mass casualty care capacity

**Dagan Schwartz**

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## **BACKGROUND:**

Hospitals worldwide are faced with the need to be prepared for extreme unexpected patient influx due to man-made and natural disasters. Since such events are rare, planning an appropriate response and disseminating it to all relevant employees is challenging. Additionally, it may be difficult to assess for planning oversites and deficiencies. To partially overcome these challenges, large scale realistic drills can be conducted.

## **STUDY QUESTION:**

How does a full scale, mass casualty drill aid in assessing and improving the hospital's preparedness?

## **METHODS:**

Description of the methodology and insights gained during the 5 months preparatory phase and the actual full scale MCE hospital drill.

## **RESULTS:**

As part of the national multi-year hospital disaster preparedness program, a large-scale mass casualty exercise was performed at Beilinson medical center. The drill followed 6 months of preparations, which included revisions to the hospital's mass casualty protocol, Internal training sessions reaching over 300 hospital employees and mini-exercises. The major exercise utilized 150 simulated patients, multiple EMS vehicles and 25 reviewers from the Ministry of Health, the Home front Command and a similar size hospital. In line with characteristics of large terror attack in a football stadium, all 150 of the participating simulated patients arrived multiple teaching sessions, round table discussions and table top exercises were performed in the months prior to the full-scale exercise. The exercise was geared to overwhelm the hospital ED capacity, thus necessitating setup of an alternate patient care site. multiple bottle-necks were identified. Following the drill and extensive after action reviews the following comments and recommendations were made: Staff activation and ED evacuation were rapid and efficient. The alternate care site intended for the mildly injured became rapidly overwhelmed and in retrospect was insufficient. Due to the distance between the ED and the additional care site two triage areas were erected causing confusion and delays.

## **CONCLUSIONS:**

Preparing a hospital for extreme mass casualty events is a great challenge. Performing large scale realistic exercises can significantly help promote preparedness and identify planning, infrastructure and personnel deficiencies.

## **Prevalence of chronic and infectious diseases among Venezuelan refugees at the international border with Colombia, a secondary data analysis of primary care facilities**

**Mary Showstark**

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**Co-authors:** Jose Damas, Alessandro Bifulco, Julio Castro

### **BACKGROUND:**

Power shifts drastically in countries around the world leaving people in a state of flux. This can be lead to shear economic constraints and leave people without the necessities they need. People rapidly evacuate

### **STUDY QUESTION:**

How many numbers and what types of diseases are being seen

### **METHODS:**

Collected data from NGO sites at Cucuta border, Cucuta hospital, and site visits from the USS Comfort. (pending)

### **RESULTS:**

Infectious disease numbers rose preventable diseases could have been stopped utilizing vaccines and medicines diseases resurfaced HIV uncontrolled

### **CONCLUSIONS:**

1. placing attention to public health sectors to mitigate



## Evidence of validity of the Brief Centrality of Event Scale Argentinian Version

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### **BACKGROUND:**

Brief Centrality of the Event Scale, developed by Berntsen and Rubin is one of the most relevant scales in order to measure the centrality that a particular traumatic event holds in identity development.

### **STUDY QUESTION:**

Since no adaptations of the Centrality of Event Scale have been recorded in the Argentine context, this study aims to evaluate its psychometric properties

### **METHODS:**

Centrality of Event Scale was backtranslated and administrated in a non-probabilistic sample consisting of 429 high school and university students in the Autonomous city of Buenos Aires.

### **RESULTS:**

Reliability of the Centrality of Event Scale was adequate ( $\alpha = .95$ ). Confirmatory Factor Analysis confirmed the factorial structure of the scale (NNFI = .99; IFI = .99; CFI = .99; RMSEA = 0.6).

### **CONCLUSIONS:**

The Centrality of Event Scale presents appropriate psychometric properties for its application in the local context . It is suggested that future studies employ different populations so that the construct can acquire greater strength.

# Multi-Casualty Incident Multiplayer Simulator to Extend Amount of Trainees and Frequency of Training

**Roman Sonkin**

*Magen David Adom, Israel*

**Co-authors:** Itamar Abramovich, Eli Jaffe

## **BACKGROUND:**

Multi-Casualty Incident (MCI) drills require both time and budget. In each drill not more than a few can practice commanding the incident. Magen David Adom (MDA), Israel's national rescue organization is responsible for preparing and responding to MCIs. All MDA personnel are trained in MCI command and are expected to take command if they are on the first ambulance arriving on scene. MDA is constantly seeking to improve MCI operations and command skills among its employees and volunteers.

## **STUDY QUESTION:**

The efficiency of a 1st person perspective multiplayer simulator in improving MCI skills for both commander roles and other responder roles was examined.

## **METHODS:**

MDA in conjunction with Ono Academic College developed a 1st person perspective multiplayer simulator using Virtual Reality (VR) technologies.

## **RESULTS:**

MCI simulator participants reported significant improvements in levels of self-confidence and understanding of MCI procedures and protocols. MDA Instructors reported that participants skills improved more than when using other methods of practice.

## **CONCLUSIONS:**

Multiplayer 1st person perspective virtual reality simulators enable participants to significantly improve their MCI management and operation skills and knowledge of MCI protocols.

# Continuous and Live Information Conduction Between EMS and Hospitals allows Emergency Departments to Premanage Multi Casualty Incidents

**Roman Sonkin**

*Magen David Adom, Israel*

**Co-authors:** Oren Blustein, Ido Rosenblat, Eli Jaffe

## **BACKGROUND:**

The initial period following an incident is characterized by complete lack of information. Afterwards the EMS services collect information and start communicating information about the character and extent of the incident. It is critical for receiving hospitals in order to prepare the facilities for receiving abnormal casualty amount, draft additional human resources and most significantly specialists. Clear receiving hospital wards and transfer non emergent patients to other facilities. Magen David Adom (MDA), The Israeli national rescue organization has developed and implemented an app to allow communication with wards such as Intensive Cardiac Care Unit and Neurological Unit for early notice of emergent cases such as STEMI and Stoke. The app communicates medical information, ecg, and even audio and video calling the attending physician. This app is used in routine, and the hospital teams aware of it and its scope of use. The "MDA teams" can be implemented in emergencies to automatically transfer information collected on scene.

## **STUDY QUESTION:**

Efficiency of technology that transfers information directly from EMS to hospital?

## **METHODS:**

Physicians working in emergency departments in major hospitals were interviewed for their opinions of the application and suggested method of use in MCIs.

## **RESULTS:**

The physicians reported that the transfer of information if based on proper protocols might improve the understanding of injury mechanisms, severity of injuries and prepare for the individual needs of the casualties that are en-route.

## **CONCLUSIONS:**

MDA Teams app allows for direct communication with hospital wards during routine times, in addition to its function during routine times it also maintains the patency of the app to function during emergencies. It may be implemented in the emergency room to function in routine and emergency.

# An unexpected threat impacting the readiness of emergency health personnel for nuclear or radiologic incidents

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**Co-authors:** Lindsay Flax, Kelly Klein, E. Liang Liu, Cham Dallas, Curt Harris

## **BACKGROUND:**

The in-jeopardy status of emergency health personnel readiness to engage in response to a nuclear or radiologic incident was identified and published by members of our international workgroup(1). Continued investigation and pertinent literature review identified an unexpected threat to medical preparedness for nuclear or radiologic incidents.

## **STUDY QUESTION:**

Over the past 2 years has improvement been demonstrated in the readiness among emergency health personnel to engage in response to a nuclear or radiologic incident?

## **METHODS:**

IRB approved survey (published), observational and relevant literature review

## **RESULTS:**

Emergency health and medical personnel readiness for nuclear or radiologic incidents is deficient in several areas including an understanding of relative risk, safety factors, identifying medical needs, and relevant education and training(1). There is a lack of willingness by personnel to perform their professional duties during these incidents(1). Subsequent inquiry identified an unexpected threat, that some prominent publications are discouraging medical response preparedness(2). These findings compromise health care readiness and pose a significant risk to the population worldwide.

## **CONCLUSIONS:**

Emergency health and medical personnel readiness for nuclear or radiologic incidents is in a crisis state. The lack of willingness among health and medical personnel to go to work during nuclear and radiologic incidents is multifactorial. Exacerbating this lack of preparedness is the unsubstantiated publication by field-related academics suggesting that medical preparedness is futile and may even be dangerous. Casualty injury and illness predictability modeling identified that early appropriate medical response will save lives, clearly contradicting the notion that medical preparedness is futile. Engaging and preparing the public must be undertaken, and a global effort made to engage a workforce ready for these demanding crises(3). A collective voice supporting preparedness must be sounded. Action is needed to avert a crisis that places our citizens worldwide in grave danger! References: 1. Dallas CE, et al. Readiness for Radiological and Nuclear Events among Emergency Medical Personnel. *Front Public Health*. 2017 Aug 18;5:202. 2. Gale RP, Armitage JO. Are We Prepared for Nuclear Terrorism? *NEJ*. 2018 Jun 21;378(25):2449-2450. 3. Burkle, F.M. and Dallas, C.E. "Developing a Nuclear Global Health Workforce Amid the Increasing Threat of a Nuclear Crisis", *Disaster Medicine and Public Health Preparedness* 2018 10:149-144.

# Establishing operational health and medical personnel proficiency levels for foundational disaster preparedness and readiness

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## **BACKGROUND:**

Improving global operational all-hazards disaster readiness requires a proficient and interoperable health and medical workforce base. Core competencies in disaster medicine and public health preparedness have gained broad acceptance in recent years. However, recognized and standardized health and medical personnel proficiency levels supporting the foundational discipline core competencies is lacking.

## **STUDY QUESTION:**

Operational all-hazards readiness is uniformly identifying proficient personnel utilizing published core competencies?

## **METHODS:**

Observational and relevant literature review

## **RESULTS:**

Our review found a lack of standardization as well as duplicative efforts to implementing the core knowledge, skills and abilities for personnel. Uniform application of the core competencies that are foundational to all-hazards operational readiness may be hampered by a lack of defined proficiency levels for health and medical personnel. Investigation identified four factors must be addressed potentially impacting effectiveness and utilization. The proficiency levels must be accessible and achievable by the target audience personnel, and the defined levels must be acceptable to and recognized by the stakeholders.

## **CONCLUSIONS:**

Health and medical personnel proficient in the fundamental knowledge, skills and abilities of disaster medicine and public health preparedness are the foundation of each country's operational readiness. Stakeholder consensus on core competencies is an important initial step to a global workforce. The lack of acceptable standardized core proficiency levels utilizing these competencies is negatively impacting uniform human resource typing of personnel, interoperability, and resulting in costly duplicative efforts by stakeholder agencies, organizations, and deployment operations. A collaborative undertaking by these stakeholder groups is needed now moving towards establishment of such proficiency levels that are acceptable and standardized, and broadly accessible and achievable by personnel globally.

# Comprehensive Network Platform for Emergency Medical Trans-border Service : Unification and Governance

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## **BACKGROUND:**

Medical Tourism covers receiving by patients medical services in other regions mostly abroad and includes qualified treatment, consequent rehabilitation process, and therapeutic recreation.

## **STUDY QUESTION:**

New problems arise when it concerns countering to emergencies and disasters and thus form a new domain of Emergency Medical Trans-border Service (EMTS) with its severe constrains on time. The objective of the work was to clarify, unify, and eliminate regional, national and discipline barriers within the domain on the way for its governance with focus on preparedness and response to emergencies and disasters.

## **METHODS:**

This study proposes a network ontology to represent EMTS to explore key processes in the field. It considers networkalization of both Network-like Systems and Network-unlike Records (time serious and image serious data).

## **RESULTS:**

Our previous ideology has been translated into a manifold network platform for delivery process of EMTS which envisages: -Networkalization of BIG data on EMTS capabilities and capacities. -Network comparative analysis of demand and supply in Preparedness period; -Matching demand (according to triage) and current supply for EMTS while Response stage; -Implementation of treatment program in line with network decision making; - Rehabilitation provision. A network assessment in delivery EMTS for sufferers from foreign regions was undertaken: Series of inconsistencies were identified between the processes in ROK and PRC and CIS in all the network layers. The role of networkalization was analyzed to unify and coordinate governance mechanisms in diverse countries and sectors.

## **CONCLUSIONS:**

The platform we propose: - seamlessly unifies and combines Network-like Structures and Network-unlike Records to clearly deliver those for diverse individual and group actors in EMTS domain; - provides a general language and methodological framework pointing on weak places and promoting cross-sectoral and trans-border governance while medical response to emergencies and disasters.



## They practice what you preach: Trends in crystalloid transfusion with clinical practice guidelines updates

**Avishai Tsur**

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**Co-authors:** Roy Nadler, Jacob Chen, Avi Benov, Elon Glassberg

### **BACKGROUND:**

Remote damage control resuscitation (RDCR) paradigms in the Israeli Defense Forces Medical Corps (IDF-MC) have waxed and waned in recent years. From overzealous crystalloid transfusion (two large bore IV needles, rapid transfusion of two liters of crystalloids), which was the mainstay of volume resuscitation in the early 2000s, to Clinical Practice Guidelines (CPGs), which discourage transfusion of crystalloids following the introduction of freeze-dried plasma as the resuscitation fluid of choice in 2014.

### **STUDY QUESTION:**

The purpose of the current study is to investigate the trends in crystalloids use and their congruency with changing CPGs.

### **METHODS:**

All patients treated by the IDF-MC personnel are recorded in the IDF trauma registry (ITR), a unique prehospital trauma registry. All patients recorded in the ITR between January 2000 and October 2018 were included. Crystalloid administration occurrence was calculated monthly as the ratio between the number of patients receiving crystalloids and the total number of patients recorded in the ITR. Trends were assessed using Spearman's rank correlation coefficient.

### **RESULTS:**

During the study period, data for 17,453 patients were recorded in the ITR. Between January 2000 and December 2004, there were no statistically significant changes in crystalloids administration occurrence (Spearman's  $\rho = -0.08$ ,  $p = 0.52$ ). Following the publication of the 2004 CPGs, there was a significant decline in crystalloid use (Spearman's  $\rho = -0.66$ ,  $p < 0.01$ ). In 2010, new CPGs were published, followed by a rise in crystalloid use (Spearman's  $\rho = 0.59$ ,  $p < 0.01$ ). In 2014, the updated CPGs were followed by a milder decline in crystalloid use (Spearman's  $\rho = 0.29$ ,  $p = 0.03$ ). Importantly, during 2018, four years following the latest CPGs update, over 8% of casualties were still treated with crystalloids, with most (6%) done by ALS providers.

### **CONCLUSIONS:**

The current study demonstrates considerable changes in crystalloid administration following periodic updates in RDCR-related CPGs. The study demonstrated a significant drop in the prevalence of patients treated by crystalloids following CPGs indicating restrictive crystalloids use and a significant rise following CPGs allowing permissive transfusion of crystalloids. These data demonstrate the adherence to CPGs, which, in turn, facilitated modifications in combat casualty care. The 2014 CPGs, introducing plasma as the resuscitation fluid of choice, failed to minimize the use of crystalloids compared with the 2004 CPGs. While the current study focuses on crystalloids use, these data can potentially be generalized to a variety of CPGs and life-saving interventions, indicating the importance of CPGs in the implementation of change and innovations, thus steering emergency medical services towards better, evidence-based combat casualty care.

## Back to the future: Whole blood is here to stay

**Avishai Tsur**

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**Co-authors:** Roy Nadler, Jacob Chen, Eilat Shinar, Avi Benov, Elon Glassberg

### **BACKGROUND:**

Hemorrhage is the most frequent etiology of preventable death in both military and civilian trauma. The Israeli Defense Force Medical Corps (IDF-MC) has been implementing damage control resuscitation techniques under the goal of eliminating preventable death. These include applying tourniquets and hemostatic dressings to control compressible hemorrhage, administering tranexamic acid at the point of injury and transfusing freeze-dried plasma (FDP) as the resuscitation fluid of choice. In the early 1970s, component therapy replaced the use of whole blood. Component therapy often resulted in red blood cells to plasma ratios exceeding 10:1. Multiple data suggest the benefit of balanced resuscitation for hemorrhaging patients, with a ratio of 1:1:1 between packed red blood cells, plasma and platelets, resulting in optimal outcomes. In the IDF, packed red blood cells and FDP are available in role 2 facilities and aeromedical evacuations. However, their alternating use in an attempt to reach a 1:1 ratio is logistically and technically challenging.

### **STUDY QUESTION:**

Who received en-route whole blood and what were their outcomes?

### **METHODS:**

Following a thorough evaluation in collaboration with the Israeli National Blood Bank Services, the IDF-MC surgeon general approved whole blood as the resuscitation fluid of choice for patients with hemorrhagic shock treated by the airborne combat search and rescue unit, thus replacing the use of packed red blood cells and FDP. The IDF-MC uses low-titer anti-A and anti-B type O-positive blood (LTOWB).

### **RESULTS:**

LTOWB is transfused in accordance with the IDF-MC guidelines for patients with signs of hemorrhagic shock. Patients receive one unit of LTOWB, undergo repeated evaluation, and receive further blood transfusions if necessary.

### **CONCLUSIONS:**

LTOWB is transfused in accordance with the IDF-MC guidelines for patients with signs of hemorrhagic shock. Patients receive one unit of LTOWB, undergo repeated evaluation, and receive further blood transfusions if necessary. As data supporting the safety and feasibility of whole blood are accumulating it's use will become wider throughout the IDF



## Two decades of battlefield pain management

**Avishai Tsur**

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**Co-authors:** Helit Nakar, Roy Nadler, Ben Antebi, Jacob Chen, Avi Benov

### **BACKGROUND:**

Pain control in trauma is an integral part of treatment in combat casualty care (CCC). More soldiers injured on the battlefield will need analgesics for pain than those who will need life-saving interventions (LSI). It has been shown that early treatment of pain improves outcomes after traumatic injury, while inadequate treatment leads to higher rates of PTSD.

### **STUDY QUESTION:**

The purpose of this study is to report the Israel Defense Forces Medical Corps (IDF-MC) experience with point of injury (POI) use of analgesia.

### **METHODS:**

All cases documented in the IDF Trauma Registry (ITR) between January 1997 and December 2018 were examined. All cases of POI pain medications were extracted. Data collection included mechanism of injury, wound distribution, pain medication administered, mortality, and provider type.

### **RESULTS:**

Of 12,152 patients, 1,481 (12.2%) patients who had at least one documented pain management treatment were included in this study. Demographics of the study population included 94.2% male and 5.8% female with a median age of 21 years. Injury mechanisms included blast injuries (40.3%) and gunshot injuries (29%). Of injured body regions reported, 52% were extremity wounds (upper and lower), 23% were truncal wounds. The most common types of analgesics were morphine (74.7%), ketamine (9.6%) and fentanyl (13.6%). Of the patients, 39% received more than one type of analgesic. Over the two decades of the study period, types of analgesics given by providers at POI had changed, as fentanyl was introduced to providers. Another change seen was an increase of casualties receiving analgesia from 5% (1997), 6% (2001), 8% (2005), 8% (2009), 12% (2013), 18% (2017) and 23% (2018). A total of 912 LSIs was performed on 490 patients (33%) receiving analgesia and no adverse events were found in any of the casualties.

### **CONCLUSIONS:**

Most casualties at POI did not receive any analgesics while on the battlefield. The most common analgesics administered at POI were opioids and the most common route of administration was intravenously (IV). This study provides evidence that over time analgesic administration has gained acceptance and has been more commonplace on the battlefield. Increasingly, more casualties are receiving pain management treatment early in CCC along with LSIs. We hope that this shift will impact CCC by reducing PTSD and overall morbidity resulting from inadequate management of acute pain.

# Association of experience and self-efficacy in performing life-saving interventions among Israel Defense Forces advanced life support providers

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## **BACKGROUND:**

When necessary, advanced life support (ALS) providers are expected to perform life-saving interventions (LSIs) competently and without fear. They are trained using manikins and animal models. Yet, experience treating real patients is important to achieve self-efficacy and competency in performing LSIs.

## **STUDY QUESTION:**

The objective of this study was to assess ALS providers' experience in performing LSIs on real patients, to investigate the association of experience with self-efficacy in performing LSIs, and to estimate the rate of ALS providers with high self-efficacy yet insufficient experience in endotracheal intubation (ETI).

## **METHODS:**

ALS providers of the Israel Defense Forces Medical Corps were sent an online questionnaire (SurveyMonkey.com). Providers were asked to estimate the number of LSIs they have performed on real patients and to rate their efficacy in performing those LSIs on a five-level Likert scale. A benchmark of 20 ETIs in the last year was used to determine experience sufficiency. Results are presented as n (%) or median (IQR) where appropriate. Correlations were calculated using Spearman's method.

## **RESULTS:**

Overall, 162 participants responded to the survey. Of them, 110 (68%) paramedics and 52 (32%) physicians. The number of respondents completing the survey was 124 (76%). Experience with major life-saving interventions in the last year included 10 (2-25) ETI attempts, 55 (20-200) IV access attempts, and 1(0-2) intraosseous access attempts. There was little experience with other life-saving procedures; in total, 122 (87%), 99 (80%) and 131 (92%) of participants reported no experience with tube thoracostomy, needle thoracostomy, and cricothyroidotomy, respectively, in the year preceding the survey. Self-efficacy in performing ETI was significantly correlated with the number of ETIs performed in the last year ( $Rho = 0.4$ ,  $p < 0.01$ ). Among 116 (81%) providers who rated their efficacy in performing ETI as high or very high, the median number of ETI in the last year was 10 (3-28), and 75 (65%) failed to achieve the 20 ETIs benchmark.

## **CONCLUSIONS:**

ALS providers have insufficient experience to perform most LSIs competently. Although self-efficacy is associated with experience, providers have high self-efficacy in their ability to perform ETI even with little experience.

# How to design a first aid and disaster preparedness course

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## **BACKGROUND:**

There are many situations in which first aid and disaster preparedness are needed, but professionals often fail to arrive in time. Delayed or incorrectly handling may do more damage. Therefore, timely and correct preparation for public are important, which will effectively reduce the casualty rate in emergency. However, due to the differences of cultural backgrounds, regions, knowledge level and so on, it is difficult to design and conduct public training courses on first aid and disaster preparedness.

## **STUDY QUESTION:**

This study investigated the ability, willingness and curriculum requirements of first aid and disaster preparedness of the in Sichuan, China. The purpose is to design a suitable training course and to explore its applied value.

## **METHODS:**

A questionnaire was designed for the study. It has four modules including basic information of the test subjects, attitude towards first aid, level of first aid skills and public requirement for the course. The questionnaire contains 9 parts including fire, flood, geological disaster, meteorological disaster, man-made disaster, prehospital CPR, laboratory accident, traffic accident and household first aid. Data were processed by IBM SPSS Statistics 23.

## **RESULTS:**

1. There were 102 valid questionnaires.
2. The overall knowledge level is moderate. The subjects thought that the best level of knowledge was meteorological disaster (3.49/5) and man-made disaster (3.41/5), and the worst was household first aid (2.84/5).
3. The overall knowledge recognition level was high, in descending order were fire, traffic accident, home first aid, laboratory accident, geological disaster, meteorological disaster, man-made disaster and flood.
4. The ability, willingness and curriculum requirements are linearly correlated ( $r=0.443$ ).

## **CONCLUSIONS:**

1. It is necessary to emphasize the importance of household first aid in the training course.
2. Knowledge, willingness and ability are linearly correlated, and future training course should be designed to different categorize based on these three elements.

# Improving realism in practical training for disaster medical responders

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## **BACKGROUND:**

Medical support for mass casualty incidents is provided by manpower from government hospitals. Emergency planning, training and education increase the effectiveness of this response. Civilian hospital staff responding to such incidents are required to attend the Disaster Medical Responders Course (DRMC). This is a one-day course, comprising of didactic lectures and a 2-hour practical session that simulates a disaster site. In the first iteration of this practical, participants were training used 10x5cm laminated injury cards, and would apply small stickers onto each card to represent treatment provided. We found that participants did not appreciate limitations of field management, namely space, limited equipment, and manpower.

## **STUDY QUESTION:**

This study aims to showcase the effectiveness of a novel method to train and prepare general medical staff, on what to expect and how to respond to a mass casualty incident site.

## **METHODS:**

Adult-sized (1.5x1m) compressed foam boards were used to simulate casualties. These simulated casualties would be triaged by trainees based on initial injury assessment and heart rate, respiratory rate and capillary refill time. After conveying the simulated casualties to the first aid post, further clinical information would be provided. Medical teams would institute treatment using equipment and medications that mirror the real-life disaster stores. To simulate scarce resources, interventions require manpower commitment and a time penalty. At the end of the practical, participants were given a questionnaire to assess their confidence and readiness.

## **RESULTS:**

A large majority of participants felt strongly that the practical session helped prepare them for potential deployments to the field.

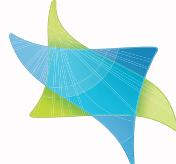
## **CONCLUSIONS:**

Use of life sized compressed foam boards with injury descriptions and labels that mimic real life assessment, and the use of time penalties, greatly improve the realism of short duration practical training for disaster medical responders.





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