

among terrorism (7%) than war (2%) casualties, particularly among civilians.

**Conclusions:** The results indicate that injuries and hospital outcomes from terrorism compared with war were more severe, especially among civilians. Differences were likely the result of the unexpected nature of the attack and preparedness of the population group.

**Keywords:** injury; injury severity; terrorism; war

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### Do Modern Conflicts Create Different Medical Needs?

*Bruria Adini, PhD,<sup>1</sup> Robert Cohen, PhD,<sup>1</sup> Adi Givon, BA,<sup>1</sup> Irina Radomislensky, BA,<sup>1</sup> Michael Viner, MD,<sup>2</sup> Israeli Trauma Group; Kobi Peleg, PhD, MPH<sup>1,3</sup>*

1. Israel National Center for Trauma and Emergency Medicine, Gertner, Institute for Epidemiology and Health Policy Research
2. Clalit Health Services
3. School of Public Health, Tel-Aviv University

**Objective:** Management of combat and civilian casualties during military conflicts creates different medical needs. This study analyzed: (1) type of injuries and medical services utilized by military casualties in three conflicts; and (2) the medical needs of military and civilian casualties from the 2<sup>nd</sup> Lebanon War.

**Methods:** Military casualties from three conflicts and military and civilian casualties from the 2<sup>nd</sup> Lebanon War were analyzed. Casualties were compared in relation to type of injury, length-of-stay (LOS), and operating room utilization (ORU).

**Results:** The rate of orthopedic injuries and casualties requiring treatment in the intensive care units (ICUs) remained fairly constant. Hospital LOS for general surgery, neurosurgery, thoracic surgery, and otolaryngology patients decreased, while LOS in the ICU increased over the three conflicts. Soldiers tended to have a higher percentage of orthopedic injuries. The LOS for both populations was similar. More civilian casualties required admission to the ICU and the LOS was lower compared to soldiers. The type of injuries sustained differed significantly for the two groups ( $\chi^2 = 13.8$ ,  $df = 4$ ,  $p < 0.008$ ). Civilian ORU was higher for orthopedic and otolaryngological procedures, and the rate of general surgery ORU decreased.

**Conclusions:** The LOS possibly decreased due to improved evacuation facilities and diagnostic and therapeutic techniques. The exception was for burn casualties who, as a result of improved evacuation procedures, had an increased chance of survival.

Civilians are less protected during military conflicts, and therefore, are more susceptible to certain kind of injuries. Civilian and military medical needs differed. Civilians had a higher morbidity than soldiers, which resulted in an increased need for treatment in the ICU.

**Keywords:** civilian; conflict; injury; medical needs; military

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### Nuclear Terrorism: Appropriate Planning Saves Lives

*Irwin Redlener, MD*

Columbia University, New York City, New York USA

Timely risk communication around nuclear terrorism can save many lives in the event of an urban nuclear detonation. Yet, in the US and many other Western nations, little has been done to organize effective planning.

During the height of the Cold War between the Soviet Union and the United States (and their respective allies) the combined arsenal of nuclear weapons peaked at more than 60,000 warheads. Hovering on the brink of nuclear war for some three decades, the atomic apocalypse was averted through a combination of the precarious doctrine of “mutually assured destruction”, crisis aversion leadership, and pure luck. The accepted assumption in the disaster response community was that because destruction would be so widespread, response planning would be futile.

Fast-forward to a post-9/11 world where we have witnessed the rise of global terrorist organizations, the increasing evidence of small, independent terrorist units, the relative availability of nuclear know-how and materials, rogue states seeking nuclear weapons, and fanaticism bent on wreaking maximum destruction on perceived foes. Now, we face a new scenario where isolated, improvised nuclear devices (INDs) represent a very different kind of nuclear threat.

Unfortunately, many disaster planning officials and agencies, including those in cities most likely to be the target of nuclear terrorism, have done little to prepare. Many are stuck in the Cold War mindset of “planning futility”. Priorities are diverted to scenarios deemed “more likely or more manageable”.

In reality, however, a nuclear detonation, while devastating and deadly to many, also is survivable for the majority of a targeted city’s population provided that: (1) responders are prepared, both locally and regionally; (2) information is timely and accessible; and (3) citizens are aware of a relatively limited number of essential survival guidelines.

This presentation will outline strategies for citizen education around nuclear readiness, as well as a rationale for appropriate regional planning for IND detonations, including principles of long-term recovery and resiliency.

**Keywords:** communication; nuclear terrorism; planning; preparedness; responders

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### Prehospital Management of Emergencies and Mass-Casualty Events

#### Airmedical Evacuation during a Mass-Casualty Incident in a Remote Location

*MAJ Osbri Barel, MD,<sup>1</sup> MAJ Shachar Shapira, MD,<sup>2</sup> CPT Leon Levinson,<sup>2</sup> LTC Ronen Levite, MD,<sup>1</sup> COL Erez Barenboim, MD<sup>1</sup>*

1. Combat Rescue and Aero Medical Unit, Israeli Air Force, Israel
2. Surgeon General Office, Israeli Air Force, Israel

**Introduction:** On 16 December 2008, a tourist bus crashed near the city of Eilat, causing 53 casualties. Due to the geographical distance, airmedical evacuation was the major means of evacuation to Level-One Trauma Centers.

**Methods:** Data were collected from several sources, including reports from medical caregivers on the ground and from the airborne medical crews, logs of the Israeli combat rescue airmedical unit, logs of the Israeli Air Force and a computerized database for debriefing airmedical evacuations.

**Results:** There were 53 casualties, of which, 25 were pronounced dead and 28 required airmedical evacuation to Level-1 Trauma Centers. Seven airmedical evacuations were performed, four of which to Soroka Medical Center (mean flight time = 45 minutes, range 40–50 minutes, median 45 minutes). One went to Hadasa Ein Carem Medical Center (flight = 50 minutes), one to Shiba Medical Center (flight time = 80 minutes) and one to Ben Gurion Airport (flight time = 40 minutes), from there, by ground to different nearby hospitals.

Four evacuations were performed with a UH-60 Blackhawk helicopter (two patients per evacuation). Two evacuations were performed with the CH-53 sea stallion helicopter (mean = 1.5 patients per evacuation). One evacuation was performed with the C-130 Hercules airplane (16 patients). Two evacuations were redirected to a closer destination due to deterioration of the patient's condition. During these evacuations, one unit of blood was administered, and a needle application using a vignon needle was performed to two patients. no patients died during transport.

**Conclusions:** Airmedical evacuation was a pillar in medical evacuation of wounded patients in this scenario. Actions and judgment of the airborne medical crews allowed for the safe transport of all patients.

**Keywords:** airmedical evacuation; Israel; mass-casualty incident; motor vehicle crash; remote location

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### Model for Preventing Post-Traumatic Stress Disorder Symptoms among Adolescent Volunteers on Ambulance Teams Exposed to Terrorism

Eli Jaffe,\* Avishay Goldberg; Einat Aviel; Haim Y. Knobler

Ben Gurion University, Beer Sheva, Israel

\*Part of PhD thesis in the Department of Medical Management, Ben Gurion University, Beer Sheva

**Introduction:** In the ambulance service of Magen David Adom (MDA), the national first aid organization in Israel, volunteers 16–18 years who work as assistant paramedics. Between the years 2000–2002, the ambulance teams of MDA treated thousands of victims of terrorist attacks. This study examined the factors affecting the number of post-traumatic symptoms among these ambulance teams, in order to develop a model for prevention of post-traumatic stress disorder (PTSD).

**Methods:** The study included 620 young volunteers (mean age: 17 years) from around the country who had been volunteering for about one year. They responded anonymously to the questionnaire, which included demographic information, motivation to volunteer, exposure variables (including terrorist attacks and other traumatic events), and post-traumatic and other psychiatric symptoms.

**Results:** None of the volunteers had a clinically significant psychiatric disorder, including PTSD. Vulnerability to post-traumatic symptoms was found among non-religious

female volunteers, volunteers whose motivation was defensive (self-centered), those from regions with low levels of terrorist attacks, and those who witnessed dead bodies during such attacks.

**Discussion:** This study points to a prevention model that identifies sub-populations of volunteers who are at a greater risk to develop post-traumatic symptoms. Primary prevention among such sub-groups will include an emphasis on their preparedness. Secondary prevention will include ensuring their participation in post-action debriefing, and further monitoring to identify post traumatic reactions—if they occur.

**Keywords:** adolescent; Magen David Adom; post-traumatic stress disorder; terrorism; volunteers

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### Magen David Adom—C4I: Meeting the Needs in the Field

Chaim Rafalowski, MA,<sup>1</sup> Ido Rosenblant, BA<sup>2</sup>

1. MA Disaster Management Director, Magen David Adom, Israel

2. National Dispatch Supervisor, Magen David Adom, Israel

**Introduction:** Magen David Adom (MDA), Israel's National emergency medical services (EMS) with an advanced life support (ALS) and basic life support (BLS) system, runs approximately 1,250 emergency calls per day. Magen David Adom uses a Computer-Aided Dispatch System (CADS) since the early 1990s. In recent years, major advances were made by MDA personnel. Magen David Adom has a fleet of approximately 900 emergency response vehicles, with 3,000 volunteers active as first responders in their communities.

**Methods:** The purpose of this study was to describe major achievements in the upgraded C4I system of MDA, compared to the first version of the system.

The major new features in the new system included: (1) online alerts of irregularities; (2) personalized, automatic activation of first responders; (3) computerized systems for multi-casualty incident management; (4) medical control of patient records; and (5) automatic alerts to the operations center officer and management.

**Results:** The objectives of the upgraded system were to: (1) reduce the response times to patients; (2) more efficiently use all of the available resources (ambulances, first responders); (3) enable quality assurance; and (4) enable the management of multi-casualty situations through a computerized system.

**Conclusions:** The involvement of field personnel is essential. The new system enables more effective use of volunteers. The online involvement of senior managers monitoring the activities is critical. Online quality assurance cannot be replaced by *post facto* procedures. Quality assurance should be a teaching system, not a disciplinary one. Criteria must be established, and the flow and amount of information must be accounted for.

**Keywords:** C4I; communications; emergency medical services; Israel; Magen David Adom

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