

(C31) Oktoberfest Tent Blowdown

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Introduction: On 17 October 2007, a severe weather event occurred in Tulsa, Oklahoma. The resulting storms caused to collapse of two large tents and several smaller tents at an Oktoberfest celebration causing 23 injuries that required evacuation to emergency departments.

Methods: This paper is a retrospective analysis of the regional health system's response to this event consisting of police, fire, emergency medical services (EMS), hospital, regional hospital emergency operations center, and the public health response. Data from the Tulsa Fire Department, the Emergency Medical Services Authority (EMSA), the receiving hospitals, and coordinating services were reviewed and analyzed. The EMS patient care reports for all 23 patients were reviewed and analyzed using triage designators assigned in the field, injury severity scores, and critical mortality.

Results: The EMTs and paramedics from Tulsa Fire Department and EMSA provided on-site care under unified incident command. All EMS patient transports were by EMSA ambulance using six local hospital emergency department services. Aeromedical evacuation was not used due to the proximity of the hospitals and the weather, with wind gusts up to 80 miles. Of the 23 patients transported by EMS, two were hospitalized, one with a critical spinal injury, and one with critical head injury.

Conclusions: Analysis of the 2007 Tulsa Oktoberfest mass casualty incident revealed rapid police, fire, and EMS response despite challenges of operations while dark under severe weather conditions and the need to treat a significant number of injured victims. There were no fatalities. Of the patients transported by EMS, a minority sustained critical injuries, with most sustaining injuries amenable to discharge after emergency department care.

Keywords: critical mortality; emergency medical services; disaster response; health system response; mass casualty incident; Oklahoma; Oktoberfest; severe weather; trauma; triage; tent; Tulsa
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(C32) Efficiency of Emergency Relief with Emphasis on the Transportation System—Case Study of Zone 6 in Tehran, Iran

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Emergency relief has an important role in reducing casualties. The performance of the transportation network is an essential factor in the efficiency of search, rescue, and relief operations. Following disasters, traffic can impact emergency travel time. In this study, the performance of the transportation network in Zone 6 of Tehran, Iran was stud-

ied. This research consisted of two techniques, the hazard identification method and What-If Analysis.

The results of this research indicate that some physical and non-physical operations can impact the efficiency of emergency travel time in the zone of study. Emergency relief in the zone of study is a function of the location and traffic flow in the area. Therefore, changing the methods of selecting safe roads to attain optimum emergency travel times is recommended.

Keywords: disaster; emergency; relief; Tehran; transportation
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(C33) Injuries due to the Bam Earthquake in Iran

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Introduction: Iran is a country with an area of 1,648,195 km² with a population of >8,000,000 people. The devastating earthquake in the Bam District of Kerman Province struck on 26 December 2003 when the population was sleeping, and left a total of 29,878 dead and 22,628 injured. It had a magnitude of 7.4 on the Richter scale. The aim of this study was to determine the frequency of physical injuries.

Methods: The data of 206 patients were collected from the medical records.

Results: The majority of patients were in the 20–29 year age group. The female/male ratio was 1.51. The overall mortality rate was 2%. Most frequent injuries were lower extremity, pelvic, and spinal fractures respectively. Of the extremity fractures, 4.9% had open fractures, 95.1% had closed, and 19 patients underwent fasciotomy due to compartment syndrome. Of the pelvic fractures, 7.9% were unstable. Of the cases, 32% with vertebral fractures had spinal cord injuries. Other injuries were less frequent and included pneumothorax, hemothorax, abdominal viscous injuries, rib fracture, and head injuries.

Conclusions: The main problems in the victims were orthopedic. Hospitals must prepare to treat these injuries.

Keywords: Bam Earthquake; disaster; hospitals; injuries; Iran
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(C34) Cyclone Nargis—The Team Singapore Experience

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Introduction: Cyclone Nargis struck on 02 May 2008 and was the worst disaster due to natural hazards in the recorded history of Myanmar. It left >146,000 people dead and thousands more homeless. More than 200 hospitals and 400 clinics were destroyed by the cyclone. Singapore was the first non-bordering country to send a medical team to help Myanmar with the disaster relief efforts and carried out operations using mobile teams.

Methods: Demographic and medical data from the medical records were collected and analyzed.

Results: A total of 4,489 patients were seen in nine days at hospitals, eight camps/villages, an orphanage, and an elderly care facility. Of the patients, 65% were female. More than a quarter of the patients were <12 years of age and 16.5% were >60 years old. The pediatric patients suffered mainly

from respiratory (26%) and gastrointestinal infections (28%), whereas the adults had a significant number of musculoskeletal complaints (21%), non-specific diagnoses (19%), and chronic medical conditions (11%). Only (6%) of the conditions required surgical interventions. A significant number of complaints were related to post traumatic stress disorder (10%).

Conclusions: Mobile clinics were useful for treating patients who did not have access to medical care. The post disaster epidemics that were expected were not experienced. Given the patient load, it was useful to have a pediatrician, primary healthcare physician, and emergency physician to cope with the cyclone-related medical conditions.

Keywords: Cyclone Nargis; disaster; mobile teams; Myanmar
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(C35) Pediatric Morbidity from Cyclone Nargis *Arif Tyebally*

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Introduction: Cyclone Nargis struck on 02 May 2008, and was the worst disaster due to natural hazards in the recorded history of Myanmar. More than two million people were affected by the cyclone, which left 146,000 people dead. Children made up a significant proportion of those affected by the cyclone, and formed a significant patient load during Team Singapore's medical relief mission. The pediatric morbidity was studied in order to help plan for future disaster relief missions.

Methods: Demographic and medical data from the medical records of the 4,489 patients seen by team doctors was collected and analyzed.

Results: A total of 1,402 pediatric patients ≤ 16 years of age were seen during nine days from team visits to a hospital, eight camps/villages, and an orphanage. They formed $>30\%$ of the total clinical workload. Most of them suffered from respiratory (36%) and gastrointestinal infections (29%). Injuries and wounds made up 12% of the attendances, and 2.8% of the children presented with psychological manifestations/post-traumatic stress disorder.

Conclusions: Children are more susceptible to infection, vulnerable to the effects of vomiting and diarrhea, and often form a large population of victims during a disaster. Their psychological needs must be addressed. The needs of children are unique and medical aid should be rendered by pediatric specialists trained to render medical assistance to children during extreme situations. The special requirements of children must be considered during the planning of any disaster relief mission.

Keywords: children; Cyclone Nargis; mobile medical teams; Myanmar; pediatrics
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Oral Presentations—Terrorist Attacks in High-Density Areas

New Concepts in Terrorism and Non-Conventional Global Threats: Framework for Health Response and Preparedness

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After the 11 September 2001 attacks, it became clear that all nations are vulnerable to a mass-casualty incident (MCI) caused by the use of non-conventional weapons. Repeated terrorist attacks in different areas and the global threat of a possible non-conventional chemical, biological, radiological, nuclear, or explosive attack (CBRNE) now are considered to be a worldwide problem. The size of the attack, setting, sophisticated level of planning and organization, and the methods employed were unprecedented.

Public institutions such as government facilities, hospitals, universities, schools, and public gathering places may be targeted by terrorists using weapons of mass destruction (WMDs). Governmental and public institutions must be prepared to prevent or respond to such attacks.

The healthcare system is called upon to react to terrorism incidents. Appropriate alternative actions for the response to these threats require planning with consideration of the level of risk and the local reality.

The development of models, an analysis of new forms of terrorism, and possible non-conventional attacks, with the examination of alternative actions according to types of risks, and the selection of the most appropriate settings for preparedness and response are underlined and suggested. The study and application of laws and regulation based on population protection and with the respect of civil liberties will be explored.

Planning, teaching and drills, risk assessment and risk communication, and inter- and multi-level cooperation at national and international levels are emphasized.

Keywords: chemical, biological, radiological, nuclear, and explosive; human rights; non-conventional attack; preparedness; response; terrorism; weapons of mass destruction

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Willingness of US Emergency Medical Technicians to Respond to Terrorist Incidents

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Introduction: There is a difference between prehospital providers' ability and willingness to respond to terrorist, public health emergencies, and disaster incidents.

Methods: A nationally representative sample of the 203,465 basic and paramedic emergency medical service providers in the United States was surveyed to assess their ability and willingness to respond to terrorist incidents.

Results: Emergency medical technicians were appreciably (10–20%) less willing than able to respond to such potential terrorist-related incidents as smallpox outbreaks, chemical attacks, or radioactive dirty bombs ($p < 0.0001$). Emergency