

Furthermore, longitudinal expandability supports the basic rules that facilitate the unidirectional flow of casualties from dirty to clean areas.

Conclusions: A LES is an answer to the requisites of disaster medicine standards and guidelines. It provides an effective and efficient area for sanitary aid in response to disasters or emergencies.

Keywords: disaster health; disaster health structure; medical shelter; medical unit

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(S105) Water Supply: Damage to Hospitals during Two Earthquakes in Japan, 2007

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Introduction: Lifeline functions are vital to maintain the function of medical treatment facilities. Patient survivability during disasters is dependent on the viability of lifelines functions, especially on a water supply system. This report deals with the water supply damage of hospitals after the Noto Peninsula and Niigataken Chuetsu-oki Earthquakes of 2007 in Japan.

Methods: The water supply management of three hospitals impacted by the two earthquakes was investigated using a field survey and interviews administered to hospital personnel. The assessment included water supply systems during normal operations and after the damage.

Results: Hospital A was damaged seriously. The water supply was disrupted completely for three days. Water was stored for only one day. This hospital depended completely on water wagons for the exceeded demand. Hemodialysis patients had to be sent to other hospitals for treatment.

Hospital B suffered little damage to its water tank.

Hospital C suffered serious damage. The water supply was disrupted completely for two weeks. The hospital held four days worth of a water supply, including a rainwater pool. The rest of its water demand was fulfilled by water wagons from the Self Defense Force.

Conclusions: Since hemodialysis consumes significant quantities of water, these patients were transferred for dialysis. Many were elderly and resisted evacuation. Keeping enough water in hospitals is vital to prevent hospital disruption due to a water shortage during disasters. Even non-potable sources like rainwater can be used.

Keywords: earthquakes; hospitals; Japan; water supply; water systems

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(S106) Evacuation Exercise of an Intensive Care Unit

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Introduction: A 14-bed intensive care unit (ICU) was moved to a new part of the hospital, allowing for the unique opportunity to perform an evacuation drill of an ICU. Patients in the ICU are not only endangered by their disease, but also by their dependence on mechanical life support. Because a collapse of that lifesaving infrastructure is seldom, this scenario often is not considered and therefore, is underestimated.

Methods: For the drill, ten volunteers were dressed as ICU patients. Four of the ten patients were placed in a hot zone so that they could not be reached by the hospital staff and only could be rescued by the firefighters working with self-contained breathing protection. The danger in the hot zone was simulated using a smoke generator.

Results: The personnel worked together efficiently. The hospital staff benefited from the experience. The patients were evacuated from the ICU in 17 ±9 minutes, the hot zone was cleared in 21 ±10 minutes, and the patients were transferred to another ICU or to emergency medical services within 52 ±21 minutes. Many team members made suggestions on how to modify and improve the response to such an incident.

Conclusions: Organizing and performing an evacuation drill was difficult, but also a beneficial experience for all those involved. It is difficult to compare these data with other institutions, however there was much to learn for everybody involved in the drill.

Keywords: drill; evacuation; exercise; intensive care unit; safe hospital

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Oral Presentations—Civil-Military Collaboration

Potential Roles of Military-Specific Response to Natural Disasters—Analysis of the Rapid Deployment of a Mobile Surgical Team to the 2007 Peruvian Earthquake

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The August 2007 earthquake in Peru resulted in the loss of critical health infrastructure and resource capacity. A regionally located United States Military Mobile Surgical Team was deployed and operational within 48 hours. However, a

post-mission analysis confirmed a low yield from the military surgical resource. The experience of the team suggests that non-surgical medical, transportation, and logistical resources filled essential gaps in health assessment, evacuation, and essential primary care in an otherwise resource poor surge response capability. Due to an absence of outcomes data, the true effect of the mission on population health remains unknown. Militaries should focus their disaster response efforts on employment of logistics, primary medical care, and transportation/evacuation. Future response strategies should be evidence-based and incorporate a means of quantifying outcomes.

Keywords: civil-military; deployment; disaster; earthquake; military-specific; mobile surgical team; natural disaster; Peru

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First Use of the Canada-US Civil Assistance Plan—Hurricane Gustav, August 2008: A Bi-National Success Story

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Introduction: In February 2008, the Canada-US Civil Assistance Plan (CAP) was signed. The agreement facilitates the armed forces from one nation to support the armed forces of the other nation during a civil emergency.

Methods: The first opportunity to carry out the plan occurred six months later, in August 2008, when Hurricane Gustav was bearing down on the coast of Louisiana. The US Northern Command received an assignment to aeromedically evacuate up to 1,000 patients who were in hospitals and nursing homes in the forecasted path of the hurricane. Given the short lead-time, this task required a significant concentration of resources in order to be successful. Accordingly, the Commander of the US Northern Command initiated a request for assistance from Canada, using the CAP.

Results: After receiving approval from both governments, the Canadian Forces quickly deployed a CC-177 Globemaster III aircraft to Lakefront, Louisiana. The time from official diplomatic request to evacuation and mission completed was <24 hours.

Conclusions: This first use of the new CAP was considered to be an overwhelming success. It was seen to uphold the long-standing tradition of cooperation and mutual support in times of crisis that has existed between Canada and the US.

Not only was the operation a huge success, it was accomplished in a remarkably short period of time. The CAP has proven to be an excellent mechanism to facilitate the provision of support in times of need between these two close neighbors.

Keywords: aeromedical evacuation; Canada-US Civil Assistance Plan; civil-military; disaster; Hurricane Gustav

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The Army Health System: One Face of the Same Coin

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Objective: The objective of this study was to determine the impact of the Army Health System in public health, through the medical support provided in the Critical Care Unit of the Central Military Hospital and the Hospital in Rio Gallegos.

Methods: A prospective trial of 594 adult patients was performed; 295 were admitted to the intensive care unit (ICU) of HMC and 254 were admitted to the ICU at HRRG1. For each patient, age, diagnosis, severity using the Apache II score, daily treatment required using the Therapeutic Intervention Scoring System (TISS 28) score, length of mechanical ventilation, length of stay in the ICU, daily cost of medication, and outcome were recorded. All data were tested using the chi-square statistical test, and a *p*-value less than 0.05 was considered to be statistically significant.

Results: The mean age was 60 (SD = 18), the mean TISS 28 score was 17 (SD = 8), the mean length of stay in the ICU was 4.5 days (SD = 5) for those in the HMC, and five days (SD = 5) in the HRRG. The mean daily cost of stay among the patients in the HMC was \$855 (SD = 120), and \$955 (SD=397) in the HRR. The mean time of invasive mechanical ventilation (IMV) of patients in HMC was 1.5 days (SD = 3), and 2.6 (SD = 4) in the HRRG. The mortality rate of the traumatic patients with an Apache II score >16 was 13% at HMC, but 37% at HRRG. The prevalence of cost a of stay >\$900 for patients with a TISS score >17 and IMV >3 days was 17% at HMC, but 47% at HRRG.

Conclusions: The mortality rate and cost are higher among those patient admitted in ICU with higher Apache II and TISS 28 scores, requiring invasive mechanical ventilation. The Army Health System provides a reduction in cost and good support to civilian public health

Keywords: Argentina; civil-military; cost; intensive care unit; ventilation

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How to Build a Mobile Field Hospital in Disasters: An Italian Model

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Introduction: During a disaster, local health services can be overwhelmed, and damage to clinics and hospitals can render them useless. Damage to the healthcare infrastructure further compromises the delivery of health services. Many countries maintain mobile field hospitals in order to respond in case of a possible disaster. In this new context and concept of disaster medicine, a mobile field hospital plays a significant response role.

Methods: The authors describe an Italian model of mobile field hospital of the Italian Association of Alpini (ANA). It is a mobile, flexible hospital that is self-contained, self-sufficient, capable deploying rapidly, and expanding or con-