

injuries. In such occasions, most of the orthopedic cases need surgery. Orthopedic surgery facilities and orthopedic surgeons are highly needed in referral hospitals after a disastrous earthquake. It should be noted that lower extremity injuries are much more to be expected than upper.

**Keywords:** Bam; children; earthquake; injuries; Iran; orthopedic; pediatric

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### Organization of Medical Help to Children and Victims of Terrorism in Beslan

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**Introduction:** On 01 September 2004, terrorists took over a secondary school in the city of Beslan, Nord Ossetia Republic. More than 600 of the hostages taken were children. **Methods:** On 02 September, the pediatric brigade of the All Russian Centre of Disaster Medicine, "Zaschita", flew to Beslan along with associates of the airmobile Hospital of the Ministry of Emergency of the Russian Federation. On the territory of a local hospital, modules of the children's field hospital (CFH) were constructed and medical equipment was mounted and tested. A training course for medical staff, which consisted of 20 doctors and nurses, was given. On 03 September, the admission of children wounded as a result of the terrorist take-over began at 13:15 hours. Adults were sent to a hospital admission division, and children were sent to the admission-triage module of the CFH. During the process of triage, children were divided into three groups: (1) in agony (5); (2) wounded—needed urgent medical help in vital indications (52); (3) wounded—must be evacuated to Vladikavkaz after receiving initial medical attention by a doctor (199).

**Results:** In the CFH, 311 children were admitted, including 256 wounded and 55 children who did not require medical assistance. A total of 47 surgical operations were performed, including seven surgical operations on the thorax and abdomen. In the hospital-evacuation module, reanimation was conducted until conditions were stabilized and evacuation to the Clinics of Vladikavkaz appeared possible.

A total of 385 children and adolescents, ranging in age from 1.8–18 years, were hospitalized in the Hospitals of Vladikavkaz and Beslan. Of those children, 146 required special methods of treatment and were transferred to Moscow (135) and Rostov (11). It should be noted that no children died during evacuation.

**Conclusion:** The efficacy of the medical-evacuation provision was determined by the timely planning and preparing of the system of medical provision, by cooperation between the Ministry of Health and the Russian Centre of Disaster Medicine, and by the unique accumulated work experience of pediatric formulations of the National Service of Disaster Medicine.

**Keywords:** children; evacuation; hostage; Russia; terrorism; triage

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### Are American Children Primary Targets of Al Qaeda Terrorism? Implications for Policy and Preparedness Planning

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Scholars and health practitioners have dedicated considerable thought to the physical and mental treatment of children in the aftermath of a terrorist attack. Likewise, education officials and others who oversee child-centered organizations have begun to develop plans for children in the event of terrorism affecting their facilities. However, most of the literature dealing with children and terrorism assumes children would be secondary or collateral victims as opposed to the intended targets. This latter possibility requires a different approach to preparedness planning on a number of levels.

While some have begun to consider the case of children as intended targets in foreign states, such as Israel and Russia, where terrorists have harmed children explicitly and successfully, little attention has been given to scenarios involving such threats in the United States. This is partly because there has not been an attack of this nature on American soil. However, a growing body of evidence suggests that international terror groups may well have such horrific scenarios in mind. American children, therefore, do face an explicit threat. Consequently, it is proposed that emergency responders be trained and preparedness models developed to protect and address the unique needs of children in the event of a terrorist attack, particularly those involving biological, chemical, or radiological weapons, which directly target children. This presentation considers the historical precedent of children as the intended targets of terrorism and the care for American children being explicitly targeted by Al Qaeda.

**Keywords:** chemical, biological, radiological (CBR); children; disasters; terrorism; United States

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### Pediatric Terrorism Preparedness: National Guidelines and Recommendations—Findings of an Evidenced-Based Consensus Process

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A cadre of experts and stakeholders from government agencies, professional organizations, emergency medicine and response, pediatrics, mental health, and disaster preparedness gathered to review and summarize the existing data on the needs of children in the planning, preparation, and responses to disasters or terrorism. This review was followed by the development of evidence-based, consensus guidelines and recommendations on the needs of children in events, including chemical, biological, and radiological terrorism. An evidence-based, consensus process was used in conjunction with a modified Delphi approach for the selection of topics and discussion points. These recommendations and

guidelines represent the first national, evidence-based standards for pediatric disaster and terrorism preparedness.

The methodology used to develop the guidelines and recommendations in the current report was one of a previously validated, evidenced-based, consensus process used in prior studies, supplemented by a modified Delphi approach for topic selection. Experts from multiple disciplines and areas of expertise involved in the planning for and care of children during times of disaster and/or terrorist events were convened for the discussion. There were several goals of this process:

1. To build collaboration among individuals with expertise in pediatrics, pediatric emergency medicine, pediatric critical care, pediatric surgery, and emergency management (including disaster planning, management, and response);
2. To review and summarize the existing data on the needs of children in disaster planning, preparation, and response;
3. To develop evidence-based guidelines and recommendations on the needs of children in disasters, and develop evidence-based consensus guidelines for dealing with the gaps in the evidence; and
4. To create a research agenda to address knowledge gaps based on the limited data that exist on the needs of children in disasters.

The final recommendations of the conference focused on three major areas: (1) emergency and prehospital care; (2) hospital care; and (3) terrorism preparedness and response, including biological terrorism, chemical terrorism, radiological terrorism, physical protection, decontamination, and the Strategic National Stockpile (SNS).

**Keywords:** children; disasters; events; guidelines; preparedness; response; terrorism

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## Special Seminar: The Tsunami of Southeast Asia

### Theme 4: Transport Medicine

Chair: Per Ortenwall

#### Emergency Air-medical Transport of Patients with Severe Head Injuries from a Remote Island to Taiwan

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**Introduction:** Transporting patients with severe head injuries has been considered a great challenge to medical professionals. Although the severity of head injuries directly affects patient outcome, the professional dedication of all parties during transport plays a significant role on patient survival. On the remote island of Taiwan, the shortage of neurosurgical professionals and facilities has resulted in

increasing demands on emergency air-medical services (EAMS) for patient transport. The quality of EAMS between Taiwan and the remote islands has become an important issue, which directly relates to the outcome of patients with severe head injuries.

**Objectives:** To investigate the outcome of patients with head injuries transported by fixed-wing, air ambulances.

**Methods:** Medical records of patients transported from Kinmen, an outer island of Taiwan, during January 2001 and August 2004 were reviewed. A total of 426 cases were transported during this period. Demographic information about these patients, including age, gender, mechanism of injury, Glasgow Coma Scale Score (GCS), and the use of a ventilator, was entered into a database for further statistical analysis.

**Results:** All patients were transported to the receiving hospital within eight hours. Patients' demographic characteristics in two groups were similar in gender, mean age, and the mode of transport; and they were transported to the same receiving hospitals. Among the 72 patients with head injuries, 39.1% (n = 18) of the patients had severe head injuries (GCS <9). The mean value of the ages was 45.0 ± 20.57 years. The majority of patients were male (male:female ratio = 3:1). In the study group, 26.4% were between the ages of 16 and 30 years old (n = 19, p = 0.022).

Nearly 40% of the patients required mechanical ventilation (p = 0.024), and most of them were comatose (p = 0.04). Eight patients (19.0%) did not survive (survival rate = 81%), and the findings were significantly different compared to the control group (survival rate 95.1%, p = 0.004). In the study group, four patients (9.5%) were not transported due to deterioration of their condition, one patient expired on arrival at the receiving hospital, and three patients expired within 24 hours after transport (p = 0.006).

The overall mortality rate for patients with head injuries was 19.0% and the mortality rate for patients with severe head injury was 44.4%.

**Conclusion:** The critical condition of patients and the mortality rates demonstrate a critical task for emergency transport. It is recommended that the quality of EAMS must be defined as an airborne intensive care unit (ICU). Patients with severe head injuries requires a 24-hour alarm center, and the patients transported should be received by neurosurgeons, critical care specialists, and flight nurses with sufficient critical care training carrying ICU-level medical equipments. Most importantly, the guidelines of the World Federation of Neurosurgical Societies (WFNS) for the care of patients with head injuries are strongly recommended as a model.

**Keywords:** air; head injuries; neurosurgery; prehospital care; Taiwan; transport

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