

the participants had severe lack of knowledge regarding the basics in management of nuclear (69.3%), biological (72.4%), or chemical (98.7%) incidents. Training difficulties were experienced in the areas of radiation damages (by 93.3% of participants) and the differences in the effects of contamination (90.7%) between radiation exposure and of other agents, weaponization (99.1%), the ability to differentiate between biological warfare agents and common biological agents (86.7%), and the different chemical warfare agents (100%) and their effects (80.5%) in combination with treatment (84.0%) and contamination/decontamination (87.6%). The potential number of mass casualties following the use of NBC warfare agents could not be estimated by 182 participants (80.9%).

Near the end of each course, different tabletop exercises were practiced. The average results of these exercises revealed: (1) 3.3% of the participants of each course were unable to launch correct early warning for the warfare agent used; (2) 4.1 % could not apply the proper treatment for a given warfare agent; (3) 2.7% were unable to decontaminate accordingly; and (4) procedures and algorithms regarding management and safety were not followed by 53% and 2.1%, respectively.

**Keywords:** emergency medical services (EMS); mass-casualty incident; nuclear, biological, and chemical (NBC) warfare; training; weapons of mass destruction (WMD)

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### (116) Mass-Casualty Triage in the Chemical, Biological, Radiological, or Nuclear Environment

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Field trauma triage systems currently used by emergency responders during mass-casualty incidents and during disasters do not account adequately for the possibility of patients contaminated with chemical, biological, radiological, or nuclear (CBRN) material. A system is needed that can help healthcare personnel assess whether there has been exposure to or involvement of CBRN agents (detection), protect themselves from secondary contamination, account for the clinical implications of the contamination in the triage algorithms, and still provide accurate, rapid, and reproducible triage of large numbers of patients using minimal resources.

The objective of this study was to propose CBRN-compatible trauma triage algorithms based on a review of the literature and the input of recognized content experts. It is presupposed that this system will be applied to a disaster with a single discrete scene (e.g., a building collapse due to a bombing with a large radiation dispersal device) or multiple discrete scenes (e.g., several, simultaneous, chemical weapons releases in a city), and not to an event with widely dispersed patients and no specific scene (e.g., multiple smallpox patients scattered around country).

The primary focus of the system shall be on the triage of physically injured patients, with less emphasis on those whose sole source of injury is a CBRN agent. It is recog-

nized that work is needed in the latter area. Emphasis will be placed primarily on the actual triage of victims and less on detection and provision of protection from contamination.

**Keywords:** algorithms; chemical, biological, radiological, or nuclear (CBRN) agents; emergency responders; mass-casualty incident; triage

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### (117) Emergency Physician-Managed Triage at a Rock Concert Avoids Overload at the Local Emergency Department

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**Introduction:** The organization of an on-site medical care system at music festivals aims to provide emergency medical care and treatment (EMCT) according to the principles of Basic Life Support, Advanced Life Support, and timely evacuation. In the case of a mass-casualty incident (MCI), EMCT also must prevent disruption of the local EMS system.

**Methods:** The composition of patient cases presenting during four-day outdoor summer concert, Rock Werchter, during the 10-year period, 1995–2004 was identified. The mean daily attendance at this event was 80,000, primarily teens and young adults.

**Results:** The overall patient presentation rate (PPR) was 220/10,000 attendees (2%). Emergency physician involvement at first aid stations (60/10,000) occurred in 27% of presentations. Only 12% of patients triaged by an emergency physician (EP) required transport to a hospital. The hospital transfer was 7/10,000. Patients transported to a hospital consisted of 80% trauma, 13% internal pathology, and 7% intoxication. Medical imaging was used in 70% of the patients transported to hospitals. Although PPR and the hospital transfer rate might be high compared to relevant literature (12/10,000 compared to 4/10,000), the systematic triage by an on-scene emergency physician reduced the eventual patient load to the local ED to 3.2%.

**Conclusion:** The benefit of a prehospital medical team at the scene of the event is illustrated by the effectiveness of triage of the on-site population and adequate regulation of patients transport to a hospital. A prehospital medical team is especially beneficial in situations likely to involve a high patient load, as may occur at a rock concert with a large young audience that is likely to use drugs and alcohol.

**Keywords:** emergency physician; music festival; on-site medical care; patient presentation rate; triage

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### (118) Azienda Sanitaria Locale 10 Medical Services at the Olympic Village Polyclinic of Sestrires during the Torino 2006 XX Olympic Winter Games and IX Paralympic Winter Games

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**Introduction:** The Azienda Sanitaria Locale (ASL) 10, in agreement with the TOROCs Medical Service, coordinated the basic and emergency medical assistance at the alpine venue of Sestrires. This represented the integration between

the Torino 2006 Olympic Medical Service and the Public Health System of the Piedmont Region.

**Methods:** We conducted a retrospective review of medical care provided to athletes, officials, workforce, and members of the 'Olympic family' at one of the three polyclinics inside the Olympic Villages. This polyclinic was located in Sestriers during the XX Olympic Winter Games and IX Paralympic Winter Games Turin 2006.

**Results:** Descriptive statistics were used to characterize data from the Olympic medical care database.

**Conclusion:** This review evaluated the level of preparedness and the level of services available during the XX Olympic Winter Games and IX Paralympic Winter Games in Torino, Italy in 2006.

**Keywords:** basic and emergency medical care; Olympic Winter Games 2006; Paralympic Winter Games; polyclinic; preparedness  
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## Oral Presentations—Theme 8: Life-Threatening Situations in Daily Emergencies and Disasters

### Session 1

*Chairs: TBA*

#### Emergency Medical Evacuation of Patients with Severe Lung Failure using Miniaturized Extracorporeal Assistance Devices

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**Objective:** An experience with two new miniaturized extracorporeal assistance devices (EADs) for emergency, interhospital transfer for adult patients experiencing severe lung failure was analyzed. The utilization, efficiency, and safety of the new assistance devices were characterized. Patient preparation, including cannulation were described, and the care and precautions en route were reported.

**Methods:** Between March 2001 and February 2007, EADs were used to facilitate medical emergency evacuation for 19 adult patients with severe hypoxemic/hypercarbic respiratory failure (n = 15), or combined respiratory and cardiac failure (n=4). Extracorporeal assistance devices were used to access the percutaneous vessels. The technique included pumpless extracorporeal lung assist (PECLA) in 15 patients. Closed-loop, extracorporeal circulation with a centrifugal pump unit for arterio-venous life support (n = 3) and veno-venous extracorporeal membrane oxygenation (n = 1) was assessed with the new Emergency Life Support System (ELS). The ELS and PECLA systems are small enough to be placed on a standard gurney.

**Results:** None of the patients died en route. Air medical evacuation was used for 13 patients, and six patients were

transported via ground ambulance. Survival was 40% in the PECLA group and 75% for the ELS patients. During extracorporeal assistance, no technical complication occurred. The patient-related complication was two cases of limb ischemia due to the arterial cannula.

**Conclusions:** The application of miniaturized extracorporeal assistance devices enables the secure transportation of critically ill patients without technical or personnel support. Oxygen delivery can be restored rapidly and blood-flow can be ensured en route.

**Keywords:** emergency medical services; evacuation; extracorporeal assistance devices; lung failure; transport

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#### Diagnostic Accuracy of Capillary Refill Time for Victims of Trauma and Gastrointestinal Bleeding

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**Introduction:** Capillary Refill Time (CRT) is an important component of START, the rapid triage tool used to evaluate the circulatory status of casualties.

**Objectives:** The objective of this study was to evaluate the predictive rate of shock by use of the CRT.

**Methods:** An observational study was conducted to assess out-of hospital trauma and gastrointestinal (GI) bleeding patients transported to the tertiary emergency center from 2001 to 2005. Upon admission, the CRT, pulse rate, respiratory rate, and Glasgow Coma Scale (GCS) were recorded. Shock was defined based on the Shock Index and clinical findings. Cases of CRT that lasted >2 seconds or were incalculable were predicted as shock, and the predictive rate was analyzed statistically. Patients <15-years-old and those experiencing out-of-hospital cardiopulmonary arrest were excluded from the analysis.

**Results:** A total of 572 trauma and 42 GI bleeding patients were enrolled in this study. One-hundred sixty-two patients (26.4%) were diagnosed as experiencing shock among the 614 total patients. The sensitivity of CRT for shock status was 74.1%, specificity was 92.0%, positive predictive value was 76.9%, and the negative predictive value was 90.8%.

**Discussion:** Considering CRT is one of the triage tools for mass-casualty incidents that must have a low incidence of false negative cases, the sensitivity of CRT seems to be unacceptable. In order to improve the diagnostic accuracy of CRT, additional physiological parameters are needed. However, an increase in the evaluation items may deteriorate the assessment speed, which is crucial for the evaluation of victims during a mass-casualty incidents. In the future, a prospective study must compare the accuracy of a set of assessments.

**Keywords:** Capillary Refill Time (CRT); gastrointestinal bleeding; mass-casualty incident; shock; trauma; triage

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