

## Putting Triage Theory into Practice at the Scene of Multiple Casualty Vehicular Accidents: The Reality of Multiple Casualty Triage

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*Research Funding:* This project was funded by a research grant from the NRMA-ACT Road Safety Trust.

**Objectives:** The aim of this research project was to investigate the experiences of ambulance paramedics in applying the principles and protocols of prehospital, multiple casualty triage at the scene of a motor vehicle accident. Key objectives included the investigation of situational cues and other contextual factors influencing triage practice and the development of recommendations for the future education of ambulance paramedics involved with the practice of multiple casualty triage.

**Methods:** A triangulated approach was used incorporating demographic data, focus groups, and in-depth interviews. Two focus groups canvassed the issues and concerns of the participants in applying multiple casualty triage principles to motor vehicle accident situations. Additionally, focus groups assisted in creating an interview schedule for in-depth interviews. The in-depth interviews were conducted with five participants involved in the earlier focus group discussion, and reflected on their experiences in a detailed way. A thematic analysis of the interviews was conducted using well-established research practices of human science research.

**Conclusions:** Described in this research is an extended and broadened interpretation of the triage process returning to a more authentic definition of triage: the process of the sorting of casualties to determine priority. There is a need to consider triage as an extended and complex process that incorporates evidence-based physiological cues to assist decision-making and the management of the process of triage from call-out to conclusion, including assessment of contextual and situational variables.

**Keywords:** Australia; motor vehicle accidents; multiple casualties; paramedics; triage

*Prehosp Disast Med 2007;22(2):s71*

## Indicators for Trauma Systems

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**Introduction:** There is an ongoing debate what trauma system (TS) is best while there is a lack of valid research instruments to evaluate a TS. Indicators can possibly be used to measure the quality of TS care.

**Objective:** The objective of this study is to develop a consensus-based set of indicators to monitor the performance of dispatch centers (DC), ambulance services (AS) and emergency departments (ED) providing care to multi-trauma patients (MTP).

**Methods:** In a 4-round Delphi procedure, the opinion of 141 experts (experienced managers, doctors and nurses from DC, AS and EDs) were questioned regarding indicators of trauma system performance. Likert scales were used to rank indicators. Consensus was defined when  $\geq 70\%$  of the panel agreed.

**Results:** Response rates to questionnaires 1 through 4 was 86%, 75%, 71%, and 60% respectively. Experts reached consensus on 5 competence indicators (professional education, trauma courses for adults and children, working experience >18 months and yearly exposure  $\geq 10$  MTP); 10 result indicators (related to diagnoses, stabilization of vital functions in AS and ED, level of care, trauma team and radiology); three chain indicators (cooperation, communication and feedback); and eight time intervals, but not on the definition of the intervals.

**Conclusions:** Expert consensus was reached on 26 indicators for MTP. No consensus could be reached on definitions of time indicators. A nominal group technique meeting will address this issue. A Delphi procedure was successful in reaching consensus on indicators that monitor performance of the TS for MTP. This is the first step in developing a valid research instrument.

**Keywords:** Delphi procedure; dispatch centers; emergency; indicators; trauma system

*Prehosp Disast Med 2007;22(2):s71*

## Tailoring the Medical Response for the Management of Burn Disasters

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**Introduction:** The aim of this review was to analyze past burn disasters and mass-casualty incidents (MCIs) involving burns since the 1942 Coconut Grove fire, in order to identify common problems arising during the response to such incidents. The study also intended to assess recommendations relating to these problems and whether or not changes were implemented based on these recommendations.

**Methods:** A comprehensive review of the literature from 1996 to September 2006 was performed using the on-line database Medline. Articles were selected based on their inclusion prehospital or in-hospital responses to burn disasters and MCIs that consisted of fires, accidental and terrorist explosions, and transportation accidents, where a large proportion of the injuries was burn-related. Articles were read, abstracted, and analyzed for death-and-injury toll, burn-and-non-burn injuries sustained, major problems experienced, and recommendations made.

**Results:** A review of recommendations from past disasters found that current disaster responders continue to experience similar problems in communication, triage, surge capacity, documentation, staff planning and experience, and transport. A comprehensive literature review enables recommendations from many past disasters to be incorporated into future planning. It also allows for the formulation of future strategies, including increased education in the

management of burns and mass casualties to healthcare providers (and the general public) at undergraduate and postgraduate levels, the expansion of specialty burns teams, incorporation of burn injuries into triage standards, and the development of prospective, centralized burn-center databases.

**Conclusion:** Vulnerability can be reduced by analyzing lessons from previous disasters. This potentially could diminish the effect disasters have on lives and local infrastructure.

**Keywords:** burn; disaster; literature review; mass-casualty incident; recommendations

*Prehosp Disast Med* 2007;22(2):s71–s72

### Teleconsultation for Deployed Healthcare Professionals in Current Combat and Disaster Operations

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**Background:** In April 2004, the United States Army approved the use of the Army Knowledge Online (AKO) email system as a teleconsultation service for remote consultations from healthcare providers in combat to medical subspecialists in the US. The success of the system resulted in its expansion to include 12 additional clinical specialty services including teletrauma (trauma-burn) consultation. The goal of the program is to provide a mechanism for enhanced diagnosis of remote trauma cases, resulting in an improved evacuation system.

**Methods:** Consults are generated using AKO routed through a contact group composed of volunteer on-call consultants. The project manager receives and monitors all teleconsultations to ensure Health Insurance Portability and Accountability and Accountability Act of 1996 (HIPAA) compliance and the recommendations of the consultants are transmitted within a mandated, 24-hour time period. A trauma “clinical champion” is responsible for recruiting consultants to answer the consultations.

**Results:** Over 2,050 consults were performed, with an average reply time of five hours from receipt of the teleconsultation until a recommendation is sent to the referring physician. Trauma-burn had 48 consultations since its inception, resulting in the prevention of three evacuations. A total of 51 known evacuations were prevented from use of the program, while 50 known evacuations have resulted following receipt of the consultants’ recommendation.

**Conclusion:** The teleconsultation program has proven to be a valuable resource for physicians deployed in austere and remote locations. Furthermore, use of such a system for austere physicians may prevent unnecessary evacuations and/or result in appropriate evacuations when patients are underdiagnosed.

**Keywords:** combat; consultation; evacuation; teleconsultation

*Prehosp Disast Med* 2007;22(2):s72

### Session 2

*Chairs: TBA*

### Successful Transtracheal Lung Ventilation using a Venturi Pump: A Combined In-Vitro and In-Vivo Study

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Lung ventilation through a thin, transtracheal cannula may be attempted in patients with laryngeal stenosis or in “cannot intubate cannot ventilate” situations. It may be impossible to achieve adequate ventilation if the lungs are emptying spontaneously through the thin transtracheal cannula that imposes high resistance to airflow, resulting in dangerous hyperinflation.

A Venturi pump that may be used as a bi-directional valve that, if supplied with a pressurized gas source, could provide active inflation and deflation of the lungs was constructed.

The capacity of such a device was tested in-vitro using mechanical lungs in combination with two different cannula sizes and various gas flows. The device was tested on five pigs using a transtracheal 16 G cannula with different predefined inspiratory/expiratory times and gas flow modes.

In the mechanical lungs, the device permitted remarkably higher minute volumes compared to spontaneous lung emptying. Used in-vivo, the arterial oxygen and carbon dioxide partial pressures increased initially to remain then stable over one hour (PaO<sub>2</sub> 470.886.8; PaCO<sub>2</sub> 63.07.2 mm Hg). The peak inspiratory pressures measured in the trachea remained below 10 cm H<sub>2</sub>O and did not substantially influence central venous and pulmonary artery pressures. Mean arterial pressure and cardiac output were unaffected by the Venturi ventilation.

The present study demonstrated in vitro and in vivo in adult pigs, that satisfactory lung ventilation can be assured with transtracheal ventilation through a 16 G cannula for a prolonged period of time if combined with a bi-directional Venturi pump.

**Keywords:** in-vitro; in-vivo; transtracheal lung ventilation; Venturi pump

*Prehosp Disast Med* 2007;22(2):s72

### Emergency Service Evacuation Plans in Unusual Situations

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Emergency services perform health services in a fast, unlimited, and intensive way in ordinary circumstances. This tempo increases in unusual situations. The number of the victims waiting for care, the seriousness of their medical problems, their method of presenting to emergency services, and timing cause stress on the quality of the emergency health services.

Upon the suspicion that an nuclear, biological, chemical agent was found in one of the cargo packages at Ankara