Reports of the Chairs of the Scientific and Invited Papers 15th World Congress for Disaster and Emergency Medicine

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EMS Systems
System Design

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In a well attended session with >70 participants, the session on EMS System Design was the first of four in a one-day-track to focus attention on the diversity, training, clinical aspects, and component integration of prehospital care. As an introduction to the complexity of the subject, the chair provided a brief overview of the current state of emergency medical services (EMS) and also described the different types of system designs from an international perspective. The presentation explained the structures of different delivery systems and the local role in the development of EMS, and provided a foundation for the thought-provoking presentations that followed.

The process of introducing specific training programs to upgrade EMS in Uzbekistan was described. Using a train-the-trainer approach and curriculum developed by the US Department of Transportation, >7,000 students participated in an initial responder course provided at 10 training centers throughout the country. Included in the student population were disaster responders, firefighters, and road police. Focus groups were brought together after completion of the courses and it was agreed that the response capability had been improved. However, questions remain regarding sustainability and the continued need of equipment.

A benchmarking project that was constructed to compare diverse rural systems in three countries—Sweden, Scotland, and Iceland—was described. Benchmarking is difficult in the best of circumstances and the differences required careful analysis. A description and data were presented for each system and compared. This project provides the foundation for future work.

A defined local need and the process employed for results were identified. Over the past decade, morbidity and mortality from traffic crashes in Crete have continued to rise at an alarming rate and a comprehensive analysis was conducted. The approach included not only analyzing patient data, but also road construction and conditions. By using a combination of communication technology, new dispatching triage techniques, and advanced training, the morbidity and mortality rates have stabilized. In addition, the inclusion of road engineering changes serve as a prime example of the role research and how an interdisciplinary approach can impact prevention in prehospital care.

The different EMS systems, component needs, and research approaches exemplified the overview provided by the chair during the opening presentation. As a result, extensive discussion was stimulated regarding the importance of EMS and its role in the healthcare continuum.

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Prehospital Triage and Networking

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The focus shifted to the specific components of an EMS system, rather than the overall design. As with the opening session of the EMS Systems track, >50 participants were in attendance and the questions and discussion provided additional input into each area.

Problems from the systemic response to previous mass-casualty incidents was the genesis for the research and approach that resulted in the solutions presented. A comprehensive victim tracking system (VTS) uses bar code technology that allows the transmission of patient demographics, condition, and treatment to a receiving facility. In addition, information is communicated with an identifier for tracking purposes, and is independent of other applications. Quick notification of the nearest relative and electronic integration with medical records are additional benefits.

As EMS demand continues to increase worldwide, different pilot and research projects have been conducted to examine alternatives to responding and transporting non-emergent patients. Development of a physiological scoring mechanism was described that helped to identify those patients not needing a response. Recognizing that over-triage is inevitable, the proposed protocols provided a framework for estimating that 35% of the patients from the studied system could be managed without the intervention of an emergency department. Ethical considerations also were studied, and there were no adverse impacts.

The debate over which advanced life support (ALS) interventions have an impact on patient outcome, if they have an impact, continues in peer-reviewed research and among the public. The results of an extensive literature review to discern the best approach for a community examining its care options was described.

The results were included in a report outlining that though ALS training is standardized, ALS interventions

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are not. Because of the lack of findings, the development in the previously described system now will concentrate on primary care interventions with specific advanced procedures, allowing the use of ALS (paramedic) providers only in a specific system design application. Again, the objective will be to reduce response and emergency department interactions.

Ambulance and equipment ergonomics were discussed. Conclusive data were provided on different ambulance structural components, pieces of equipment, and safety practices that should lead to the systemic redesign and reengineering of the transfer for the patient. Latest technologies, including wireless communications, are not being implemented, and adaptation from other industries is needed. The projected result is more awareness of the human risk factors and fewer personnel injuries.

The common theme emerged that much research remains to be done to provide an evidence base for emergency medical services. Challenges of research design, data gathering, and controlling the external environment, while difficult, must be recognized and addressed to provide solutions to the complex issues that will continue to increase over the next decade.

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Aeromedical Transport in EMS (Including Helicopter Emergency Medical Services)

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Rotary wing services are but one of the alternatives for EMS transportation systems. Systems design must take into account the requirements of the community to be served—the environment, journeys over sea, and the locations of and distance to travel to specialist services. Any analysis of speed and efficiency must consider the total prehospital or total transfer time that must include time for loading or unloading and (where applicable) secondary transport to and from landing sites. The higher risks of nighttime flying must be analyzed against the lesser need for nighttime journeys.

The patient's condition must be considered when analyzing the extent and components of a "HEMS" service—those that will benefit the most are those with critical injuries (especially brain injury), but these patients will need drug-assisted intubation and ventilation. Though HEMS crews may come from different backgrounds (doctors, nurses, paramedics), it is essential that they are equally competent in all of the skills required for safely providing the service. At the end of the day, economic considerations will influence the sophistication and extent of the service.

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System Developments—New Horizons and Evaluation

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The levels of medical training in the Fire Service in the United Kingdom, where emergency medical services (EMS) are provided entirely by a third emergency "ambulance service" were reviewed. The UK Fire Service is not expected to provide patient care, but because of its response performance, it often is on the scene of an emergency before EMS arrive. Firefighters do provide initial assessment and assistance, and the study showed that most brigades provided three to four days of basic training for this role. The skill level achieved in this timeframe generally exceeded the minimum set by statute; however, the scope of the training was highly variable. It was felt that there was a clear case for standardization of emergency healthcare training across the UK fire services.

A team of experienced Dutch anesthetists performed a study demonstrating that inductions of anesthesia in a standard anesthetic room and at a prehospital incident scene were similar in terms of the technical difficulty of intubation and success rate and when difficulties developed effective application of the "Dutch Difficult Airway Algorithm" was achievable in both environments.

During an incident, a tangle of monitoring wires around a patient invariably occurs, and there are practical difficulties in terms of maintaining close supervision of the patient and their vital signs during extrication and transport. A new technological solution was presented using wireless biosensors to transmit their information to a local base station; allowing the caregiver to be a little more remote, but maintain close oversight. The potential for this system to be used in a mass-casualty incident during which a single healthcare provider might oversee a number of patients at the same time was explored. While this uses readily available technology in a novel application, there were some operational issues to be worked through for a multiple-casualty situation. The system has potential for the future.

The oft-neglected subject of EMS health and safety was discussed. The issue with respect to vehicle operations was brought into focus, demonstrating that there is no consistent approach around the world. In terms of safety, Europe and Australasia have statutory standards with which employers must comply with respect to vehicle design, while in the US, there is very little regulation. Even driver training showed vast variation, from almost nothing beyond a classroom briefing to a three-month, dedicated driver-training program. Surely, there is room for the setting of a minimum safety standard for key issues across global EMS systems.

Modern technology has great potential, and there was a demonstration of a number of potential safety developments in ambulances. The examples highlighted how far EMS is lagging behind current automotive and ergonomic safety developments and standards. We must engage with vehicle

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