Emergency Medical Services: A Unique Transportation Safety Challenge  
Nadine Levick MD, MPH, EMS Safety Foundation, New York USA

ABSTRACT

The USA fleet of ~50,000 ambulance vehicles perform emergency service, and now key component of the new SAFETEA-LU critically important fleet for the safety of our public. These auto transport is hazardous, and the most hazardous form of ground transport per mile traveled. Its safety is in need of urgent focus and has been left behind commercial truck and bus and air transport safety infrastructure and oversight.

DISCUSSION

EMS is a relatively young field, and although a comparatively small fleet of 50,000 vehicles is a critically important fleet for the safety of our public and a key element of the highway safety system. However, it also remains a fleet of vehicles that for historical and other reasons that has developed outside of both transportation systems/fleet safety, as well as vehicle and automotive safety infrastructure and oversight. While recently being clearly described as having serious transportation safety failures - in contrast to the safety culture and the comprehensive safety oversight of the commercial vehicle industry (such as the bus and truck and also for air ambulance transport) - the ground ambulance transport environment is lacking in both safety standards and safety oversight. An innovative framework bridging EMS health care delivery needs with safety research, embracing current ergonomic and automotive technology with a safety systems approach is necessary to facilitate enhanced cross disciplinary collaboration and development of effective safety initiatives in EMS transport.

SUMMARY

EMS transportation is hazardous, and the most hazardous form of ground transport per mile traveled. Its safety is in need of urgent focus and has been left behind commercial truck and bus and air transport safety infrastructure and oversight.

There is a need for a systems engineering approach to bridge the diverse disciplines that are part of the EMS transport environment and to address the risks and hazards involved. It is key that the knowledge and resources to minimize these hazards and optimize safety with design and practice aspects and also policy and oversight be applied to EMS transport urgently.

The TRB has a unique opportunity to facilitate the development of both transport systems and vehicle areas. Additionally the SAFETEA-LU legislation should create an environment to facilitate knowledge transfer between transport and highway safety and EMS practitioners.

EMS transport safety is a unique gap in the standards, oversight and coordination of the transport system. The SAFETEA-LU legislation is also a major potential benefit to EMS to assist in integrating EMS with engineering, enforcement and education within the highway system.

Contact: Nadine Levick MD, MPH  
Email: nlevick@objectivesafety.net

INTRODUCTION

EMS ambulance transport has been recently described as highly hazardous. Per estimated travel, traveled, ambulances are the most lethal vehicle on the road. Detailed safety data is limited, as there is no specific data capture or oversight of the transportation safety of the EMS system nationally – and it is exempt from FMCSA.

OPTIMIZING SAFETY & SYSTEMS ENGINEERING

EMS is a complex transport and health delivery system with a multidisciplinary need in the transport safety management environment. Management of the safety of this transportation system bridges: automotive safety, transportation safety (including driver performance and interaction with the environment), occupational health and safety, ergonomics and human factors, practice policy and acute health care delivery as well as public safety and requires a multidisciplinary systems safety engineering approach. Utilizing a systems based multidisciplinary approach, bridging transportation safety perspectives and health care delivery in conjunction with safety standards development is necessary to ensure improved outcomes in EMS transport safety. The key fields include: Data Capture, Vehicle Crashworthiness, Design, and Occupant Safety Devices, Ergonomics and Biohazards, Transportation Environment, EMS Practice and Fleet Safety Management (see Table 1).

Table 1. Primary Issues in Optimizing EMS Safety and Systems Engineering

- Data Capture
  - System profile
    - Denominator – vehicles, runs, miles travelled, personnel, HOS
    - Numerator – safety outcomes and performance
  - Vehicle Design, Biomechanics and Crashworthiness
    - Vehicle fleet
      - Structurally built by the automotive industry
    - Non-collision occupant protection
      - Lock down positions for routine equipment
      - Seat belts for all seated occupants
    - Over-shoulder harnesses for all patients on the stretcher
      - Crashworthiness features for vehicle structure & seating design
    - Forward and rear facing seating positions, not side facing
    - Enhanced vehicle stability
  - Ergonomics and Biohazards
    - Threading
      - Head protection and Protective Clothing
      - Conspicuity/Visibility
      - Biohazard protection
    - Equipment and Vehicle Layout and Design
      - Equipment and vehicle interface ergonomics and human factors
      - Vehicle conspicuity/visibility and appropriate warning signals
    - Transportation Environment
      - Intelligent Transportation System (ITS) Technologies
        - Driver/vehicle performance monitoring and feedback devices
      - Collision avoidance vehicle technologies
      - Signal systems
      - Integration with Strategic Highway Safety Planning
      - Roadside safety design and planning technologies
      - Safe hospital ambulance bay access and egress
    - Fleet mix
      - Rapid response vehicles
      - Vans and Trucks
      - Motorcycles
  - Safety Management
    - Fleet Management
      - Safety program
      - ANSI/AASHE 2.15
      - EMS practice and Policy
    - Health care delivery
      - Safe driving policy and practice
      - Seat belt use policy - for providers, patients and passengers
    - Secure all equipment
    - Stop at intersection policy - red lights, stop signs

Fig. 1. Recent catastrophic ambulance crash outcomes