EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Implementation of a Sustainable Interdisciplinary Emergency Medical Services (EMS) Transport Safety Innovation and Knowledge Transfer e-platform

Nadine Levick, MD, MPH
Research Division,
EMS Safety Foundation, New York, NY
Arthur Cooper, MD, MS
Division of Pediatric Surgery, Columbia University, Harlem Hospital, New York, NY
The EMS Safety Foundation Consortium

Objective

- To design, implement, and sustain a purpose developed e-platform for interdisciplinary collaboration and transfer of knowledge from research to practice in EMS transport safety

Mission

- A team of like minded innovators across EMS Medical Transport and a number of technical disciplines, who share the common mission of enhancing the safety of EMS delivery for all involved.

Why now?

- Operating optimally in a transportation environment that is largely devoid of specific safety standards for the hazards and risks present
- Bridge the gap between what technical information exists and what is accessible and applied to EMS

Absence of standards and oversight

- Challenges in identifying best practice
- Myriad of unregulated commercial products
- No safety performance standards
- Absent national safety oversight

Ambulance transport a serious transport safety problem…

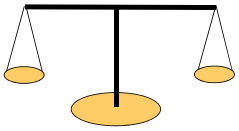
- the most lethal vehicle on the road both per mile travelled and per vehicle
- is exempt from federal commercial fleet safety oversight (FMCSA)
- 2/3 fatalities not in the ambulance
- Exempt from most FMVSS standards

Burden
2010 Insurance data

- 35 crash claims for every one medical liability claim
- 1 in 4 EMS workers have a career ending back injury in the first 4 years
- back injury is the number one reason for leaving EMS

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Balance of concerns and risk during transport



- Response and transport time
- Clinical care provision
- Occupant safety/protection
- Public Safety

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMS Transport General Concerns

- Consequences can be predictable & likely preventable
- Costs of these adverse events are high in loss of life, financial burden and negative impact on delivery of EMS care
- Other high speed vehicles (eg. racing cars) have a different safety paradigm
- Design of interventions to mitigate injury is predicated on a valid testing model
- Complex both engineering and public health issues

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

and who's life was he racing to save?

Some odd USA facts

- Ambulances are generally not built by the automotive industry
- Intelligent Transportation Systems (ITS), transportation safety engineering is not generally integrated into EMS systems
- Although all EMS systems have medical direction and oversight, it is rare for there to be transportation expertise oversight

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

this vehicle is safety crash tested by automotive experts

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Unlike this vehicle

ESC – Does your ambulance have it??

- ESC helps drivers stay in control when they need to swerve or brake suddenly to avoid an obstacle or turn corners on slippery roads.
- Vehicles equipped with ESC are involved in fewer severe collisions caused by loss of control, resulting in significantly fewer deaths and injuries

1980's Then….

And NOW!…

1980's Then….

And NOW!….

The science of lifting & loading

Data…

- What is your transport safety record in your service?
- What can you lift safely? Can you reach the equipment you need?
- How can you improve if you don't have a meaningful measure of safety performance?
- Safety is not guesswork, it is a science

Operational Process

- A lean infrastructure
- Focus on information dense content
- Skewed towards innovators
- Optimize use of state of the art virtual interactive technologies
- Leverage use of social media tools
- Minimize travel and face to face meeting

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Methodology

- An electronic virtual environment/consortium was established to create an end-user driven forum bridging operational EMS services with specific technical fields addressing EMS transport systems safety

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Methodology

- Communication platform identified as 'Webinar' VOIP technology with secure electronic access to interactive interdisciplinary presentations, recordings, handouts and workshops combining onsite and virtual offsite participation
- Participants essentially self selected

EMSSafety FOUNDATION

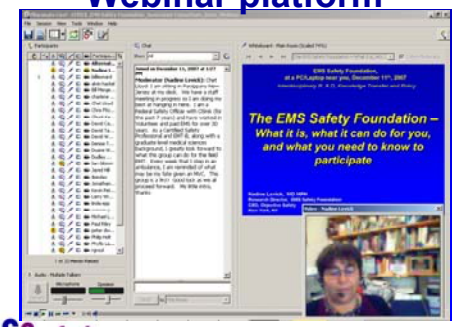
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Participant selection

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

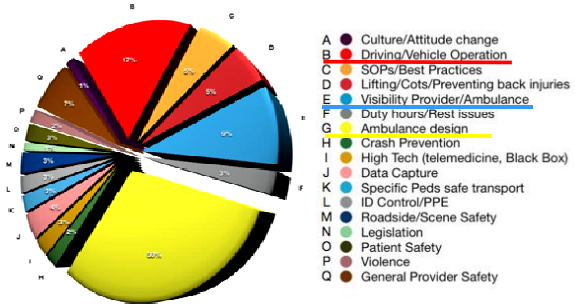
The EMS Safety Foundation Webinar platform



EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Key 5 Safety Priority areas of focus Here is what you sent in: n = 155



FOUNDATION

Relative Priority Issues

- Priority Number one
  - Vehicle ops - 29%
  - Ambulance design - 27%
- Priority Number two
  - Ambulance design - 35%
  - Vehicle ops - 29%

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Big issues are

- Transport
  - Vehicle
  - Vehicle operations
  - Scene
- Patient handling
- Equipment
  - Protective and other

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Approach:

- EMS Safety Foundation has been established to fill a gap in
  - technical knowledge transfer
  - practical interdisciplinary R & D
  - evaluation and implementation of system safety enhancements for EMS and Medical Transport
- A not-for-profit institute

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Goals

- The primary goals of bringing this unique group of folks together are to:
  - Share pooled best practices
  - Integrate key technical expertise to address common challenges
  - Advance new multidisciplinary research projects
  - Translate safety technology from appropriate related technical areas to EMS
  - Knowledge transfer from research to practice

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

The EMS Safety Foundation: A practical and functional model

Interdisciplinary and Operational

- Innovation
- Collaboration
- Knowledge transfer

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Structure

- Innovation Consortium
- Technical Expert Panel
- Advisory Board
- Operational Team
- Management Board
- Corporate Sponsors
- Corporate Partners
- Interns

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Innovation Consortium

- Small volunteer rural EMS services
- Major metropolitan EMS services
- Private patient transport services
- EMS Associations
- Interns

Technical Expert Panel

- Transport engineering
- Automotive safety
- Ergonomics and human factors
- Occupational safety
- Patient Safety
- Public Safety
- New information technologies
- Data Management
- Risk Management
- Systems safety research,
- Public health

Oversight and Support

- Oversight
  - Advisory Board
  - Management Board
- Support
  - Membership Dues
  - Corporate Sponsors/Partners

Results

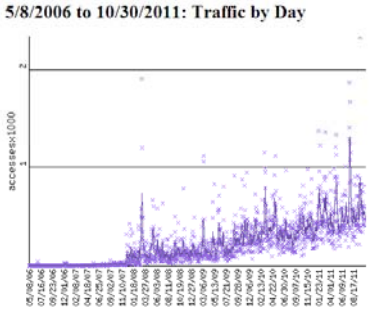
- The e-platform, launched January 2008, utilizes a user friendly interactive Webinar program.
- The >360 participant consortium includes major urban municipal EMS services to small volunteer rural services, and a spectrum of technical experts, from North America, Europe, Scandinavia and Australasia: automotive and transportation engineers, ergonomists, and public health researchers.

www.EMSSafetyFoundation.org

Results

- Real-time and asynchronous access is 426,292 accesses from 26,306 distinct addresses.
- Interactive and interdisciplinary Webinars are held every 8 weeks.
- Biannual workshops addressing topic areas identified as gaps in systems safety knowledge, and an annual international best practice field trip are also conducted.

Web Page Access Data



EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Applied and Operational Interdisciplinary Research

- Vehicle design
- Ambulance service fleet safety monitoring platforms
- Neonatal ambulance occupant protection
- Technology, lay community, provider and researcher interface in CPR/AED use

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Results

- Three fleets of innovative prototype vehicles have been developed, manufactured and implemented in North America and Europe based on this interdisciplinary technical input, a fourth is underdevelopment
- Ergonomic operational task analysis and measurement innovation has been performed
- General advances in fleet and operational safety practice and policy throughout the consortium have been embarked upon

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

In a nutshell

- EMS Safety Foundation is a not-for-profit multidisciplinary virtual think – tank and test bed for safety innovation and knowledge transfer
- It is a virtual network integrating the end users and the technical experts
- A tool to enhance the safety of delivery of EMS services

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Knowledge transfer and information sharing

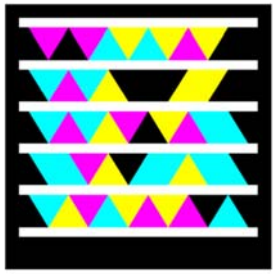
EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

What is the result of the EMS Safety Foundation's activities??

- Networking
  - Opportunities to build relationships with like minded colleagues and also technical experts across a spectrum of safety related disciplines
- Innovation Community
  - A regionally diverse community of EMS services and providers all focused on the mission of innovation and information dissemination
- Collaborative Consortium
  - A unique opportunity to expand and optimize decision making, purchase approaches and impact regional policy

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

www.EMSSafetyFoundation.org
etag



EMSSafety FOUNDATION

EMS Safety Foundation Vehicle & Ergonomics Workshops, classroom and hands on

Automotive engineers addressing EMS Safety Foundation Workshop

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Ergonomic Challenges

EMSSafety FOUNDATION

Automotive technical input

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Loading height – size matters

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

European EMS interdisciplinary innovation delegation Rettmobil 2008 -2011

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

RETTmobil is -

- A major European Emergency Rescue Congress, Trade show and Symposium
- Held in Fulda, Germany
- Established in 2001
- Attended by ~ 20,000 attendees
- Brainchild of Prof Peter Sefrin

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Birds eye view

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMS Safety Foundation Rettmobil Interdisciplinary Delegation

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Workshop May 2009 – Rettmobil Germany

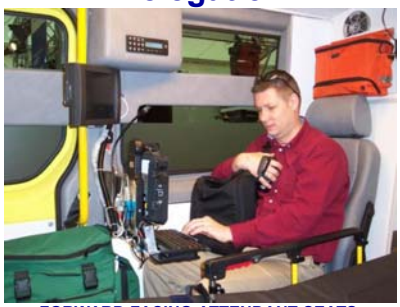
EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

2010 Rettmobil Interdisciplinary Onsite and Webcast Workshop

EMSSafety FOUNDATION

Lessons from 2009 Rettmobil Delegation

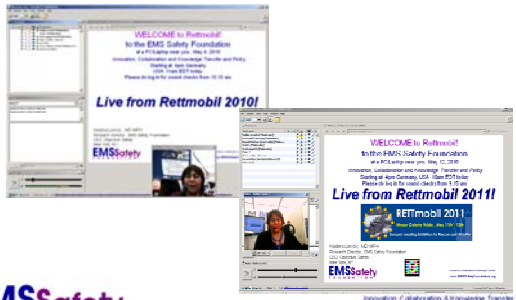


FORWARD FACING ATTENDANT SEATS
EVERYTHING WITHIN ARMS REACH WHILE REMAINING BELTED

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Live from Rettmobil 2010, 2011

recording for gratis public access at www.EMSSafetyFoundation.org



EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Rettmobil 2011

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

FOUNDATION
www.EMSSafetyFoundation.org

PodCasts - with Kyle Bates in 'First Few Moments'

- Latest Podcast - Chris Fitzgerald, our EMS Safety Foundation's Director of Human Factors and Ergonomics shares some key points on lifting and moving patients and equipment - http://firstfewmoments.com/?p=742
- Rettmobil 2011- Nadine Levick Onsite Podcast http://firstfewmoments.com/?p=694
- Rettmobil 2011 - podcast with Chris Fitzgerald and the DorsaVi team - http://firstfewmoments.com/?p=714

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Innovation in back strain measurement

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

FOUNDATION

www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Swedish industrial designer meets North American Ambulance builder

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

the result of the frequency analysis, green dots mark equipment used every time the ambulance is driven, orange

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Achievements

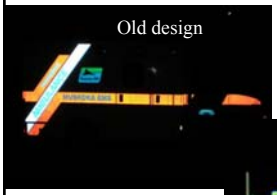
- Having access to interdisciplinary technical knowledge supports changes to improve safety practice

EMSSafety FOUNDATION

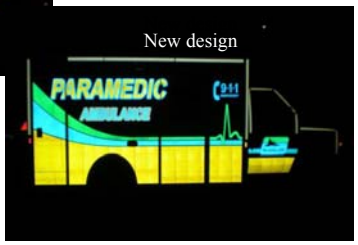
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Muskoka EMS – Canada 2009

Old design



New design



EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

New vehicle Innovation - 2010

EMSSafety FOUNDATION CareFlite®

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Texas - Careflite's new vehicle

EMSSafety FOUNDATION CareFlite®

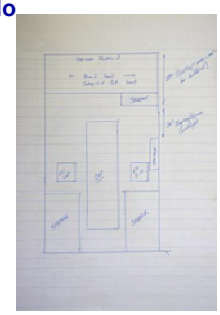
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

and From this… October 2010

from Western Eagle County Ambulance District, Colorado



EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

To this, in September 2011!

EMSSafety FOUNDATION

Pittsburgh Childrens Hospital

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer

www.EMSSafetyFoundation.org

The new Oslo Ambulance

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer

www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer

www.EMSSafetyFoundation.org

2011 Hands on Workshop

FOUNDATION

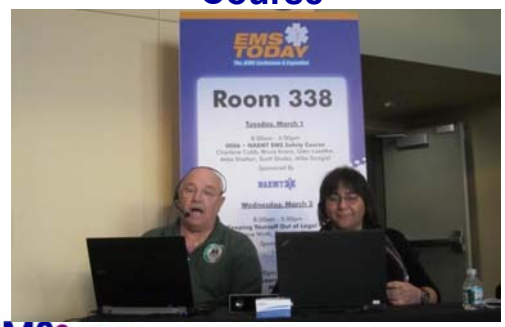
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer

www.EMSSafetyFoundation.org

Support of new NAEMT Safety Course



EMSSafety FOUNDATION

Innovation, Collaboration & Knowledge Transfer

www.EMSSafetyFoundation.org

Active Relationship with National Academies Transportation Research Board

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

EMSSafety FOUNDATION
www.EMSSafetyFoundation.org

Limitations

- Limited to a small spectrum of forward thinking EMS services, who are focused on the benefits of interdisciplinary collaboration and innovation
- Not representative of EMS generally
- Lean infrastructure, limited resources
- Operational in contrast to academic

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Interdisciplinary Collaboration and Outcomes

- Collaboration can be facilitated between EMS and appropriate technical expertise - automotive and occupant protection engineers, transport system design, ergonomics and human factors expertise, safety science and industry
- Is key to facilitating and enhancing the development of innovative solutions
- Meaningful measures of outcome and performance improvement can be demonstrated

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Conclusion

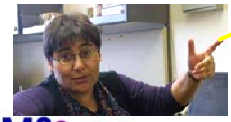
- Establishment of a sustained interdisciplinary forum for transfer of knowledge from research to practice has been achieved through a secure virtual access network, in a cost efficient manner
- Demonstrated to be accessible to a spectrum of end users
- Has resulted in development of innovations in vehicle design and operations policy for safer EMS transport.

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org

Thank you!
Any Questions??

Handout is available on line

EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org



EMSSafety FOUNDATION
Innovation, Collaboration & Knowledge Transfer
www.EMSSafetyFoundation.org