June 8, 2011, Englewood, NJ

“Ride of your Life”
What you Can’t Afford Not to Know About Ambulance Safety

To quote Steve “Sid” Caesar –
Director IHS ES
“We want everyone to get home safely each day”

EMSSafety

Nadine Levick, MD MPH
Research Director, EMS Safety Foundation
CEO, Objective Safety
New York, USA

EMSSafety

Know About Ambulance Safety

EMSSafety

But really….

Harvey is here to save your life!!!

EMSSafety

Emergency Medical Service Transport

- What are the transport safety issues that pertain to this important public service and public safety industry?
- What do we know of the risks and hazards and how can we measure these?
- How can the safety of this transport system be optimized?
- What can we learn from international colleagues?

EMSSafety

Who am I?

- Nadine Levick, MD, MPH
- Emergency Medicine Physician and Public Health Academic, (USA-Hopkins, Harlem, Maimonides, Brookdale & Australia – Royal Melbourne, Royal Childrens Hospitals, Royal Australian Flying Doctor Service)
- Chair, National Academies Subcommittee TRB EMS Transport Safety, USA
- Founder of EMS Safety Foundation
- Recipient, International Society of Automotive Engineers, Women’s Leadership Award for EMS Safety

EMSSafety

Outline

I. Identification of ground EMS transport safety issues, hazards and areas of risk to patients, providers and public
II. Highlight unacceptable mythology and challenges to advancing EMS transport safety
III. Profile innovation, new safety technologies and strategies and knowledge transfer to enhance safety and reduce risks of ground EMS and patient transport

EMSSafety

Things can go wrong – but when there are sound safety policies and technologies in place, and the system is well prepared, you can minimize harm

EMSSafety

Your Interactive Handout awaits you online at...

- www.objectivesafety.net

This WILL be FAST!!
No need to take any notes – all text slides will be awaiting you in your online Handout

EMSSafety

http://www.objectivesafety.net
Your Handout and Additional Resources

EMSSafety
Safety of the... 

- Provider
- Public
- Patient

Some questions for you all:
- Have you ever been in a EMS crash?
- How many times?
  - 0
  - 1
  - More?
- Have you ever been hurt in an EMS crash?
- Do you know any one who has ever been hurt in an EMS crash?
- Do you know of anyone who has been killed in an EMS crash?

“...I’d like to know what can be done so this never happens again...”

Thursday July 5th 2007......
Paramedic Allan Parson’s killed

Friday July 20th 2007
The worst ambulance crash in USA history

May 29, 2011
Two ambulances collide in Jackson County: one killed - (Jackson)

June 3, 2011
Crash Involving Ambulance South of Traffic on U.S. 90 in Minnehaha Hills
Emergency Medical Services (EMS)
An important and unique transport system
- Public safety, public health and emergency service
- Is there to save lives

Firstly!
- An accident?
- or a predictable and preventable event

A tragic emergency health care intervention outcome
It does happen….

A devastating tragedy...
- An ETT down the wrong hole may kill your patient and be a terrible burden for the pts family and for the medic involved

Negative impact on system performance...
- BUT an EMS crash can kill all those involved AND wipe out a rural EMS system AND negatively impact a regions response capacity……

Ambulance Transport Safety
- Emergency care, public heath, public safety, and patient transportation.
- Important Principle: Ambulance transport safety is part of a system, the overall balance of risk involves the safety of all occupants and the public
- All get home safely

Real world answers to real world questions -
- What features will enhance safety of my new vehicle purchase?
- What color scheme do I want on my vehicle to make it safest?
- Do I need a helmet, and if so which one?
- What policies offer the safest system?
- How do I get my team to address safety issues?
- What data should I collect when something goes wrong, and how to analyze it?

Safety oversight of what and .... by whom
- Vehicle Safety
- Vehicle Design
- Transportation systems safety
- Safety Equipment Design
- Vehicle and Safety Equipment Testing and Standard development
- Safety policies

In the USA there are more safety standards for moving cattle than for moving patients
Absence of standards and oversight

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

What we need to consider, where is the 'bang for buck' in ambulance transport safety:

Is there an acceptable rate of morbidity and mortality for pre-hospital transport systems?*

USA EMS data

In the USA*

- ~ 50,000 vehicles
- ~ 5,000 crashes a year
- One fatality each week
  - ~ 2/3 pedestrians or occupants of other car
  - Approximately 4 child fatalities per year
- ~ 10 serious injuries each day
- Cost estimates > $500 million annually
- USA crash fatality rate/capita 35x higher than in Australia

USA EMS data

Is it your service’s tragic year?

- ~ 50 fatalities a year
- 15,000 EMS services
- Each year one in 300 services experiences a fatality

Creating a Safety Culture

within a company must have leadership and support of upper management

- Awareness
- Training
- Incentive

Key elements to transport safety policies

- Vehicle/Fleet Safety
- Occupant protection
- Driver performance monitoring and feedback
- Hours of service
- Driver/provider wellness and fitness
- Driver/provider impairment
- Public safety

the EMS transport process

- communications/dispatch
- the patient
- restraining device/seat
- transporting device/gurney
- paramedics/transport nurses, doctors & family
- patient monitoring equipment
- clinical care & interventions
- protective equipment
- the vehicle
- the driver/driving skill
- the road
- patient monitoring equipment
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*FARS/BTS 2005-6
The Emergency Department (ED)

An ambulance is not an ED/ICU on wheels

Ground Ambulance Transport Safety
IS Complex AND Multidisciplinary

- Epidemiological Data Collection
- Risk Management
- Public Safety
- Transport Policy
- Driver Training
- Equipment
- Safety Technology
- Regulations and Standards

Very Important Principle

Ambulance transport safety is part of a SYSTEM, the overall balance of risk involves the safety of all occupants and the public

And..

- In the vehicle
- At the scene
- During transport

Ontario EMS Occupant Safety
30 August 2010

EMS Transport Safety

- 'patient safety'
- 'provider' and 'public safety'
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

Data...

- What is your transport safety record in your service?
- How can you improve if you don’t have a meaningful measure of safety performance?
- Transport safety is not guesswork, it is a science

ESC – Does your ambulance have it??

- Transport Canada announced that effective August 31, 2011, automakers must install Electronic Stability Control (ESC) technology in Canadian vehicles.
- 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

An interhospital transport?

“Do no harm….”

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1980’s Then.... And NOW!....

1980’s Then.... And NOW!....

1980’s Then.... And NOW!....

1980’s Then.... And NOW!....
**Predictable risks**
- Fatal crashes more often at intersections, & with another vehicle (p < 0.001)
- 70% of fatal crashes are MVC related
- Most serious & fatal injuries occurred in rear (OR 2.7 vs front) & to improperly restrained occupants (OR 2.5 vs restrained)**
- 82% of fatally injured EMS rear occupants unrestrained**
- > 74% of EMT occupational fatalities are MVC related***
- Serious head injury in > 95% of fatal occupant injuries
- More likely to crash at an intersection with traffic lights (37% vs 18%) & more people & injuries/crash than similar sized vehicles#

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**EMS Transport General Concerns**
- Consequences of these adverse events are high in loss of life, financial burden and negative impact on delivery of EMS care
- Other high speed vehicles (e.g. 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

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**USA EMS**
- EMS Systems - >15,000
- Personnel - ~1 million (~30% FIT professional & 70% volunteer)
- Vehicles - ~50,000
  (Type I, II, III: Ambulances, Hot Rods, Motorcycles)
- Transports - ~50 million
  (to Emergency Depots ~50%, < 1/3 emergent)
- Cost - ~$8 Billion annually
- Safety Oversight - ? Disparate

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**USA EMS transport safety data estimates**
- ~50,000 vehicles
- ~9,000 crashes a year
- One fatality each week
  – ~23 pedestrians or occupants of other car
  – ~10 serious injuries each day
- Cost estimates > $500 million annually

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**Occupational transportation fatalities**
- WE HAVE A BIG PROBLEM HERE

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**and what is killing EMS?**
- 74% transportation related
- ~1/5 of ground transport fatalities were struck by moving vehicles
- 11% were cardiovascular
- 9% were homicide
- 4% needle sticks, electrocution, drowning and other

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**So does it make sense?**
- Gloves and universal precautions?...
  …good biohazard protection BUT aren’t going to give much protection in an ambulance crash

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**And...**
- This is in a setting where transport safety is the major and most costly adverse event in EMS
- And there have been all sorts of major technical and informational developments since Jan 2006

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**New Information/Technical Developments Jan 2006- Jan 2011**
- Enhanced Safety of Vehicles (ESV) - publications June 2007, 2009
- Transportation Safety Advancement Group (TSAG) – Feb 2008
- National Academies TRB - Inaugural EMS Safety Subcommittee meeting Jan 2008
- OSHA September 11, 2007 EMS safety in Federal Register
- Enhanced Safety of Vehicles (ESV) - publications June 2007, 2009
- Enhanced Safety of Vehicles (ESV) - publications June 2007, 2009
A challenge we know now...

- ...is that there is a major problem with the present approach and what is being done currently
- and many practices are in conflict with, or not supported by, existing technical engineering science

Some new dimensions

- Vehicles – smarter, sleeker, safer – CHEAPER!
- Operations – new technology tools
- Interdisciplinary infrastructure – new global platforms

Systems safety of:

- Getting you, your patient and equipment in and out of the vehicle
- Providing patient care inside the vehicle
- Occupant protection in crash and near miss situations

Safety Performance

- Measurement
- Outcomes
- Technical expertise

When is it safe to do what... ?

- What are your policies???
  - If your patient is pink, warm and talking?
  - Are you required to notify the driver if you are out of your seat belt?
  - Are ‘routine procedures’ putting you at risk?

What is a safe speed and how do we identify that?

- What is a survivable impact?
  - E= ½ mv^2
  - v^2 = 2as

- 12 mph (20 km/hr)?
- ~ 30 mph - survivable
- ~ 60 mph – not survivable
A survivable impact??

A serious problem...

Transport related aspects -
- dispatch of EMS/Medical transport vehicles
- transport policies and protocols
- vehicle fleets and vehicle design
- vehicle purchase standards
- Intelligent Transportation Systems (ITS) technology
- driver training
- driver performance monitoring
- roadside and road design
- integrated traffic safety technologies
- scene safety and visibility
- safety data capture
- safety oversight

A “Fleet” to many in Emergency Medical care means….

Transport Medicine
- Impact Biomechanics
- Transport Ergonomics
- Fleet Safety

Impact biomechanics
- Crashworthiness
- Vehicle design
- Occupant protection

Transport Ergonomics
- Operational tasks
- Human factors analysis
- Range of reach
- Patient loading and unloading

Fleet safety
- Operational policies – dispatch, safety
- Fleet mix
- Vehicle selection – safety, ESC, loading height
- Driver performance and monitoring
- Scene safety
- Visibility and conspicuity
- Safety measurement and management
April 14th, 2008

An emergency services worker here has died today after the collision in which the EMS vehicle was struck. The victim was a paramedic and a patient killed in this vehicle.

June 17th 2008

A paramedic and a patient killed

A paramedic and a patient killed in this vehicle.

In this vehicle...

October 31, 2008 - Kentucky

A paramedic and a patient killed in this vehicle.

April 30, 2009 - Tennessee

A paramedic and a patient killed in this vehicle.

August 2009 – Impaired...

A paramedic and a patient killed in this vehicle.

October 22, 2009, TN

Patient and Provider killed, Attendant Critical

December 2009

A paramedic and a patient killed in this vehicle.
January 14, 2010

This IS a Transportation and Automotive Safety issue

February 1, 2010

Benefit of Safety

March 2010 Annals EM

Golden Hour – not so hot

Golden Hour Summary

Safety is a tool to save

- Lives
- Time
- Money

must be evidenced based

Any cost of addressing these issues is dwarfed in contrast to the huge burden of not doing so - in financial costs let alone the personal, societal, ethical and litigation costs

Lives

Time

Money

This study suggests that in our current out-of hospital and emergency care system time may be less crucial than once thought. Routine lights-and-sirens transport for trauma patients, with its inherent risks, may not be warranted. [Ann Emerg Med. 2010;55:247-248.]
April 2010, Resuscitation –
 Going fast can hurt your patient clinically!

CPR?

The laws of physics prevail...

• and they don’t care what your job title is or if you are a patient, a provider or a member of the public

Science behind Policy

• “For successful technology, reality must take precedence over public relations, for Nature cannot be fooled.”

Richard P. Feynman 1988

Important...

• Ergonomics and automotive safety issues are interrelated
• Crashworthiness priorities override the ergonomic issues

Goals

• Standards for safety
• Policy based on Science
• Databases to demonstrate outcome

MedStar Ambulances Will No Longer “Run Hot” When Transporting Cardiac Arrest Patients (4/21/2010)

“MedStar ambulances will no longer ‘run hot’ - when paramedics inside are giving chest compressions to patients in cardiac arrest, officials say.” This “policy, which took effect Friday, will affect about 1,400 of the more than 100,000 calls to which MedStar responds annually in the 15 Tarrant County cities it serves.”

NAEMT July 2006 Position statement

Policy makes a difference...
Patients must be in the over the shoulder harness, medics restrained in seat belts, equipment secured

Safety is Good Business

A problem

2007 Insurance data –
• 27 fold more likely to have a claim based on transport than related to medical care

2003 Insurance data –
• 10 fold more likely to have a claim based on transport than related to medical care

Expensive…

Very Expensive

EMS CANNOT Afford to keep paying out like this….

And very Predictable…
• Intersections are lethal environments

So.. The real world for an EMS vehicle approaching a red light
• You think they heard you...
• You know they must have seen you...
• And maybe they did
• ??... But...
• There is NO way humanly possible that they could stop.....
The real world
Intersection passenger car stopping distance* at 40 mph dry and wet

Testing the real world

And this all takes place in 60 milliseconds – the blink of an eye

A few key words about restraint systems…

Deceleration Sled test (upon impact) 24 G, 30mph

Systems safety failure AND dangerous


Overwhelming existing evidence these practices are HIGHLY dangerous
NO evidence whatsoever that these practices are NOT dangerous, let alone safe

Side facing 4-point harnesses demonstrated to be lethal, even at slow ground vehicle speeds
Being seated IN an automotive seat is what will protect you
- Anything that allows or encourages you to get up out of your seat will also encourage you to be injured or killed – it is potentially lethal to be out of your seat in any fashion
- 4 or 5 point harnesses over both shoulders for side-facing occupants are potentially lethal – and in NO WAY SUPPORTED BY ANY DATA OR INDEPENDENT AUTOMOTIVE SAFETY EXPERTISE

What do we know now??
- Intersection crashes are the most lethal
- There are documented hazards, some which can be avoided
- Occupant restraint with standard belts is effective. (Over the shoulder belts for patients, with the gurney in the upright position where medically feasible)
- All equipment should be locked down
- Some vehicle design features are beneficial - automotive-grade padding in head strike areas, seats that can slide toward the patient
- Head protection??
- Electronic Driver monitoring/feedback systems appear to be highly effective

Air EMS is a role model for safety initiatives and focus

An Aviation Safety Plan

Air Safety Approach
- Safety Program Planning
- Evaluating
- Analysis of Safety Performance
- Analysis of Safety Information and Data
- Analysis of Risk Profiles and Plans

Ambulance Safety Research: A New Field

We should use the best safety practices demonstrated in engineering
and in ergonomics

EMS Ergonomist Chris Fitzgerald addressing the EMS Safety Foundation Workshop

The science of Stretcher lifting & loading

The new Mondial Ferno

So what is important...
- A stretcher system that doesn’t harm your back… and your services wallet
- The new Mondial Ferno
- A 27 inch loading height

And what is the loading height of your ambulance??

Size matters…. Less than 27 inches will save your back!!!!

2011....
Range of reach.. This is a well defined technical science

‘Workplace’ Hazards

Bigger is not necessarily better……

But what about head protection?

New EMS helmet prototypes

Which of these two vehicles would you want?
Sprinter v Ford Transit crash test

High speed crash, rolled and the occupants (patient and medics) had only minor scratches
‘Safety’ approaches being driven by manufacturers claims and sales rather than by science and data

Yet another potentially lethal example marketed as a ‘safety innovation’ YET outside of automotive safety practice

Yes, the ride of your life….

- Sure… these vehicles all parade around the EMS and Fire shows
- BUT…
- NOT ONE of these vehicles has been to the automotive safety shows or scrutinized by the automotive safety industry

October 2008 JEMS Article
“Rig Safety – 911”

Ambulance Vehicle Standards??
- KKK?
- AMD?
- FMVSS?
- CMVSS?
- NFPA?
- SAE…?
- ASTM…?
- International
  - ASA
  - CEN

Global EMS Vehicle Safety Standards v Specifications and Guidelines
- EMS Safety and Performance Standards
  - Australia & New Zealand 4535
  - Common European Community (CEN) EN1789
- Non EMS Specific USA Standards
  - [Aviation – FAA/DAJAA]
  - [Fleet vehicles - ASSE/ANSI Z15 ]
- USA Other
  - Purchase Specification: KKK
  - “Standards” – NTEA – AMD, ASTM F 20, NFPA (d)ev
  - Guidelines: EMSC Dos and Don’ts, and (ASTNA, CAAS and CAMTS)

American National Standard
ANSI/ASSE Z15.1-2006
Safe Practices for Fleet Motor Vehicle Operations

What Z15 encompasses
- Safety Program
- Safety Policy
- Responsibilities and Accountabilities
- Driver Recruitment, Selection and Assessment
- Organizational Safety Rules
- Orientation and Training
- Reporting Rates and Major Incidents to Executives
- Oversight

USA KKK ambulance purchase specifications
- Specifications for the purchase of a Star of Life Ambulance
  - Static Pull test
  - 2200 Lbs. static stretcher test in longitudinal, lateral & vertical
  - No dynamic test for vehicle, occupants or equipment
  - No automotive test manikin
- Voluntary
USA Ambulance Manufacturing Division (AMD)
Ambulance Standards – August 2007

- No dynamic or impact test
- No automotive test manikin
- Mandates NO ‘crumple zone’
- No impact tested anchorages for occupant restraint or equipment
- Internal, not independent

NTSB 1979… and 30 years later and still the same problem

USA Ambulances: FMVSS Exempt

EMS Best Practice, Sept 2006

It isn't like this in the rest of the world

Worker visibility Act: November 24th 2008

Day visibility

Night visibility

Here’s the real world at 6 ft…
August 2009 – Visibility review

Policy and practice ignorant of existing technical safety data

This addresses some very real risks, very creatively – and currently ONLY available in London Ontario!

Color-blindness affects 10% of the population

Emergency Vehicles – Viewer Awareness

- Location
- Size
- Shape
- Speed
- Intended path

Having access to that technical knowledge supports changes to improve safety practice

Muskoka EMS - Canada

Old design

New design
Safety concepts out there now
- Driver feedback technologies
- Tiered dispatch
- Enhanced ambulance vehicle design
- Intelligent Transport Technologies – ITS
- New platforms for interdisciplinary exchange
- New Safety Standards

Transport performance
- Driver training?
- Real time safety performance outcomes?

Invehicle technologies to enhance transport safety
- Aftermarket in vehicle electronic e-safety devices with monitoring and feedback

Human Interface approaches
- Hardware fitted to the vehicle
- Non hardware App Driven cellular technology

What about changing driver behavior in the real world??

The “Feedback box”
Driver behavior monitoring and feedback device
Extensive Indirect cost savings

- Fewer out of service vehicles
- Improved transport times
- Decreased administrative lost in managing unsafe behaviors
- Decreased legal burden
- Automatic system wide data
- Insurance benefits

Monitoring and feedback devices

- Implementation well received by the providers.
- 20% cost saving in vehicle maintenance within 6 months.
- No increase in response times
- Fewer crashes and less severe crashes
- Sustained improvement in safety proxies, with no inservice or retraining after the initial introduction period.

ACETECH™ Auto Vehicle Informatics (AVI) key features

- Vehicle Status
  - Stationary, Ignition On/Off, Speed, Batteries
  - Integrates to FM software
- Asset management of all assets in stores and fleet
- Operational and Fleet Reports
  - Driver Behaviour, Over speeding / 911 / Reds /
    Lone Worker Capability
- Remote Vehicle Diagnostics
  - Driver ID
    - Beneficial for Driver behaviour.
    - Important for Asset Management
- Remote Alert Notification
  - Texting / Email
- Fuel Monitoring, l/t/km of fleet.
- Carbon Monitoring
  - Real Time Odometer Readings (OBD)
  - ECO Run Monitoring capability
- ACETECH™ AVI advantage
  - Send a time – Vehicle Informatics
    - Know where your vehicles are
    - Dispatch the closest, most appropriate unit.
    - Improved productivity
    - Reduced fuel expense
  - Reduce carbon emissions
    - Reduce response times
    - Reduced risk (shorter response)
    - Fewer collisions
    - Reduced claims
  - Plus: Panic / emergency button to send to operations
- THE ACETECH™ AVI advantage
  - Fleet Summary
  - Sales by Report
  - Fleet Safety
  - Fleet Utilisation
  - Speeding Report
  - Fleet Incident Report
  - Fleet Response Times
  - Emergency Incident Report
  - Engine Idle Report
  - Fuel Usage and Cost
  - Event Notification
  - Shore Line Charge Usage
  - Cost on Grid
- ACETECH AVI
  - Fleet Summary
  - Journey Report
  - Fleet Battery
  - Fleet Utilisation
  - Speeding Report
  - Fleet Incident Report
  - Fleet Response Times
  - Emergency Incident Report
  - Engine Idle Report
  - Fuel Usage and Cost
  - Event Notification
  - Shore Line Charge Usage
  - Cost on Grid

Telematicus

- “Learn”
  - All trips recorded (start trip/stop trip)
  - Established the benchmarks
- “Guide”
  - Speed feedback activated
  - Driver Clinics
  - Automated Application update
- “Sustained”
  - Messaging
  - Incident Management
  - GPS

GGD views

- A smart phone App that is a safety tool
  - Driver feedback to GGD scorecards, messages, training.
  - Driver controls GGD on mobile platform to provide data
  - Drive records, analyzes & actions data in real time
Example trip trace from the ggdrive business application. This trace is automatically created using GPS data sent from ggdrive and can be used to analyse speed, distance, acceleration (deceleration) and time during the trip.

Example scorecard of comparative driver performance from the ggdrive business application. The scorecard is created using telematics data from dedicated on-board telematics device and is presented in traffic light format against benchmark and set targets.

GGD Smartphone views
Driver’s individual performance against company set performance targets in the system.
- Needle points to individual driver performance against targets
- Green area represents the difference between standard and stretch targets
- Goals can be varied by region, market, team as required
- Performance is updated and presented in real time.

How did the UK pilot drivers perform??

<table>
<thead>
<tr>
<th>Name</th>
<th>Total distance (Miles)</th>
<th>Total number of trips</th>
<th>Distance per Trip</th>
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<td>11,972</td>
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<td>7,556</td>
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<td>46</td>
</tr>
</tbody>
</table>

TRB TRANSFORMATION RESEARCH BOARD
October 29, 2009 TRB Summit

What could you learn from the National Academies – right NOW and gratis
- The realm of burden and benefit
  - measuring the safety of the system
  - determining the economic, ethical and risk benefit challenges
- Transport System Management
  - fleet safety and oversight technologies and policies
  - operations management – dispatch, congestion routing, deployment of resources, benchmarking
- Vehicle safety
  - occupant protection design and testing
  - vehicle performance safety
  - vehicle and pedestrian human factors issues
- Dissemination and Policy
  - Knowledge transfer
  - Standards, specifications and policy

Auspices of the National Academies of Science, Medicine and Engineering

2011 TRB Summit
- Safety Strategies and Solutions Summit
- To be held on site DC and online Dec 12
- Auspices of the National Academies of Science, Medicine and Engineering

Its out there NOW
- TRB 2009 Summit – addressed the key and interdisciplinary issues, in one day – please seek that information out.
- There have been two TRB Summits held, 2008, 2009 and both with vehicle engineering and transportation systems technical expertise

Realtime mapping from London for 2.5hr of a trip of attempting to park in NYC after a snow storm and whilst ‘Law and Order’ filming was underway

The “kitchen design” is completely unacceptable and a failure in health care delivery, occupant protection and ergonomics.
- Independent technical expertise must be here and involved

Independent Technical Expertise

2011 TRB Summit
- Safety Strategies and Solutions Summit
- To be held on site DC and online Dec 12
- Auspices of the National Academies of Science, Medicine and Engineering
The EMS Safety Foundation
www.EMSSafetyFoundation.org

EMS Safety Foundation

- Established in 2008 to fill a gap in
  - technical knowledge transfer
  - practical interdisciplinary R & D
  - evaluation and implementation of system
    safety enhancements for EMS and Medical
    Transport
- It is a not-for-profit institute

Mission

- This is 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.

The EMS Safety Foundation: A practical and functional model

Interdisciplinary and Operational and International
- Innovation
- Collaboration
- Knowledge transfer

R & D

“Ripoff and Duplicate”

- Avoid reinventing the wheel at all costs
- Where are the best practices that we
  need to transfer knowledge from

EMS Safety Foundation Ambulance Vehicle & Ergonomics Workshop, October 2009

Automotive engineers addressing EMS Safety Foundation Workshop

EMS Safety Foundation Ambulance Innovation Workshop and Design Clinic

Session A
Vehicle Safety and Occupant Protection
Gene Lukianov
Session B
Hands-on human factors operational safety and task analysis
Chris Fitzgerald
October 2nd, 2010
International approaches

- The state of the art non-USA vehicles have NO squad bench nor the aftermarket structural vehicle modifications that can potentially decrease crashworthiness integrity that were seen in study vehicles.

EMS Safety Foundation Delegation seeking out International Innovation

Rettmobil 2011 – May 11-13th

EMS Responder Rettmobil 2010 Delegation

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

EMS Safety Foundation Delegation www.EMS Safety Foundation.org

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Vehicle Occupant Safety design

European design
Safety technology is a key focus

Safe and Ergonomic design

Patient Transferring Slides

Ergonomic layout and equipment

EMS Safety

EMS Safety

EMS Safety
Flexibility to manage two patients

Texas - Careflite’s new vehicle

Careflite’s new vehicle

Tips for Emergency Vehicle Operations

USFA Emergency Vehicle Safety Initiative

Traffic Incident Management Systems (TIMS)
- Released April 2008
- FEMA, USFA, IFSTA
- Covers setting up safe roadway incident work areas and using unified command at these incidents

Transportation Research Board is an excellent resource... we should be using it!!
Technical Collaboration is key
• We are NOT the experts in this science
• We cannot afford to play the silo game here, it is costing lives, time and money
• We MUST have a meaningful evidenced based approach to design, operations and policy
• We must be outcomes driven

this vehicle is safety crash tested by automotive experts

Unlike this vehicle

So….
• Which vehicle do you want to be in?
• Which vehicle is the best for efficient, and effective patient care?
• Which vehicle provides optimal risk management?
• What is the optimal fleet mix?

Fleet Mix?

Were we safer in the Cadillac???

What do we know works…
• Vehicle Operations Safety Policies
• Squad bench lap seat belts
• Patient over the shoulder belts
• Securing equipment
• Forward and rear facing seating
• Some electronic technical devices
• Safety awareness
• Cultural change

Risk/Hazards
• Predictable risks
• Predictable fatal injuries
• Serious occupational hazard
• Public safety hazards
Goals
- Standards for safety
- Policy based on Science
- Databases to demonstrate outcome

Safety Management
- A Safety Culture
- Protective Policies
- Protective Devices
  - In the event of a crash
  - To prevent a crash
- Continuous Education and Evaluation

Very Important Principle
Ambulance transport safety is part of a SYSTEM, the overall balance of risk involves the safety of all occupants and the public

Future
- Meaningful Goals
- New policies
- New practices
- New standards
- New vehicles
- New technologies

Conclusion
- EMS transport has serious hazards and safety issues
- Major advances in EMS safety research, infrastructure and practice over the past 5 years
- Development of substantive EMS safety standards is a necessity and a reality
- Multidisciplinary safety issue that EMS cannot solve internally
- Failure to transfer knowledge from transportation and automotive safety is unacceptable and dangerous
- EMS is still way behind the state of the art in vehicle, transportation and occupational safety

And....
- It is no longer acceptable for EMS to be functioning outside of transportation, automotive and PPE safety standards for prevention of and protection of EMS providers and the public from injury and death

Thank you!
Any Questions??
Electronic handout and resources available online
http://www.objectivesafety.net