Ambulance Transport Safety: Separating Fact from Fiction

Beth Israel Grand Rounds
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Who am I?
• Nadine Levick MD, MPH
• Emergency Medicine Physician and Public
  Health Academic, (USA-Hopkins, Harlem,
  Maimonides, Brooklyn & Australia - Royal
  Melbourne, Royal Childrens Hospitals, Royal
  Australian Flying Doctor Service)
• Chair, National Academies Subcommitte TRB
  EMS Transport Safety, USA
• Founder of EMS Safety Foundation
• Recipient, International Society of Automotive
  Engineers, Woman's Leadership Award for EMS
  Safety

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

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

Outline
I. Review of data on ambulance crashes and safety
   standards and guidelines that exist for the ground
   EMS
II. Identification of ground EMS transport safety issues,
   hazards and areas of risk to patients, providers and
   public
III. Highlight unacceptable mythology and challenges to
   advancing EMS transport safety
IV. Profile innovation, new safety technologies and
   strategies and knowledge transfer to enhance safety
   and reduce risks of ground EMS and patient

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?
The Public Health Paradigm

1. Define the problem
2. Measure its magnitude
3. Understand the key determinants:
   a. Biologic etiology: host/agent/vector
   b. Environmental & biomechanic influences
   c. Social/behavioral practices of at risk pop.
4. Develop intervention/prevention strategies
5. Set policy/priorities
6. Implement and evaluate

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

Unique workplace

• In vehicles
• At roadside and other emergency scenes

The ‘workplace’ IS a vehicle

• EMT’s often in vulnerable positions during transport.
  – Bench seat
  – Captains chair
  – Standing or kneeling

The ‘workplace’ is also a crash scene

Absence of USA standards and oversight

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

Canada - Corporate Manslaughter
Corporate Homicide Act: 8th April, 2008

Transport Medicine

• Biomechanics
• Ergonomics
• Fleet Safety
A “Fleet” to many in Emergency Medical care means….

EMS Transport Safety

- 'patient safety'
- AND also
- 'provider' and 'public safety'

Key Issues

- Mythology – That Emergency Medical Service personnel are safe
- Injury Hazards – Biohazard – Chemical/Radiation – Physical/Mechanical trauma – THE BIG PROBLEM
- Motor Vehicle Crashes are the highest cause of death at work – EMS has > 2X the mean national rate
- An R & D and Regulatory Gap – Occupational Health and Safety
  • the workplace is in a vehicle – exposure data are scant
  – automotive safety
  • a vehicle is the workplace – 'exempt' from automotive research and regulation

Challenges to Optimizing EMS Transport Safety

- Disparate and fragmented safety infrastructure
- Lack of a centralized EMS Safety oversight or data
- A large number of small groups of end users, with a mix of volunteers and professionals
- Ambulances are non-standard vehicles, a truck chassis and an after market box or a modified van
- EMS vehicle safety is not integrated as a part of the transport safety industry

Ambulance design & transport safety initiatives timeline

- 1959’s National Academies of Medicine – the Cadillac to the chassis and box truck, birth of the American ambulance
- 1969 – Swedish rescue ambulance
- 1977 – JAMA paper – patient safety
- 1979 – First white paper on ambulance safety
- 1985 – Swedish money to test and build
- 1989 – EMS vehicle safety regulations: ANSI (formerly adopted FMVSS)
- 1993 – Swedish ambulance crash tests – first standards
- 1995 – Last Swedish ambulance – crash tests and regulations
- 2000 – First SAE Emergency Vehicle Safety Symposium
- 2001 – First EMS vehicle safety standards
- 2003 – First EMS vehicle safety standards
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- 2012 – First EMS vehicle safety standards
- 2013 – First EMS vehicle safety standards
- 2014 – First EMS vehicle safety standards
- 2015 – First EMS vehicle safety standards
- 2016 – First EMS vehicle safety standards
- 2017 – First EMS vehicle safety standards
- 2018 – First EMS vehicle safety standards
- 2019 – First EMS vehicle safety standards
- 2020 – First EMS vehicle safety standards

Transport related aspects -

- dispatch of EMS/Medical transport vehicles
- transport policies and protocols
- vehicle fleets and vehicle design
- 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

What’s missing

1. What data is collected nationally?
   - We have no denominator data
   - We have incomplete numerator data
2. Absent population based national injury data or injury mechanics data
3. Absent structured transportation safety engineering input
   1 + 2 + 3 = resultant inability to design and evaluate efficacy of injury interventions
4. What oversight is there?
5. Which organizations would determine policy?
Challenges to Optimizing EMS Transport Safety

- Rear compartment exempt from FMVSS
- Complex automotive safety area bridging acute clinical care, public health, public safety and automotive safety
- Very recent history as a research issue
- Limited fiscal support for cross disciplinary EMS transport safety research

Firstly!

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

A tragic emergency health care intervention outcome

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 health, 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

USA EMS

- EMS Systems - >15,000
- Personnel - ~1 million (~30% F/T professional & 70% volunteer)
- Vehicles - ~50,000 (Type I, Type II, Type III, Freightliners, motorcycles)
- Transports - ~50 million (to Emergency Depts ~50%, <1/3 emergent)
- Cost - ~$8 Billion annually
- Safety Oversight - ? Disparate

Safety oversight of what and .... by whom

- Vehicle Safety
- Vehicle Design
- Transportation systems safety
- Safety Equipment Design
- Vehicle and Safety Equipment Testing
- Safety policies
In the USA there are more safety standards for moving cattle than for moving patients.

Creating a Safety Culture

- Awareness
- Training
- Incentive

The Emergency Department (ED)

An ambulance is not an ED / ICU on wheels.

Ground Ambulance Transport Safety is Complex AND Multidisciplinary

Do we ask vehicle builders to write cardiac arrest protocols...? Vehicle design and safety is not what we are trained to do!!!
What is a survivable impact?

12 mph (20 km/hr)?

What is a survivable impact?

E = \frac{1}{2} mv^2

\approx 30 \text{ mph} - \text{survivable}

What is a survivable impact?

E = \frac{1}{2} mv^2

\approx 60 \text{ mph} - \text{not survivable}

What is a survivable impact??

A serious problem...

A survivable impact??

Tragedy you don’t want to be involved in

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

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

2 weeks later... Friday July 20th 2007
The worst ambulance crash in USA history

Five Killed in Crash of Ambulance and Semi

The impact was so severe that the ambulance was stripped of its body and the rest of the vehicle had to be cut away. The driver and one of the paramedics died, while two others were critically injured. The driver was identified as 26-year-old paramedic Allan Parson. He had been working for the ambulance service for just over a year. The crash occurred on I-95 northbound near mile marker 67, between the exits for US-1 and US-90.

The investigation into the crash is ongoing, but preliminary reports indicate that the semi-truck driver may have been speeding at the time of the collision. The accident has sparked widespread concern among emergency medical personnel, who are calling for increased safety measures to be put in place to prevent such tragedies in the future.

It has been a year since the tragic accident and the community is still dealing with the loss of one of its own. The paramedics who were fortunate enough to survive the crash are still recovering both physically and emotionally.

In memory of Allan Parson, a memorial fund has been established to help support the families of the victims and to raise awareness about the dangers of driving while under the influence. The fund is administered by the Florida Department of Health and the Florida Highway Patrol.

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Emergency personnel throughout the region were shocked and mourning their loss.

"That’s one of our worst scenarios when it’s one of our own," said Dan Dillaker of the Pierce Fire Department.

"Everyone is heartbroken," said friend. "Everybody talks after an accident.

Deputy Sheriff, director of Pulaski County Emergency Management Agency, said the accident has had a huge impact.

You’ve affected every emergency personnel in the county," he said. "You were a family member of mine."

The car was driven by a nurse who was involved in an accident Friday. You were every nurse in the county, everything.

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**June 17th, 2008**

A paramedic and a patient killed

**October 31, 2008 - Kentucky**

**February 11, 2009 - North Carolina**

**April 30, 2009 - Tennessee**

**Minnesota - June 20, 2009**

**August 2009 - Impaired...**
Is there an acceptable rate of morbidity and mortality for pre-hospital transport systems??

How are we counting these events?
What/Where are the relevant data bases?
- FARS
- NASS/CDS
- GES
- State Traffic Records
- FMCSA
- BLS
- NEMSIS
- Other

USA Emergency Vehicles
Minimum Annual Fatalities 1995-2007
FARS – A National Data Set?
Small numbers – but no data captured from 20% of the nation in 10 years

USA EMS transport safety data estimates
- ~50,000 vehicles
- ~9,000 crashes a year
- ~one fatality each week
- ~2.5 pedestrians or occupants of other car
- ~10 serious injuries each day
- Cost estimates > $500 million annually

Is it your service’s tragic year?
- ~50 fatalities a year
- 15,000 EMS services
- Each year one in 300 services experiences a fatality

and what is an EMS crash?
- Definition of an EMS crash
- Definition of Emergency Response Mode

So for EMS personnel...
- What’s going to kill you?
- What’s going to injure you?

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

and what is killing EMS?
EMS personnel fatalities*
- 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

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

Predictable risks
- Fatal crashes more often at intersections, with another vehicle (p = 0.0001)
- 70% of fatality crashes EMS crashes during Emergency Use*
- Most serious & fatal injuries occurred in rear (OR 2.2 vs front) & to improperly restrained occupants (OR 2.5 vs restrained)**
- 62% of fatally injured EMS rear occupants unrestrained**
- 74% of EMT occupational fatalities are MVC related***
- Serious head injury in >50% of fatal occupant injuries#
- More likely to crash at an intersection with traffic lights (37% vs 18%, p=0.001) & more people & injuries/crash than smaller vehicles##

** Kahn CA, Pirrallo RG, Kuhn EM, Prehosp Emerg Care 2001 Jul-Sep;5(3):261-9
# NIOSH, 2003
## Ray AM, Kupas DF, Prehosp Emerg Care 2005 Dec; 9:412-415
Ambulance transport a serious USA 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

Balance of concerns and risk during transport

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

Haddon/Baker/Runyan Phase-Factor Matrix as applied to EMS Safety

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

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

Safety is a tool to save

- Lives
- Time
- Money

Firstly, the DANGER...

- The state of EMS transport safety research is an EMBARRASSMENT
- Lags at least 30 years behind general automotive and transportation safety research
- EMS Safety research is NOT EVEN ON THE PLAYING FIELD of state of the art automotive safety research
- ‘Reinventing the wheel’ – should be avoided at all costs

Then, The OPPORTUNITY

- This is vehicles, and this is transportation safety
- Vehicle and transportation safety technology and research infrastructure exists
- Ditto drivers, and driver/fleet safety technology
- Collaboration, and the multidisciplinary model is key
- Optimal use of very scarce resource
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

New Information/Technical Developments Jan 2006 - Jan 2010
- SAFETEA-LU, 2006 – EMS identified as one of the 4 E’s – Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
- International Ergonomists Association (IEA) - publication June 2006
- Enhanced Safety of Vehicles (ESV) - publications June 2007, 2009
- American Society Safety Engineers (ASSE) - publications June 2006, 2007
- National Academies TRB – Inaugural EMS Safety address, Jan 2007
- NEMSAC established – April 2007
- AMD Engineering Public Comments, July 2007
- KKK-F, August 2007
- OSHA September 11, 2007 EMS safety in Federal Register
- Transportation Safety Advancement Group (TSAG) – Feb 2008
- Transportation Safety Advancement Group (TSAG) – Feb 2008
- Society for Automotive Engineers (SAE) – publications Oct 2007, 2008, 2009
- Worker visibility Act - Nov 2008
- SAE Ambulance Standards development – April 2009
- NFPA Ambulance Standards Committee – June 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
2 most recent publications
ESV July 2009

October SAE – October 2009

and in ergonomics

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

‘Workplace’ Hazards

Bigger is not necessarily
better.....

IMPORTANT
ADVISORY

- Due to respect for the wishes of
the families of medics killed in
the line of duty there is to be NO
PHOTOGRAPHY of any aspect
of the images in this presentation
- that is NO video, NO
photography, NO digital images
of any type

It does happen....
But what about head protection?

Attitudes to Head Protection in EMS

- Would you consider wearing a helmet pre-present?
  - Yes: 16%
  - No: 84%

- Would you consider wearing a helmet post-present?
  - Yes: 18%
  - No: 82%

Role of a head protective device

- A simple, immediate and inexpensive adjunct – a protective device
- To protect occupants from hazardous interiors
- As vehicle crashworthiness design advances
- As driver training advances
- For when equipment becomes unsecured
- As EMS Safety Standards are developed, for both EMS vehicles and EMS occupational safety

New EMS helmet prototypes for 2006-2007

What is known

- Ambulance transport is part of a system of integrated elements, as is an ambulance vehicle a microcosm safety system of interrelated occupant and safety issues
- The laws of physics prevail

Would we.....?

Seeing that we are health care providers – lets look at it this way –
- Would we use medical equipment that was built by folks who were not technically qualified or trained biomedical engineers and who just said – “this device is safe”?
- Or would we expect them to be qualified in this field and that their products were tested in a meaningful way to ensure that they were safe?

1995 - Deceleration Sled test
(upon impact) 24 G, 30mph

Why do we do this?
Vehicle Crashworthiness testing

USA - 2000 research
Europe - 2007 to meet LNE

Full Vehicle Crash Tests

Test 1 – Right side impact
Target vehicle, Type I ambulance
Bullet vehicle, Type II ambulance
Closing speed 44 mph

Test 2 – Frontal
Target vehicle, Type II ambulance
Bullet vehicle, Type III ambulance
Closing speed 34 mph

Pre-impact CTD positioning
Preparation of test vehicles

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

Which of these two vehicles would you want?
Sprinter v Ford Transit crash test
http://www.youtube.com/watch?v=C3kN6WF5vAA&feature=related

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

Rash of “Safety Concept” vehicles….. Devoid of substantive automotive safety engineering input or testing

A few key words about restraint systems…

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

PPE from the stationary environment can be highly hazardous in the automotive setting

NOT new technical data...


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 sidefacing occupants are potentially lethal – and in NO WAY SUPPORTED BY ANY DATA OR INDEPENDENT AUTOMOTIVE SAFETY EXPERTISE

Yet another potentially lethal example marketed as a ‘safety innovation’ YET outside of automotive safety practice
Airbags in the back....??
Absent safety testing standards, any meaningful crash or injury mechanism data or effective occupant positioning – rear compartment airbags are likely to be hazardous

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

Ambulance Vehicle Standards??
- KKK?
- AMD?
- FMVSS?
- 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/CAU/AA]
  - [Fire vehicles - ASSE/ANSI Z16 ]
- USA Other
  - Purchase Specification: KKK
  - “Standards” - NTBA – AMD, ASTM F 20
  - Guidelines: EMSC Dos and Don’ts, and (ASTNA, CAAS and CAMTS)

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

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

October 2008 JEMS Article “Rig Safety – 911”

What KKK-A-1822F, AMD and FMVSS state and don’t state...
USA Ambulances: FMVSS Exempt

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

USA KKK ambulance purchase specifications
- Specifications for the purchase of a Star of Life Ambulance
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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

Occupant protection......??

KKK/AMD – static ‘safety testing’
- Ignorant of automotive safety principles – and specifies -
  - No structural damage to any load bearing or supporting members, i.e., torn or broken material, broken welds, popped or sheared body rivets, bolts, and/or fasteners, shall be evident during the application of the force and after the release of the force.

KKK Specification and AMD Standards both default to the FMVSS for safety – however..
- FMVSS has a specific exemption for ambulance vehicles once you are 600mm or 2 feet positioned rearward of the driver
- KKK require a ‘national test lab’
- AMD ‘tests’ BUT NOT an automotive test lab!
- No dynamic impact tests AT ALL
- No crashworthiness tests

No ‘a’… then NO ‘F’ !!!!!
- \( F = ma \)
  
  where \( F \) – force
  \( m \) – mass
  \( a \) – acceleration

Yes a “nationally recognized testing lab” – BUT - NOT an automotive/occupant safety crash test lab!!
FMVSS exempt……

Standards Development Update
- NFPA – Meetings March 2010
- SAE – x2 standards underdevelopment
  - General vehicle crashworthiness and occupant safety standard
  - Specific equipment and occupant restraint standard
- ISO - ISO/AWI 39001 - Road-traffic Safety management systems
  - Recent update meeting in Canada

Visibility and lighting issues

Hmm…

So why is it...
- That the EMS providers -
  - Were wearing navy blue – one of the most difficult colors to see at night
  - Had no head protection, when all other emergency personnel at the scene did
  - Had no protective clothing, when other emergency personnel at the scene did???

News we don’t want to see

Caught On Video: EMT Struck By Car

Worker visibility Act: November 24th 2008

It isn’t like this outside of the USA

Day visibility
Night visibility

Here’s the real world at 6 ft…

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

For a timely, appropriate and safe response

- Location
- Size
- Shape
- Speed
- Intended path
Having access to that technical knowledge supports changes to improve safety practice.

Invehicle technologies to enhance transport safety

- Aftermarket in vehicle electronic e-safety devices with monitoring and feedback

Transportation safety invehicle e-monitoring and feedback device

Muskoka EMS - Canada

Old design

New design

Muskoka EMS - Canada

Hmmm.. and what is this – a fighter plane, a billboard…??

But whatever color …. If you run a red light someone will be killed
What’s new

- New automotive safety technologies
  - Crashworthiness
  - EVS
  - ITS
  - Monitoring and feedback enhancements
- New expertise
  - TRB
  - ASSE
  - UTRC
  - Ergonomics
  - Industrial Design

What the independent technically expert occupant protection and automotive safety engineers say about our current ambulances and ‘safety’ approaches:

- “The rear compartment Death Vault”
- “The Kitchen Design must go”
- “The Kill, Kill, Kill (KKK) spec”
- “The organ donor harness system”

Independent Technical Expertise

- 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

What could you learn from the National Academies – right NOW and gratis

- The realm of burden and benefit
  - Measuring the safety of the system
  - 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
- Dissemination and Policy
  - Knowledge transfer
  - Standards, specifications and policy

October 29, 2009?

- This is where the technical experts were, operational EMS providers and the government agencies too

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2009 TRB Summit Participants
http://www.objectivesafety.net/TRBSummit2009.htm

- Technical experts
  - Automotive safety engineering, occupant protection
  - Automotive and EMS operational ergonomics and human factors
  - Transportation systems safety engineering
- Government agencies
  - National Highway Traffic Safety Administration (NHTSA)
  - Department of Transportation ITS (DOT)
  - National Transportation Safety Board (NTSB)
  - Federal Highways Administration (FHWA)
  - Federal Motor Carrier Safety Administration (FMCSA)
  - Bureau of Labor and Statistics (BLS),
  - Department of Homeland Security (DHS)
- EMS State Directors
- Industry partners
- Academics

Please do go and access this information, it comes from technical and operational experts and it is gratis.

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.
- See www.trb.org, and for the Summit archives: www.objectivesafety.net/TRBSummit2008.htm
  www.objectivesafety.net/TRBSummit2009.htm

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

The EMS Safety Foundation: A practical and functional model
- Interdisciplinary and Operational
  - Innovation
  - Collaboration
  - Knowledge transfer

The EMS Safety Foundation
November 2009 Webinar for Public Access
www.EMSSafetyFoundation.org and www.objectivesafety.net

EMS Safety Foundation Delegation bringing Rettmobil to you
Vehicle Occupant Safety design

- European design
- Safety technology is a key focus

Safe and Ergonomic design

- Patient Transferring Slides
- Flexibility to manage two patients

Collaboration and Outcomes

- Interdisciplinary Collaboration is what is key – not orthopedic folks talking to cardiologists – BUT collaboration between the health care folks appropriate automotive and occupant protection engineers and transportation system design and industry standards that make sense – and
- Meaningful measures of outcome and performance

Texas’ Careflite’s new vehicles
Careflite’s new vehicle

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 operations and policy
We must be outcomes driven
We MUST cease to be a fiefdom in a discipline we have no technical background or expertise in

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 operations and policy
- We must be outcomes driven
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Is this acceptable...?

- There are ambulances rolling out of the show room on a daily basis – as we speak – being designed by health care providers and built by after market retrofitters, who are not at all governed as are other passenger vehicle manufacturers by the standards set by the society for automotive engineers
Reach out to the appropriate experts – they sure do want to help us.

STOP being philistines and be the scientists we are trained to be and at least seek a scientific approach.

Get your heads out of the sand – there is plenty of valid technical information – FMCSA, TRB, SAE.

Make policy and purchase decisions on technically sound data, not a marketing brochure.

HAVE MEANINGFUL AND TRANSLATABLE OUTCOME MEASURES FOR YOUR SERVICES SAFETY PERFORMANCE.

What is the EMS Transport Safety Research Agenda?

- Shouldn’t it be driven by data, and appropriate technical expertise

So what do we need to do??

And what is the EMS Transport Safety Research budget??

- What has been spent by whom, on what and how, and with what oversight??

Future Directions

- Rational use of limited resource
- Avoid reinventing the wheel
- Formal safety research agenda
- Framework bridging key research and infrastructure
  - Society of Automotive Engineers
  - Involvement with ESV activities
  - EMS safety research funding
  - Foster evidence based initiatives

Goals

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

Were we safer in the Cadillac???

Creating a Safety Culture

Awareness
- Training
- Incentive

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 available online
http://www.objectivesafety.net