Robert Wood Johnson
March 11, 2010

Emergency Transportation Safety: Extra Attention Needed

Robert Wood Johnson
March 11, 2010

Emergency Medical Service Transport

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 transport

http://www.objectivesafety.net

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
Emergency Medical Services (EMS)
An important and unique transport system
- Public safety, public health and emergency service
- Is there to save lives

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
  - Captain’s 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
EMS Transport Safety

‘patient safety’
AND also
‘provider’ and ‘public safety’

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
- road uses and road design
- integrated traffic safety technologies
- scene safety and visibility
- safety data capture
- safety oversight

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
  - Automotive Safety
    - ‘exempt’ from automotive research and regulation

Ambulance design & transport safety initiatives timeline
- 1960’s National Academies of Medicine – the Cadillac to the chassis and box truck, birth of EMS
- 1963 – National Safety Council
- 1964 – Swedish Center
- 1967 – NHTSA
- 1969 – JAMA paper - Paul Auerbach
- 1983 – Swedish barrier crash tests
- 1987 – JAMA paper - Paul Auerbach
- 1995 – First published text on Ambulance collisions - and by an optometrist
- 1998 – First published text on Ambulance collisions - and by an optometrist
- 2000 – First peer reviewed engineering publication on ambulance crashworthiness
- 2000 – First full vehicle ambulance crash tests
- 2001 – First SAE Emergency Vehicle Safety Symposium
- 2003 – Mobile Medical Transport Safety Task Force (MMS) established
- 2004 – Morgantown program
- 2005 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2008 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2009 – Second published text on Ambulance rear compartment sled tests with instrumental dummies
- 2010 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2011 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2012 – Mobile Medical Transport Safety Task Force (MMS) established
- 2013 – Mobile Medical Transport Safety Task Force (MMS) established
- 2014 – Morgantown program
- 2015 – Mobile Medical Transport Safety Task Force (MMS) established
- 2016 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2017 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2018 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2019 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2020 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2021 – First published text on Ambulance rear compartment sled tests with instrumental dummies
- 2022 – First published text on Ambulance rear compartment sled tests with instrumental dummies

What’s missing
1. What data is collected nationally?
   - We have no denominator data
   - We have incomparable 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
- 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
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 and Standard development
- Safety policies

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?
In the USA there are more safety standards for moving cattle than for moving patients.

Creating a Safety Culture
- Awareness
- Training
- Incentive

the EMS transport process
- communications/dispatch
- the patient
- restraining device/sheet
- transporting device/gurney
- paramedics/transport nurses, doctors & family
- patient monitoring equipment
- clinical care & interventions
- protective equipment
- the vehicle
- the driver/driving skill
- other road users
- the road

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} m v^2  

v^2 = 2as  

~ 30 mph - survivable

~ 60 mph – not survivable

What is a survivable impact?  

A survivable impact??

A serious problem...

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….”

Five Killed in Crash of Ambulance and Semi

2 weeks later… Friday July 20th 2007

The worst ambulance crash in USA history
Emergency personnel throughout the region are also shadowed and. "It's a really sad situation when it's one of our own," said Dave Stiebel, director of the Family Fun Park.

"There's a brand new," said him, "something to take after everybody." Emergency Services director of Faulking County Emergency Management, said the accident has led to some work.

\[ \text{In this vehicle...} \]

\[ \text{In this vehicle...} \]

\[ \text{In this vehicle...} \]\n
Jan 28th, 2008

1 dead, others injured in Sussex crash involving ambulance

\[ \text{In this vehicle...} \]

\[ \text{In this vehicle...} \]

\[ \text{In this vehicle...} \]

April 20, 2008...

\[ \text{In this vehicle...} \]

\[ \text{In this vehicle...} \]

\[ \text{In this vehicle...} \]
October 31, 2008 - Kentucky

February 11, 2009 – North Carolina

April 30, 2009 - Tennessee

October 22, 2009, TN
Patient and Provider killed, Attendant Critical

October 22, 2009
Provider and Patient Killed

Monday November 30, 2009
Smithfield

Minnesota - June 20, 2009

August 2009 – Impaired…

Contact information: Crash - North Carolina

Minnesota

Contact information: Crash - Tennessee

EMS Safety

EMS Safety

EMS Safety

EMS Safety
An interhospital transport? “Do no harm….”?

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

How bad is the problem

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

Total Fatalities Per 10 Million Registered
1996-2006
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

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?

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

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

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

Predictable risks
- Fatal crashes more often at intersections, & with another vehicle (p < 0.001)*
- 70% of fatal crashes EMS crashes during Emergency Use*
- Most serious & fatal injuries occurred in rear (OR 2.7 vs front) & to improperly restrained occupants (OR 2.5 vs restrained)**
- 62% of fatally injured EMS rear occupants unrestrained***
- Serious head injury in >65% 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 similar sized vehicles!!

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

**Kahn CA, Pirrallo RG, Kuhn EM, Prehosp Emerg Care 2001 Jul-Sep;5(3):261-9
***Becker, Zaloshnja, Levick, Li, Miller, Acc Anal Prev 2003
##NIOSH, 2003
###Ray AM, Kupas DF, Prehosp Emerg Care 2005 Dec; 9:412-415
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
  must be evidenced based

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
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

We should use the best safety practices demonstrated in engineering

...in automotive safety engineering

2 most recent publications

ESV July 2009

Range of reach... This is a well defined technical science
‘Workplace’ Hazards

Bigger is not necessarily better……

Creating a Safety Culture

- Awareness
- Training
- Incentive

USA EMS in 1917

1960 to 2009

Some recent adverse outcomes

- “Ambulance transport has a death toll……”
  Carl Craigie EMT-Il - Chief Platte Valley Ambulance
It does happen….

But what about head protection?

Attitudes to Head Protection in EMS

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

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

Ambulance Pediatric Restraint Systems, SAE Australasia 1998;58:2:45-51

Why do we do this?

Vehicle Crashworthiness testing

Full Vehicle Crash Tests

Test 1 – Right side impact

Test 2 – Frontal

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

2000 Full Vehicle Crash Testing

Pre-impact CTD positioning

Preparation of test vehicles

Impact residue

During impact

CTD dynamics
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

And now for some MYTH BUSTING

‘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...

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
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

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) EN1799
- Non EMS Specific USA Standards
  - [Aviation - FAA/CAUAA]
  - [Fire vehicles - ASSE/ANSI Z15]
- USA Other
  - Purchase Specification: KKK
  - "Standards": NTEA – AMD, ASTM F 20
  - Guideline: 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
- Oversight

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
- 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

Occupant protection......??

July 2007

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’ to conduct AMD tests BUT NOT an automotive test lab!
- No dynamic impact tests AT ALL
- No crashworthiness tests

No ‘a’... then NO ‘F’ !!!!!

- \[ F = ma \]

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

- Visibility and lighting issues

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???

It isn’t like this outside of the USA

News we don’t want to see

Worker visibility Act: November 24th 2008

Day visibility

Night visibility

Caught On Video: EMT Struck By Car

News we don’t want to see

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???
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!

“...the multicolored (patterned) ambulance while distinctive, may suffer decreased conspicuity because of the effects of camouflage” - De Lorenzo & Eilers Annals EM 1991

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

Muskoka EMS - Canada

Old design

New design
But whatever color .... If you run a red light someone will be killed.

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

Transportation safety in-vehicle e-monitoring and feedback device
MEMS March 2003 – July 2006

Technical information available

EMS Transport Safety
- ‘patient safety’
- ‘provider’ and ‘public safety’

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

What’s new
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
  - determining the economic, ethical and risk benefit challenges
- Transport System Management
  - real safety and oversight technologies and policies
  - operations, management – all aspects, organization, deployment
- 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
- The Kitchen Design \(\text{must go}\)
- The Kill, Kill, Kill (KKK) spec
- The organ donor harness system

2009 TRB Summit Participants

- Technical experts
  - automotive safety engineering, occupant protection
  - automotive and EMS operational ergonomics
  - 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
  - EMS Equipment
  - Vehicles, both OEM and aftermarket
- Academics

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

October 29, 2009 TRB Summit

- Bridging the gap between what we do and what is known
- Enhancing ambulance transport safety through shared knowledge of technical data
- Open access, all EMS related organizations notified and invited, and beam to EMS Expo!

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
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
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

Manitoba’s new fleet
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
- We MUST cease to be a fiefdom in a discipline we have no technical background or expertise in

this vehicle is safety crash tested by automotive experts

Unlike this vehicle

- 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

Is this acceptable...?

- 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

What do we know works...

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

PREDICTABLE PREVENTABLE and NO ACCIDENT

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