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.

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

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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

23 September 2010

The Ride of Your Life –
A Global EMS Forum
Optimizing Knowledge Transfer & Safety Innovation

in what we do

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23 September 2010
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.

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

Canada - EMS Safety Leaders
- The West
  - British Columbia
  - Alberta
  - Saskatchewan
  - Manitoba
- The East
  - Ontario
  - Quebec
  - New Brunswick
  - Nova Scotia
  - Prince Edward Island
  - Newfoundland
- The North
  - Yukon Territory
  - Northwest Territory
  - Nunavut

Dan Berry P. Eng (1948-1998)

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

Ontario EMS Occupant Safety
30 August 2010

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.

Tragedy you don’t want to be involved in
Patient Safety UK - A routine concept...

But Patient Safety is just one part of this system

EMS Transport Safety

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

Balance of concerns and risk during transport

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

Some odd USA and also Canadian 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

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.
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

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

What is a survivable impact?
E = \frac{1}{2} mv^2
v^2 = 2as

What is a survivable impact?
12 mph (20 km/hr)?

What is a survivable impact?
~ 30 mph - survivable

What is a survivable impact?
~ 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

Transport Medicine

Impact Biomechanics
Transport Ergonomics
Fleet Safety

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

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 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
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 AND Canada 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

Creating a Safety Culture

within a company must start with upper management's commitment to safety

- Awareness
- Training
- Incentive

the EMS transport process

- communications/dispatch
- the patient
- restraining device/seat
- transporting device/ambulance
- paramedic/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
Would we….?  
Seeing that we are health care providers – let’s 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?

April 14th, 2008

A paramedic and a patient killed in this vehicle...

June 17th, 2008

A paramedic and a patient killed

We are trained to write cardiac arrest protocols...?

Vehicle design and safety is not what we are trained to do!!!

Do we ask vehicle builders to write cardiac arrest protocols...?
April 30, 2009 - Tennessee

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

December 2009

January 14, 2010

February 1, 2010

April 28, 2010

Sept 16, 2010
This IS a Transportation and Automotive Safety issue

Benefit of Safety
- 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

Important...
- Ergonomics and automotive safety issues are interrelated
- Crashworthiness priorities override the ergonomic issues

Safety is a tool to save
- Lives
- Time
- Money
- must be evidenced based

Golden Hour – not so hot
- March 2010 Annals EM

Golden Hour Summary
- 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!

So why do we operate in conflict with 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

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

Policies? – is pull over to the right really safer…?

May 13, 2010…

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.”

Safety is Good Business

Workers Compensation Rate increased by 27%

Are you self insured???

Very Scary insurance data – the $10 million dollar EMT Year Payroll

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<th>Year</th>
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<th>Modified Premium</th>
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</table>

Workers Compensation Rate increased by 27 %
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....

Safety saves time, lives AND money
Canada, Nova Scotia

- Since 2000 working towards a goal of zero loss ratio with insurance provider
- 10 million kilometers per year
- 150 emergency response ambulance units
- Collision claim history measured in dollars per 100,000 kilometers traveled:
  - 2000/2001 $1725.00
  - 2001/2002 $1049.00
  - 2002/2003 $751.00
  - 2003/2004 $416.00
  - 2004/2005 $229.00

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.....
Testing the real world

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

A few key words about restraint systems...

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

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

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
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 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

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

Air Safety Approach

- In vehicles
- At roadside and other emergency scenes

Unique workplace

Canada - Corporate Manslaughter Corporate Homicide Act: 8th April, 2008
An interhospital transport? “Do no harm…”?

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)**
- 82% of fatally injured EMS rear occupants unrestrained**
- >74% of EMT occupational fatalities are MVC related***
- 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##

EMS Transport General Concerns

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

USA EMS

- EMS Systems - >15,000
- Personnel - ~1 million
- Vehicles - ~50,000
- Transports - ~50 million
- Cost - ~$8 Billion annually
- Safety Oversight - ? Disparate

How are we counting these events?

What/Where are the relevant data bases?

- FARS
- NASS/CDS
- 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
- ~ 2/3 pedestrians or occupants of other car
- ~10 serious injuries each day
- Cost estimates > $500 million annually
Denominator ....?

- # vehicles
- # types of vehicles
- # runs
- # miles/kms
- Nature of patient
- Severity of patient

Moose crash data....? – not EMS crash data

Is response time really a meaningful measure of patient outcome??

- What are the confidence limits?
- What about demographics, population density?

Jan 2010 - Evaluating Trauma Management Performance in Europe

Data Envelopment Analysis

- EMS Stations
  - 10,000 citizens
  - 100 km rural road length
  - 1000 km² area
- # Staff
- # EMS Transportation Units
  - 10,000 citizens
  - 100 km rural road length
  - 1000 km² area

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

Current accepted safety design and transport system technologies are being ignored, and worse...

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
- Gloves and universal precautions?...
  ... good biohazard protection BUT aren't going to give much protection in a
  ambulance crash


So does it make sense?

- Gloves and universal precautions?...
  ... good biohazard protection BUT aren't going to give much protection in an ambulance crash

Current accepted safety design and transport system technologies are being ignored, and worse...

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

Ambulance Safety Research: A New Field

Priorities......

Research papers in the past 30 years

- EMS Safety
  - 42 papers - on ambulance safety
  - 2 papers - on ambulance ergonomics
  - 1 paper - on stretcher ergonomics

- Computer Workstations
  - 30,000 papers - on ergonomics of computer work stations

- Erectile Dysfunction
  - 100,000 papers - on Erectile Dysfunction

We should use the best safety practices demonstrated in engineering

...in automotive safety engineering

and in ergonomics

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

Bigger is not necessarily better......

Ouch!
My liver!!

Ouch!
My spleen!!

It does happen.....

But what about head protection?

New EMS helmet prototypes

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

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

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/DAA/IAA]
  – [Fleet vehicles - ASSE/ANSI Z15.1]
- USA Other
  – Purchase Specification: KKK
  – “Standards” - NTEA – AMD, ASTM F 20, NFPA (devel)
  – Guidelines: EMSC Dos and Don’ts, and (ASTNA, CAAS and CAMTS)

October 2008 JEMS Article “Rig Safety – 911”


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

What Z15 encompasses
**Australia & New Zealand**

**Ambulance restraint standard AS/NZS 4535:1999**
- Restraint systems shall apply to all equipment and people carried in an ambulance.
- Dynamic Testing - 50th & 95th percentile manikins
- 24G in Forward and Rearward
- 19G in Transverse

**Common European Community**

- European Committee for Standardization Medical vehicles and their equipment - Road Ambulances
- "Without exception, all persons, medical devices, equipment, and objects normally carried on the road ambulance shall be maintained to prevent them from becoming a projectile when subject to a force…"
- 50th percentile manikins - 10 G in Forward, Rearward, Transverse, & Vertical directions
- Certified by Notified Body and Ambulance Mfg.

**ISO – 39001**

Road-traffic Safety management systems

---

**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

**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**

NATIONAL TRANSPORTATION SAFETY BOARD

- July 2007
- Medic Survivors
- Medic Fatality

---

**What KKK-A-1822F, AMD and FMVSS state and don’t state...**

**USA Ambulances: FMVSS Exempt**
- July 2007

**Occupant protection......??**
May 13, 2010

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

Ridiculous current 2009 USA ambulance ‘safety testing’ !?? – Is NOT consistent with accepted automotive safety practice...

F = ma
where F – force
m – mass
a – acceleration

Visibility and lighting issues

Hmm...
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!
The multicolored (patterned) ambulance while distinctive, may suffer decreased conspicuity because of the effects of camouflage.

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.

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

Innovation
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??

Optimizing driver performance monitoring and feedback: An innovative approach utilizing a global mobile interactive e-platform

The analysed system data that sits behind each Trace Assessment
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

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>Driver</th>
<th>Total distance (Miles)</th>
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Episodes of Harsh Braking

Harsh Braking per 100 trips

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 personnel human factors issues
• Dissemination and Policy
  - standards, specifications and policy

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

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
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”

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 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

The science of Stretcher lifting & loading
EMS Safety Foundation Delegation seeking out International Innovation

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 Responder Rettmobil 2010 Delegation
http://www.emsresponder.com/web/online/Safety/Live-From-RETTmobil/25$13137
Vehicle Occupant Safety design
European design
Safety technology is a key focus

Safe and Ergonomic design

Patient Transferring Slides

EMSafety
Small AED

Ergonomic layout and equipment

Flexibility to manage two patients

"Together for your safety"

Ambulance Investigation - Norway
National analysis group

- National Health Authority
  Licensing health professionals
- National Vehicle & Roads Administration
  Approval and technical control of ambulances
- Paramedics from Oslo university hospital

Ambulance investigation

- Accidents involving an ambulance with injury or death
- Accidents involving an ambulance with major damage to property
- Accidents where equipment inside the ambulance cause injury / danger of injury

Texas - Careflite’s new vehicle

Careflite’s new vehicle

Manitoba’s new fleet
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, ergonomists and industry standards that make sense – and
- Meaningful measures of outcome and performance

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???
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.

So what do we need to do ??

- 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.

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

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

Safety Management

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

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

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
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