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

September 13, 2011, Mineola, NY

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

Who am I?

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

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

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

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

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

10 Years Ago…
Safety of the...

- Provider
- Public
- Patient

Some questions for you all:

- Have you ever been in a EMS crash?
- How many times?
  - 1?
  - 2?
  - More?
- Have you ever been hurt in an EMS crash?
- Do you know any one who has ever been hurt in an EMS crash?
- Do you know of anyone who has been killed in an EMS crash?

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Tragedy you don’t want to be involved in

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

2 weeks later... Friday July 20th 2007
The worst ambulance crash in USA history
Five Killed in Crash of Ambulance and Semi

Emergency Medical Services (EMS)
An important and unique transport system

- Public safety, public health and emergency service
- Is there to save lives
Firstly!

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

A tragic emergency health care intervention outcome

A devastating tragedy...

- An ETT down the wrong hole may kill your patient and be a terrible burden for the patient's 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 region's 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 safer?
- Do I need a helmet, and if so which one?
- What policies offer the safest system?
- How do I get my team to address safety issues?
- What data should I collect when something goes wrong, and how to analyze it?

Safety oversight of what and by whom

- Vehicle Safety
- Vehicle Design
- Transportation systems safety
- Safety Equipment Design
- Vehicle and Safety Equipment Testing and Standard development
- Safety policies

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

Absence of standards and oversight

- Challenges in identifying best practice
- Myriad of unregulated commercial products
- No safety performance standards
- Absent national safety oversight
What we need to consider, where is the ‘bang for buck’ in ambulance transport safety:

Creating a Safety Culture

within a company must have leadership and support of upper management

- Awareness
- Training
- Incentive

Key elements to transport safety policies

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

the EMS transport process

- communications/dispatch
- the patient
- restraining device/seat
- transporting device/journey
- 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

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!!!

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?

And...

- In the vehicle
- At the scene
- During transport

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.

Balance of concerns and risk during transport

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

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??

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

1980’s Then....

And NOW!....

1980’s Then....

And NOW!....

So

- What’s important
- What’s not important

What’s going to save your life

What might take your life

What’s going to hurt you

What’s going to protect you
Is there an acceptable rate of morbidity and mortality for pre-hospital transport systems??

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

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

Is it your service’s tragic year?
- ~ 50 fatalities a year
- 15,000 EMS services
- Each year one in 300 services experiences a fatality
**Current accepted safety design and transport system technologies are being ignored, and worse...**

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

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**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

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**Some new dimensions**

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

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**Systems safety of:**

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

- Measurement
- Outcomes
- Technical expertise

When is it safe to do what...?

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

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

What is a survivable impact?

\[ E = \frac{1}{2}mv^2 \]
\[ v^2 = 2as \]

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

A survivable impact??

A serious problem...

Transport related aspects -

- dispatch of EMS/Medical transport vehicles
- transport policies and protocols
- vehicle fleets and vehicle design
- vehicle purchase standards
- Intelligent Transportation Systems (ITS) technology
- driver training
- driver performance monitoring
- roadside and road design
- integrated traffic safety technologies
- scene safety and visibility
- safety data capture
- safety oversight
A “Fleet” to many in Emergency Medical care means….

Impact biomechanics
- Crashworthiness
- Vehicle design
- Occupant protection

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

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

April 14th, 2008
Emergency medical personnel in action - West Nyack, New York

June 17th, 2008
a paramedic and a patient killed

In this vehicle…
October 31, 2008 - Kentucky

April 30, 2009 - Tennessee

August 2009 – Impaired...

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

Monday November 30, 2009
Smithfield

January 14, 2010

February 1, 2010

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

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.

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.

April 2010, Resuscitation – Going fast can hurt your patient clinically!

CPR?
The laws of physics prevail...
- and they don’t care what your job title is or if you are a patient, a provider or a member of the public
Science behind Policy

- “For successful technology, reality must take precedence over public relations, for Nature cannot be fooled.”
  
  Richard P. Feynman 1988

Important...

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

Goals

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

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."

Policy makes a difference...

- Patients must be in the over the shoulder harness, medics restrained in seat belts, equipment secured
### Safety is Good Business

**Very Scary insurance data – the $10 million dollar EMT**

| Year | Payroll | Modified Premium | Incurred Indemnity | Incurred Medical | Total Claims
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*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....

*The Huntsville Times*

**Ambulance suit gets $3.1 million**

A read-made suit will be delivered on a 30-day free-spending vehicle.

### Very Expensive

Expensive...

EMS CANNOT Afford to keep paying out like this....

And very Predictable...

- Intersections are lethal environments
So... The real world for an EMS vehicle approaching a red light

- You think they heard you...
- You know they must have seen you...
- And maybe they did
- ... But...
- There is NO way humanly possible that they could stop.....

The real world
Intersection passenger car stopping distance* at 40 mph dry and wet

- Perception + Reaction + Vehicle braking time (varies with age, skill, agility, alertness + vehicle type, tire pressure, road etc)

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

A few key words about restraint systems...

Dynamic Sled Testing of Ambulance Pediatric Restraints

* Stopping distance: Perception time + Reaction time + Vehicle braking time (parametric: age, skill, agility, awareness + vehicle type, tire pressure, road etc)
Deceleration Sled test (upon impact) 24 G, 30mph

Systems safety failure AND dangerous

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

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

Air Safety Approach

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

Ambulance Safety Research: A New Field

We should use the best safety practices demonstrated in engineering

...in automotive safety engineering

and in ergonomics

August 11, 2011

Priorities...... Research papers

in the past 30 years

- EMS Safety
  - 43 papers - on ambulance safety
  - 2 papers - on stretcher 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

Ambulance Safety Research: A New Field

- Funding??
DOT Funding for Reptiles and Road Kill

Deer me! ... or is that duck?!

Not all deer jump in....

Moving Patients

Your back... – 1880’s

2011... but these can really hurt your back too!

EMS Ergonomist Chris Fitzgerald addressing the EMS Safety Foundation Workshop

The science of Stretcher lifting & loading
So what's important...

- A stretcher system that doesn't harm your back... and your services wallet
- The new Mondial Ferno
- A 27 inch loading height

And what is the loading height of your ambulance??

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

2011....

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

Bigger is not necessarily better......

Carl Craigle EMT-P, Chief Platte Valley Ambulance, CO

Workplace Hazards

Bigger is not necessarily better......

Carl Craigle EMT-P, Chief Platte Valley Ambulance, CO

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

High speed crash, rolled and the occupants (patient and medics) had only minor scratches

http://www.youtube.com/watch?v=C3kN6WF5vAA&feature=related
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

Were they on drugs...?

Airbags in the back....?? Hazardous for this environment

Absent safety testing standards, any meaningful crash or injury mechanism data or effective occupant positioning – as per the automotive engineers, rear compartment airbags are likely to be highly hazardous

Airbags ....?? Absent safety testing standards, any meaningful crash or injury mechanism data or effective occupant positioning – rear compartment airbags are likely to be hazardous

“Sure… these vehicles all parade around the EMS and Fire shows BUT...”

Yes, the ride of your life....

NOT ONE of these vehicles has been to the automotive safety shows or scrutinized by the automotive safety industry

“Our design features are focused on improving the safety of the patient compartment, and side roll protection in Horton ambulances helps reduce the threat of a fatal injury if a rollover occurs.”
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/CAAA]
  - [Fleet vehicles - ASSE/ANSI Z15 ]
- USA Other
  - Purchase Specification: KKK
- “Standards” - NTEA – AMD, ASTM F 20, NFPA (devel)
- Guidelines: EMSC Do’s and Don’ts, and (ASTNA, CAAS and CAMTS)

Ambulance Vehicle Standards??

- KKK?
- AMD?
- FMVSS?
- CMVSS?
- NFPA?
- SAE...?
- ASTM...?
- International
  - ASA
  - CEN

What Z15 encompasses

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

USA KKK ambulance purchase specifications


- Specifications for the purchase of a Star of Life Ambulance
- Static Pull test
- 2200 Lbs. static stretcher test in longitudinal, lateral & vertical
- No dynamic test for vehicle, occupants or equipment
- No automotive test manikin

USA Ambulance Manufacturing Division (AMD)

- 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

KNOTHOL TRANSPORTATION SAFETY BOARD

USA Ambulances: FMVSS Exempt

- NTSB Exempt:
  - Ambulances (Exempt from FMVSS)
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...

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!!

SAE Ambulance Equipment mounting testing standards

Frontal Impact SAE 2917, published May 2010
Side Impact SAE 2956, published June 2011

Best Practices?
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" - De Lorenzo & Eilers Annals EM 1991

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

Muskoka EMS - Canada
Old design

New design
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?

What about changing driver behavior in the real world??

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

The “Feedback box”

Driver behavior monitoring and feedback device

Extensive Indirect cost savings

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

And when a rare crash happens....

Unit 302 Accident

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

THE ACETECH™ AVI advantage
- ACETECH™ AVI – Vehicle Informatics
  - Know where your vehicles are
  - Dispatch the closest, most appropriate unit
  - Improved productivity
  - Reduce carbon emissions
  - Reduce risk (driver response)
  - Fewer collisions
  - Fewer lost injuries
  - Fewer reunions
  - Ensure emergency button is used

ACETECH™ Auto Vehicle Informatics (AVI) key features
- Vehicle Status
- Operational and Fleet Reports
- Remote Vehicle Diagnostics
- Telematicus
  - "Learn"
    - All Trips recorded (Start trip/Stop trip)
    - Established benchmarks
  - "Guide"
    - Speed feedback activated
    - Driver Clinics
    - Automated Application update
  - "Sustain"
    - Messaging
    - Incident Management
    - ESL
GPS and GPRS status

GGD views

A smart phone App that is a safety tool

Driver and vehicle ids

Reports & Scorecards

Example trip trace from the ggdrive business application.

This trace is automatically created using GPS data send from gg drive and can be used to analyse speed, distance, acceleration (deceleration), and time during the trip.

Example scorecard of comparative driver performance from the ggdrive business application.

The scorecard is created using telematics data from dedicated on-board telematics device and is presented in traffic light format against benchmark and set targets.

GGD Smartphone views

Driver’s Individual performance against company set performance targets in the system

• Needle points to individual driver performance against targets
• Green area represents the difference between standard and stretch targets
• Goals can be varied by region, market, team as required
• Performance is updated and presented in real time.

How did the UK pilot drivers perform??

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Harsh Braking per 100 trips

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

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
  • Knowledge transfer
  • 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
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.

2011 TRB Summit

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

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.

R & D

“Ripoff and Duplicate”

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

EMS Safety Foundation Ambulance Vehicle & Ergonomics Workshop, October 2009

Automotive engineers addressing EMS Safety Foundation Workshop

The EMS Safety Foundation: A practical and functional model

Interdisciplinary and Operational and International
- Innovation
- Collaboration
- Knowledge transfer
EMS Safety Foundation
Ambulance Innovation Workshop
and Design Clinic

Session A
Vehicle Safety and Occupant Protection
Gene Lukianov
Session B
Hands-on human factors operational safety and task analysis
Chris Fitzgerald

October 2nd, 2010

International approaches

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

EMS Safety Foundation Delegation
seeking out International Innovation

Rettmobil 2011 – May 11-13th

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
Vehicle Occupant Safety design

Safe and Ergonomic design

Patient Transferring Slides
Flexibility to manage two patients

PodCasts - with Kyle Bates in ‘First Few Moments’

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

Guest Technical Expert
- Jonas Liden, Industrial Design, Sweden
Chris Dick

- Deputy Chief
- Western Eagle County Ambulance District, Colorado

From this... October 2010

To this, in September 2011!
EMS SAFETY COURSE
National Association of Emergency Medical Technicians

Course Design
• One-day program
• Interactive lecture, discussion, group activities
• Case studies using real incidents
• 8 hours continuing education credit (CECBEMS)
• Presented in 8 modules

For more information about the course, including how to find a class in your area or to sponsor a class
call 1-800-346-2368
(1-800-3NAEMT)
www.NAEMT.org
or email info@naemt.org

www.NAEMT.org
Tips for Emergency Vehicle Operations

USFA Emergency Vehicle Safety Initiative

Traffic Incident Management Systems (TIMS)

- Released April 2008
- FEMA, USFA, IFSTA
- Covers setting up safe roadway incident work areas and using unified command at these incidents

Transportation Research Board is an excellent resource... we should be using it!!

Technical Collaboration is key

- We are NOT the experts in this science
- We cannot afford to play the silo game here, it is costing lives, time and money
- We MUST have a meaningful evidenced based approach to design, operations and policy
- We must be outcomes driven

this vehicle is safety crash tested by automotive experts

Unlike this vehicle

So....

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

Fleet Mix ?
Were we safer in the Cadillac???

Vehicle Operations Safety Policies
- Squad bench lap seat belts
- Patient over the shoulder belts
- Securing equipment
- Forward and rear facing seating
- Some electronic technical devices
- Safety awareness
- Cultural change

Risk/Hazards
- Predictable risks
- Predictable fatal injuries
- Serious occupational hazard
- Public safety hazards

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

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

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

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

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

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

Thank you!

Any Questions??

Electronic handout and resources available online

http://www.objectivesafety.net