'Building a Culture of Safety in Health Care‘ - Are You on the Ride of Your Life?

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Ambulance transport safety "is just one part of the health care system."

Patient safety...a hospital safety issue too?

Issues with Ambulance manufacturing

"It's an unsafe system...why?"

Need for measurement for safer performance

Creating a 'culture of safety' thru awareness, training, and incentive.

What I have been asked to cover today

Where am I really from? ...

Yes, it IS that big!

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

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

Emergency Medical Services (EMS)
An important and unique transport system
- Public safety, public health and emergency service
- 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’
- ‘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.

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

What is factual
What is garbage

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?

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

~ 30 mph - survivable

~ 60 mph – not survivable

A survivable impact??

12 mph (20 km/hr)?
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....

Safe Systems Approach

Source: Road Safety Branch, Infrastructure and Surface Transport Policy, Department of Infrastructure, Transport, Regional Development and Local Government, Australia.
Key Elements to Safety

- Data Capture
- Vehicle Biomechanics and Crashworthiness
- Ergonomics and Biohazards
- Transportation Environment
- Safety Management – evaluation and analysis

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 heath, public safety, and patient transportation.
- Important Principle: Ambulance transport safety is part of a system, the overall balance of risk involves the safety of all occupants and the public
- All get home safely
Real world answers to real world questions -

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

Safety oversight of what and .... by whom

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

In the USA 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

- What we need to consider, where is the ‘bang for buck’ in ambulance transport safety:
  - Awareness
  - Training
  - Incentive
the EMS transport process

- communications/dispatch
- the patient
- restraining device/seat
- transporting device/gurney
- paramedics/transport nurses, doctors & family
- patient monitoring equipment
- clinical care & interventions
- protective equipment
- the vehicle
- the driver/driving skill
- 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 –
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?

April 14th, 2008

Ambulance member has crash in accident - West Nyack, New York

An emergency services worker test has died today after the ambulance in which she was a passenger crashed into a truck parked along Route 30 near the Palisades Corners mall.

Bonnie Jones, 35, was taken by helicopter to the Cross River Medical Center in Tarrytown where she underwent surgery.

“Join us for me, but she lost her arm,” Howard Hanota, director of community paramedics said early this evening.

Her unit makes runs from the point of life to support her,” West Nyack Fire Chief George Broccher said. “She appeared to be seriously injured.”

The paramedic, who, 25-year-old local, lives in New York Medical Center, died.

June 17th 2008

a paramedic and a patient killed

EMS Crash Kills Patient and A Sussex County (DE) Paramedic in the Line of Duty

Tuesday, June 17, 2008

We regret to advise you that a female Sussex County (DE) Paramedic was killed in the Line of Duty as was a patient killed in a horrific crash involving an ambulance in Sussex County (DE) this morning.

The single-vehicle crash happened around 5:10 a.m. on the Route 201 William Street near the Route 284/Route 201 joint in Sussex County in New Jersey.

The male Sussex Borough squad ambulance was transporting to Route 201 Medical Center with a patient. A 2 MSSS Squad members and the Sussex County Paramedic were on board when it struck a tree, which opened the side of the ambulance and sent it over a barrier. Tragically, the patient was killed as was the Sussex County EMS Paramedic, who was killed in the Line of Duty.

Sussex County EMS also suffered a close call last year when a Paramedic Jack Schmitt was seriously injured in a crash when his ambulance hit a distracted Driver while traveling on a rural. Additional details on this morning’s crash will follow.

In this vehicle...
**October 31, 2008 - Kentucky**

**April 30, 2009 - Tennessee**

**August 2009 – Impaired...**

**October 22, 2009, TN**

**Patient and Provider killed, Attendant Critical**

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**EMT Indicted On Murder Charges**

*Tammy Brewer Driving Ambulance Involved in Fatal 2008 Crash*

*By Andy Acock/WLKY*

**LOUISVILLE, Ky.** -- A Louisville EMT who was driving an ambulance involved in a fatal crash has been indicted on seven criminal charges, including murder and operating a motor vehicle under the influence of intoxicants.

Tammy Brewer, 36, was behind the wheel when that crash took place in April 2008. The patient inside the ambulance, Vickie Whalen, 54, died of her injuries from the wreck.
December 2009

[Image of a newspaper article titled "EMSSafety"

February 1, 2010

[Image of a newspaper article titled "The Sun Times"

Sept 16, 2010

[Image of a newspaper article titled "SUV Rips Side Off Ambulance in Deadly Maryland Crash"

The Elephant in the Room

[Image of an elephant in a room]
This IS a Transportation and Automotive Safety issue

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

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

Important...
- 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

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

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

A problem

Expensive…

Very 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
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

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##

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

TRB TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES

October 29, 2009 TRB EMS Transport Safety Summit

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

- The realm of burden and benefit
  - measuring the safety of the system
  - determining the economic, ethical and risk benefit challenges
- Transport System Management
  - fleet safety and oversight technologies and policies
  - operations management – dispatch, congestion routing, deployment of resources, benchmarking
- Vehicle safety
  - occupant protection design and testing
  - Vehicle performance safety
  - vehicle and 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
In-vehicle 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

New cost effective App driven innovation

- GPS and GPRS signals
- Driver and vehicle stats

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

The analysed system data that sits behind each Trace Assessment

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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<th>Name</th>
<th>Total Distance (Miles)</th>
<th>Total Number of Trips</th>
<th>Distance per Trip</th>
<th>Harsh Braking per 100 Trips</th>
<th>Harsh Braking/1,000 Mile</th>
<th>Severe Braking/1,000 Mile</th>
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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

Automotive engineers addressing EMS Safety Foundation Workshops
EMS Safety Foundation Delegation seeking out International Innovation

Texas - Careflite’s new vehicle
CareFlite’s new vehicle

Manitoba’s new fleet

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

Collaboration and Outcomes

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???
There are ambulances rolling out of the showroom 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 automotive engineers.

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.

EMS Transport Safety

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

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