EMS to your rescue? Research, Technology and Reality....

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CEO, Objective Safety
New York, NY

EMS Safety Crisis

"The Chinese word for 'crisis' (危機) is made up of the words 'danger' (危) and 'opportunity' (機)"

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
- Global EMS vehicle safety research is sparse
- 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 infrastructure exists
- Ditto drivers, and driver safety technology
- Collaboration, and the multidisciplinary model
- Optimal use of very scarce resource

Firstly!

- An accident?
- or a predictable and preventable event
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

It is with great irony that I speak here today

- Ambulance transport
  - the most lethal vehicle on the road both per mile travelled and per vehicle
  - is exempt from federal safety oversight
  - has the worst transportation safety data capture for any ground transportation system AND…..
  - Is THE VEHICLE THAT COMES TO RESCUE YOU ON THE HIGHWAY!!

A tragic emergency health care intervention outcome

A devastating tragedy…

- In contrast to medical error – such as an ETT down the wrong hole which may kill the patient and be a terrible burden for the pts family and for the medic involved
- BUT an EMS crash can kill all involved AND wipe out an EMS systems response capacity……
Friday July 20th 2007...
The worst ambulance crash in USA history

Five Killed In Crash of Ambulance and Semi

July 23, 2007 06:20 AM EDT

VAN WERT, OHIO (AP) -- The Ohio State highway patrol continues to investigate the crash of an ambulance that killed five people Friday night, including three emergency medical technicians.

The crash occurred near the intersection of County Road 175 and County Road 67. The ambulance went off the road, hit a tractor-trailer, and then overturned.

The highway patrol says five EMS workers were killed. They were identified as 26-year-old charity Smith, 23-year-old Roger Mohr, and 21-year-old Holly Gugler. The two patients were also killed. They were identified as 25-year-old Robert Mertz and 60-year-old Joseph Meindl.

Another emergency medical technician, Scott Mohr, and the truck driver, Gerald Chapman, Jr., of Indiana, were both taken to the hospital. It's not yet clear whether they suffered any injuries.

authorities have not said who had the right of way at the intersection nor have they said whether the ambulance was responding to an emergency.


EMS Transport Safety

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

Very Important Principle

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

EMS Transportation Safety

Key elements

- What is the appropriate data to collect?
- Which is the optimal method to capture it?
- How do you identify and implement appropriate solutions?
- Who should be doing it?

Real world answers to real world questions -

- What policies offer the safest system?
- What features will enhance safety of ambulance vehicles?
- What technologies will optimize transport safety performance?
- What color scheme is best for vehicles and staff to make it safest?
- What data should be collected when something goes wrong, and how to best analyze it?

Lori Bailey
July 22, 2007
B-LEW-057-L14B

Emergency personnel throughout the region are also shocked and mourning their own.

"That's one of our worst scenarios when it's one of our own," said Carl Shaffer of the Payne Fire Department.

"Everyone is a brotherhood," said Friend. "Everybody looks after everybody."

Randy Shaffer, director of Paulding County Emergency Management Agency, said the accident has had a deep impact.

"It has affected every emergency personnel in the county," he said.

"We know it could happen at any time. We read about it in our newsletter. We just didn't think it would happen to us."

Shaffer said when a call came in that an ambulance was involved in an accident Friday, "I think every squad in the county activated."
**Emergency Medical Services (EMS)**

**An important and unique system**

- Public safety, public health and emergency service
- Is there to save lives
- A more recent service compared to Fire and Police

**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

**History of EMS**

- EMS is a relatively new industry
- An unusual history of beginnings within the mortician industry.
  - Early ambulances were hearses, once motorized usually a Cadillac, a vehicle in which an occupant could be transported in the recumbent position
- Over the past 100 years, the sophistication of EMS medical care has advanced dramatically
- EMS communications and transportation technology have not kept up with that pace

**1960 to 2007**

- A passenger vehicle - sure
- A 'laundry or mail truck'? ?
- A passenger vehicle - yes!

**Some recent adverse outcomes**

- UPS and Laundry trucks have very similar design and even more stringent safety requirements to EMS vehicles
- BUT
- very different cargo......

**People are passengers and NOT packages or parcels**
Some odd 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

Transport oversight?

- In contrast to the bus and truck industries, which have:
  - comprehensive safety oversight
  - transportation safety interventions
  - transportation safety data capture via the Federal Motor Carrier Safety Administration (FMCSA)
- EMS has been focused more as an acute health care delivery and emergency medical service and largely outside of much of the other transportation oversight infrastructure that exists

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

There are more safety standards for moving cattle than for moving patients

A Simple Question….

- This IS a Transportation and Automotive Safety issue
- This is a Systems safety issue

Clinical Care?

Occupational Health and Safety…..?

- This IS a Transportation and Automotive Safety issue
- This is a Systems safety issue
Jan 28th, 2008

1 dead, others injured in Sussex crash involving ambulance

Collision happened at the intersection of Beaver Dam and Indian Mission roads near Angola Launch.

April 14th, 2008

Ambulance worker shown in accident - West Nyack, New York

An emergency services worker lost her arm today when the ambulance in which she was a passenger crashed into a truck parked along Route 80 near the Palisades Correctional Center.

Ronnie Jones, 25, was taken by helicopter to the Manhattanville Medical Center in Yonkers where she underwent surgery.

"Shocked out of shape, but she lost her arm," New York Medical director of Memorial Parc Medical said today. The victim.

"We send our prayers to the family to see how we can help her," West Nyack Fire Chief George Brown said. "She appeared to be seriously injured.

The paramedic, a 36-year-old from West Nyack, was transported to Westchester Medical Center, said Brown.

April 20, 2008...

Child injured after being struck by ambulance

State News

NYC: Child injured after being struck by ambulance

April 17th 2008

a paramedic and a patient killed

EMS Crash Kills Patient and a Sussex County Paramedic in the Line of Duty

In this vehicle...
Unacceptable, and ridiculous AMD/KKK-F ‘safety testing’ practices and ‘standards’ !!!

AMBULANCE TEST RECORD BROKEN

36,000 lbs
59,000 lbs on ROOF
55,000 lbs on SLIDE

THAT WAS THEN

In 2000, shattered industry records by testing and certifying the modular body to more than double the 100% curb weight Federal standard. In addition, they performed a body slide test that had never been seen before. Now has broken that record with a 55,000 body test on the top and side of the module.

THE AMBULANCE BODY IS NOW CERTIFIED TO 100% CURB WEIGHT!!

INDUSTRY LEADING SAFETY INNOVATION

THIS IS NOW...

2 counts of vehicular homicide...
November 5, 2007 - PA

An interhospital transport? “Do no harm....”?

2 counts of vehicular homicide...
November 5, 2007 - PA

An interhospital transport? “Do no harm....”?

Pa. ambulance involved in crash; patient pronounced dead at scene

An interhospital transport? “Do no harm....”?

Goals

- Standards for safety
- Policy based on Science
- Databases to demonstrate outcome
What data resources are there

What are the strengths and weaknesses of each

Existing transportation data systems

- FMCSA
  - EMS is exempt
  - extensive data on both numerator and denominator aspects of commercial truck safety, with safety performance monitoring and targeted safety guidance

- NHTSA re: EMS
  - FARS – incomplete mortality data
  - GESS/NASS/CDS – sample of low #
  - minimal data with incomplete numerator data for both morbidity and mortality and virtually non-existent denominator data
  - No safety monitoring nor any targeted safety guidance

- NTSA re: Ground EMS
  - One crash report, 1979
  - no system wide data capture (unlike aviation EMS)
  - No safety monitoring, no recommendations since 1979

Effective data capture is powerful...

Valuable information... EMS exempt

FMCSA - Exceptions

- Unless otherwise specifically provided, the rules do not apply to:
  - (f)(1) All school bus operations as defined in §390.5;
  - (f)(2) Transportation performed by the Federal government, a State, or any political subdivision of a State, or an agency established under a compact between States;
  - (f)(3) The occasional transportation of personal property by individuals not for compensation nor in the furtherance of a commercial enterprise;
  - (f)(4) The transportation of human corpses or sick and injured persons;
  - (f)(5) The operation of fire trucks and rescue vehicles while involved in emergency and related operations;
Why isn't EMS ground transport data captured by FMCSA?

30 years later, ~ 1,600 fatalities and still the same problem

Why ISN'T EMS on the NTSB's "Most Wanted List"??

NTSB 1979 Accident Report

Major crash investigation - NTSB comprehensive analysis for commercial vehicles

Other potential sources of EMS ground transport safety data?

- NEMSIS - a powerful EMS patient flow and management database, not a transportation safety database
- Some states (PA, MO, NY) have EMS transport fatality reporting systems – but data incomplete
- NEMS Memorial – incomplete – voluntary – verified
- EMSClosecalls.com, EMSNetwork.org – voluntary, anecdote
National EMS Information System

State based - incomplete

Voluntary, verified but incomplete ...

Voluntary, ? anecdote ...

By contrast - Law enforcement and Fire detailed fatality data

Canada - Corporate Manslaughter Corporate Homicide Act: 8th April, 2008
EMS safety data estimates
In the USA*
- ~ 50,000 vehicles
- ~ 5,000 crashes a year
- ~ One fatality each week
  - ~ 2/3 pedestrians or occupants of other car
  - Approximately 4 child fatalities per year
- ~10 serious injuries each day
- Cost estimates > $500 million annually
- USA crash fatality rate/capita > 2x higher than in Australia

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

Commercial vehicle comparisons
- Estimates for ambulance fatality/mile traveled are 3 to 50 fold the rate of large truck fatal crashes
  - Large trucks - 2.2 fatal crashes/100 million miles traveled in 2005
  - Ambulance - 7.7 to 109 fatal crashes/100 million ambulance miles traveled
- Injury estimates
  - 37 truck crash injuries/100 million miles
  - Ambulance estimates of crash injury of 308 to 4,360 injuries/100 million ambulance miles traveled
- Ambulance vehicle occupant crash fatality percentage is double that for large trucks.

Ambulance Safety Research: A New Field

Priorities......
Research papers in the past 30 years
- EMS Safety
  - 40 papers - on ambulance safety
  - 2 papers - on ambulance ergonomics
  - 1 paper - on stretcher ergonomics
- Computer Workstations
  - 30,000 papers – on ergonomics of computer workstations
- Erectile Dysfunction
  - 100,000 papers – on Erectile Dysfunction

Ambulance Safety Research: A New Field

Funding??
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##

*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

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

44 feet

Dry
Stopped at
Perception + Reaction time Vehicle Braking time (dry)
176 feet

Wet
Stopped at
220 feet

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

What is actually happening during an ambulance crash

1 - Target vehicle, Type I ambulance
2 - Subj vehicle, Type II ambulance
Closing speed 44 mph

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

NIOSH Ambulance Occupant Safety Crash Testing

Impact Direction
25 MPH!
Balance of concerns and risk during transport

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

2003 a problem...

The Wisconsin EMS Association

Fatal Ambulance Crash Still Under Investigation

Surgeon General Visit Changed
Due to conflicts with the schedule, the visit with Surgeon General Michael H. Crimmins was canceled on Tuesday, September 2, 2003. Ever since then, nothing has been scheduled and the ambulance team has been set up in the same way. A follow-up visit for the August 3rd continues to be negotiated. September 2nd. Check with the CHIA or WIESA and/or their staff.

June 2007

Safety is Good Business

What do ambulance crashes really cost?

- Loss of life and injury
- Negative impact on EMS system
- Collisions are the largest liability cost and exceeds malpractice or negligence
- Besides the direct financial costs of replacing a damaged ambulance and equipment, there are additional hidden costs incurred:
  - investigating the ambulance collision
  - litigation/settlement/lawsuit
  - medical/disability costs of injured EMTs
  - hiring of new employees to replace injured personnel
  - retraining and psychological counseling of personnel involved and others
  - increased insurance rates

2007 a bigger problem

2007 Insurance data –

- 27 fold more likely to have a claim based on transport than related to medical care

June 2007

Safety is Good Business

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  - retraining and psychological counseling of personnel involved and others
  - increased insurance rates
EMS CANNOT afford to keep paying out like this....

So an ambulance is:
- Most lethal vehicle on the road per mile traveled
- >3 times more lethal per vehicle than other vehicles on the road
- Not designed by automotive engineers - nor are design features based on known automotive safety technology or ergonomic science
- NO transportation systems oversight

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

We appear to have a serious transportation systems problem

Ground Ambulance Transport Safety IS Complex AND Multidisciplinary
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

Ambulance Transportation Safety

- Dispatch policy and procedures
- Vehicle Operations Safety
- Vehicle Crashworthiness
- Vehicle Ergonomics
- Clinical care policies
- Scene Safety

Occupational transportation fatalities

- WE HAVE A BIG PROBLEM HERE

Interrelated aspects

- The crash
- The patient condition
- The system status pressures

Crash Data that are routine

- Vehicle
- Time of Day
- Location
- Injuries and Fatalities

Crash Data that are not routine

- Emergency patient care data
- EMS System capacity and impact data
- Human factors data

**The Driver**

- Driver selection
- Driver monitoring and feedback
- Driver Impairment
- Driver training

**EMS Driver issues**

Conclusions: When controlling for call volume and ambulance time, the odds of having an injury as an ambulance occurred within the past year were significantly higher for younger EMSs. Future studies should investigate the effects of various interventions such as enhanced driver mind in emergency response training programs on the driving performance of younger EMSs.

**November 5, 2007**

Speeding, Alcohol Blamed In Fatal Ambulance Crash

*POSTED: 12:49 pm EST November 5, 2007
UPDATE: 2:54 pm EST November 5, 2007*

MARSHALL TOWNSHIP, Pa. — Speeding and alcohol were being blamed for a crash between an ambulance and a car along Route 19 at Brinender Road in Marshall Township on Sept. 23, killing two people and injuring three others.

The driver of the ambulance, Shane LeBoeuf, 32, of Evans City, was charged on Monday with two counts of homicide by vehicle and involuntary manslaughter, driving under the influence and several traffic offenses.

**Impaired Driver**

- Since 2003, medical oversight of commercial truck and bus drivers on NTSB's "most wanted" list
- The NTSB issued eight safety recommendations to crack down on unfit commercial drivers
- FMCSA has begun taking steps to address them
R & D
“Ripoff and Duplicate”

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

Safety concepts out there now
- Fleet Safety Management
  - Z-15
  - Driver monitoring and feedback
- Enhanced ambulance vehicle design
- Intelligent Transport Technologies - ITS
- Visibility and Conspicuity
- New Safety Standards
- Life Safety Initiatives
- Resources and information

September 2007, It’s not magic…..

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
**Z15 Incident Rates**

- Incident rate based on number of vehicles operated:
  
  \[
  \text{Incident rate} = \frac{\text{Number of incidents}}{\text{Number of vehicles}} \times 100
  \]

- Incident rate based on vehicle mileage:
  
  \[
  \text{Incident rate} = \frac{\text{Number of incidents}}{\text{Vehicle mileage}} \times 1,000,000
  \]

- Injury incident rate based on vehicle mileage:
  
  \[
  \text{Injury incident rate} = \frac{\text{Number of incidents with injury}}{\text{Vehicle mileage}} \times 1,000,000
  \]

- Incident rates based on service activity:
  
  Motor vehicle operations that pose injury risks other than those associated with driving should also use the service activity as the basis of a safety performance rate. The number of deliveries, stops, or loads should be considered as appropriate indicators of performance.

  \[
  \text{Incidents per 10,000 transports} = \frac{\text{Number of incidents}}{10,000} \times 10,000
  \]

- Vehicle injury rates based on work hours:
  
  \[
  \text{Vehicle incidents per 200,000 hours} = \frac{\text{Number of incidents}}{200,000} \times 200,000
  \]

**What about changing driver behavior in the real world??**

**AN OPTIMAL SOLUTION FOR ENHANCING AMBULANCE SAFETY: IMPLEMENTING A DRIVER PERFORMANCE FEEDBACK AND MONITORING DEVICE IN GROUND EMERGENCY MEDICAL SERVICE VEHICLES**

Nadine R. Levick MD, MPH
Maimonides Medical Center

**REAL WORLD APPLICATION OF AN AFTERMARKET DRIVER HUMAN FACTORS REAL-TIM REAL-BEFORE MONITORING AND FEEDBACK DEVICE: AN EMERGENCY SERVICE PERSPECTIVE**

Nadine Levick
Maimonides Medical Center

**Purpose of ‘Feedback box’ Program**

- Enhance Safety
- Improve Driver Performance
- Save Maintenance Dollars
- Aid Accident / Incident Investigation

**Demonstrated Effectiveness**

- Change driver behavior
- Carrot not stick
- Vehicle maintenance improvement
- Decreased administrative burden
- Insurance benefits

**Visibility and lighting issues**
Warning Light Glare

Disability glare
▶ A bright light source in the visual field reduces the ability to see objects
  ◦ (windscreen, rain & spectacles)

Discomfort glare
▶ Irritating or painful glare that may cause drivers to avert their gaze
  ◦ (headlights in the mirror or rear-facing red fog-light)

Policy and practice ignorant of existing technical safety data

Color-blindness affects 10% of the population
▶ As seen with normal vision
▶ As seen with color blind vision

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

No uniform standards....
Emergency Vehicles – Viewer Awareness

For a timely, appropriate and safe response

- Location
- Size
- Shape
- Speed
- Intended path

from John Killeen at www.ambulancevisibility.com

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

State Strategic Highway Safety Plans

- Required as part of the SAFETEA-LU legislation
  - (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users)
- Effective October 1st 2007
- Focus is the 4 'E’s
  - Engineering
  - Education
  - Enforcement
  - Emergency Medical Services
- EMS is a core theme

State SHSP EMS Focus*

<table>
<thead>
<tr>
<th>STATE SHSP</th>
<th>AREA OF EMS FOCUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>EMS Section 6 of 43 pages</td>
</tr>
<tr>
<td>- Establish EMS Legislation and Regulation</td>
<td></td>
</tr>
<tr>
<td>- Provide EMS Funding</td>
<td></td>
</tr>
<tr>
<td>- Enhance Capabilities for Medical Response to Disaster</td>
<td></td>
</tr>
<tr>
<td>- Expand EMS Human Resources</td>
<td></td>
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<tr>
<td>- Enhance EMS Education System</td>
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<td>- Expand EMS Services</td>
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<td>- Facilitate EMS Communications</td>
<td></td>
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<tr>
<td>- Conduct EMS Public Education and Information Programs</td>
<td></td>
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<tr>
<td>- Conduct Injury Prevention Public Awareness Efforts</td>
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<tr>
<td>- Enhance Medical Direction</td>
<td></td>
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<tr>
<td>- Provide Enhanced Trauma System and Facilities</td>
<td></td>
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<tr>
<td>- Establish an EMS Information System</td>
<td></td>
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<tr>
<td>- Evaluate and Monitor EMS Programs</td>
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</table>

| Content | EMS Section 4 of 38 pages |
|-------------------|
| - Identify and Analyze Performance Data |
| - Identify Crash Location |
| - Statewide assessment and Plan |
| - Improve EMS Rural Access |

Integration and Collaboration


- **EMERGENCY MEDICAL SERVICES DISPATCH SERVICES**
  - Increase the participation and role of Regional EMS Councils in local and regional highway traffic safety boards and/or organizations

- **EMERGENCY MEDICAL SERVICES PARTNERSHIPS**
  - Train EMS providers in the use of the new medical protocols; provide funds and/or other support to certified EMS Course Sponsors to train EMS providers in the use of these protocols; and collaborate with Regional EMS Councils and Regional Emergency Medical Advisory Committees (REMAC) on the development and implementation of training programs

- **PRE-HOSPITAL TRAINING PROGRAMS**
  - Increase the participation and role of Regional EMS Councils in local and regional highway traffic safety boards and/or organizations

- **ROAD CONDITION AND INCIDENT RESPONSE**
  - Provide a placeholder for regional and/or county EMS representatives in municipal DOT emergency management plan development and implementation


- **EMS RESPONDER CRASH PREVENTION**
  - Undertake a systematic review of other state actions and protocols on ambulance traffic safety measures to identify and prioritize those appropriate for the New York State pre-hospital system
  - Increase education and involvement of EMS providers in principles of appropriate traffic safety techniques
  - Develop and implement ambulance traffic safety protocols at state, regional and service level
  - Review treatment modalities and protocols to identify those that may contribute to injuries resulting from the impact of ambulance crashes
  - Identify methods to provide incentives for adoption by EMS services of protocols that enhance traffic safety
  - Partner with organizations that provide public driver awareness and education campaigns to improve driver awareness of driver responsibility and appropriate response to approaching emergency vehicles

Worker visibility Act: Help is on the way!! November 24th 2008

No need to reinvent the wheel...

March 2007 - FHWA

Tips for Emergency Vehicle Operations
USFA Emergency Vehicle Safety Initiative

Traffic Incident Management Systems (TIMS)

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

UPS: The ‘Big Brown’

- No left turns – instead make three rights
- Don’t back up
- Don’t employ any drivers under 25 years of age
- Don’t employ anyone with a history of driving convictions

IAFC June 2007

- The Effects of Sleep Deprivation on Fire Fighters and EMS Responders
- Final Report, June 2007

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

The Good News

- TRB
- New multidisciplinary safety initiatives
- ATS - EMS Transport Safety Summit
Discussion:

- The mix of volunteer and career providers is raised as an explanation for this situation - however such lack of safety data and standards does not occur for the fire dept which has a similar challenges.
- FMCSA data capture system provides extensive data on both numerator and denominator aspects of truck safety –
  - EMS is exempt along with other emergency services, however police and fire have comprehensive alternate data bases to capture this data.
- Vehicle, vehicle operations and transportation safety standards do not exist for EMS
  - Standards for vehicle operations, occupant protection and for securing equipment, patient and equipment handling loads do not exist in EMS.

Summary:

- Transport systems engineering and human factors safety hazards are serious issues in EMS transport injury and fatality
- Both are devoid of acceptable safety standards, and minimally addressed by any meaningful data
- Lack of a national oversight of EMS transport safety data and safety standards, as exists for fire, police and commercial vehicles.
- Data driven best practices scarce – yet resources for transportation data capture abound.

We need to take a good look at what data we do and don’t capture on EMS transport and determine what we should be capturing so that we can measure and monitor the safety of the system and any system enhancements.
Thank you!
Any Questions??
a .pdf handout of this presentation awaits you online
www.objectivesafety.net