

MMTS Seminar, NYC, July 17th, 2007  
AAA Meeting, Hilton, New York

## AMBULANCE SAFETY

So what's new...?



Nadine Levick, MD MPH  
CEO, Research Director  
EMS Safety Foundation  
Objective Safety LLC

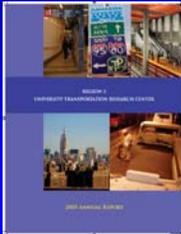
### What's new

- ▶ New expertise and collaborations
- ▶ New automotive and safety technologies
- ▶ New Information
- ▶ New events

### New expertise and collaborations

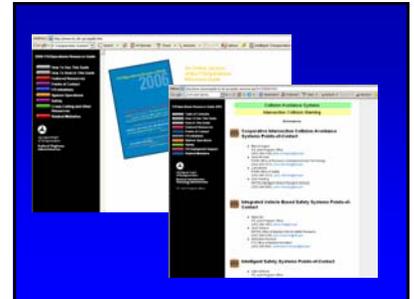
- ▶ TRB
- ▶ ASSE
- ▶ OSHA
- ▶ SAE
- ▶ UTRC
- ▶ Ergonomics
- ▶ Industrial Design

### Regional University Transportation Research Centers



### New automotive and safety technologies

- ▶ crashworthiness
- ▶ EVS
- ▶ ITS
- ▶ Monitoring and feedback enhancements



### New Information

- ▶ ESV
- ▶ ASSE
- ▶ OSHA best practices
- ▶ KKK-F Public Comments
- ▶ Worker visibility Act
- ▶ SAFET-LU
- ▶ State Strategic Highway Safety Plans
- ▶ State EMS Council Policies

### New Events

- ▶ OSHA best practices panel 06-07
- ▶ ASSE PDC, June 06 & 07
- ▶ TRB EMS Transport Safety, 07 & 08
- ▶ EMS Today 'panel', 07
- ▶ KKK-F Auto safety Public Comments
- ▶ State EMS Council, Safety subcommittees
- ▶ Safety Summit? 08

### EMS Today.. 'expert panel'

#### AMBULANCE SAFETY FIRST

Experts convene to discuss

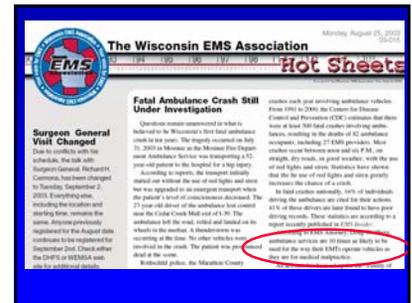
ambulance & patient safety issues

suggested looking to other related industries for the answer to safety issues. "We are grappling with issues that the automotive industry has already studied, has data [on], and knows only too well," said audience member Nadine Levick, MD, MPH, executive director of Objective Safety LLC.

Levick noted that ambulances are designed outside of the automotive industry and not tested for crashworthiness, "making them more than twice as lethal as large trucks." She was especially concerned about the seating arrangements inside the ambulance. "There's no justification for a sideways-facing seat in a forward-moving vehicle," she said.

## 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



## A problem

- 2007 Insurance data –
- ▶ **27** fold more likely to have a claim based on transport than related to medical care

## Is it your services tragic year?

- ▶ ~ 50 fatalities a year
- ▶ 15,000 EMS services
- ▶ Each year one in 300 services experiences a fatality

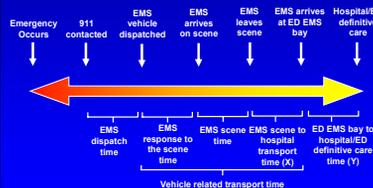
## Key Elements to Safety

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

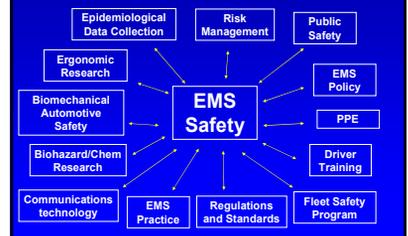
## What are the solutions?

- ▶ Training?
- ▶ Practice Policy?
- ▶ Transportation Systems Engineering?
- ▶ Automotive Engineering?
- ▶ Education of other road users???

## 911 Call to Hospital/ED Definitive Care Time Intervals\*



## EMS Transport Safety IS Complex AND Multidisciplinary

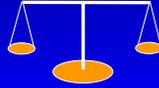


## What's missing

1. What data is collected nationally?
  - We have no denominator data
  - We have incomplete numerator data
2. Absent population based national injury data or injury mechanics data
3. Absent structured transportation safety engineering input
 

1 + 2 + 3 = resultant inability to design and evaluate efficacy of injury interventions
4. What oversight is there?
5. Which organizations would determine policy?

## Balance of concerns and risk during transport



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

## An excellent model

<http://www.EveryoneGoesHome.com>

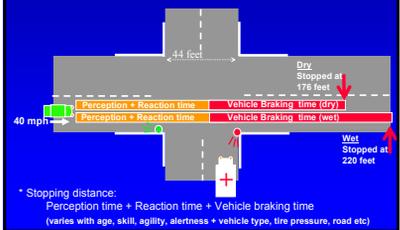
## Transport related aspects of EMS

- ▶ dispatch of EMS vehicles
- ▶ transport policies and protocols
- ▶ vehicle fleets and vehicle design
- ▶ vehicle purchase standards
- ▶ Intelligent Transportation Systems technology
- ▶ driver training
- ▶ training simulation
- ▶ driver performance monitoring
- ▶ roadside and road design
- ▶ integrated traffic safety technologies
- ▶ scene safety and visibility
- ▶ safety data capture
- ▶ safety oversight

## 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



## A peer reviewed tragedy

- ▶ Persistent disconnect between automotive safety science and EMS transport safety approach
- ▶ Pre-hospital and Emergency Care 2004
  - "EMS vehicle drivers are advised to approach the intersection, slowing to ensure that traffic has stopped and making eye contact with other drivers before entering the intersection."
- ▶ In the modern era of road safety to suggest that a strategy of "eye contact" to be made at an intersection with a driver travelling at ~ 40mph in the hope that this would result in a safety intervention, is at best frightening

## NAEMT July 2006 Position statement



## Policy makes a difference...



## Patients must be in the over the shoulder harness, medics restrained in seat belts, equipment secured



## A very serious gap in data, performance and oversight

- ▶ FMCSA Truck safety goals – to decrease the fatality rate of 2.8 per 100 million truck-miles in 1996 to 1.65 by 2008
- ▶ EMS crash fatality rate estimates are – 7.66 - 41.93 fatalities per 100 million ambulance-miles

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

## Thursday July 5<sup>th</sup> 2007.....

**NEWS CENTER**

**Paramedic Killed in Turner Ambulance Crash**

By: [John J. Harty](#) / [Reporting Editor](#)  
 Posted: [Thursday, July 5, 2007](#)

TURNER (NEWS CENTER) — The Med-Care paramedic was killed when the ambulance rolled over on its side on the road at about 1:30 p.m. Thursday.

The Anchorage Local Health Department says the Med-Care ambulance rolled over on its side on the road at about 1:30 p.m. Thursday. The paramedic who was killed was identified as 40-year-old Michael P. Harty.

Several patients in the ambulance were injured, but none were seriously injured, according to the Anchorage Police Department.



Posted By: [mad at July 5, 2007 4:08 PM](#) (Suggest Removal)  
 to all the people worried about how fast the emt was going. would it be fast enough if it was your loved one in there.....

[Add your comments](#)

Posted By: [Concerned at July 5, 2007 4:49 PM](#) (Suggest Removal)  
 To mad: It would be too fast if they ran over my family member on their way to another's family member...

[Add your comments](#)

Posted By: [Concerned at July 5, 2007 4:58 PM](#) (Suggest Removal)  
 To X responder: Why can't I second guess this? A man is dead and I want to know if the actions and situation surrounding this were worth this sort of loss. And I'd like to know what can be done so that this never happens again.

▶ "Ambulance transport has a death toll...."

Carl Craigie EMT-P, Chief Platte Valley Ambulance  
 Colorado Springs, April 2007

**Anchorage Daily News**

Search in:

**Paramedic injured in crash is recovering**

By: [John J. Harty](#) / [Reporting Editor](#)  
 Published: [December 26, 2006](#)  
 1:45 PM Alaska Time (UTC -9) 0100 at 03:07 AM

An Anchorage Fire Department ambulance rushing a patient to the hospital was struck by a Dodge pickup this morning, injuring three paramedics, according to the Anchorage Police Department.

The Dodge broadsided the ambulance, which had lights flashing and sirens on, hitting it in the back around 8 a.m. as the medic vehicle was crossing the Glenn Highway at Airport Heights Drive.

Onboard the ambulance were seriously injured patient Antonio Martinez, 70, who, Carl Matlock, and four Anchorage Fire Department personnel: driver Eric Tuess, 21, SMT Jeff Walker, 40, and paramedics Dave Williams, 43, and Tara Bruggler, 26.

Bruggler, who was riding with Martinez in the back of the rig, was hospitalized with a head injury and is in stable but guarded condition. Walker and Williams were treated for minor injuries and released. Williams took off the driver of the pickup, and



### The 'accident' scenario...

- ▶ There were three personnel in the back of the ambulance plus the patient.
- ▶ The patient being treated had a self inflicted laceration with an arterial bleed to an upper extremity.
- ▶ The ambulance was traveling lights and sirens and moving slowly through an intersection when they were involved in a T-bone collision.
- ▶ They were struck on the passenger side of the vehicle near the rear of the box.

### At the time of the 'accident'...

- ▶ The paramedic with the serious head injury was seated and un-restrained on the bench seat over the rear wheel well on the impact side of the vehicle.
- ▶ At the time of impact, the paramedic with the head injury had just finished starting an IV and he was discarding his needle in a wall mounted sharps container.
- ▶ A second Paramedic was standing at the head of the patient involved in an unknown activity. An EMT was standing near the front of the bench seat, holding direct pressure and elevating the patients arm upright.

### The tip of the iceberg of the 'accident' outcome..

- ▶ The second paramedic and the EMT received minor soft tissue injuries only.
- ▶ The paramedic with the head injury was intubated for a short time and then extubated later that same evening.
- ▶ He is back to work after a couple of months off the job. He is not working as a paramedic yet, but he is back on the line as a chiefs aid until his doctor gives him permission to return to active duty status. He has been dealing with memory problems and the need to sleep for longer hours than normal.

### Bigger is not necessarily better.....



### Occupant protection.....??



### USA ambulance purchase specifications GSA:KKK-A-1822E, 2002

- ▶ Static Pull test
- ▶ 2200 Lbs. (8G's) in Longitudinal and Lateral
- ▶ No dynamic test
- ▶ No definition to manikin mass
- ▶ No restraint for equipment
- ▶ Voluntary



### KKK – static 'safety testing'

- ▶ Ignorant of automotive safety principles – and specifics -
  - ▶ 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.

### Unacceptable current 2007 USA ambulance 'safety testing' practices !!??

**AMBULANCE TEST RECORD BROKEN**

36,000 lbs	55,000 lbs on ROOF	55,000 lbs on SIDE
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**THAT WAS THEN**      **THIS IS NOW...**

In 2000, shattered industry records by testing and certifying the modular body to more than double the 150% curb weight Federal Standard. In addition, they performed a body side 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 a 500% curb weight level! **\*MORE INFO**

**INDUSTRY LEADING SAFETY INNOVATION**

▶ **F = ma**

where F – force  
m – mass  
a – acceleration



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



Major events for innovation sharing – but regional and often language isolation



Vehicle Occupant Safety design

2007 European design  
Safety technology is a key focus



Ergonomic design



Securing equipment



Ergonomic layout and equipment



## Policy Changes

**Safety leadership... from the IAFIC and USFA**



4035 Fox Ridge Drive, Fairfax, VA 22033 | Tel: 703.273.0811 | Fax: 703.273.4300

**IAFIC NEWS ALERT FOR IMMEDIATE RELEASE**  
 Contact: IAFIC Communications Department  
 International Association of Fire Chiefs  
 703.273-0911  
[www.iafic.org](http://www.iafic.org)

**The IAFIC and the USFA Develop Model Policy and Procedures Guide for Emergency Vehicle Safety**

**Fairfax, Va., October 20, 2006**—The International Association of Fire Chiefs (IAFIC) and the Department of Homeland Security's United States Fire Administration (USFA) announce the release of a Guide to Model Policies and Procedures for Emergency Vehicle Safety. This innovative, web-based educational program is aimed at reducing the impact of vehicle-related incidents on the fire service and the communities they protect. The guide provides in-depth information for developing policies and procedures required to support the safe and effective operation of all fire and emergency vehicles, as well as privately-owned vehicles, which are the leading cause of volunteer firefighter on-duty fatalities responding and returning to emergencies.

**CPR?**



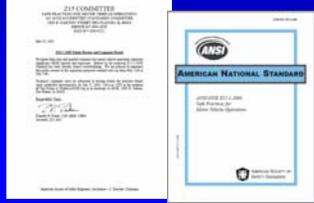
The weight on you don't have to be heavy.

**EMSNetwork**

www.EMSNetwork.org

The onset of the advanced knowledge, training and skills drastically reduced the necessity for the ambulance to "race" back to the hospital. Highly skilled care can now be rendered immediately upon the crews' arrival at the patients' side and remain uninterrupted until arrival at the emergency department. The days of needing to travel 60-100 mph to "save" the patient are now gone, at least it should be. Studies time and time again confirm that CPR is best performed in the ambulance at speeds of 25 mph or less. While we are on the issue of CPR, statistics have shown that survival rates (patient walks out of the hospital) for "out of hospital" CPR is less than 2%. There are very, very few instances now when CPR should be performed in a speeding ambulance. Prolonged CPR in an ambulance is CONTRAINDICATED (should NOT be performed), due to the risks involved for the crew. An older, very wise ER doctor once told me, "Tom, dead is dead", and I can't argue that point.

**American National Standard ANSI/ASSE Z15.1-2006**  
**Safe Practices for Fleet Motor Vehicle Operations**



**What Z15 encompasses**

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

**Z15 Incident Rates**

- ▶ Incident rate based on number of vehicles operated:  
 $\text{Incident rate} = \frac{\text{Number of incidents} \times 100}{\text{Number of vehicles}}$
- ▶ Incident rate based on vehicle mileage:  
 $\text{Incident rate} = \frac{\text{Number of incidents} \times 1,000,000}{\text{Vehicle mileage}}$
- ▶ Injury incident rate based on vehicle mileage:  
 • Injury incident rates, the most frequently used indicator of incident severity, are useful for tracking events that have the potential to affect technical or operational performance of the operating unit.  
 $\text{Injury incident rate} = \frac{\text{Number of incidents with injury} \times 1,000,000}{\text{Vehicle mileage}}$
- ▶ 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.  
 $\text{Incidents per 10,000 transports} = \frac{\text{Number of incidents} \times 10,000}{\text{Number of transports}}$
- ▶ Vehicle injury rates based on work hours:  
 $\text{Vehicle incidents per 200,000 hours} = \frac{\text{Number of incidents} \times 200,000}{\text{Number of hours worked}}$

**Legal Perspectives on Z.15**

**ANSI Z15.1 Standard: A Tool for Preventing Motor Vehicle Injuries and Minimizing Legal Liability**  
 By **Adelle L. Abrams, Esq., CMAA**  
 Law Office of Adelle L. Abrams P.C.

Motor vehicle crashes that occur on American roadways have historically been the leading cause of occupational fatalities in this country. In the decade between 1992 and 2001, more than 13,000 civilian workers died in such incidents – accounting for 22 percent of all injury-related deaths. According to the Occupational Safety and Health Administration (OSHA), every 12 minutes someone dies in a motor vehicle crash, every 10 seconds an injury occurs and every 5 seconds a crash occurs.<sup>1</sup>

Employers whose workers are involved in such crashes have tremendous liability exposure, especially if the individuals injured or killed are third parties (non-employees), where no worker's compensation liability shield exists as an exclusive legal remedy. They bear not only the worker's compensation costs for their employees, and the potential damage awards from third party tort claims, but also the costs of equipment replacement and the indirect costs of workforce disruption and lost productivity associated with such incidents.

**EMS Specific Z.15.....**



<http://www.objectivesafety.net/TransActions%20Z15.pdf>

**State Strategic Highway Safety Plans**

## Integration and Collaboration



## Integration and Collaboration

EMS Transport Safety Strategies - 2006-2007 New York State Strategic Highway Safety Plan



## New York State Strategic Highway Safety Plan 2006-2007

### VISION

New York's safety community will continue to work to ensure that its customers – those who live, work and travel in New York State – have a safe, efficient, balanced and environmentally sound transportation system, and that safety is appropriately considered in all education, enforcement, engineering and emergency medical services activities in New York State in order to reduce fatal and injury crashes.

### GOALS

- Reduce motor vehicle fatalities from 1,410 in 2005 to 1,285 in 2011
- Reduce the Fatal Crash Rate/100 Million VMT from 1.00 in 2004 to .90 in 2011

## EMS Transport Safety Strategies - 2006-2007 New York State Strategic Highway Safety Plan

- 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
- PRE-HOSPITAL TRAINING PROGRAMS
  - 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/or Regional Emergency Medical Advisory Committees (REMAC) on the development and implementation of training programs
- 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 Transport Safety Strategies - 2006-2007 New York State Strategic Highway Safety Plan

- 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

## EMS Best Practice, Sept 2006

## News we don't want to see

Jan 22, 2007 8:09 am US/Eastern

### Caught On Video: EMT Struck By Car

Low Young Reporting

(CBS) BROOK The car hit 46-year-old Capt. Steven Quindongo so silently it smashed the vehicle's windshield and sent him flying through the air.

Quindongo, a 17-year veteran of the city's emergency medical services, was on the scene of a fire on Riverside Avenue in the Bronx Sunday afternoon when a civilian car moved past police barricades and caught him from behind. Chief Wayne McPartland was on the scene as the damaged health food store where his men had successfully put out the flames.

"We had two firefighter minor injuries," he told us, "and they were taking care of our man and when he (Quindongo) was walking back to the ambulance he was struck by the civilian vehicle."

## .....May 21st, 2007, Seattle

KOMOTV.COM

### EMT seriously injured in crash on I-5



Seattle - An emergency medical technician was seriously injured early Sunday morning after he was struck by a pickup truck on Interstate 5.

The crash took place in an area of 18 mi. north of Allyn, where an ambulance was on I-5 South near Boeing Field. David Marston, who was driving the ambulance, pulled over to the right shoulder and got out to see if there was a problem.

A pickup truck came along and crashed into Marston, then crashed into the ambulance. The impact pushed the ambulance forward another 5 feet, nearly

## .....May 25th 2007?

Original Message  
Subject: Feasibility for an EMS Workforce Safety and Health Surveillance System - information from NHTSA's Office of EMS  
Date: Fri, 25 May 2007 14:42:14 AM  
From: Dave.Zimmer@dot.gov

Dear EMS Professionals,

The National Highway Traffic Safety Administration (NHTSA), Office of Emergency Medical Services (EMS) is pleased to announce publication of a feasibility study for an EMS Workforce Safety and Health Surveillance System. This is the first of a study funded by NHTSA's Office of Emergency Medical Services (EMS) and conducted in collaboration with state and national EMS stakeholder organizations. This report discusses the study and possible solutions to reducing national occupational injuries of EMS workers across and districts.

This feasibility study serves as a valuable supplement to ongoing national EMS workforce research. NHTSA continues to explore ways of enhancing the safety of EMS workers. NHTSA, and the Health Resources and Services Administration (HRSA) EMS for the 21st Century program are collaborating with the national EMS community on the EMS Workforce for the 21st Century project, managed by the University of California San Francisco (UCSF).

### Feasibility for an EMS Workforce Safety and Health Surveillance System



Help is on the way ???  
November 24<sup>th</sup> 2008



This looks cool AND SAFE!



Not rocket science..



New EMS helmet prototypes for  
2006-2007



Problems

- ▶ No Standards
- ▶ Unique safety and hazard protection needs
- ▶ A number of less than appropriate devices out there

EMS has unique head protection needs – not well met by a 'truncated' fire helmet...



Hmm...



So why is it...

- ▶ That the EMS providers -
  - Were wearing navy blue – one of the most difficult colors to see at night
  - Had no head protection, when all other emergency personnel at the scene did
  - Had no protective clothing, when other emergency personnel at the scene did???

It isn't like this outside of the USA



## Safety at the scene



## eg: Scandinavia Innovation in Vehicles, and Equipment



## Knowledge Transfer?



### Active Projects

(all due early 2007)

- ▶ Commercial Motor Vehicle Driver Training Curricula and Delivery Methods and Their Effectiveness
- ▶ Commercial Motor Vehicle Carrier Safety Management Certification
- ▶ The Role of Safety Culture in Preventing Commercial Vehicle Crashes
- ▶ The Impact of Behavior-Based Safety Techniques on Commercial Motor Vehicle Drivers
- ▶ Health and Wellness Programs for Commercial Motor Vehicle Drivers

## The truck and bus industry is on the right track.... Where is EMS???



## What about FMCSA's Mission

- ▶ Office of Research and Analysis is committed to reducing the large truck-related fatality rate from 2.8 per 100 million truck-miles in 1996 to 1.65 by 2008.

### Mission

- ▶ The mission of FMCSA's Office of Research and Analysis is to reduce the number and severity of commercial motor vehicle (CMV) crashes and enhance the efficiency of CMV operations by:
  - Conducting systematic studies directed toward fuller scientific discovery, knowledge, or understanding
  - Adopting, testing, and deploying innovative driver, carrier, vehicle, and roadside best practices and technologies
  - By expanding the knowledge and portfolio of deployable technology, the research and technology program will help FMCSA reduce crashes, injuries, and fatalities and will deliver a program that contributes to a safe and secure commercial transportation system.

## What type of passenger carrier do you need ?



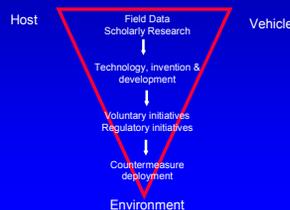
Federal Motor Carrier Safety Administration

Home | Data & Research | Regulations & Compliance | Training | Safety & Awareness | Events & News | About FMCSA

Home > Data & Research > Research and Technology Forum - January 9, 2005

Overview	Description	Speakers	Downloadable File	Related Links
Chairing Remarks		Walter	PPT	PDF
Keynote Speaker		David Daniels	PPT	PDF
5 Year Strategic Plan Overview		Doug McKinley	PPT	PDF
Research Accomplishments		Mark Walker	PPT	PDF
Technology Accomplishments		Doug McKinley	PPT	PDF
Large Truck Crash Causation Study		Alisa Cook	PPT	PDF
Study				
Outboard Vehicle Recording		Danaher Freund	PPT	PDF
Conference				
Technical Safety and Security Operational Tool		Joe DeLorenzo	PPT	PDF
Vehicle Infrastructure		Tom Johnson	PPT	PDF
Management				
Site Visit of Michigan Management Technologies		David Singer	PPT	PDF

## Automotive Injury Triangle and Safety Development



## Protective devices/concepts

### To prevent a crash

- ▶ Driver feedback
- ▶ Driver monitoring
- ▶ Driver training
- ▶ Vehicle Intelligent Transportation System (ITS) technologies
- ▶ Tiers dispatch
- ▶ Appropriate policies

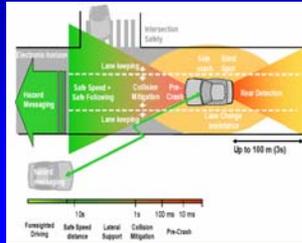
### In the event of a crash

- ▶ Vehicle crashworthiness
- ▶ Seat/seat belt systems
- ▶ Equipment lock downs
- ▶ Padding
- ▶ Head protection

## Tiered Dispatch



## Intelligent Transport Safety Systems



## Back up Camera..... Shouldn't all vehicles have one of these?

VRBCS300 - Backup Camera

**Backup Camera**

- Complete with all accessories. Nothing else to buy
- 110° Horizontal Camera Viewing Angle
- 80° Vertical Camera Viewing Angle
- Monitor Mounts on Dash or Visor
- For Use With 12 Volt DC Electrical Systems
- Great for Cars, SUVs, RVs and Delivery Vehicles!
- Helps Avoid Accidents & Injuries!

English product manual  
FAQs - English

## The "Black Box"

Driver behavior monitoring and feedback device

How to modify the risk-taking behavior of emergency medical services drivers?

How to modify the risk-taking behavior of emergency medical services drivers?

Dr. Steven K. Green, MD, GCU, PhD, Nashville, TN, August 19th

Research conducted that for several years only a small amount of time is spent by EMTs and an aggressive style of driving. Furthermore, we are convinced that a "black box" is a good tool to modify the risk-taking behavior of emergency medical services drivers.

High-velocity emergency medical services vehicles have an increased collision rate. We report on two studies designed to modify the risk-taking behavior of emergency medical services drivers.

## The "Black Box" - A transportation safety monitoring and feedback device

This technology is conceptually like a vehicle safety 'pulse oximeter' - that with auditory feedback - can save your life, your coworkers life, your patients life, and others on the road

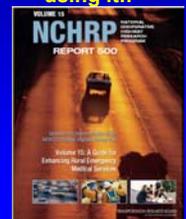


## Purpose of 'Black box' Program

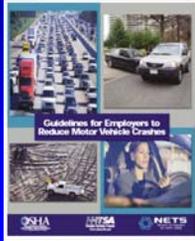
- ▶ Enhance Safety
- ▶ Improve Driver Performance
- ▶ Save Maintenance Dollars
- ▶ Aid Accident / Incident Investigation

## Tips for Emergency Vehicle Operations

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



## No need to reinvent the wheel...



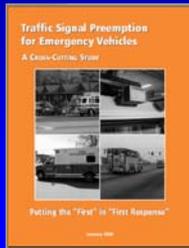
## USFA Emergency Vehicle Safety Initiative



## March 2007 - FHWA



## Data, but is it generalizable



## Healthcare Safety

- ▶ Importance of safety as an organizational value
- ▶ Proactive approaches to safety management and leadership
- ▶ Prevention of accidents, injuries
- ▶ Presents authoritative data from OSHA, EPA, NFPA, NRC, and JCAHO
- ▶ ? EMS Transport Safety? – Not a mention



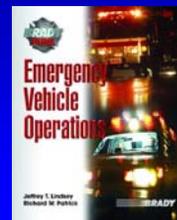
## Sit Down for EMS Safety!



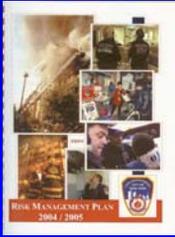
## VFIS Summer 2006



## Where is transport research ?



## FDNY a leader in safety



## Ambulance Driver Safety - Australia



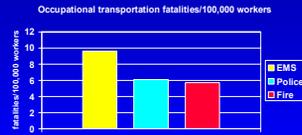
## Fleet Driver Training..



## Dynamics of Fleet Safety - NSC



## Occupational transportation fatalities..



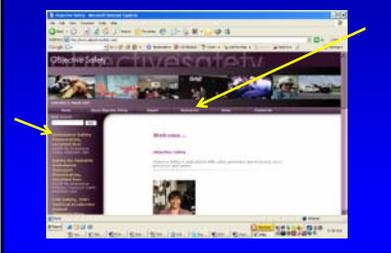
▶ WE HAVE A BIG PROBLEM HERE

\* Maguire, Hunting, Smith & Levick, Occupational Fatalities in Emergency Medical Services: A Hidden Crisis, Annals of Emergency Medicine, Dec. 2002

## A few weeks ago....

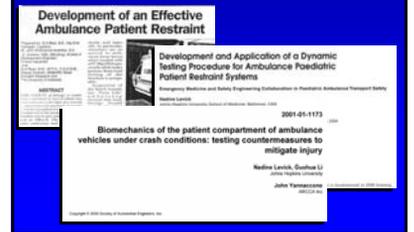


<http://www.objectivesafety.net>



## Ambulance Safety Research: A New Field

## We should use the best safety practices demonstrated in engineering





### The squad bench??



Richardson S.A., et al. *Int. J. of Crash.*, 4:3, 239 – 259, 1999  
and those rock climbing harnesses??

### The squad bench...?



### 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 for sidefacing occupants are potentially lethal – and is in **NO WAY SUPPORTED BY ANY DATA OR AUTOMOTIVE SAFETY EXPERTISE**

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



### Key Testing issues..

- ▶ In both the military and the automotive industry being **ambulant** in a moving ground vehicle or crash, in any device, is a dangerous practice and is not supported
- ▶ Use of current 'seated' crash dummies to demonstrate that such ambulatory devices may be safe is a fallacy, and misleading

### Were we safer in the Cadillac???



### Current fleet

- ▶ Secure all equipment
- ▶ Secure occupants
- ▶ Don't drive through red lights
- ▶ Use properly implemented "Black Boxes"
- ▶ Monitor crash events with common denominators (ie. per 100,000 miles and per trip)
- ▶ Have a written and implemented 'safety program'

### Future

- ▶ Vehicle design
- ▶ PPE
- ▶ Practice policy
- ▶ Data/Monitoring/Oversight

## Current and Future Research

- ▶ Epidemiology
- ▶ Ergonomic hazards
- ▶ PPE & Head protection  
(Bio/Chem/Radiation hazard)
- ▶ Transport
  - Vehicle/Occupant automotive testing
  - Vehicle design innovation
  - Driver behavior (Real time and Simulated)
  - Intelligent Transportation Systems
- ▶ Operations tracking
- ▶ Data systems/reporting systems
- ▶ Enhanced Practice policies evaluation

## Conclusion

- ▶ New Infrastructure
- ▶ New information
- ▶ New collaborations
- ▶ New events
- ▶ Innovation in safety technologies, strategies and policy
- ▶ Knowledge transfer
- ▶ Unacceptable mythology
- ▶ Challenges to advancing EMS transport safety

## And....

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