


WakeMed Trauma Symposium,  
September, 17th 2009

## The Ride of Your Life: Ambulance Transport Safety – The State of the Art



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CEO, Objective Safety  
New York, USA

### Outline

- I. Review of data on ambulance crashes and safety standards and guidelines that exist for the ground EMS
- II. Identification of ground EMS transport safety issues, hazards and areas of risk to patients, providers and public
- III. Highlight unacceptable mythology and challenges to advancing EMS transport safety
- IV. Profile innovation, new safety technologies and strategies and knowledge transfer to enhance safety and reduce risks of ground EMS and patient transport

### 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?

### 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?

Your Interactive Handout awaits you online at...

- ▶ [www.objectivesafety.net](http://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>



Firstly!

▶ ~~An accident ?~~

▶ or  
a predictable and preventable event

### A tragic emergency health care intervention outcome



Rollover Crash Kills Medical Technician  
Inhabitant from 174th and 18th Street, San Francisco and a Patient

It does happen....

### A devastating tragedy...

- ▶ An ETT down the wrong hole may kill your patient and be a terrible burden for the pts family and for the medic involved
- ▶ BUT an EMS crash can kill all involved AND wipe out an EMS systems 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

## In a nutshell

- ▶ Am here to try to save you  
Lives  
Time and  
Money

## 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



## October 2008 JEMS Article "Rig Safety – 911"



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

## USA EMS data

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 35x higher than in Australia

\*FARS QTS 2006-6

## Is it your service's tragic year?

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

## Creating a Safety Culture

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

- ▶ Awareness
- ▶ Training
- ▶ Incentive

## Safety - Why now?

- ▶ Operating optimally in a transportation environment that is largely devoid of specific safety standards for the hazards and risks present
- ▶ Bridge the gap between what technical information exists and what is accessible and applied to EMS

## 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



## A survivable impact??



## Impact and energy transfer – its all about time - $E = \frac{1}{2} mv^2$

- ▶ Duration of a vehicle crash impact is 60-80 milliseconds – the duration of a blink



## Thursday July 5<sup>th</sup> 2007..... Paramedic Allan Parson's killed

### NEWS CENTER

#### Paramedic Killed in Turner Ambulance Crash

The U.S. Coast Guard's Marine Corps Unit, Station 16007, is the lead agency for the investigation of the crash.

The ambulance struck the 10-year-old female child of the driver and the driver of the car. The driver of the car was killed and the child was seriously injured.

The paramedic who died has been identified as Allan Parson, 40, of Turner.

A coroner's inquest is scheduled for about the time the crash occurred.

Some photos by request to the Coast Guard's Marine Corps Unit, Station 16007, are available at the following URL: <http://www.uscg.mil/16007/16007.htm>



## "...I'd like to know what can be done so this never happens again..."

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

| Add your comments

Posted By [Bryan](#) at July 5, 2007 4:46 PM (Suggest Removal)  
In mad: it would have been fast if they ran over my family member on their way to another family member...

| Add your comments

Posted By [Bryan](#) at July 5, 2007 4:58 PM (Suggest Removal)  
In X: no rules: Why isn't it a rule to have the 7 A.M. P.M. and I want to know if the adults 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.

## 2 weeks later... Friday July 20<sup>th</sup> 2007 The worst ambulance crash in USA history

### Five Killed in Crash of Ambulance and Semi

July 21, 2007 08:20 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. Troopers say the ambulance was broadsided by a semitrailer in Crane Township, about 85 miles southwest of Toledo.


The ambulance, with four Antwerp Emergency Medical Services workers aboard, was taking two victims from an earlier car crash to a hospital. Troopers say it was broadsided by a tractor-trailer at the intersection of County Road 176 and County Road 87. The ambulance then burst into flames.

The Highway Patrol says three EMS workers were killed. They were identified as 44-year-old Sunny Smith, 31-year-old Heidi McDougall and 25-year-old Kelly Rager. The two patients were also dead. They were identified as one-year-old Robert Wally, 60-year-old Arnelita Wells of Heidelberg.

Another emergency medical technician, Matt McDougall, and the truck driver, Gerald Chapman, 31, 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 fatal intersection nor have they said if the ambulance's emergency siren and lights were turned on.

**Antwerp fire chief says, "They were doing what they loved..."**



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 Con Shuehik 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 don't think it's going to 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."

## June 17<sup>th</sup> 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 12:40 Hours on the John J. Williams Highway near the Levens-Rehoboth joint fire company station in Angula.

The Mid-Sussex Rescue Squad ambulance was transporting to Dober Medical Center with a patient, 2 MERS Squad members and the Sussex County Paramedic were on board when it struck a tree, which opened the side of the ambulance as seen on our home page. 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, John Schmitt was seriously injured in a crash when a collision struck the Millard Fire Company ambulance he was riding in, while returning from a run. Additional details on this nearmiss crash will follow.




**Jan 28<sup>th</sup>, 2008**

Monday, January 28, 2008 10:14 am

[Top Story](#) [Previous Top Stories](#) [Our Picks](#) [Today's Pick](#)

Posted at 7:33 am | 3 Comments

### 1 dead, others injured in Sussex crash involving ambulance



Collision happened at the intersection of Beaver Dam and Indian Hills road near Angula Launch.



### April 20, 2008..??

**HERALD**  
 Home News Sports Business Entertainment Food & Drink  
 State News

**Child injured after being struck by ambulance**  
 Friday, April 18, 2008 9:40 AM EDT

EMERGENCY RESPONDERS TOOK A CHILD TO HOSPITAL WITH AN INJURY AFTER BEING STRUCK BY AN AMBULANCE.

Police said a 7-year-old boy was struck by an ambulance while riding his bike over the weekend.

The ambulance was en route to a hospital at 11:30 a.m. Wednesday at St. Luke's Hospital. The ambulance driver reported on his log that a 7-year-old boy was struck by the ambulance while riding his bike on the sidewalk.

The ambulance driver was not injured in the accident. The boy was taken to the hospital and is expected to make a full recovery.

**Springfield boy hit by ambulance dies**  
 Friday, April 11, 2008 9:15 AM EDT

EMERGENCY RESPONDERS TOOK A 7-YEAR-OLD BOY TO HOSPITAL AFTER BEING STRUCK BY AN AMBULANCE WHILE RIDING HIS BIKE OVER THE WEEKEND.

Police said the ambulance driver reported on his log that a 7-year-old boy was struck by the ambulance while riding his bike on the sidewalk.

The ambulance driver was not injured in the accident. The boy was taken to the hospital and is expected to make a full recovery.

### October 31, 2008 - Kentucky



### February 11, 2009 – North Carolina

**EMS Driver Charged After Ambulance Crash - North Carolina**

A Rockingham County ambulance slid off the road and flipped over Wednesday afternoon.

The crew was transporting a patient to a nursing home when the ambulance went off the road. The county emergency services director Steve Cook said the medical crew had played a role in the crash. "We said it sounds like he dropped off and started to correct it himself on the spot, so you know he was just an over-reaction trying to take the wheel and everything else into play, may have been a factor."

### April 30, 2009 - Tennessee



### Minnesota - June 20, 2009

**Woman Struck, Killed by Ambulance in St. Paul - Minnesota**

The ambulance, along with other emergency responders, was at a Walgreens parking lot in St. Paul responding to a report of a car that had gone through a fence and into an alley.

When the ambulance backed up the alley to get closer to the crash, it hit the woman, who was pronounced dead at the scene. Her identity has not yet been released.

Warrants had been issued for those who lost a loved one today. They fall to search the anguished crew whose job was to save lives on a fateful day. The will take investigate the circumstances of the tragic accident, and as the day wears on grief, our thoughts and prayers are with the family of the victim as they go through the difficult time," said St. Paul Police Chief Colman in a statement.

### August 2009 – Impaired...

**EMS RESPONDER**

Home News Sports Business Entertainment Food & Drink  
 State News

**Kentucky EMT Indicted on Murder Charges after Crash**  
 By Andy Blanks-Welby  
 Story by J. Blanks-Welby

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, Vicki Williams, 54, died of her injuries from the wreck.

Only WICKY was there April 30 when Brewer appeared in court to face a no-probation insurance charge after she was involved in an unrelated non-injury accident in her own vehicle.

### September 15, 2009 ...this week

**ONE KILLED, THREE INJURED IN TN AMBULANCE CRASH**

Wednesday, September 16, 2009 - A fatal wreck occurred last night in Johnson County involving a car, whose driver is suspected of being on drugs, and a rescue squad ambulance. The out-of-control car crossed the center lane of Highway 87 and hit a Johnson County Rescue Squad ambulance. The hit pushed the ambulance off the road. It came back onto the road, but the ambulance's rear tire caught the edge, and flipped it over an embankment. A female patient in the ambulance died at the scene, and three others were airlifted by Wings to JCMC.

The driver of the car that hit the ambulance, 51-year-old Brenda J. Buchanan was probably was on drugs. The THP said that drugs may have been a factor in the crash, so they're treating this as a criminal investigation. We wish the rescue squad members a quick recovery.

### An interhospital transport ? "Do no harm..."?

DOI: 10.1186/1745-2975-11-1427

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

By Elizabeth C. Davis  
 The Carlisle Daily Express  
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An Adams County ambulance carrying a patient to York Hospital collided with a car at the intersection of York Road and York Road in York on Tuesday at 1:47 this morning, and the patient was pronounced dead at the scene.

York County Deputy Sheriff Clark H. Heston said the patient, whose name was being withheld from Carlisle Daily Express because the news outlet is a "public utility" under state law.

He said he's still trying to determine whether the crash was a result of a driver's error or if the ambulance was involved in a collision with a car. Heston said the driver of the car was not injured in the crash.



## 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:

## 1960 to 2009



A passenger vehicle - sure



A 'laundry or mail truck' - ?



A passenger vehicle - yes!

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

Carl Craigle EMT-P, Chief Platte Valley Ambulance

**Anchorage Daily News**

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**Paramedic injured in crash is recovering**

By Julia D'Alley  
Anchorage Daily News  
Published December 28, 2008 at 09:07 AM

More anchorage stories >

- Crashes cost Sitka's paramedics their lives
- Bomb threat at Anchorage school leads to school off a night earlier
- City workers will start smoking ban
- Suspect caught in death
- Alcohol seems a factor in teen death

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 Andrew Malana, 70, wife, Dal Malana, and four Anchorage Fire Department personnel: driver Eric Taitt, 33, EMT base trainer, 40, and paramedics Dave Wallace, 43, and Tony Bruggiera, 36.

Bruggiera, who was riding with Malana in the back of the rig, was hospitalized with a head injury and is in stable but guarded condition. Healer and traction were brought for minor injuries and released. Officer Taitt, 43, the driver of the pickup and



**Rollover Crash Kills Medical Technician**  
Joshua's News (1/1) and Bala (Over) Spinning: Ben Engstrom and a Patient!

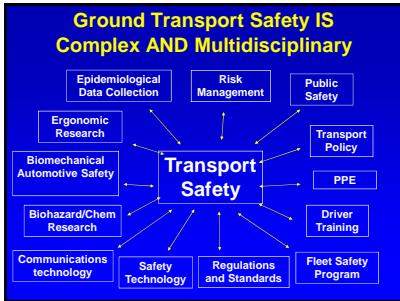
It does happen....

## But what about head protection?



## New EMS helmet prototypes for 2008-2009





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



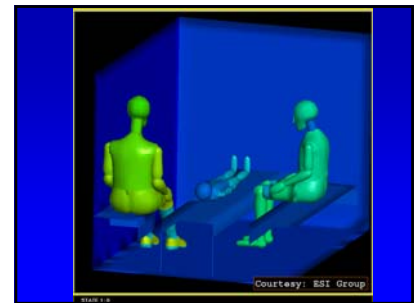
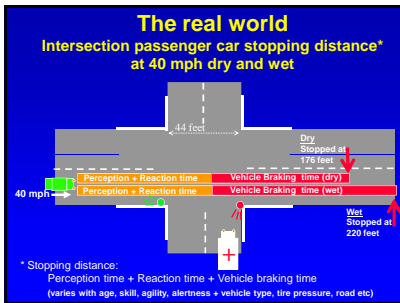
- Ambulance Vehicle Standards??**
- ▶ KKK?
  - ▶ AMD?
  - ▶ FMVSS?
  - ▶ NFPA?

- USA KKK ambulance purchase specifications**  
**GSA:KKK-A-1822F, Aug 2007**
- ▶ 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
  - ▶ Voluntary [www.msa.com/WorkArea/showcontent.aspx?id=1352](http://www.msa.com/WorkArea/showcontent.aspx?id=1352)
- 

- USA Ambulance Manufacturing Division (AMD) Ambulance Standards – August 2007**
- ▶ No dynamic or impact test
  - ▶ No automotive test manikin
  - ▶ Mandates NO 'crumple zone'
  - ▶ No impact tested anchorages for occupant restraint or equipment
  - ▶ Internal, not independent
- 
- <http://www.ntra.com/WorkArea/showcontent.aspx?id=1358>



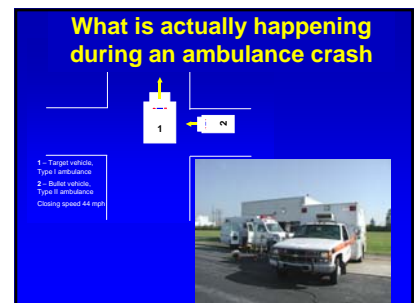




- ### The Crash Event - Crash Testing
- ▶ An introduction
  - ▶ What one needs to know
  - ▶ What do the tests really mean
  - ▶ And, what tests are meaningful

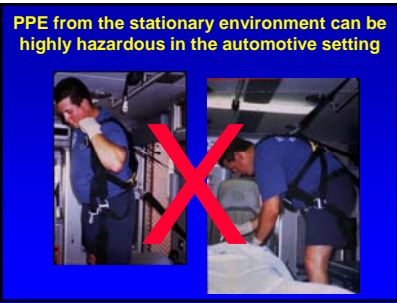
- ### Intrusion vs Deceleration
- ▶ Intrusion = vehicle to vehicle or vehicle to fixed narrow object
  - ▶ Deceleration = sudden stop – ie. sled test

- ### Dynamic Safety Testing
- ▶ requires sophisticated, expensive equipment
  - ▶ measurably demonstrates forces generated during collision
  - ▶ accepted international standard for vehicle restraint systems





A few key words about restraint systems...



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**



Increasing awareness ...

### What do we know now??

- ▶ Intersection crashes are the most lethal
- ▶ There are documented hazards, some which can be avoided
- ▶ Occupant and equipment restraint with standard belts is effective. (Over the shoulder harnesses for patients should be used, with the gurney in the upright position where medically feasible)
- ▶ Some vehicle design features are beneficial - automotive grade padding in head strike areas, seats that can slide toward the patient
- ▶ Electronic Driver monitoring/feedback systems appear to be highly effective
- ▶ Head protection??

### Innovation

### Safety concepts out there now

- ▶ Driver feedback technologies
- ▶ Tiered dispatch
- ▶ Enhanced ambulance vehicle design
- ▶ Intelligent Transport Technologies - ITS
- ▶ New Safety Standards

### 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 E. Levick, MD, MPH  
Maimonides Medical Center

#### REAL WORLD APPLICATION OF AN AFTERMARKET DRIVER HUMAN FACTORS REAL TIME AUDITORY MONITORING AND FEEDBACK DEVICE: AN EMERGENCY SERVICE PERSPECTIVE

Nadine Levick  
Chicago Safety LLC  
United States of America  
Larry Wieruck  
Michael E. Nagel  
Civitas Ambulance  
United States of America  
Paper Number 07-253

### Purpose of 'Feedback box' Program

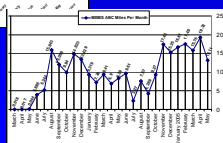
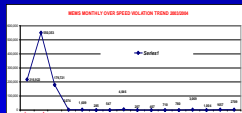
- ▶ Enhance Safety
- ▶ Improve Driver Performance
- ▶ Save Maintenance Dollars
- ▶ Aid Accident / Incident Investigation

### How the Device Works

- ▶ Computerized monitoring device installed on each vehicle to measure parameters
- ▶ Each driver has individual key "fob"
- ▶ Data collected every second
  - including: vehicle speed and performance, driver behaviors and emergency mode
- ▶ Auditory feedback of warning 'growls', and penalty tones
- ▶ Data downloaded automatically every day



### Demonstrated Effectiveness



I – blind data, no growls  
II – growls & tones ON  
III – identified data

### A key to safe ambulance transport



### 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

### Other monitoring devices

- ▶ Primarily to record events during and immediately preceding a crash
- ▶ Give no driver crash prevention feedback
- ▶ Administratively burdensome
- ▶ Intrusive
- ▶ Not demonstrated to be as effective in improving vehicle maintenance costs or as effective in modifying driver behavior long term

### You want a system that works!!

- ▶ Does the system really work
- ▶ Is it going to be a major burden on your staff to implement
- ▶ What are the real costs
- ▶ Are you going to have video of your company vehicle on you tube??

### Visibility and lighting issues



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



### News we don't want to see

Jan 22, 2007 8:39 am US/Eastern  
**Caught On Video: EMT Struck By Car**  
 Iva Young Reporting  
 (CBS) BROWNS The car hit 46-year-old Capt. Steven Quindongo so violently 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 men and when he (Quindongo) was walking back to the ambulance he was struck by the civilian vehicle."

### Worker visibility Act: November 24th 2008

**PART 634—WORKER VISIBILITY**  
 634.1 Purpose.  
 634.2 Reference.  
 634.3 Definitions.  
 634.4 Construction Act.  
 634.5 Authority.  
 634.6 Short title.  
 634.7 Effective date.

**§ 634.2 R4A.**  
 All on-street vehicles in the right-of-way of a Federal-aid highway shall be equipped with high-visibility safety apparel.  
 All on-street vehicles in the right-of-way of a Federal-aid highway, such as highway construction and maintenance, snow, street cars, utility cars, mail carriers, shall wear high-visibility safety apparel.  
 Whenever more people are kept within the right-of-way of a Federal-aid highway, such as highway construction and maintenance, snow, street cars, utility cars, mail carriers, shall wear high-visibility safety apparel.

### Day visibility



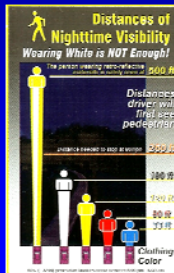
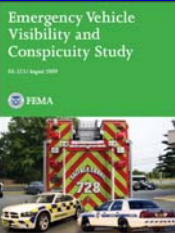
### Night visibility



### Here's the real world at 6 ft...



### August 2009 - review



### Policy and practice ignorant of existing technical safety data

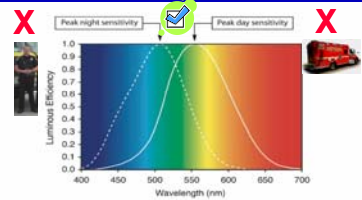


Figure 1. The scotopic (dashed line) and photopic (solid line) luminous efficiency functions, describing the spectral sensitivities of night and day vision, respectively.

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



### Emergency Vehicles – Viewer Awareness

For a timely, appropriate and safe response

- ▶ Location
- ▶ Size
- ▶ Shape
- ▶ Speed
- ▶ Intended path



### Summit County EMS - Colorado

Old vehicle

New yellow vehicle markings

Staff use lime-green vests & jackets

### Muskoka EMS - Canada

Old design

New design

### Muskoka EMS - Canada

Old design

New design

### Muskoka EMS - Canada

Old design

New design

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

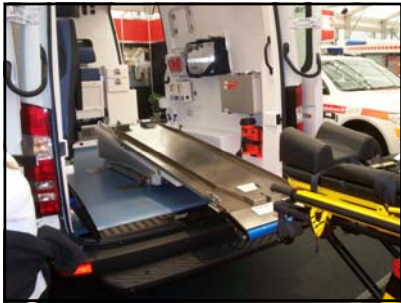
JEMS.com

Article: Don't Play Russian Roulette at Intersections

### 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 bringing Rettmobil to you





### Vehicle Occupant Safety design

European design  
Safety technology  
is a key focus

### Safe and Ergonomic design



### Ergonomic layout and equipment

### Flexibility to manage two patients

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

**JOURNAL**

Local News

**IRHA selected to test new ambulance**  
New design smaller, more cost efficient, say health officials

ambulance health is looking to act on its original plan by implementing a pilot project, giving the firm a year to put the sprinter design to see if it could be a replacement to the current fleet of ambulances.

According to Christensen, the Sprinter design looks similar to delivery vans, and boasts a whole new set of safety and technology features such as GPS.

It's a lot smaller, so that makes it a lot easier for paramedics to be strapped in but still be able to reach all the equipment needed to tend to a patient," said Christensen.

Christensen also explained that the new ambulances require less maintenance, and have an overall smoother, quieter ride. They also are lower to the ground and come equipped with new "no-lift" stretchers, that eliminate 85 per cent of strenuous lifting paramedics do to get patients in and out of the vehicle.

### Safety first - Passive Safety

Fold-in ridges on subframe

Front axle module

Front axle module after crash

- A main feature in a front-end crash is the "disconnectable" front axle, which releases additional deformation zones in the longitudinal frame member when a particular force level is reached.
- On a frontal crash, transmission and engine will be pushed underneath front occupants.



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?

Were we safer in the Cadillac???



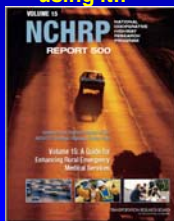
Fleet Mix ?



“Ripoff and Duplicate”

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

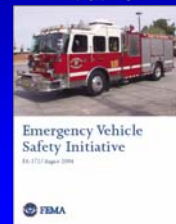
Transportation Research Board is an excellent resource... we should be using it!!



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



### National Academies TRB Ambulance Transport Safety Summit October 29, 2009



<http://www.objectivesafety.net/TRBSummit2009.htm>

### Risk/Hazards

- ▶ Predictable risks
- ▶ Predictable fatal injuries
- ▶ Serious occupational hazard
- ▶ Public safety hazards

### What you can do now

- ▶ Have a written and implemented 'safety program'
- ▶ Secure all equipment
- ▶ Secure occupants with standard belts
- ▶ Don't drive through red lights/stop signs
- ▶ Use properly implemented "Feedback Boxes"

### 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

### Important Principles !

1. A culture of safety
  2. Drive cautiously
  3. Wear your belts & restrain all occupants
  4. Secure all equipment
  5. Integrate scientific data into your policies and procedures
- Unrestrained occupants and equipment are a potential injury risk to all occupants

### 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

### small changes can make a BIG DIFFERENCE

- ▶ **PREPARE – TEACH – REACH – RESPOND**
  - **Look** at your own safety record
  - **Teach** safety and hazard awareness
  - **Reach** out with safety information to all your EMS providers
  - **Respond** with the best safety practices

**PREDICTABLE  
PREVENTABLE  
and  
NO ACCIDENT**

## Conclusion

- ▶ EMS transport has serious hazards and safety issues
- ▶ Major advances in EMS safety research, infrastructure and practice over the past 5 years
- ▶ New technologies for vehicle design, occupant PPE and equipment restraint and driver performance are now available
- ▶ Development of substantive EMS safety standards is a necessity and a reality
- ▶ 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 safety and occupant protection

## 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

## Thank you! Any Questions??

Electronic handout available online  
<http://www.objectivesafety.net>

