

### Keynote Speakers

**EMS Safety FOUNDATION**  
Innovate. Collaborate. & Knowledge Transfer  
[www.EMSSafetyFoundation.org](http://www.EMSSafetyFoundation.org)

**AON**

CareFlite Symposium,  
 Monday, June 22<sup>nd</sup>, 2009

How to Arrive Alive - EMS Fleet Safety from the Experts, Part 1:

## The Ride of Your Life: Managing the Risks and Hazards of Ambulance Transport

Nadine Levick, MD/MPH  
 Research Director, EMS Safety Foundation  
 CEO, Objective Safety  
 New York, USA

- ▶ To quote Steve "Sid" Caesar – Director IHS ES

*"We want everyone to get home safely each day"*

### 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**



**It does happen....**

**Hollover Crash Kills Medical Technician**  
Continuation from Page 10 of our Fall 2004 Special Issue: Equipment and People

**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

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



**Rig Safety 9-1-1**  
What you need to know about ambulance safety & standards

**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

**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 QRTS 2005-6

**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
- TIME  
↓  
PLACE

## The Emergency Department (ED)



## An ambulance is not an ED /ICU on wheels



## A survivable impact??



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

**NEWS CENTER**

**Paramedic Killed in Turner Ambulance Crash**

The Madison County Sheriff's Department was the first law enforcement to respond to the ambulance crash on Thursday, July 5, 2007.

The ambulance driver, 38-year-old former Lieutenant of Police and the driver of the group, Turner was the Volunteer Chief of Turner County and was on duty when the ambulance crashed. He was the patient being carried in the ambulance.

The paramedic who died has been identified as Allan Parson, 38-year-old Madison County resident.

Some patients he helped to bring to the county Sheriff's headquarters were taken to the hospital. The ambulance was destroyed and the driver was killed.

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

Posted By [Bryan](#) on July 5, 2007 4:08 PM (Suggest Removal)

In fact, it would have been fast if they ran over my family member on their way to another family member...

Posted By [Bryan](#) on July 5, 2007 4:06 PM (Suggest Removal)

In fact, it would have been fast if they ran over my family member on their way to another family member...

Posted By [Bryan](#) on July 5, 2007 4:08 PM (Suggest Removal)

In fact, it would have been fast if they ran over my family member on their way to another family member...

**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 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 and 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**

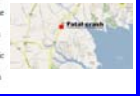
**EMS CRASH KILLS PATIENT AND A SUSSEX COUNTY (DE) PARAMEDIC IN THE LINE OF DUTY**  
Tuesday, June 17, 2008

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 0240 Hours on the John J. Williams Highway near the Levee Rehabilitation joint fire company station in Angola.

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 Angola Launch.



April 20, 2008..??

**HERALD**

Home News Sports Entertainment Entertainment Entertainment  
 and More... Local News, National News, Business, Entertainment, Sports, News Photos

State News

**Child injured after being struck by ambulance**

Friday, April 19, 2008 8:34 AM EDT

AMBUCLANCE, N.J. (AP) — A 7-year-old boy has died after being struck by an ambulance while riding his bike over the weekend.

The ambulance was heading north on Route 108 in the township of Gladstone when it struck the boy at about 9:30 a.m. on Saturday. The ambulance driver, who was not named, was cited for driving on the wrong side of the road. The boy was taken to the hospital and died of his injuries on Monday. A report of the crash was filed with the state police on Monday.

**Spiritfield boy hit by ambulance dies**

Friday, April 11, 2008 8:32 AM EDT

AMBUCLANCE, N.J. (AP) — A 7-year-old boy has died after being struck by an ambulance while riding his bike over the weekend.

The ambulance was heading north on Route 108 in the township of Gladstone when it struck the boy at about 9:30 a.m. on Saturday. The ambulance driver, who was not named, was cited for driving on the wrong side of the road. The boy was taken to the hospital and died of his injuries on Monday. A report of the crash was filed with the state police on Monday.

May 19th, 2008

**Girl On Way To School Struck By Ambulance - New York**

A 11-year-old girl was in serious condition Monday after being hit by an ambulance in the Midwood section of Brooklyn.

She had earlier been reported dead.

School officials said the teenager, a student at Public School 99, was walking to school around 8 a.m. when she was hit at Coney Island Avenue and Avenue K. The ambulance was responding to a call at the time of the crash.

A crossing guard said that the ambulance approached with its lights and sirens on while the girl was crossing the street. After she was struck, ambulance workers put the girl in the ambulance and took her to the hospital, the crossing guard said.

The ambulance was from New York Presbyterian Hospital.

October 31, 2008 - Kentucky



February 11, 2009 – North Carolina

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

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

The crash was transporting a patient to a nursing home when the ambulance went off the road. The County Emergency Services Director Steve says the weather may have played a role in the crash. He said a driver, when he flipped off and started to correct himself on the dirt, so you know he was just an overcorrection trying to take the road and everything else was okay. They have no idea if it was a factor.

April 30, 2009 - Tennessee



Arlington, Texas – June 18, 2009

**Paramedic, woman involved in ambulance crash in Arlington - Texas**

A paramedic and a pregnant woman were taken to a hospital after their ambulance collided with a truck in Arlington early this morning.

The ambulance was heading west on East Atlantic Lane when it collided with a pickup going north on South Collier Street about 2 a.m., said an officer, a spokesman for the American Medical Response, the ambulance company.

The ambulance was responding to a non-emergency call and did not have its lights or sirens on, he said.

Clint patient privacy, Colbe declined to release details about the woman, but an Arlington police dispatcher said she was in labor.

Two ambulances arrived at the crash scene. The paramedic and woman were taken to the Medical Center of Arlington and have been released without injuries.

But they were shaken up a little, but they're OK, he said. The drivers of both vehicles refused treatment.

Arlington police were investigating the cause of the accident.

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.

Towards the end of the crash scene. They had to express the depth of our sadness for those who lost a loved one today. They had to touch the anguish of the paramedic crew whose jobs went from a 10-minute run to an 18-minute run. We will fully investigate the circumstances of this tragic accident, and as this day ends in grief, our thoughts and prayers are with the family of the victim as they go through this difficult time," said St. Paul Mayor Chris Coleman in a statement.

Arlington police were investigating the cause of the accident.

## EMS 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

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

LexisNexis

PA ambulance involved in crash patient pronounced dead at scene

By Elizabeth Trane  
The York Dispatch (York, Pa.)  
Copyright 2007 York Dispatch, Inc.  
All Rights Reserved

An Adams County ambulance carrying a patient to York Hospital, will deal with a car at the intersection of Routes 20 and 61 in West Manchester Township at 7:47 a.m. Monday, and the public it was pronounced dead at the scene.

York County Deputy Coroner Gus DeStefano told the patient, a woman, who being transported from Gettysburg Hospital, Ansonia, Pa. was suffering a "significant" heart condition.

The crash will be investigated to determine whether the road or a particular area and not prior to the crash, or whether the car had a fatal fault, a lack because of or after the crash. The day said the killed or injured if it was a fatal crash.



- ▶ This IS a Transportation and Automotive Safety issue

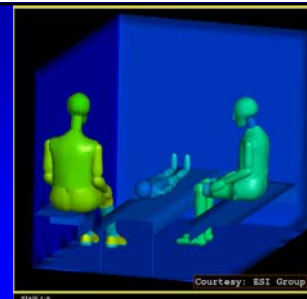
## Benefit of Safety

- ▶ Any cost of addressing these issues is dwarfed in contrast to the huge burden of not doing so - in financial costs let alone the personal, societal, ethical and litigation costs

## 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

## Testing the real world



Courtesy: ESI Group

### Unique workplace

- ▶ In vehicles
- ▶ At roadside and other emergency scenes

### 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:

### USA EMS in 1917



### 1960 to 2009



It does happen....

### But what about head protection?



### New EMS helmet prototypes for 2008-2009



### So for EMS personnel...

- ▶ What's going to kill you?
- ▶ What's going to injure you?



## EMS Best Practice, Sept 2006



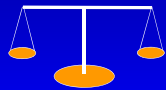
## Patients must be in the over the shoulder harness, medics restrained in seat belts, equipment secured



## What are the solutions?

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

## Balance of concerns and risk during transport



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

## Safety Management

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

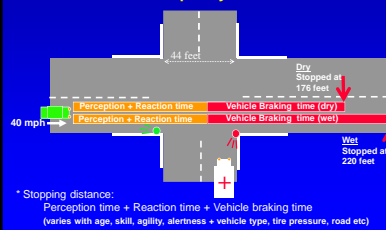
## And very Predictable...

- ▶ 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



## 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

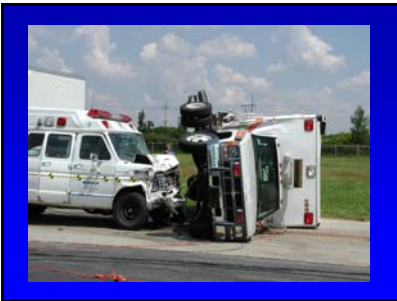

### Dynamic Safety Testing

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

### What is actually happening during an ambulance crash



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



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



A few key words about restraint systems...

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



NOT new technical data...



Richardson S.A., et al, *Int. J. of Crash*, 4:3, 239 - 259, 1999  
Side facing 4-point harnesses demonstrated to be lethal, even at slow ground vehicle speeds

### Being seated IN an automotive seat is what will protect you

- ▶ Anything that allows or encourages you to get up out of your seat will also encourage you to be injured or killed – it is potentially lethal to be out of your seat in any fashion
- ▶ 4 or 5 point harnesses for sidefacing occupants are potentially lethal – and is in **NO WAY SUPPORTED BY ANY DATA OR AUTOMOTIVE SAFETY EXPERTISE**

### Rash of “Safety Concept” vehicles..... Devoid of substantive automotive safety engineering input or testing



### Yes, the ride of your life....

- ▶ Sure... these vehicles all parade around the EMS and Fire shows **BUT...**
- ▶ **NOT ONE** of these vehicles has been to the automotive safety shows or scrutinized by the automotive safety industry

### Increasing awareness ...



### What do we know now??

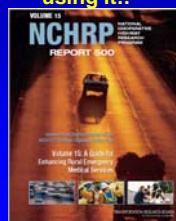
- ▶ Intersection crashes are the most lethal
- ▶ There are documented hazards, some which can be avoided
- ▶ Occupant and equipment restraint with standard belts is effective. (Over the shoulder harnesses for patients should be used, with the gurney in the upright position where medically feasible)
- ▶ 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

### Air EMS is a role model for safety initiatives and focus



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



### 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 R. 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  
Objective Safety LLC  
United States of America  
Loren Wieruch  
Michael E. Nagel  
California Ambulance  
United States of America  
Paper Number 050234

## Purpose of 'Feedback box' Program

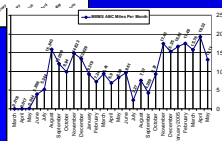
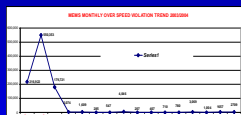
- ▶ Enhance Safety
- ▶ Improve Driver Performance
- ▶ Save Maintenance Dollars
- ▶ Aid Accident / Incident Investigation

## 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 unidentified data capture
- 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





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???



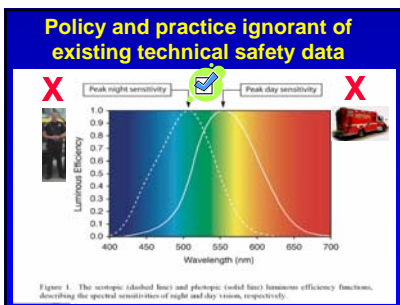
Worker visibility Act: November 24<sup>th</sup> 2008

**PART 631—WORKER VISIBILITY**

§ 631.2 Rule.

All workers within the right-of-way of a Federal-aid highway who are engaged in traffic activities shall wear high-visibility safety apparel.

Workers must wear people on foot who do not place them within the right-of-way of a Federal-aid highway, such as highway construction and maintenance forces, survey crews, utility crews, maintenance forces, etc. within the



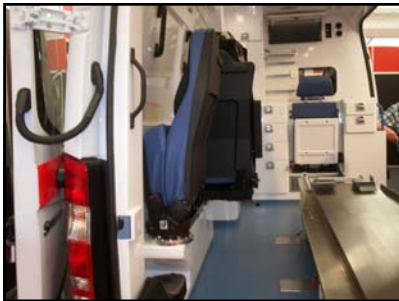
This addresses some very real risks, very creatively – and currently ONLY available in London Ontario!



### 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.

### The EMS Safety Foundation bringing international innovation 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

Parish Health is looking to act on its original plan by implementing a pilot project, giving the IRHA a year to test the Sprinter design to see if it could be a replacement to the current Fleet Mac ambulance design.

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

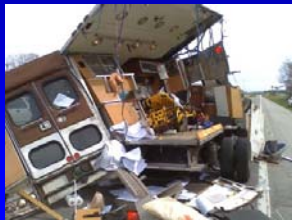
'It's a lot smaller, so that makes it a lot easier for paramedics to be strapped in but still be able to reach all the equipment needed to tend to a patient,' said Christenson.

Christenson 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.

Is crash safety 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 ?



R & D  
 "Ripoff and Duplicate"

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

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



## 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>

