September 13, 2011, Mineola, NY

"Ride of your Life" What you Can't Afford Not to Know About Ambulance Safety

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

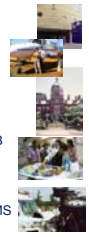
- To quote Steve "Sid" Caesar – Director IHS ES

"We want everyone to get home safely each day"

Emergency Medical Service Transport

- What are the transport safety issues that pertain to this important public service and public safety industry?
- What do we know of the risks and hazards and how can we measure these ?
- How can the safety of this transport system be optimized?
- What can we learn from international colleagues

Who am I?



- Nadine Levick MD, MPH
- Emergency Medicine Physician and Public Health Academic, (USA-Hopkins, Harlem, Maimonidies, Brookdale & Australia – Royal Melbourne, Royal Childrens Hospitals, Royal Australian Flying Doctor Service)
- Chair, National Academies Subcommittee TRB EMS Transport Safety, USA
- Founder of EMS Safety Foundation
- Recipient, International Society of Automotive Engineers, Women's Leadership Award for EMS Safety

Outline

I. Identification of ground EMS transport safety issues, hazards and areas of risk to patients, providers and public

II. Highlight unacceptable mythology and challenges to advancing EMS transport safety

III. Profile innovation, new safety technologies and strategies and knowledge transfer to enhance safety and reduce risks of ground EMS and patient transport

Things can go wrong –

but when there are sound safety policies and technologies in place, and the system is well prepared, you can minimize harm

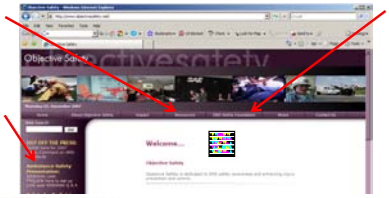
Your Interactive Handout awaits you online at…

- www.objectivesafety.net

This WILL be FAST!!
No need to take any notes – all text slides will be awaiting you in your online Handout

http://www.objectivesafety.net

Your Handout and Additional Resources



10 Years Ago…

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Safety of the…

- Provider
- Public
- Patient

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Some questions for you all:

- Have you ever been in a EMS crash?
- How many times?
  - 1?
  - 2?
  - More?
- Have you ever been hurt in an EMS crash?
- Do you know any one who has ever been hurt in an EMS crash?
- Do you know of anyone who has been killed in an EMS crash?

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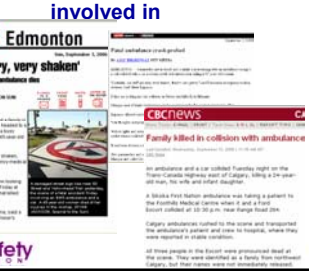
Tragedy you don't want to be involved in



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Thursday July 5th 2007…… Paramedic Allan Parson's killed

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

Posted By:mad at July 5, 2007 4:30 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)
Re 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)
Re 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 loss. And I'd like to know what can be done so that this never happens again.

2 weeks later… Friday July 20th 2007 The worst ambulance crash in USA history

Five Killed in Crash of Ambulance and Semi

July 21, 2007 08:20 AM EDT

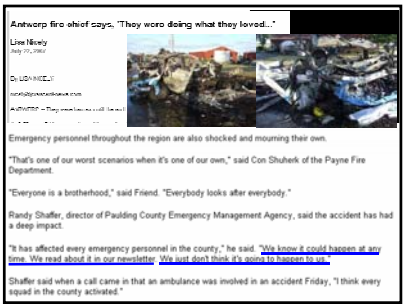
VAN WERT, OHIO (AP) -- The Ohio State Highway Patrol continues to investigate the crash of an ambulance that killed five people Friday night, including three emergency medical technicians. Troopers say the ambulance was broadsided by a semitrailer in Crane Township, about 65 miles southwest of TOledo.

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 64-year-old Sammy Smith, 31-year-old Heidi McDougall and 25-year-old Kelly Rager. The two patients were also killed. They were identified as 64-year-old Robert Wells 60-year-old Ameldia Wells of Hicksville.

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

Authorities have not said who had the right of way at the rural intersection nor have they said if the ambulance's emergency siren and lights were turned on.



Emergency Medical Services (EMS) An important and unique transport system

- Public safety, public health and emergency service
- Is there to save lives

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Firstly!

- An accident ?
- or
  a predictable and preventable event

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A tragic emergency health care intervention outcome

It does happen….

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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

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Negative impact on system performance…

- BUT an EMS crash can kill all those involved AND wipe out a rural EMS system AND negatively impact a regions response capacity……

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Ambulance Transport Safety

- Emergency care, public heath, public safety, and patient transportation.
- Important Principle:
  Ambulance transport safety is part of a system, the overall balance of risk involves the safety of all occupants and the public
- All get home safely

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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?

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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

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In the USA there are more safety standards for moving cattle than for moving patients

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Absence of standards and oversight

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

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- What we need to consider, where is the 'bang for buck' in ambulance transport safety:

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Creating a Safety Culture

within a company must have leadership and support of upper management

- Awareness
- Training
- Incentive

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Key elements to transport safety policies

- Vehicle/Fleet Safety
- Occupant protection
- Driver performance monitoring and feedback
- Hours of service
- Driver/provider wellness and fitness
- Driver/provider impairment
- Public safety

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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

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The Emergency Department (ED)

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An ambulance is <u>not</u> an ED /ICU on wheels

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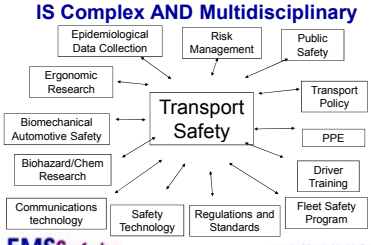
Ground Ambulance Transport Safety IS Complex AND Multidisciplinary



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Do we ask vehicle builders to write cardiac arrest protocols…? Vehicle design and safety is not what we are trained to do!!!!

Would we….?

Seeing that we are health care providers – lets look at it this way –

- Would we use medical equipment that was built by folks who were not technically qualified or trained biomedical engineers and who just said – "this device is safe"?
- Or would we expect them to be qualified in this field and that their products were tested in a meaningful way to ensure that they were safe?

And..

- In the vehicle
- At the scene
- During transport

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

Ontario EMS Occupant Safety

30 August 2010

Ontario Emergency Medical Services
Section 21 Sub Committee

Emergency Medical Services Guidance Note #2

Ontario Emergency Medical Services
Section 21 Sub Committee

EMS Transport Safety

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

EMS1.com

Nurse sues W. Va EMS agency after ambulance crash

Ambulances / Emergency Vehicles Article

November 11, 2010

Nurse sues W. Va EMS agency after ambulance crash

Ambulance crashed and injured nurse while she treated a patient

By EMS1 Staff

MORGANTOWN, W.Va. — A West Virginia nurse hurt in a 2009 ambulance crash is suing an EMS agency, accusing a mode of reckless driving.

Neonatal transport nurse Melissa Slavenski was treating a premature baby girl in November when the Morningside EMS ambulance they were travelling in hit a median and flipped, according to The Dominion Post.

Joshua David Slagle drove the ambulance "at a high rate of speed and in an unsafe and reckless manner," the lawsuit says.

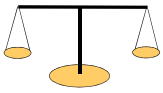
The grandfather of the baby, who survived, credits Slavenski for saving the baby's life during the crash, shielding her from the impact.

Slavenski suffered injuries, including broken arms, a head blow, scarring and disfigurement, and reactions to medications for both her pain and hospital acquired infections, The Dominion Post said.

According to her attorney, Slavenski has returned to nursing, but is now unable to do medical transports.

Slavenski and her husband Roy Slavenski are suing for payment of medical bills, lost wages and an unspecified sum of money for punitive damages, according to the report.

Balance of concerns and risk during transport



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

Some odd USA 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

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Ambulance transport a serious transport safety problem…

- the most lethal vehicle on the road both per mile travelled and per vehicle
- is exempt from federal commercial fleet safety oversight (FMCSA)
- 2/3 fatalities not in the ambulance
- Exempt from most FMVSS standards

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Data…

- What is your transport safety record in your service?
- How can you improve if you don't have a meaningful measure of safety performance?
- Transport safety is not guesswork, it is a science

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ESC – Does your ambulance have it??

- ESC helps drivers stay in control when they need to swerve or brake suddenly to avoid an obstacle or turn corners on slippery roads.
- Vehicles equipped with ESC are involved in fewer severe collisions caused by loss of control, resulting in significantly fewer deaths and injuries

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1980's Then….

And NOW!…

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1980's Then….

And NOW!….

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So

- What's important
- What's not important

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- What's going to save your life
- What might take your life

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- What's going to hurt you
- What's going to protect you

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- What is factual
- What is garbage

- What is new
- What is not new

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

Date accessed: Monday, January 21, 1:18 PM

Print this Article | Email this Article to a friend | LexisNexis

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

By Elizabeth Dent
The York Dispatch (Pennsylvania)
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A Adams County ambulance carrying a patient to York Hospital collided with a car at the intersection of routes 30 and 616 in West Manchester Township at 9:07 this morning, and the patient was pronounced dead at the scene.

York County Deputy Coroner Claude Stanley said the patient, a woman, was being transported from Gettysburg Hospital because she was suffering a "significant" heart condition.

He said he's still trying to determine whether she went into cardiac arrest and died prior to the crash, or whether she was revived a few times and then died because after the crash, Stanley said the collision was significant enough to cause multiple injuries.

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

Predictable risks

- Fatal crashes more often at intersections, & with another vehicle ($p < 0.001$)*
- 70% of fatal crashes EMS crashes during Emergency Use*
- Most serious & fatal injuries occurred in rear (OR 2.7 vs front) & to improperly restrained occupants (OR 2.5 vs restrained)**
- 82% of fatally injured EMS rear occupants unrestrained**
- > 74% of EMT occupational fatalities are MVC related***
- Serious head injury in >65% of fatal occupant injuries#
- More likely to crash at an intersection with traffic lights (37% vs 18% $p=0.001$) & more people & injuries/crash than similar sized vehicles##

*Kahn CA, Pirrallo RG, Kuhn EM, Prehosp Emerg Care 2001 Jul-Sep;5(3):261-9
**Becker, Zaloshnja, Levick, Li, Miller, Acc Anal Prev 2003
***Maguire, Hunting, Smith, Levick, Annals Emerg Med Dec 2002
#NIOSH, 2003
##Ray AM, Kupas DF, Prehosp Emerg Care 2005 Dec; 9:413-415

EMS Transport General Concerns

- Consequences can be predictable & likely preventable
- Costs of these adverse events are high in loss of life, financial burden and negative impact on delivery of EMS care
- Other high speed vehicles (eg. racing cars) have a different safety paradigm
- Design of interventions to mitigate injury is predicated on a valid testing model
- Complex both engineering and public health issues

USA EMS

- EMS Systems - >15,000
- Personnel - ~1 million
  (~30% F/T professional & 70% volunteer)
- Vehicles - ~50,000
  (Type I, Type II, Type III, Freightliners, ?motorcycles)
- Transports - ~50 million
  (to Emergency Depts ~ 50%, < 1/3 emergent)
- Cost - ~$8 Billion annually
- Safety Oversight - ? Disparate

USA EMS transport safety data estimates

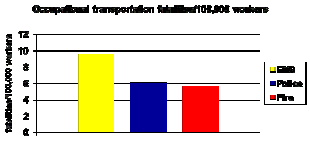
- ~ 50,000 vehicles
- ~ 9,000 crashes a year
- ~ One fatality each week
  - ~ 2/3 pedestrians or occupants of other car
- ~10 serious injuries each day
- Cost estimates > $500 million annually

*FARS/BTS 2007

Is it your service's tragic year?

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

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*

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and what is killing EMS ?

EMS personnel fatalities*

- 74% transportation related
  - 1/5 of ground transport fatalities were struck by moving vehicles
- 11% were cardiovascular
- 9% were homicide
- 4% needle sticks, electrocution, drowning and other

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

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So does it make sense ?

- Gloves and universal precautions?...
  … good biohazard protection BUT aren't going to give much protection in a ambulance crash

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

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And…

This is in a setting where

- transport safety is the major and most costly adverse event in EMS
- And there have been all sorts of major technical and informational developments since Jan 2006

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New Information/Technical Developments Jan 2006- Jan 2011

- SAFETEA-LU, 2006 – EMS identified as one of the 4 E's
  - (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users)
- International Ergonomists Association (IEA) - publication June 2006
- Enhanced Safety of Vehicles (ESV) - publications June 2007, 2009
- American Society Safety Engineers (ASSE) - publications June 2006, 2007
- National Academies TRB – Inaugural EMS Safety address, Jan 2007
- NEMSAC established – April 2007
- AMD Automotive Engineering Public Comments - July 2007
- OSHA September 11, 2007 EMS safety in Federal Register
- State Strategic Highway Safety Plans, October 2007
- Sporadic State EMS Council Transport Safety Policies
- APHA EMS Safety technical abstracts - Nov 2007, 2008, 2009
- EMS Safety Foundation established – Dec 2007
- National Academies TRB – Inaugural EMS Safety Subcommittee meeting Jan 2008
- National Academies TRB– first EMS Safety Publication Jan 2008
- Transportation Safety Advancement Group (TSAG) – Feb 2008
- Society for Automotive Engineers (SAE) – publications Oct 2007, 2008, 2009
- Worker visibility Act - Nov 2008
- SAE Ambulance Standards development – May 2010
- NFPA Ambulance Standards Committee – June 2009
- National Academies TRB EMS Safety Summits –Nov 2008, Oct 2009
- EMS Safety Foundation Innovation WorkShop - October 2010

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A challenge we know now…

- …is that there is a major problem with the present approach and what is being done currently
- and many practices are in conflict with, or not supported by, existing technical engineering science

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Some new dimensions

- Vehicles – smarter, sleeker, safer – CHEAPER!
- Operations – new technology tools
- Interdisciplinary infrastructure – new global platforms

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Systems safety of:

- Getting you, your patient and equipment in and out of the vehicle
- Providing patient care inside the vehicle
- Occupant protection in crash and near miss situations

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Safety Performance

- Measurement
- Outcomes
- Technical expertise

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When is it safe to do what… ?

- What are your policies???
  - If your patient is pink, warm and talking?
  - Are you required to notify the driver if you are out of your seat belt?
  - Are 'routine procedures' putting you at risk?

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What is a safe speed and how do we identify that?

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What is a survivable impact ?

12 mph (20 km/hr)?

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What is a survivable impact?

$E = \frac{1}{2} mv^2$ $v^2 = 2as$

~ 30 mph - survivable

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What is a survivable impact?

$E = \frac{1}{2} mv^2$ $v^2 = 2as$

~ 60 mph – not survivable

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A survivable impact??

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A serious problem…

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Transport related aspects -

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

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- Transport Medicine

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- Impact Biomechanics
- Transport Ergonomics
- Fleet Safety

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A "Fleet" to many in Emergency Medical care means….

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Impact biomechanics

- Crashworthiness
- Vehicle design
- Occupant protection

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Transport Ergonomics

- Operational tasks
- Human factors analysis
- Range of reach
- Patient loading and unloading

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Fleet safety

- Operational policies – dispatch, safety
- Fleet mix
- Vehicle selection – safety, ESC, loading height
- Driver performance and monitoring
- Scene safety
- Visibility and conspicuity
- Safety measurement and management

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April 14th, 2008

Ambulance worker loses arm in accident - West Nyack, New York

An emergency service worker lost her right arm today after the ambulance in which she was a passenger crashed into a truck parked along Route 59 near the flyover to the Palisades Center mall.

Bonnie Ames, 20, was taken by helicopter to the Westchester Medical Center in Valhalla where she underwent surgery.

"She's out of danger, but she lost her arm," Raymond Florida, director of **Rockland Paramedic Services** said early this evening.

"We used multiple units from the jaws of life to extricate her," West Nyack Fire Chief George Drescher said. "She appeared to be seriously injured."

The paramedic van driver, 19-year-old Sco
there to Westchester Medical Center, said

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June 17th 2008
a paramedic and a patient killed

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

We regret to advise you that a female Sussex County (DE) Paramedic was killed in the Line of Duty as was a patient killed in a horrific crash involving an ambulance in Sussex County (DE) this morning .
The single vehicle crash happened around 0240 Hours on the John J. Williams Highway near the Lewes-Rehoboth joint fire company substation in Angola.
The Mid-Sussex Rescue Squad ambulance was transporting to Beebe Medical Center with a patient, 2 MSRS 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 civilian struck the Milford Fire Company ambulance he was riding in, while returning from a run. Additional details on this mornings crash will follow:

In this vehicle…

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October 31, 2008 - Kentucky

April 30, 2009 - Tennessee

August 2009 – Impaired…

EMS RESPONDER

Kentucky EMT Indicted on Murder Charges after Crash

By Andy Alcock/WLKY

LOUISVILLE, Ky. –

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

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

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

October 22, 2009, TN

Patient and Provider killed, Attendant Critical

Ambulance, TDOT truck collide on I-65; ambulan

An accident on Interstate 65 this afternoon killed a

Just before 3 p.m., a RuralMetro ambulance transp appointment ran into a Tennessee Department of Tr emergency lane, according to Metro police informati

The ambulance driver—David Cline, a firefighter in Vanderbilt Medical Center, where he died.

The elderly patient died at the scene; her name has also not been released.

Nashville firefighter and RuralMetro employee Evans Johnson, 31, was in the rear of the ambulance assisting the patient when the crash occurred. He was transported to Vanderbilt Medical Center, where he is in critical condition.

TDOT vehicle driver Robert Green, 40, of Columbia was transported to Vanderbilt Medical Center where he is in stable condition, Mumford said.

As of 5:45 p.m. traffic on the northbound lanes of I-65 was moving, but southbound traffic was moving slowly, Mumford said. There were also significant delays on I-440.

Monday November 30, 2009 Smithfield

WRAL.com

Ambulance, Krispy Kreme truck collide

FOUR OAKS, N.C. — An ambulance collided with a Krispy Kreme doughnuts truck Monday morning south of Smithfield.

Four Oaks police responded to the wreck near the junction on U.S. Highways 301 and 701 just before 11 a.m.

Police said the ambulance was not carrying patients at the time of the crash.

The ambulance hit the back of the doughnut truck, causing it to flip. Both the driver and a passenger in the ambulance were taken to Johnston Medical Center where they were being treated for non-life threatening injuries.

Police were still investigating the wreck and did not release the identities of those involved.

January 14, 2010

WARREN COUNTY, N.J. NEWS

Ambulance accident on Route 519 in White Township claims patient in back - UPDATE

By Express-Times staff

January 14, 2010, 5:12PM

A patient in the back of an ambulance was killed this afternoon in Warren County when the vehicle swerved suddenly to the right and crashed into a tree. New Jersey State Police said at the scene.

February 1, 2010

THE SUN TIMES

"Your Store for all Seasons"

One dead as car, ambulance collide

Sept 16, 2010

SUV Rips Side Off Ambulance in Deadly Maryland Crash

EMS Crew Escapes Serious Injury, Three Civilians Killed

SUSAN PHILLIPS, WUSA9 | Thursday, September 16, 2010

DISTRICT HEIGHTS, Md. (WUSA) - A violent collision between an SUV and a ambulance has killed three people and sent two paramedics to the hospital.

Mark Brady, spokesperson for Prince George's County Fire and Rescue, says the crash happened shortly after Midnight in the 4900 block of Marlboro Pike in District Heights. According to Brady, investigators believe ambulance Rich was traveling east on Marlboro Pike on its way to an overdose call on Tanyer Place when it came upon a GMC Suburban traveling eastbound in the westbound lanes at a high rate of speed.

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- This IS a Transportation and Automotive Safety issue

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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

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Safety is a tool to save

- Lives
- Time
- Money

must be evidenced based

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Golden Hour – not so hot

- March 2010 Annals EM

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Golden Hour Summary

- This study suggests that in our current out-of hospital and emergency care system time may be less crucial than once thought. Routine lights-and-sirens transport for trauma patients, with its inherent risks, may not be warranted. [Ann Emerg Med. 2010;55:247-248.]

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April 2010, Resuscitation – Going fast can hurt your patient clinically!

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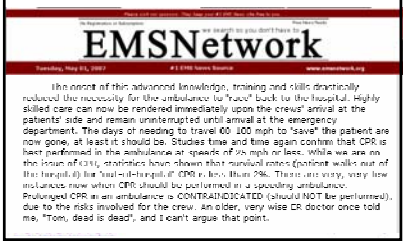
CPR?



EMSNetwork

The laws of physics prevail…

- and they don't care what your job title is or if you are a patient, a provider or a member of the public

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Science behind Policy

- "For successful technology, reality must take precedence over public relations, for Nature cannot be fooled."

  Richard P. Feynman 1988

Important…

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

Goals

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

May 13, 2010…

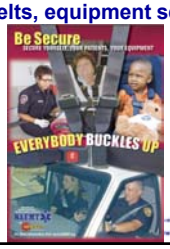
MedStar Ambulances Will No Longer "Run Hot" When Transporting Cardiac Arrest Patients (4/21/2010)

- "MedStar ambulances will no longer 'run hot' - when paramedics inside are giving chest compressions to patients in cardiac arrest, officials say." This "policy, which took effect Friday, will affect about 1,400 of the more than 100,000 calls to which MedStar responds annually in the 15 Tarrant County cities it serves."

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



The Relationship between Ambulance Crashes and Emergency Medical Technician Age

Jonathan B. Shubnik and Kyle Porter

The National Registry of Emergency Medical Technicians, Columbus, OH, Big Ohio State University, Columbus, OH

ABSTRACT

Objectives: Ambulance crashes can have devastating effects on the community. Driver safety and crash prevention programs would help reduce the number of ambulance crashes. However, there is little research describing if there are subpopulations within the emergency medical services workforce where preventive strategies should be targeted. This study intends to determine which emergency medical technicians (EMTs) have an increased chance of involvement in an ambulance crash.

Methods: In 2004, a cohort of nationally registered EMTs and paramedics were asked to report if they had been involved in an ambulance crash. Respondents also answered several demographic questions including age, community size, service type, call volume, and time spent in an ambulance. Exploded bivariate analysis were EMTs who reported, "I have never worked as an EMT" or had missing data for one or more explanatory or response variables. A multivariate logistic regression model was used to identify variables

Conclusions: When controlling for call volume and ambulance time, the odds of having been in an ambulance accident within the past year were significantly higher for younger EMTs. Future studies should investigate the effects of various interventions such as increased field supervision or driver safety training programs on the driving performance of younger EMTs.

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Safety is Good Business

Are you self insured???

Very Scary insurance data – the $10 million dollar EMT

Year	Payroll $million	Modified Premium $1,000	Incurred Indemnity $1,000	Incurred Medical $1,000	Total Claims #
2003	14.1	540	885	9,925	93
2002	12.6	547	266	255	78
2001	11.3	454	88	128	55
2000	10.6	420	63	194	89
1999	10.1	405	115	117	56
1998	9.6	411	13	30	51

Workers Compensation Rate increased by 27 %

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A problem

2007 Insurance data –

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

2003 Insurance data –

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

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Expensive….

The Huntsville Times

Ambulance suit gets $3.1 million

Meridianville teen killed in wreck with speeding vehicle

Tuesday, May 01, 2007

By DAVID HOLDEN
Times Staff Writer david.holden@times.com

A federal jury awarded $3.1 million in damages Friday to the family of a Madison County woman who was killed in a collision with a speeding ambulance from Tennessee in 2005.

A felony charge of manslaughter is still pending in Madison County Circuit Court against the ambulance driver, Charles Christopher Eakes of Tennessee.

Dianna Christine Bowden, 18, of Meridianville died in a two-vehicle crash Oct. 13 involving the ambulance owned by Lincoln County Medical Center Emergency Services. The wreck occurred around 9:45 p.m. at U.S. 231/431 and West Limestone Road, about seven miles north of Huntsville.

Very Expensive

Law & Justice & ambulances — firegeezer on 30 Sep 2008 09:10 am

$24 Million Judgement Against AMR

AN ALAMEDA COUNTY, CALIFORNIA, JURY ORDERED AMERICAN MEDICAL RESPONSE (AMR) to pay nearly $24 million damages to a man who was permanently paralyzed after a traffic accident involving one of their ambulances.

On April 16, 2007, Louis Del Barba, 85, was driving his auto and making a turn when he was broadsided by the ambulance. The ambulance's speed was measured at 65 mph in a 35 mph zone. Experts agreed that such a speed, in rush hour conditions, was reckless and unsafe.

A press statement released yesterday by the plaintiff's lawyers stated:

Mr.

Del Barba had the right of way and was wearing a shoulder and lap seat belt when the crash occurred. As a result of the accident, he received numerous traumatic injuries and is paralyzed completely, save for some movement of his head and left arm. He is constantly dependent on a ventilator.Doctors believe that he can return to his 110-year-old family home if there are funds to fit a room for medical care. The jury felt strongly that Mr.

EMS CANNOT Afford to keep paying out like this….

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And very Predictable…

- Intersections are lethal environments

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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…..

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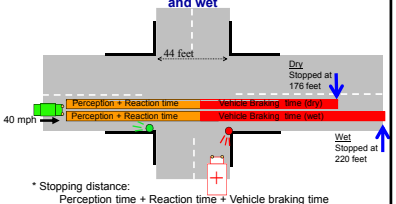
The real world

Intersection passenger car stopping distance* at 40 mph dry and wet



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

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Testing the real world

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

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A few key words about restraint systems…

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Dynamic Sled Testing of Ambulance Pediatric Restraints

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Deceleration Sled test
(upon impact) 24 G, 30mph

Levick NR, et al. Development and Application of a Dynamic Testing Procedure for Ambulance Pediatric Restraint Systems, SAE Australasia 1998;58:2-45-51

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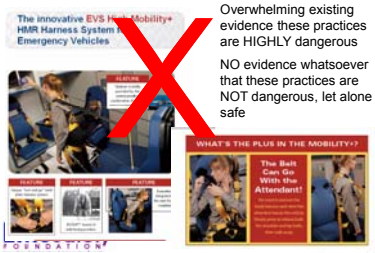
Systems safety failure AND dangerous



Overwhelming existing evidence these practices are HIGHLY dangerous

NO evidence whatsoever that these practices are NOT dangerous, let alone safe

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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

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Side facing 4-point harnesses demonstrated to be lethal, even at slow ground vehicle speeds

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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 over both shoulders for sidefacing occupants are potentially lethal – and in NO WAY SUPPORTED BY ANY DATA OR INDEPENDENT AUTOMOTIVE SAFETY EXPERTISE

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What do we know now??

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

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Air EMS is a role model for safety initiatives and focus

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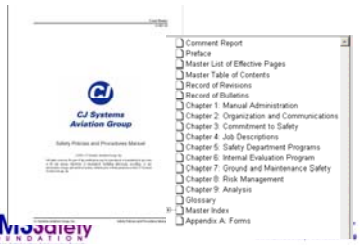
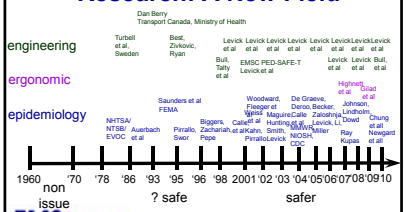
An Aviation Safety Plan



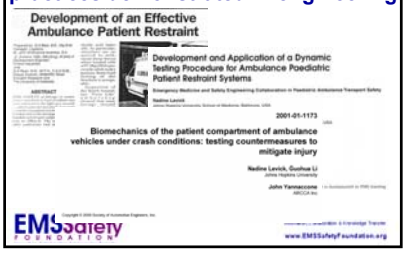
Air Safety Approach

- Safety Program Planning
- Evaluating
- Analysis of Safety Performance
- Analysis of Safety Information and Data
- Analysis of Risk Profiles and Plans

Ambulance Safety Research: A New Field



We should use the best safety practices demonstrated in engineering



…in automotive safety engineering

and in ergonomics

August 11, 2011

Online Annals:
http://www.ncbi.nlm.nih.gov/pubmed/21834620

Priorities…… Research papers

in the past 30 years

- EMS Safety
  - 43 papers - on ambulance safety
  - 2 papers - on ambulance ergonomics
  - 1 paper – on stretcher ergonomics
- Computer Workstations
  - 30,000 papers – on ergonomics of computer work stations
- Erectile Dysfunction
  - 100,000 papers – on Erectile Dysfunction

Ambulance Safety Research: A New Field

- Funding??

DOT Funding for Reptiles and Road Kill

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Deer me! … or is that duck?!

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Not all deer jump in….

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Moving Patients

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Your back… – 1880's

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2011… but these can really hurt your back too!

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EMS Ergonomist Chris Fitzgerald addressing the EMS Safety Foundation Workshop

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The science of Stretcher lifting & loading

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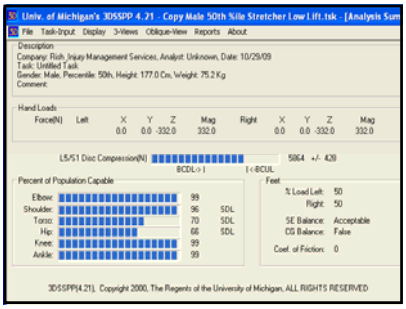
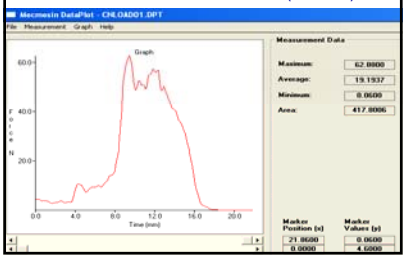


Stretcher Load - # 1 (CNLOAD01)



So whats important..

- A stretcher system that doesn't harm your back… and your services wallet
- The new Mondial Ferno
- A 27 inch loading height

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And what is the loading height of your ambulance??

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Size matters…. Less than 27 inches will save your back!!!!

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2011….

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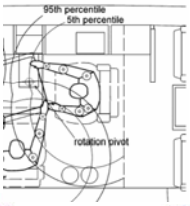
Range of reach.. This is a well defined technical science



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‘Workplace’ Hazards

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Bigger is not necessarily better……

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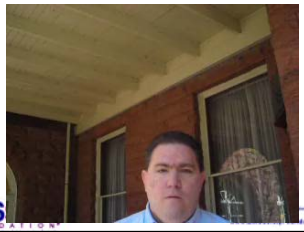
Carl Craigle EMT-P, Chief Platte Valley Ambulance, CO



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Rollover Crash Kills Medical Technician

Ambulance Runs Off I-66 and Rolls Over, Injuring Two Employees and a Patient

It does happen….

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But what about head protection?

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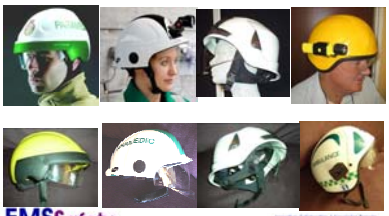
New EMS helmet prototypes



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Which of these two vehicles would you want?

Sprinter v Ford Transit crash test

http://www.youtube.com/watch?v=C3kN6WF5vAA&feature=related

Sprinter V Transit Crash Test

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

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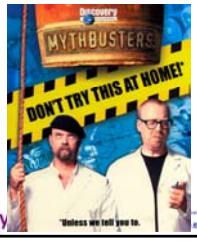
And now for some MYTH BUSTING



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'Safety' approaches being driven by manufacturers claims and sales rather than by science and data

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Rash of "Safety Concept" vehicles….. Devoid of substantive automotive safety engineering input or testing

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Yet another potentially lethal example marketed as a 'safety innovation' YET outside of automotive safety practice

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Were they on drugs…?

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Airbags in the back….?? Hazardous for this environment

Absent safety testing standards, any meaningful crash or injury mechanism data or effective occupant positioning – as per the automotive engineers, rear compartment airbags are likely to be highly hazardous

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"Our design features ar focused on improving the safety of the patient compartment, and side ro protection in Horton ambulances helps re ce the threat of a fatal injury if a rollover occurs."

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Airbags ….??

Absent safety testing standards, any meaningful crash or injury mechanism data or effective occupant positioning – rear compartment airbags are likely to be hazardous

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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

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October 2008 JEMS Article "Rig Safety – 911"

http://www.objectivesafety.net/JEMSRigSafety911.pdf

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Ambulance Vehicle Standards??

- KKK?
- AMD?
- FMVSS?
- CMVSS?
- NFPA?
- SAE…?
- ASTM…?
- International
  - ASA
  - CEN

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Global EMS Vehicle Safety Standards v Specifications and Guidelines

- EMS Safety and Performance Standards
  - Australia & New Zealand 4535
  - Common European Community (CEN) EN1789
- Non EMS Specific USA Standards
  - [Aviation - FAA/CAA/JAA]
  - [Fleet vehicles - ASSE/ANSI Z15]
- USA Other
  - Purchase Specification: KKK
  - "Standards" - NTEA – AMD, ASTM F 20, NFPA (devel)
  - Guideline: EMSC Dos and Donts, and (ASTNA, CAAS and CAMTS)

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American National Standard ANSI/ASSE Z15.1-2006

Safe Practices for Fleet Motor Vehicle Operations

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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

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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.ntea.com/WorkArea/downloadasset.aspx?id=1352

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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.ntea.com/WorkArea/showcontent.aspx?id=1350

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NTSB 1979… and 30 years later and still the same problem

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: May 17, 1979

The interior of the ambulance body was severely damaged. The flooring, oxygen bottles, litter, cabinets, and bench were either destroyed or ejected from the ambulance. Because the plywood flooring was not secured to the floor or chassis, everything attached to or resting on it came loose when the ambulance rolled over. All body structures were deformed downward and to the right.

A review of the Federal Motor Vehicle Safety Standards (FMVSS) revealed that there are no standards or specifications which ensure that the total design and construction of ambulances as modified by the after-market installers are of sufficient structural strength and stability to withstand impact forces similar to requirements imposed on the original vehicle manufacturer. FMVSS 208, "Occupant Crash Protection in Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses," applied to the 1974 Chevrolet Suburban Custom 10 Van as manufactured. However, this protection was not extended to the patient(s) or medical personnel occupying the body of the ambulance since it did not apply to the modifications made after the vehicle was sold by the manufacturer.

There are no performance requirements for the after-market modifications as vehicle structural integrity, crashworthiness, interior occupant protection, and the anchorage of items such as litters, benches, cabinets, oxygen bottles, or flooring. The only guidance concerning these safety

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USA Ambulances: FMVSS Exempt

DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration

49 CFR Parts 571, 572, and 589
[Docket No. 92-28; Notice 7]
[RIN No. 2127-AB85]

Federal Motor Vehicle Safety Standards;
Head Impact Protection

S6.1 Vehicles manufactured on or after September 1, 1999 and before September 1, 2002. Except as provided in S6.3, for vehicles manufactured on or after September 1, 1999 and before September 1, 2002, a percentage of the manufacturer's production, as specified in S6.1.1, S6.1.2, S6.1.3, or S6.1.4, shall meet the requirements specified in S7. At the target locations specified in S10 when impacted by the free motion headform specified in S9 in any speed up to and including 24 kilometers per hour. The requirements do not apply to any target that cannot be located using the procedures of S10. The phase-in schedule the manufacturer chooses to use during this period shall be reported to the National Highway Traffic Safety Administration pursuant to 49 CFR 583.4.

S6.2 Vehicles manufactured on or after September 1, 2002. Except as provided in S6.3, vehicles manufactured on or after September 1, 2002 shall, when tested under the conditions of S8, comply with the requirements specified in S7 at the target locations specified in S10 when impacted by the free motion headform specified in S9 in any speed up to and including 24 kilometers per hour. The requirements do not apply to any target that cannot be located using the procedures of S10.

S6.3 A vehicle need not meet the requirements of S6.1 through S6.2 for

(a) Any target located on a convertible roof frame or a convertible roof linkage mechanism.

(b) Any target located rearward of a vertical plane 500 mm behind the seating reference point of the rearmost designated seating position.

(c) Any target located rearward of a vertical plane 500 mm behind the seating reference point of the driver's seating position in an ambulance or a motor home.

(d) Any target in a walk-in van-type vehicle.

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DOT/NHTSA; FMVSS 49 CFR Parts 571, 572 & 589 Docket no. 92-28; notice 7

www.EMSSafetyFoundation.org

Occupant protection……?? July 2007

May 13, 2010

May 13, 2010

Email | Print | Comment | Register | Bookmark | RSS | What's This

2 killed in Iowa ambulance crash

2 dead and 3 injured in collision Thursday

KCCI.com

BOONE, Iowa -- A paramedic with significant injuries remains in critical condition after a crash in Boone County.

Rescue crews arriving on the scene said the paramedic, Wendy Baker, told them her co-worker in the back of the ambulance was dead. Baker then continued to move back and forth treating the patient in the back of the ambulance as well as the driver.

"She was working so hard I had to physically remove her from the ambulance scene because she didn't want to give up her patients," said Boone County Deputy Brian Pontius. "I don't even know her name."

KKK/AMD – static 'safety testing'

- Ignorant of automotive safety principles – and specifies -
  - 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.

KKK Specification and AMD Standards both default to the FMVSS for safety – however..

- FMVSS has a specific exemption for ambulance vehicles once you are 600mm or 2 feet positioned rearward of the driver
- KKK require a **'national test lab'** to conduct AMD 'tests' BUT NOT an automotive test lab!
- No dynamic impact tests AT ALL
- No crashworthiness tests

Ridiculous current 2009 USA ambulance '*safety testing*' !?!? – Is NOT consistent with accepted automotive safety practice…

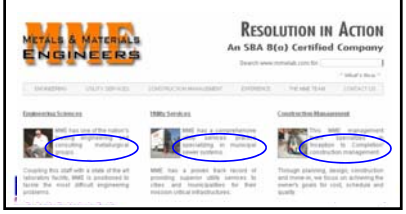
No 'a'… then NO 'F' !!!!!

- $F = ma$

where F – force
m – mass
a – acceleration

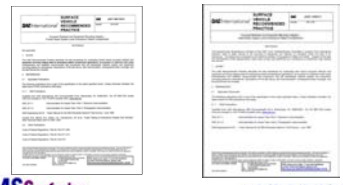
Sir Isaac Newton (1642-1727), Philosophiae Naturalis Principia Mathematica (Mathematical Principles of Natural Philosophy), published in 1687. http://en.wikipedia.org/wiki/Newton's_laws_of_motion

Yes a "nationally recognized testing lab" – BUT - NOT an automotive/occupant safety crash test lab!!



SAE Ambulance Equipment mounting testing standards

Frontal Impact SAE 2917, published May 2010
Side Impact SAE 2956, published June 2011



Best Practices?

EMS Best Practice, Sept 2006

Q: What can emergency services leaders do in their own organizations to promote ambulance safety?

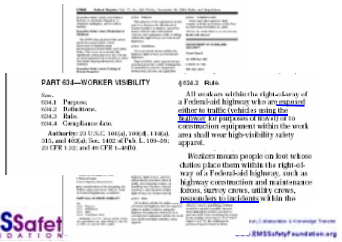
...sonnel Not Buckling up

www.EMSSafetyFoundation.org

Hmm…

It isn't like this in the rest of the world

Worker visibility Act: November 24th 2008


PART 634—WORKER VISIBILITY

§ 634.2 Rule.

All workers within the right-of-way of a Federal-aid highway who engaged either to traffic (vehicles using the highway for purposes other) or to construction equipment within the work area shall wear high-visibility safety apparel.

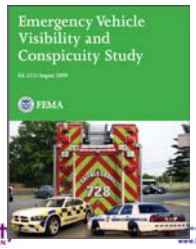
Workers means people on foot whose duties place them within the right-of-way of a Federal-aid highway, such as highway construction and maintenance forces, survey crews, utility crews, inspectors, to including within the

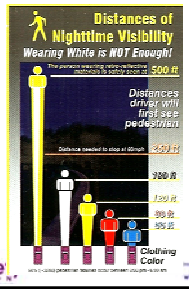
Day visibility

Night visibility

Here's the real world at 6 ft…

August 2009 – Visibility review





Policy and practice ignorant of existing technical safety data

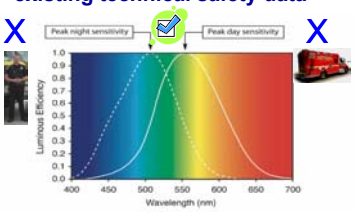


Figure 1. The scotopic (dashed line) and photopic (solid line) luminous efficiency functions, describing the spectral sensitivities of night and day vision, respectively.

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*

Color-blindness affects 10% of the population

- As seen with normal vision

- As seen with color blind vision

Emergency Vehicles – Viewer Awareness

For a timely, appropriate and safe response

- Location
- Size
- Shape
- Speed
- Intended path

- Having access to that technical knowledge supports changes to improve safety practice

Muskoka EMS - Canada

Old design

New design

Muskoka EMS - Canada

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

Innovation

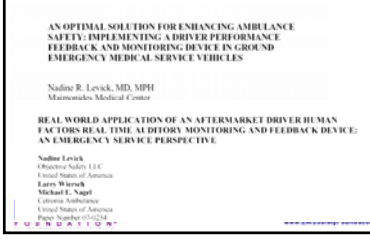
Safety concepts out there now

- Driver feedback technologies
- Tiered dispatch
- Enhanced ambulance vehicle design
- Intelligent Transport Technologies – ITS
- New platforms for interdisciplinary exchange
- New Safety Standards

Transport performance

- Driver training?
- Real time safety performance outcomes?

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
Larry Wiersch
Michael E. Nagel
Cotronia Ambulance
United States of America
Paper Number 07-0234

Invehicle technologies to enhance transport safety

- Aftermarket in vehicle electronic e-safety devices with monitoring and feedback

Human Interface approaches

-

- Hardware fitted to the vehicle
- Non hardware App Driven cellular technology

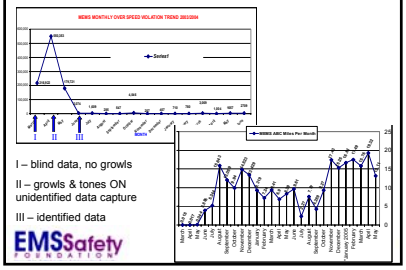
The "Feedback box"

Driver behavior monitoring and feedback device

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

Demonstrated Effectiveness



I – blind data, no growls

II – growls & tones ON unidentified data capture

III – identified data

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And when a rare crash happens….

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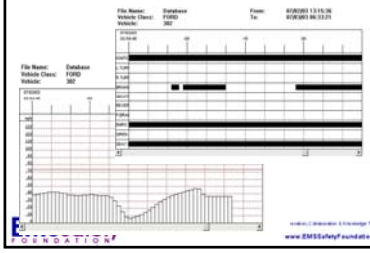
Unit 302 Accident



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Monitoring and feedback devices

- Implementation well received by the providers.
- 20% cost saving in vehicle maintenance within 6 months.
- No increase in response times
- Fewer crashes and less severe crashes
- Sustained improvement in safety proxies, with no inservice or retraining after the initial introduction period.

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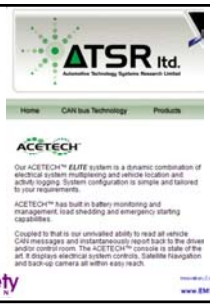

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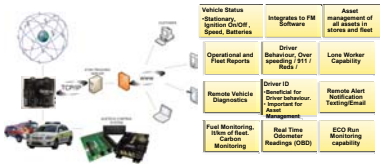
ACETECH™ Auto Vehicle Informatics (AVI) key features



ACETECH

THE ACETECH™ AVI advantage

- **ACETECH™ AVI – Vehicle Informatics**

- Know where your vehicles are
- Dispatch the closest, most appropriate unit.
- Improved productivity
- Reduce fuel expense
- Reduce carbon emissions
- Reduce response times
- Reduce risk (shorter response)
  - ✓ Fewer collisions
  - ✓ Reduced injuries
- Plus: Panic /emergency button to alert to operations

ACETECH

ACETECH AVI

- Fleet Summary
- Journey Report
- Fleet Battery
- Fleet Utilisation
- Speeding Report
- Fleet Incident Report
- Fleet Response Times
- Emergency incident Report
- Engine Idle Report
- Fuel Usage and Cost
- Event Notification
- Shore Line Charge Usage - Cost on Grid

ACETECH

Telematicus

- "Learn"
  - All Trips recorded (start trip/stop trip)
  - Established the benchmarks
  - Alarm Active
- "Guide"
  - Speed feedback activated
  - Driver Clinics
  - Automated Application update
- "Sustain"
  - Messaging
  - Incident Management
  - ISA

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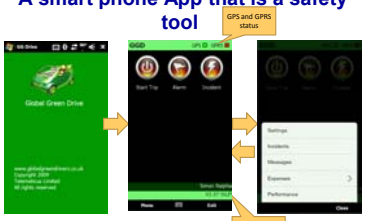
GGD views

A smart phone App that is a safety tool



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Example scorecard of comparative driver performance from the ggdrive business application™.

The scorecard is created using telematics data from dedicated on-board telematics device and [illegible] format against [illegible] breaks.

Example trip trace from the ggdrive business application™.

This trace is automatically created using GPS data send from gg drive and can be used to analyse speed, distance, acceleration (deceleration), and time during the trip.

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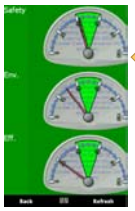
GGD Smartphone views



Driver's Individual performance against company set performance targets in the system

- Needle points to individual driver performance against targets
- Green area represents the difference between standard and stretch targets
- Goals can be varied by region, market, team as required
- Performance is updated and presented in real time.

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How did the UK pilot drivers perform??

Name	Total distance (Miles)	Total number of trips	Distance per Trip	All Breaking <-0.8	Harsh breaking <-4.0	Severe Harsh breaking <-4.6	Breaking/ 1,000 Mile	Harsh breaking/ 1,000 Mile	Severe HB/1,000 Mile	Break/Trip	Harsh breaking/ 100 Trips
Driver 9	11,972	194	62	16,066	25	16	1341.96	2.09	1.34	83	12.89
Driver 2	12912	394	33	5,217	19	7	404.04	1.47	0.54	13	4.82
Driver 11	7,433	136	55	5,164	7	5	694.74	0.94	0.67	38	5.15
Driver 10	5,733	96	60	2,169	5	1	378.34	0.87	0.17	23	5.21
Driver 6	6939	261	27	9,254	6	3	1333.62	0.86	0.43	35	2.30
Driver 8	2,365	47	50	768	2	1	324.74	0.85	0.42	16	4.26
Driver 1	9179	144	64	9,972	7	3	1086.39	0.76	0.33	69	4.86
Driver 13	7,337	321	23	2,000	5	4	272.59	0.68	0.55	6	1.56
Driver 4	7,556	164	46	1,463	4	1	193.62	0.53	0.13	9	2.44
Driver 3	9,479	231	41	2,394	5	2	252.56	0.53	0.21	10	2.16
Driver 12	5,497	63	87	1,516	1	1	275.79	0.18	0.18	24	1.59

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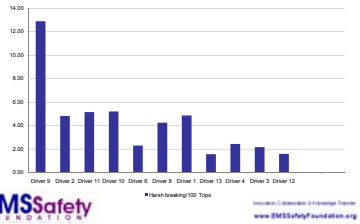
Harsh Braking per 100 trips



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

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TRB TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES

October 29, 2009 TRB Summit

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

- The realm of burden and benefit
  - measuring the safety of the system
  - determining the economic, ethical and risk benefit challenges
- Transport System Management
  - fleet safety and oversight technologies and policies
  - operations management – dispatch, congestion routing, deployment of resources, benchmarking
- Vehicle safety
  - occupant protection design and testing
  - Vehicle performance safety
  - vehicle and personnel human factors issues
- Dissemination and Policy
  - Knowledge transfer
  - Standards, specifications and policy

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Its out there NOW

- TRB 2009 Summit – addressed the key and interdisciplinary issues, in one day – please seek that information out.
- There have been two TRB Summits held, 2008, 2009 and both with vehicle engineering and transportation systems technical expertise
- See www.trb.org, and for the Summit archives: www.objectivesafety.net/TRBSummit2008.htm www.objectivesafety.net/TRBSummit2009.htm

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Independent Technical Expertise

- The "kitchen design" is completely unacceptable and a failure in health care delivery, occupant protection and ergonomics.
- Independent technical expertise must be here and involved

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2011 TRB Summit

- Safety Strategies and Solutions Summit
- To be held on site DC and online Dec 12
- Auspices of the National Academies of Science, Medicine and Engineering

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The EMS Safety Foundation

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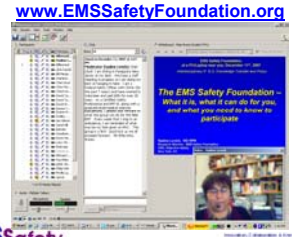

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EMS Safety Foundation

- Established in 2008 to fill a gap in
  - technical knowledge transfer
  - practical interdisciplinary R & D
  - evaluation and implementation of system safety enhancements for EMS and Medical Transport
- It is a not-for-profit institute

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Mission

- This is a team of like minded innovators across EMS Medical Transport and a number of technical disciplines, who share the common mission of enhancing the safety of EMS delivery for all involved.

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The EMS Safety Foundation: A practical and functional model

Interdisciplinary and Operational and International

- Innovation
- Collaboration
- Knowledge transfer

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R & D "Ripoff and Duplicate"

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

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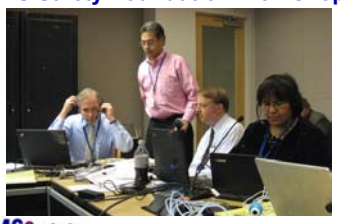
EMS Safety Foundation Ambulance Vehicle & Ergonomics Workshop, October 2009

Automotive engineers addressing EMS Safety Foundation Workshop



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EMS Safety Foundation Ambulance Innovation Workshop and Design Clinic

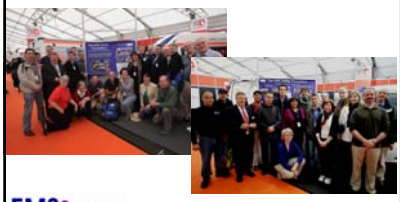
Session A
Vehicle Safety and Occupant Protection
Gene Lukianov
Session B
Hands-on human factors operational safety and task analysis
Chris Fitzgerald

October 2nd, 2010

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 seeking out International Innovation



Rettmobil 2011 – May 11-13th

RETTmobil is -

- A major European Emergency Rescue Congress, Trade show and Symposium
- Held in Fulda, Germany
- Established in 2001
- Attended by ~ 20,000 attendees
- Brainchild of Prof Peter Sefrin

EMS Responder Rettmobil 2010 Delegation

http://www.emsresponder.com/web/online/Safety/Live-From-RETTmobil/25$13137

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Vehicle Occupant Safety design

European design

Safety technology is a key focus

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Safe and Ergonomic design

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Patient Transferring Slides

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Ergonomic layout and equipment

Flexibility to manage two patients

PodCasts - with Kyle Bates in 'First Few Moments'

- Latest Podcast - Chris Fitzgerald, our EMS Safety Foundation's Director of Human Factors and Ergonomics shares some key points on lifting and moving patients and equipment - http://firstfewmoments.com/?p=742
- Rettmobil 2011- Nadine Levick Onsite Podcast http://firstfewmoments.com/?p=694
- Rettmobil 2011 - podcast with Chris Fitzgerald and the DorsaVi team - http://firstfewmoments.com/?p=714

- **Guest Technical Expert**
  - Jonas Liden, Industrial Design, Sweden

the result of the frequency analysis, green dots mark equipment used every time the ambulance is driven, orange

EMS World Expo 2011

Chris Dick

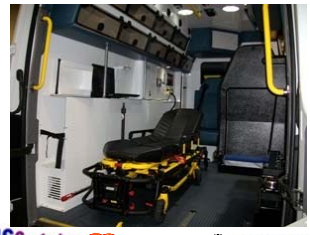
- Deputy Chief
- Western Eagle County Ambulance District, Colorado

From this… October 2010

To this, in September 2011!

Texas - Careflite's new vehicle

Careflite's new vehicle



Manitoba's new fleet

The new Oslo Ambulance

EMS SAFETY COURSE

National Association of
Emergency Medical Technicians

NAEMT

Course Design

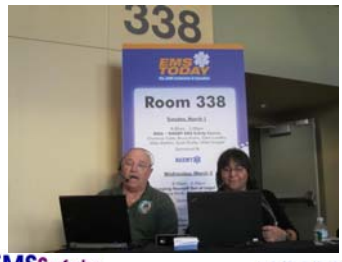
- One-day program
- Interactive lecture, discussion, group activities
- Case studies using real incidents
- 8 hours continuing education credit (CECBEMS)
- Presented in 8 modules

NAEMT EMS Safety Course

For more information about the course, including how to find a class in your area or to sponsor a class

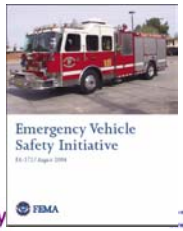
call 1-800-346-2368
(1-800-34NAEMT)
www.NAEMT.org

or email info@naemt.org



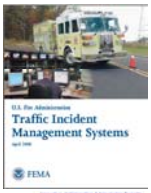
Tips for Emergency Vehicle Operations

USFA Emergency Vehicle Safety Initiative

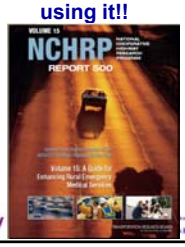


Traffic Incident Management Systems (TIMS)

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



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



Technical Collaboration is key

- We are NOT the experts in this science
- We cannot afford to play the silo game here, it is costing lives, time and money
- We MUST have a meaningful evidenced based approach to design, operations and policy
- We must be outcomes driven

this vehicle is safety crash tested by automotive experts

Unlike this vehicle

So….

- Which vehicle do you want to be in ?
- Which vehicle is the best for efficient, and effective patient care?
- Which vehicle provides optimal risk management ?
- What is the optimal fleet mix?

Fleet Mix ?

Were we safer in the Cadillac???

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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

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Risk/Hazards

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

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Goals

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

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Safety Management

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

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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

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Future

- Meaningful Goals
- New policies
- New practices
- New standards
- New vehicles
- New technologies

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Conclusion

- EMS transport has serious hazards and safety issues
- Major advances in EMS safety research, infrastructure and practice over the past 5 years
- Development of substantive EMS safety standards is a necessity and a reality
- Multidisciplinary safety issue that EMS cannot solve internally
- Failure to transfer knowledge from transportation and automotive safety is unacceptable and dangerous
- EMS is still way behind the state of the art in vehicle, transportation and occupational safety

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And….

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

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Thank you!

Any Questions??

Electronic handout and resources available online

http://www.objectivesafety.net

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