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

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

Firstly!
An accident?
or a predictable and preventable event

http://www.objectivesafety.net

A tragic emergency health care intervention outcome
It does happen....
A devastating tragedy...

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

Ambulance Transport Safety

- Emergency care, public 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

In a nutshell

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

Safety oversight of what and .... by whom

- Vehicle Safety
- Vehicle Design
- Transportation systems safety
- Safety Equipment Design
- Vehicle and Safety Equipment Testing and Standard development
- Safety policies

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

- USA EMS data

- In the USA*
  - ~50,000 vehicles
  - ~5,000 crashes a year
  - One fatality each week
  - ~20 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

- October 2008 JEMS Article “Rig Safety – 911”

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

- 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

- 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
- Restrainting devices/seat
- Transporting device/gurney
- Paramedics/transport nurses, doctors & family
- Patient monitoring equipment
- Clinical care & interventions
- Protective equipment
- The vehicle
- The demanding skill
- Other road users
- The road

The Emergency Department (ED)

An ambulance is not an ED / ICU on wheels

Thursday July 5th 2007 …

Paramedic Allan Parson’s killed

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

five killed in crash of ambulance and semi

2 weeks later... Friday July 20th 2007
The worst ambulance crash in USA history
June 17th, 2008
a paramedic and a patient killed

In this vehicle...

January 10, 2008

This is not a crashworthy environment

Jan 28th, 2008

April 20, 2008...

May 19th, 2008

April 20, 2008

In Sussex crash involving ambulance

Kill on the Go: School Bus Hits Ambulance — New York

A 48-year-old driver lost control of a school bus and collided with an ambulance in New York City, killing a 7-year-old girl and wounding several others. The driver, who had a history of traffic violations, lost control of the bus and hit the ambulance head-on. The accident occurred near a school in the city's Queens borough.

The driver was later arrested on charges of reckless driving and vehicular manslaughter.
**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...”?**

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.

**Absence of standards and oversight**

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

**Unique workplace**

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

**1960 to 2009**

- A passenger vehicle - sure.
- A laundry or mail truck??
“Ambulance transport has a death toll….”
Carl Craigle EMT-P, Chief Platte Valley Ambulance

IMPORTANT
ADVISORY
Due to respect for the wishes of the families of medics killed in the line of duty there is to be NO PHOTOGRAPHY of any aspect of the images in this presentation - that is NO video, NO photography, NO digital images of any type.

But what about head protection?

Role of a head protective device
A simple, immediate and inexpensive adjunct – a protective device –
- To protect occupants from hazardous interiors
- As vehicle crashworthiness design advances
- As driver training advances
- For when equipment becomes unsecured
- As EMS Safety Standards are developed, for both EMS vehicles and EMS occupational safety

New EMS helmet prototypes for 2007-2009

Problems
- No Standards
- Unique safety and hazard protection needs
- A number of less than appropriate devices out there
EMS Transport Safety

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

Goals

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

Ambulance Safety Research: A New Field

- Engineering
- Ergonomic
- Epidemiology

Priorities......
Research papers in the past 30 years

- EMS Safety
  - 40 papers - on ambulance safety
  - 2 papers - on ambulance ergonomics
  - 1 paper - on stretcher ergonomics
- Computer Workstations
  - 30,000 papers - on ergonomics of computer workstations
- Erectile Dysfunction
  - 100,000 papers - on Erectile Dysfunction

Funding??

Not all deer jump in....

So for EMS personnel...

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

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

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

The EMS Safety Foundation

http://www.emssafetyfoundation.org

Background:

- EMS Safety Foundation has been established 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

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.
In a nutshell

- EMS Safety Foundation is a not-for-profit multidisciplinary virtual think tank and test bed for safety innovation and knowledge transfer
- It is a virtual network integrating the end users and the technical experts
- A tool to enhance the safety of delivery of EMS services

EMS Safety Foundation International 2009 Interdisciplinary Delegation

- Business case for safety
- ROI – outcomes data
- Comparative fleet and vehicle economics
- Ambulance Equipment list
- Update on NFPA, SAE and ISO standards
- Some safety design issues
- FEMA Visibility Document
- New EMS Safety Foundation developments
- October Workshop outline & logistics
- October TRB Summit agenda & logistics

Last weeks EMS Safety Foundation Webinar covered

Matt Crossman – New Brunswick

Fleet/Vehicle Options and Approaches

Crash costs (direct + indirect)

- Direct Costs:
  - Cargo Damage
  - Vehicle Damage
  - Medical Costs
  - Replacement Property
  - Administrative Costs
  - Police/Fire
  - Possible Effect on Cost of Insurance
  - Possible Effect on Salary
  - Medical/Insurance
  - Training Costs
  - Storage of Damaged Vehicle

- Indirect (Hidden) Costs:
  - Lost Sales
  - Non-Contributing Employees
  - Lost Time
  - Lost Product
  - Lost Ability to Apply for Employment
  - Loss of Personal Property
  - Lost Sales
  - Loss of Public Relations
  - Loss of Access to Market
  - Damaged Equipment Downtime
  - Replacement Property
  - Replacement Property
  - Accident Reporting
  - Medical/Insurance Paid by Company
  - Poor Public Relations/Publicity
  - Increased Medical/Insurance Costs
  - Government Agency Costs

Crash costs (direct + indirect) consist of any or all of the following:

- Direct Costs:
  - Subject Hospital Costs
  - Lost Sales
  - Non-Contributing Employees
  - Lost Time
  - Lost Product
  - Lost Ability to Apply for Employment
  - Loss of Personal Property
  - Loss of Public Relations
  - Loss of Access to Market
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Federal Motor Carrier Safety Administration (FMCSA) Research

FMCSA Crash Cost Table


Matt Crossman – New Brunswick

Sent: Monday, July 20, 2009
Subject: Mercedes Sprinter Question

Nadine,

Do you know of any EMS provider in the US who has ordered a Sprinter ambulance designed to European standards? Do any US manufacturers currently have anything remotely resembling one built to European standards?

I would like to go after some grant money for a Sprinter that has at least forward facing, SW engineered seating and no clutter in the attendant area. I am on a short timeline. Any contact info you can provide or recommendations for a manufacturer would be helpful.

Thanks so much!

Chris

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Chris
Chassis issues JEMS August 17th

The Ford F-350/F-450 Diesel cab/chassis will have the SCR system.

The Dodge RAM 4500 Diesel cab/chassis will have the SCR system.

Sprinter will offer the 2500 SRW diesel with SCR. (Cost for this chassis is in the low $40s; however, it appears to have a significant advantage in fuel and operating costs.)

GM

The GM C-3500 has an inadequate GVW capacity for ambulance applications.

Navistar has made a decision to stay diesel (Models 4100/4300/4400) and will use only the advanced EGR. The cost for the emission compliance is estimated to be the same as SCR.

Freightliner has made a decision to stay diesel and will use an SCR System (the Freightliner M2 106 series chassis). The Sprinter G3500 Cargo Van is no longer useable as an ambulance chassis effective with the 2010 model year. In the future, Sprinter will use a new diesel platform.

The Econoline Gas Ambulance Package with 6.8L V-10 will be in production by Oct. 2009.

Second generation Dodge/Freightliner Sprinter by Mercedes is becoming increasingly popular, though marginally more expensive, for body builders. There are many more suppliers, and the larger engines are more reliable.

Future Ambulance Chassis Options - JEMS

2009 Position Paper Equipment for Ambulances

The government has low the retail price of diesel engines for 2009, allowing them to have a competitive advantage in the market. This is expected to lower the cost of vehicles using diesels in the future.

Emergency service agencies will soon be affected by the massive changes that are happening in Detroit. Financial condition of some of the OEM chassis manufacturers has resulted in delays due to lack of orders, weak financial structure and the availability of parts.

Currently the chassis used by EMS manufacturers is split approximately 50/50 between Ford and all others. But Van Arnam predicts that within a year, GM and others could provide a greater share of the EMS chassis based on Ford's failure to provide a diesel engine in the Econoline.

Ambulance sales down 11.4% - 6,627 ambulances sold in 2005, 5,673 were sold in 2008

Impact of New Emission Standards

As of January 2010 the Sprinter will be a Freightliner and Mercedes product in the USA.

And in Canada it will be a Mercedes product.

A list of approved ambulance builders on the Sprinter product will be forwarded.

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Equipment and Supplies
- Required Equipment
  - BLS Ambulances
  - ALS Ambulances
- Optional Equipment: BLS, ALS
- Optional Medications: BLS, ALS
- Interfacility Transport

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

ISO 39001 - Principles of RTS management systems
a) Focus on loss of life and health
b) Holistic view
c) Focus on results
d) Leadership
e) Process approach
f) Continual improvement
g) Best available information
h) Transparent and inclusive process
i) Tailored implementation
j) Systematic and structured
k) Part of decision making

Whilst a focus on safety is important – this is fundamentally an automotive and transportation issue

http://www.jems.com/news_and_articles/articles/danger_in_the_back.html
"Ambulance engineering and design need examination, too. Slattery says, "The back of an ambulance is usually not crash worthy." Future designs may want "to draw from the nautical industry" with more of the equipment secured as it is on boats and ships, he suggests…"

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

Serious concerns for the danger of these devices to be safe – there is no meaningful data to support this – and much existing data to support the potential hazards and dangers of this practice

1. Vital first step toward developing informed guidelines
2. A generalised report with an underlying awareness of numerous political and multi-agency sensitivities
3. Embraces operational diversity (Fire, Police, EMS)
4. Recognises US & selected international research
5. Key Findings / Opportunities are basic sound practice
6. ! Generalisation can lead to misinterpretation of detail
7. ! Many photos in the report display real-life examples of poor design & practice

TRB Ambulance Transport Safety Summit
October 29th, 2009
2009 TRB Summit

- Focus: whole area of ambulance transportation safety and with more indepth follow up on summit of last November
  - automotive safety, vehicle operations, dispatch and systems modeling, vulnerable ambulance transport populations (pediatrics, neonates, elderly, obese), standards and ethics
- Platform: onsite (~100) and via Webinar
- Schedule: Washington DC full day, October 29th, 2009
- Speakers: a number of technical experts from respective fields

Submit YOUR Questions to the TRB Summit Panel
http://www.objectivesafety.net/TRBSummit2009.htm

EMS Safety Foundation October 28th Workshop

- Focus: vehicle safety and design, and ergonomics of stretchers
- Platform: onsite, and via webinar
- Schedule: Washington DC, half day afternoon, Wednesday 28th October
- Speakers: Automotive and ergonomics technical expertise

EMS Safety Foundation Workshop sign up
http://www.emssafetyfoundation.org/amember/ProtectedICTEP/WorkshopReg2009.htm

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

Testing the real world

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

* Stopping distance:
  Perception time + Reaction time + Vehicle braking time
  (varies with age, skill, agility, distance, vehicle type, tire pressures, road etc)
And this all takes place in 60 milliseconds – the blink of an eye.

And now for some MYTH BUSTING:

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

A few key words about restraint systems...

NOT new technical data...


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

NOT new technical data...


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NOT new technical data...


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

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

Head ripper off Harness AND Head Strike zone hazards.
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 side-facing 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

Dangerous failures of both occupant protection and systems engineering

Bigger is not necessarily better……

NO automotive safety engineer
NO crashworthiness engineer
NO ergonomist
NO reference to ANY existing or relevant automotive safety or crashworthiness technical publications….
yet multiple occupant fatalities and injuries annually….!

The dangers of ignorance…

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

JEMS and EMS Responder ARE NOT automotive safety journals

And the reviews in them are completely inappropriate, misleading and outside of what is known in automotive safety
We should NOT TOLERATE this as it is both completely irresponsible and very dangerous .......

Ambulance Vehicle Standards??

KKK?
AMD?
FMVSS?
NFPA?

What KKK-A-1822F, AMD and FMVSS state and don't state...

USA KKK ambulance purchase specifications
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

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

KKK/AMD – ‘safety testing’
Ignoreant of automotive safety principles – and specifies that a ‘successful test’ is -
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.

2009 USA ambulance ‘safety testing’ ??!
Not consistent with accepted automotive safety practice...

USA Ambulances: FMVSS Exemption
Propaganda that kills...

Ambulance must comply with the highest safety and performance standards applicable to vehicles in the United States. All motor vehicles operated on public roads and highways must conform to Federal Motor Vehicle Safety Standards (FMVSS) promulgated by the U.S. Department of Transportation (DOT) under the authority of the National Highway Traffic Safety Act. These standards govern the design, engineering, and production of each vehicle. They are government prescribed standards, and the overwhelming majority of those sold to the public, also must be certified to the safety requirements of the Federal Motor Vehicle Safety Standards (FMVSS). FMVSS-214, promulgated by the National Highway Traffic Safety Administration (NHTSA), requires that ambulances designs incorporate an occupant protection system that has been shown to be effective in protecting occupants from injury in real-world crashes. This system includes the use of seat belts, airbags, and other safety features. The goal of this system is to reduce the risk of injury to emergency personnel during the course of their duties. Additionally, the FMVSS-301 (aFavorite) standard requires that ambulances be certified by the U.S. Department of Transportation to meet specific performance requirements. The standard requires that the ambulance must be tested in a simulated real-world crash scenario to ensure that it meets certain performance criteria.

Occupant protection...??

July 2007

Medic Survivors Medic Fatality

No ‘a’... then NO ‘F’ !!!!!

F = ma

where

F – force
m – mass
a – acceleration

KKK certified and FMVSS exempt...?

A closer look

Its not magic... what is safe is known and understood

Increasing awareness ...

Most trucks, SUVs do poorly in whipcrash test

It's not magic, what is safe is known and understood

In a recent study, conducted by the Insurance Institute for Highway Safety (IIHS), the safety performance of various types of vehicles, including trucks and SUVs, was evaluated using a whipcrash test. The test simulates a rear-end collision and measures how well the vehicle's interior is able to protect occupants in such a scenario. The results showed that many trucks and SUVs did not perform well in this test, with some models failing to meet the minimum safety standards. The study highlights the need for improved occupant protection in these vehicles.

Increasing awareness ...

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What do we know now??

- Intersection crashes are the most lethal
- There are documented hazards, some of 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??

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

A key to safe ambulance transport

Extensive Indirect cost savings

Other monitoring devices

You want a system that works!!

Visibility and lighting issues

Hmmm...

So why is it...

It isn’t like this outside of the USA
News we don't want to see

Caught On Video: EMT Struck By Car

Worker visibility Act: November 24th 2008

So where is the science and what does it say?

August 2009 - review

Day visibility

Night visibility

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

Policy and practice ignorant of existing technical safety data
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

Muskoka EMS - Canada
Old design

New design

Muskoka EMS - Canada
Old design

New design
But whatever color ..., if you run a red light someone will be killed.

International approaches

- The state of the art non-USA vehicles have NO squad bench nor the after market structural vehicle modifications that can potentially decrease crashworthiness integrity that were seen in study vehicles.

EMS Safety Foundation Delegation bringing Rettmobil to you

The EMS Safety Foundation

Rettmobil 2009 Delegates

- Innovation Consortium
- Technical Expert Panel (TEP)
- Advisory Board

Technological Expert Panel (TEP)
- Raphel Grzebieta - Occupant protection and crashworthiness
- Martha Florey - Transport Policy
- Michael Silver - Photography
- Al Miller - Ambulance manufacturer – Miller Coach
- Neil Blackington – Boston EMS, Massachusetts
- Charlene Cobb - Sunstar EMS, Florida

Advisory Board
- Gordon Smith - Epidemiology
- Larry Wiersch - Private EMS
- Gene Lukianov - Automotive design
- Wayne Zygowicz – Municipal Fire/EMS
- Chris Fitzgerald - Ergonomist
- Deborah Lockhart – Advocacy

Research Director
- Nadine Levick

Interns
- Leo McFarland
- Chris Sparks – EMT

Corporate
- David Bennett – Pacific Helmets
- Tony Maloney – Pacific Helmets
- Arne Schauer - Dlouhy Ambulance

R & D

“Ripoff and Duplicate”

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

Mark Kessler - CareFlite

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
Standard size Stryker that will collapse to fit in small areas

This seat is rated to 10g of force will face forward provides three point belt system and will fold out of the way

Safety concept vehicle made in Sweden

A stretcher system that anyone can use

Are helmets the next step. This is actually not a new concepts in the US. Many fire departments wear them while responding already
Stretcher and platform tested to 10Gs dynamically.

A platform – ? another 2 years in concepts

Securing Bariatric Patients

SCT Transport Bed

Vehicle Outlining

Real Equipment Securing

Patient Transferring Slides

Equipment Balance
SPACE EFFICIENCY
DO WE CARRY TOO MUCH?
BACKBOARD UNDER LITTER
FORWARD FACING ATTENDANT SEATS
EACH TWIN VENTED AND MEETS STANDARDS
JUMP PACK
BACKPACK LIKE EQUIPMENT BAG CONTAINS 99% OF PATIENT CARE ITEMS
CARE IN A BAG
NO LIFTING
GERMAN MILITARY RESPONDS
EUROPEAN WHEELCHAIR CAR
WHEELCHAIR SIMPLICITY
Gene Lukianov
MRSA resistant uniforms

Professionals at the event included Al Miller from Miller Coach and Peter Dworsky from MONOC.

Roll up cabinet doors – little risk of opening during crash

Secure mounting bracket

Slide boards for obese patients

Side doors slide open instead of being hinged

Hi - vis clothing

Loading device
Different equipment storage

No over head compartments, all cabinets are reachable from a seated position

No bench seats

Forward facing crew seats

Martha Florey – Transport Policy

Rettmobil Main Drag

Last-minute technical stuff

Sprinters with EMS Delegation at the Wheel

Charlene at the Wheel
Military Rescue Vehicle

Swedish Ambulance

Conspicuity

Mobile Data Entry

Mobile Data Entry – What data do they enter? – Is this set-up safe?

Loading Patients Without Breaking Old EMT Backs

Storage and Patient Loading

Spargel mit Schinken
Innovation Workshop May 15th

Rettmobil Summary
- Avoid reinventing the wheel
- Learn from and with our international colleagues
- Bringing together the expertise to assist in guiding safer design and practice
- Multidisciplinary collaboration is essential

Wayne Zygowicz’s JEMS Blog and Article
- From Wayne’s pen to your ears –
  - “Give it a look. I think you will find some incredible innovations that we do not see here in the US. This trip was about discovery, information sharing and knowledge transfer in public safety.”
- Blog -
- Article -

Vehicle Occupant Safety design

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

Safety first - Passive Safety

Is safety crash tested by automotive experts

Unlike this vehicle

So….

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

Were we safer in the Cadillac???
Fleet Mix?

“Ripoff and Duplicate”

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

Tips for Emergency Vehicle Operations

USFA Emergency Vehicle Safety Initiative (TIMS)

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

Traffic Incident Management Systems (TIMS)

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