Rig Safety 9-1-1: What You Need to Know About Ambulance Safety and Standards
The Cutting Edge of Innovation in EMS Safety
better, safer AND cheaper

January 19, 2014
Doctor killed in latest mudslide horror

This could be you....

He sure did not expect to be in that situation when he started his shift that day

What are we going to cover today?
- Key principles of ambulance transport safety
- Ambulance safety research and data
- National and Regional Standards and Guidelines
- How to make your ambulance transport environment safer right now
- Future goals for Ambulance transport safety

Goals and Learning Objectives
- Educate on the risks to patients, transport and emergency medical service providers and the public from ambulance transport adverse events
- Identify and explore factors related to ambulance crashes and identify potential mechanisms of injury to EMS transport providers, patients and the public and expose safety myths
- Instruct providers on strategies for enhancing transport safety and reducing risk of injury to patients and providers and the public during transport

Emergency Medical Service Safety
- What are the transport and other 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 and share with our international colleagues

Who am I?
- Nadine Levick MD, MPH
  Emergency Medicine Physician and Public Health Academic, USA-Hopkins, Columbia SUNY & 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

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
Emergency Medical Services (EMS)
An important and unique transport system
- Public safety, public health and emergency service
- Is there to save lives

A lot is now possible and for less!
- Driver behavior
- Vehicle behavior
- Roadside ITS
- Fuel consumption/Economics
- Resource modeling

Goals
- Cheaper
- Better
- Safer

EMS Transport Safety
- 'patient safety'
- AND also
- 'provider' and 'public safety'

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

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

Safety of the...
- Provider
- Public
- Patient

Safety is a tool to save
- Lives
- Time
- Money
- must be evidenced based

EMS Safety timeline
- Didn’t know it was an issue – 60’s-70’s
- Knew it was an issue – but didn’t really know what to do – 80’s-90’s
- Safety technical data rolls out – past 10 years
- Change and adoption challenges – we are here now
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.

Safety Dimensions
- Safe systems – CRM / transport system safety
- Risk perception
- Fleet and operations management
- Vehicle design safety
- Scene safety
- Patient Handling
- Health and wellness

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

USA 1980’s Then… And NOW!…

USA 1980’s Then… And now…

Equipment hard to reach

Innovation Yes Now…

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

Where is the low hanging fruit?

911 Call to Hospital/ED Definitive Care Time Intervals*

In a nutshell...

- Understanding of the dangers in Ambulance Transport
- Overview of the opportunities to enhance safety

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

Your electronic 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

Your electronic handout/resource link

http://www.objectivesafety.net

Your Handout and Additional Resources
Ambulance Safety Innovation Design Module 1.0

www.INDEMO.info

EMS Safety Foundation’s new demonstration Project: Ambulance Safety INDEMO 1.0

- Ambulance Safety INDEMO 1.0, Innovation Design Module, a unique hands-on model ambulance rear compartment that is configurable so you can get the feel of being in a cutting edge rig. Integrating innovations from around the world for the north American market.
- The future that you can have right now.

EMS Today – booth 1450

Better, safer and cheaper
EMS Safety Foundation’s new demonstration Project: Ambulance Safety INDEMO 1.0

- Designs so that you can do your work with optimum safety and efficiency.
- Based on state of the art science, practice and input from the world's leading experts in automotive safety and human factors.
- Designs that are cheaper, better, safer.

Integrating structural, cognitive and tech design innovation
Next phase of the INDEMO Project
INDEMO 1.1 and INDEMO 2.0
Launched on MedStartr

Ambulance Safety Innovation Design Module 1.0
See us @booth 1450
EMS Today

EMS Expo 2013 – EMS Safety Foundation
INDEMO 1.0
Ambulance Safety Innovation Design Module
Safer, Better, Cheaper!

EMS World Expo
- Strategies and Solutions for Ambulance Transport Safety Systems
  Session 110
  Tuesday, Sep 10 2013 - Handout:
  http://www.objectivesafety.net/2013EXPOLasVegasHO.pdf
- How to Design Your Next Ambulance
  Session 610
  Wednesday, Sep 11 2013 - Handout
  http://www.objectivesafety.net/2013EXPODesignHO.pdf

What is Medstartr??
It is a platform to fast track getting you the latest developments in ambulance safety

youtube video
http://www.youtube.com/watch?v=q8kPYOzgNyQ&feature=c4-overview&list=UUQj31V_yV1cvduWyBETc80w
– taken as we were getting set up at EMS Expo
INDEMO 1.0
You can too!

MedStartr
the future that you can have right now!


December 10, 2013 Medcity News

To be presented to:
Steve Thomas
Saturday Feb 8th 10.30am
@EMS Today 2014

www.iRescU.info

iRescU Geolocation Prize

Social good
Community engagement
Crowdsourcing
Open/augmented government data
Public Health & Safety
Saving lives

Social Media Explained
• I'm thinking about finding AEDs
• I am finding AEDs
• This is where I am finding AEDs
• Why am I finding AEDs
• Still shot of me finding AEDs
• Live action shot of me finding AEDs
• God, I am good at finding AEDs
• Everyone, let's find AEDs together
iRescu, one of 10 Finalists

Please BACK US NOW too!!!!
http://www.medstartr.com/projects/303-iRescu-project
link also at www.iRescu.info

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

R & D “Ripoff and Duplicate”
- Avoid reinventing the wheel at all costs
- Where are the best practices that we need to transfer knowledge from

The EMS Safety Foundation: A practical and functional model
Interdisciplinary and Operational and International
- Innovation
- Collaboration
- Knowledge transfer

EMS Safety Foundation Ambulance Vehicle & Ergonomics Workshop

Please BACK US NOW!!!!

CLICK HERE

CLICK HERE
A System of Safety

Safe Systems Approach

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
- Public safety

Occupant Systems Safety
- Occupant Safety in EMS is driven by both operational and biomechanical systems.
- Systems Safety integrating these two issues is key
- There is interaction of occupants with the system, with each other and with available seating options and vehicle interior, equipment and operational tasks.

Safety Performance
- Measurement
- Outcomes
- Technical expertise

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

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

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?

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

12 mph (20 km/hr)?

What is a survivable impact?

E = \frac{1}{2} m v^2
v^2 = 2as

~ 30 mph - survivable

What is a survivable impact?

E = \frac{1}{2} m v^2
v^2 = 2as

~ 60 mph – not survivable

A survivable impact??

A serious problem...

July 18, 2013

Utah Medical to Stand Trial for Traffic Death

A serious problem in your work environment!!
And yes, this meets KKK or NFPA

June 6, 2013

Georgia EMTs and Patient Killed in Crash Involving Semi

August 27, 2012 - NYC

NTSB: Pilot's testing contributed to crash.

Paramedic David Restuccio killed

Fatal injuries among EMTs and paramedics, 2003-2010

Science behind Policy

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

Richard P. Feynman 1988
Patients must be in the over the shoulder harness, medics restrained in seat belts, equipment secured

Policies to protect you too!

Policy makes a difference…

DOH NYS, 2012
Advisory on patient care in a moving ambulance

Pennsylvania Department of Health Operations 123– BLS– Adult/Peds Effective 07/01/11 Protocol 123

EMS VEHICLE OPERATIONS/SAFETY
EMMCO WEST REGIONAL PROTOCOL

Criteria:

A. All EMS operations, including incident responses and patient transports.

These guidelines provide general information and "best practice" guidelines related to the use of lights and sirens by EMS providers and EMS vehicle operators during incident response and patient transport. EMS agencies may use these guidelines to fulfill the agency’s requirement for a policy regarding the use of lights and other warning devices as required by EMS Act regulation 28 § 1005.10 (l) or regions may use these guidelines in establishing regional treatment and transport protocols.

Seat Belt and Restraint Use: Seat belts or restraints will be securely fastened to the following individuals when the vehicle is in motion:

1) All EMS vehicle operators
2) All patients
3) All non-EMS passengers (cab and patient compartment)
4) All EMS practitioners (when patient care allows)
5) All infants and toddlers (these children should be transported in an age appropriate child seat if their condition allows). Children should not be placed in cab passenger seat with airbag.

e. Avoid Distracted EMSVOs

1) Distracted driving is responsible for many MVCs, and EMS agencies should assure that policies reduce the risk of a distracted driving accident.

a) EMSVOs should not view pagers, cell phone screens, text messages, or mobile data terminals or enter data into GPS devices while an EMS vehicle is in motion.

Safety Event reporting
Balance of concerns and risk during transport

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

Communicating risk

October 28, 2012

Which image of October 26th communicates better risk perception

The EMS transport process
- Communications/dispatch
- The patient
- Restraining device/seat
- Transportation device/gurney
- Paramedic/transport nurses, doctors & family
- Patient monitoring equipment
- Clinical care & interventions
- Protective equipment
- The vehicle
- The driver/driving skill
- Other road users
- The road

The Emergency Department (ED)

An ambulance is not an ED/ICU on wheels

Firstly!

- An accident?
- Or a predictable and preventable event

A devastating tragedy...
- An ETT down the wrong hole may kill your patient and be a terrible burden for the patient's family and for the medic involved
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……

A tragic emergency health care intervention outcome

It does happen…..

But what about head protection?

New EMS helmet prototypes

Head protection @ EMS Expo

Based on what is identified to date
- Choice of vehicle – ESC
- Crashworthiness of vehicle
- Layout of vehicle
- Monitoring of driver performance
- Securing of equipment
- Number of occupants
- Skill set of occupants
- Seating position of occupants
- Head protection

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

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
Ambulance Transport Safety

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

Ground Ambulance Transport Safety

- IS Complex AND Multidisciplinary
- Epidemiological Data Collection
- Risk Management
- Transport Policy
- Driver Training
- Biomechanical Research
- Safety Technology
- Regulations
- Standards
- Fleet Safety Program

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

USA EMS

- EMS Systems - >19,000
- Personnel - ~1 million (~30% F/T professional & 70% volunteer)
- Vehicles - ~80,000 (Type I, Type II, Type III, Firefighters, 7motorcycles)
- Transports - ~30 million (to Emergency Dept ~50%, <1/3 emergent)
- Cost - ~$8 Billion annually
- Safety Oversight - ? Disparate

USA EMS transport safety data estimates

- ~80,000 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

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
#NIOSH, 2003
##Ray AM, Kupas DF, Prehosp Emerg Care 2005 Dec; 9:412-415

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 Occupational transportation fatalities...

- WE HAVE A BIG PROBLEM HERE

and what is killing EMS?

USA 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


EMS Safety Foundation
August 2009 – Impaired…

Lesson 3
Making responsible decisions means getting people all… It’s important to make the difficult decisions in the right way. By making decisions quickly, you avoid getting caught up in a long process. It’s simple: you must make the difficult decisions in the right way.

A Leadership Primer from General Colin Powell, Former Secretary of State

EMS Safety Foundation
Innovation, Collaboration, Knowledge Transfer

EMS Safety Foundation
Innovation, Collaboration, Knowledge Transfer

Training... effectiveness...??

EMT Indicted On Murder Charges

LOUISVILLE, Ky. — A Louisville EMT who was driving an ambulance involved in a fatal crash has been indicted on three criminal charges, including reckless operation of a motor vehicle under the influence of alcohol.

Emergency medical technician, 36, was behind the wheel when the crash took place in April 2009. The patient inside the ambulance, Victor Whetley, 54, died of brain injuries from the crash.

How Does Technical Information Translate at an Operational Level – Perspectives from the Lone Star State

James C. Swartz, CMTE
President & CEO
CareFlite

Lesson 1: “Being responsible sometimes means pissing people off… By procrastinating on the difficult choices by trying not to get anyone mad and by treating everyone equally, you’ll simply ensure that the only people you’ll wind up angering are the most creative and productive people in the organization.”

A Leadership Primer from General Colin Powell, Former Secretary of State

EMS Safety Foundation
Innovation, Collaboration, Knowledge Transfer

EMS Safety Foundation
Innovation, Collaboration, Knowledge Transfer

Incremental Steps
Always Forward
Safer today than yesterday
System, Vehicles, Operations, Culture

What is the problem?
1) How to match culture & processes of air and ground safety
2) Absence of data, appropriate regulation and/or best practices for ground operations

WE DO HAVE TECHNICAL DATA!!!
Ambulance Safety Research: No longer such a New Field

We should use the best safety practices demonstrated in engineering and in ergonomics

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

As well as epidemiological injury data

Safety Systems, Strategies and Solutions Summit Feb 2012

TRB/Transportation Research Board

EMS Safety Systems, Strategies and Solutions Summit

2012 EMS Safety Systems, Strategies and Solutions Summit

- One Day event, 30 presentations
- Held in Washington DC, Keck Center
- Simulcast Live to EMS Today
- Live Webinar Access - globally
- Over 100 participants live across 3 continents
- Greater than 10,000 downloads of handouts within the first week!

ESV July 2009


Safety Systems, Strategies and Solutions Summit Feb 2012

- ~50 onsite – lead representatives
- Live online participation with international representation
- 7 focus areas and a panel
- >120,000 downloads of presentation handouts
- Multi-Media ‘e-document’ with QR tags
- You tube overview
What are global best practice models
Making it happen
How can we translate global interdisciplinary best practice initiatives to North American EMS

Its out there NOW
TRB 2012 Summit – addressed the key and interdisciplinary applied solutions issues, in one day – please seek that information out.
www.objectivesafety.net/TRBSummit2012.htm
There have been two prior 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

Telematics

Communication Technology trends

Rules/Policies Addressing Known Hazards

A lot is now possible and for less!

Driver behavior
Vehicle behavior
Roadside ITS
Fuel consumption/Economics
Resource modeling

Smartphone navigation devices

Federal Motor Carrier Safety Administration (FMCSA)
– Cell phone use – November 2011
– Hours of Service – December 2011
Talking increases crash risk 5x
Texting is COMPLETELY UNACCEPTABLE
23X increase in crash risk

The impaired/distracted driver
- Impairment
  - Illness
  - Exhaustion
  - Substance
  - Emotion
  - Distraction
- CELL PHONE !!!! – (A MAJOR HAZARD)
- Other technology

DOT HOS Rules
- Limits established for on-duty hours
- Establishes minimum levels of off-duty time-8 hours if on duty less than 12 hours FRA or if over 12 hours then 10 hour off-duty time
- Commercial airline pilot can fly up to 100 hrs/month
- Adopts 60/70 hour weekly maximum for truck drivers, 10 hour off-duty time

Fleet Management technologies
- ACETech/Femo
- FleetEyes – Intermedix
- Zoll rescuinet and roadsafety fleet management systems
- Marvis
- Telematicus
- Optima
- Northrop Grumman

Response, Emergency Staging, Communications, Uniform Management, and Evacuation (R.E.S.C.U.M.E.)
Linda D. Dodge
ITS Joint Program Office, US DOT
EMS Subcommittee of the TRB ANB10(5)
EMSSafety
EMS Transport Safety Summit
February 29th, 2012

Overview
- USDOT ITS Program Background
- Traffic Incident Management & ITS
- Mobility Program
- NG9-1-1 Status
- R.E.S.C.U.M.E. Status and Plans

Federal Motor Carrier Safety Administration - FMCSA
- http://www.fmcsa.dot.gov/

Nov 2011, Hand Held Cell Phone Ban
Talking increases crash risk 5x
Texting is COMPLETELY UNACCEPTABLE
23X increase in crash risk
Next Generation 911 Initiative

Long Term Goal:
To enable the general public to make a 911 “call” (any real-time communication – voice, text, or video) from any wired, wireless, or Internet Protocol (IP)-based device, to the PSAP, and enable data sharing with the emergency communication network.

Major Milestones:
• National architecture and high-level design for NG911 System
• Proof of Concept Demonstration
• Transition plan for NG9-1-1 implementation

For More Information
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http://www.its.dot.gov/

Model Inventory of Emergency Care Elements “MIECE”

USA Ambulance Standards & Testing
• KKK A 1822F: Purchasing Guideline
  “Minimum Specification and performance parameters”
• AMD-001-025: Manufacturing Guideline
• ASTM F2020-02a: Standard Practice
• NFPA 1917 Standard for Automotive Ambulances: 2013 Edition

Ambulance Standards and Testing
• Interrelated – mostly paraphrasing each other’s requirements
• Self certified

The science of Stretcher lifting & loading

And what is the loading height of your ambulance??

Size matters…. Less than 27 inches will save your back!!!!
International Ambulance Design
Safety and Occupant Protection Standards

In existence since 1999
- Australia – ASA
- Europe - CEN

AMD ambulance ‘safety testing’? – Is NOT consistent with accepted automotive safety practice...

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

The Laws of Physics Prevail...

Philosophiæ Naturalis Principia Mathematica, July 1687

New Resources
New Data
New Relationships

Summary
- New Resources
- New Data
- New Relationships

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

A few key words about restraint systems...

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

Testing the real world

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

Impact residue

CTD dynamics

During impact

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

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.

NOT new technical data…

Beware some provider restraint systems are dangerous

Range of reach. This is a well defined technical science


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


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

Bigger is not necessarily better......

Dangerous manufacturer approaches- absent any meaningful injury data, task analysis or testing standards

“design features are focused on improving the safety of the patient compartment, and side roll protection in our ambulances helps reduce the threat of a fatal injury if a rollover occurs.”

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

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

October 2008 JEMS Article “Rig Safety – 911”

http://www.objectivesafety.net/JEMS/RigSafety911.pdf

Transporting kids?

• DON’T put child in the front seat
• DON’T put the child on the rear facing captains chair

• Just about anywhere else is OK!
• Use a child seat when medically appropriate and size fits, well secured

Ambulance Vehicle Standards??

• KKK?
• AMD?
• FMVSS?
• CMVSS?
• NFPA?
• SAE...?
• ASTM...?
• International – ASA – CEN

Basically...
Golden Hour – not so hot

- March 2010
- Annals EM

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.


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

Jan 2010 - Evaluating Trauma Management Performance in Europe

Yongjun Shen, Elke Hermans, Da Ruan, Geert Wets, Tom Brijs and Koen Vanhoof

GAO-13-6


GAO findings

- Transports for all Medicare fee-for-service beneficiaries grew 33% 2004 to 2010
- Transports nationwide grew most in super-rural areas (41%) relative to urban & rural areas
- 59% increase in basic life support (BLS) nonemergency transports
- BLS nonemergency transports in super-rural areas grew the most—by 82%

Cost components

Safety is Good Business
What are the solutions?

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

EMS SAFETY COURSE
National Association of Emergency Medical Technicians

- Crew Resource Management
- Emergency Vehicle Safety
- Scene Operations
- Patient Handling
- Provider, Patient & Bystander Safety
- Personal Health

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 on how to sponsor a course,

- go to www.naemt.org, click “EMS Safety”
- call 1-800-346-2368 (1-800-34NAEMT)
- email info@naemt.org
- visit “NAEMT EMS Safety” on Facebook

Are you self insured???

Very Scary insurance data – the $10 million dollar EMT

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Workers Compensation Rate increased by 27%

A problem

2011 Insurance data –
- 35 fold more likely to have a claim based on transport than related to medical care

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

Expensive....

The Huntsville Times

Ambulance suit gets $3.1 million

- A federal jury awarded $3 million in damages to the Huntsville family of a medical technician who was killed during a 2001的一切-vehicle accident.
- The jury awarded the family $500,000 in punitive damages, or a total of $3.5 million, or $3 million in damages to the Huntsville family of a medical technician who was killed during a 2001的一切-vehicle accident.
- The jury awarded the family $500,000 in punitive damages, or a total of $3.5 million.

Very Expensive

2011 Insurance data –
- 35 fold more likely to have a claim based on transport than related to medical care

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

Very Expensive

2011 Insurance data –
- 35 fold more likely to have a claim based on transport than related to medical care

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
EMS CANNOT Afford to keep paying out like this….

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

-44 feet

Perception time + Reaction time + Vehicle braking time

Dry

Stopped at 176 feet

Wet

Stopped at 220 feet

Perception + Reaction time Vehicle Braking time (wet)

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

-Transport Medicine

Key elements to safety

- Impact Biomechanics
- Transport Ergonomics
- Fleet Safety

Impact biomechanics

- Crashworthiness
- Vehicle design
- Occupant protection

Transport Ergonomics

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

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

Safe Practices for Motor Vehicle Operations
ASSE/ANSI Z15.1 2012
https://www.asse.org/cartpage.php?fo...Z15_1_2012&adu...Z15_3_12_105_11_2012&store_media=emss

Newly Revised ANSI/ASSE Z15.1-2012 Standard is now available.
- ANSI/ASSE Z15.1-2012 Revised Standard is now available. These practices are designed for use by those having the responsibility for the administration and operation of motor vehicles as a part of organizational operations.

Z15.1 Technical Brief
http://asse.wix.com/asse-tech-brief
manage.com/track/track?src=407f92b0b1c70f7b2ce60716&uid=a31f629e&dat=8007747006

New Safety Data
- TRB 2012
- 2011 National EMS Assessment
- 2011 NFPA
- TZD EMS
- NCHRP 17-51
- FARS/MMUCC
- NEMSIS
- BLS

Fleet Management technologies
- ACETech/Ferno
- FleetEyes – Intermedix
- Zoll rescueNet and roadsafety fleet management systems
- Marvelis
- Telematicus
- Optima
- Northrop Grumman
Telematics

Transport performance
- Driver training?
- Real time safety performance outcomes?

What about changing driver behavior in the real world??

Invehicle technologies to enhance transport safety
- Aftermarket in vehicle electronic e-safety devices with monitoring and feedback

Creating a Safety Culture
within a company safety must have leadership and support of upper management
- Awareness
- Training
- Incentive

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

What MUST we do?
- We MUST stop pretending that this is not an automotive safety occupant protection impact engineering issue
- We MUST stop writing ‘consensus’ policies on disciplines we are not trained in
- We MUST reach out to the technical experts in this field
- We MUST engage the existing technical and safety transport arenas with EMS transport

Which of these two vehicles would you want?
Sprinter v Ford Transit crash test
http://www.youtube.com/watch?v=C3kN6WF5vAA&feature=related
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

Emergency Vehicles – Viewer Awareness
For a timely, appropriate and safe response
- Location
- Size
- Shape
- Speed
- Intended path

Policy and practice ignorant of existing technical safety data

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

EMS Safety Foundation
Rettmobil 2013 Delegation’s Special Participants
So What is RETTmobil??

- 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
- Over 460 exhibitors, 19 Countries!
The newest Oslo Ambulance

User friendly
- All necessary equipment should be reach from the seats without loosing the seat belt
The stretcher platform can be moved into 3 different positions. Based on technically sound scientific principles.
Vehicle Occupant Safety design

European design
Safety technology is a key focus

Safe and Ergonomic design

Patient Transferring Slides

Flexibility to manage two patients

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

Based on technically sound scientific principles and seen at Expo too

In almost ¼ (23.5%) of all motorcycle missions ambulance use was avoided!

Ambulance Sparing

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

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

Caution!!!

- Just because it has been 'Tested' does not necessarily mean it has been crash tested – nor that it is crashworthy and/or going to protect you
- Even if it has been 'Crash tested' – it depends upon to which standard, whether or not it is actually safe under real world crash conditions
- Appropriate technical expertise is key!!

The ambulance response vehicle of the future?

April 30, 2009 - Tennessee

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?

What do we know works...
- Tiered dispatch
- Vehicle Operations Safety Policies
- Ideally, forward and rear facing seating
- If not, use squad bench lap seat belts
- Patient over the shoulder belts
- Securing equipment
- Fleet management electronic technical devices
- Safety awareness
- Cultural change

Risk/Hazards
- Predictable risks
- Predictable fatal injuries
- Serious occupational hazard
- Public safety hazards

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

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

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

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

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

Your electronic handout/resource link

Or if you are < 30 years
Thank you!
Any Questions??
Electronic handout and resources available online
http://www.objectivesafety.net