

So, You Drive an Ambulance???



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Ahhhhh... too cute!



The screenshot shows the EMSNetwork website interface. The main content area features several news articles with headlines such as "Highway crash kills ambulance driver, patient", "At least 2 dead in Arkansas, Texas crash", "Witness: White House fire arrives on scene of chopper crash", "111 calls, 8000 dispatch requests after Texas chopper crash", "1 killed in plane crash pulled from Lake Michigan", "Former EMT gets out of jail early", "Lionel Messi over helicopter crash", "1 killed as car drives into ambulance on I-5", and "Investigation probes death of chopper crash, while Branch memorializes crew". The left sidebar contains navigation links for "Home", "About Us", "Contact Us", "Privacy Policy", "Terms of Service", "Advertise", "Sitemap", "RSS Feeds", "Facebook", "Twitter", "LinkedIn", "YouTube", "Instagram", "Pinterest", "Google+", "SoundCloud", "Spotify", "Bandcamp", "SoundCloud", "Spotify", "Bandcamp", "SoundCloud", "Spotify", "Bandcamp".

Ohio Ambulance Crash Kills Three EMTs and Two Civilians



SUSAN NICOL KYLE
CRANE TOWNSHIP -- A fiery ambulance crash here Friday night claimed the lives of three Ohio EMTs and the two patients they were transporting from a previous wreck.

The ambulance from Antwerp EMS was headed south on county road 87 when it was hit broadside by a commercial truck traveling east on 178. Upon impact, the emergency vehicle burst into flames, the Ohio State Highway Patrol reported.

Reports indicate there were no stop signs at the intersection. The EMTs killed in the 8:59 p.m. crash were identified as Sammy R. Smith, 64, Heidi McDougall, 31, and Kelly J. Rager, 25. The Patients were Robert R. Wells, 64, and Armelda Wells, 60, of Hicksville.

Another EMT, Matt McDougall, 31, and the truck driver, Gerald D. Chapman Jr., 54, of Bryant, Ind., were injured and transported to The hospital.

EMSRESPONDER.COM NEWS
7/21/07





Today's Discussion Points

- Ambulance crashes as an issue
- Ambulance crash data
- Laws, rules and regulations of the road
- Ambulance Construction
- Considerations for minimizing crashes, injuries and death
 - Personal protection
 - Response modes
 - Accident prevention education
 - Public awareness



EMS Systems in the US

- 15,276 ambulance services in the US
- 30 million EMS responses each year
(with as many routine ambulance transports)
- 500,000 911 calls each day
- 850,000 certified EMS personnel
- 49,000 ambulance vehicles

American Ambulance Association

"Study Finds EMS is Risky Occupation"

- A study in the December, 2002 - *Annals of Emergency Medicine*¹, found...
 - 1992 through 1997
 - estimated 12.7 fatalities for every 100,000 EMS workers
 - firefighters 16.5
 - police 14.2
 - Greater than 2X the national average for occupational fatalities at 5:100,000

1 - Maguire, BJ, Hunting, KL, Smith, GS, Levick, NR
Annals of Emergency Medicine, Occupational Fatalities in EMS: A Hidden Crisis

What is Killing EMS Personnel?

- 74% transportation related
- 11% cardiovascular
- 9% homicide
- 4% needle sticks, infectious diseases, electrocution, drowning and others



* Maguire, BJ, Hunting, KL,
Smith, GS, Levick, NR
Annals of Emergency
Medicine, Occupational
Fatalities in EMS: A Hidden
Crisis - 2002

A 1992 - Six Year Study

- Ambulance crashes
 - 67 ground ambulance related deaths
 - 19 air ambulance related deaths
- 13 cardiovascular related deaths
- 10 assaults/homicides
- 5 other causes
- Totaling 114 or 12.7 per 100,000 EMS workers

The National EMS Memorial



To the Present...

- In 2008 there were 72 individuals...
- In 2009 there were 90 individuals...
- So far in 2010 there will be 26 providers
 - 5 of whom were killed in ambulance crashes
 - 6 from air medical service crashes
 - 10 died from cardio-vascular related events
 - 3 from fatal gunshot wounds

... inducted into the
National EMS Memorial

The Numbers are of Concern...

- More than 5,000 ambulance crashes a year – excluding air medical services
- One EMS provider killed per month
- A fatality as a result of an ambulance wreck occurs every week.
- More than 2/3 of the fatalities involve the general public – unrelated to the emergency transport
- An individual will be involved in a crash at least once in ten years
- There is a 30% chance of sustaining a permanent disability

New York State's EMS Memorial



Closer to Home...

- 36 EMS providers have been inducted onto the New York State EMS Memorial.
- Honorees date back to 1975.
- Of those inducted...
 - Ten were killed at the World Trade Center on September 11, 2001 and 3 subsequently from illnesses contracted during the recovery.
 - 12 were killed in ambulance crashes since 2001
 - Two were struck by vehicles while on the scene
 - Three have died from sudden cardiac death

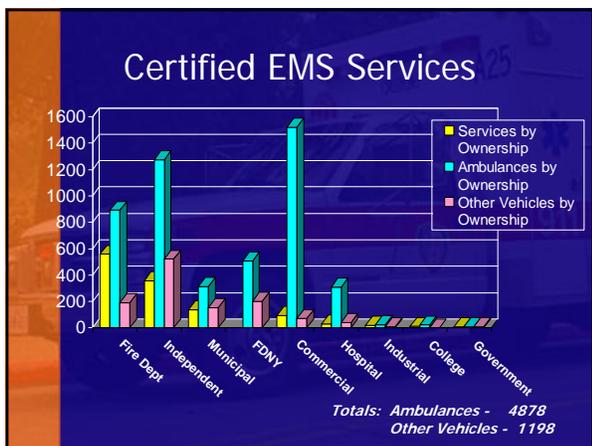
<http://www.health.state.ny.us/nysdoh/ems/emsmemorial.htm>

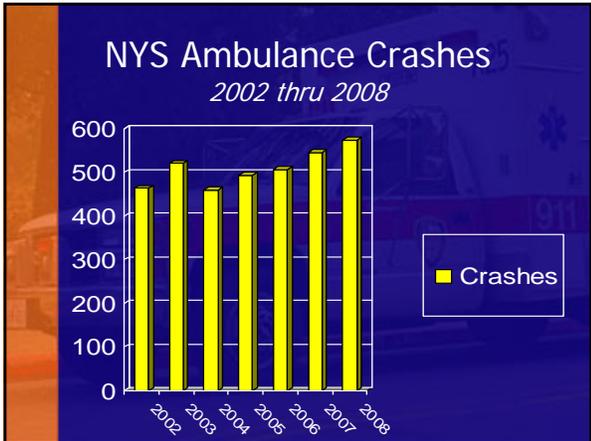
This Year... 2010

- Three more EMS providers are being inducted to the EMS Memorial
- Since the first of the year... two more people of have died in the line of duty...



EMS Providers are at a 50% greater risk of being involved in a crash while on duty...







- ### NYS Ambulance Crash Data
- The Department of Motor Vehicles collects the following data details...
 - Ambulance accident summary
 - Day of week and time of day
 - Investigating police agency
 - Jurisdictional road system
 - Manner of collision
 - Accident contributing factors
 - Driver age and gender
 - Killed/injured age group
 - Safety equipment used



Driving Emergency Vehicles

- NYS Department of Motor Vehicles 2007 crash data for ambulance vehicles
 - Total of 546 ambulance crashed
 - 18 serious • 31 moderate
 - 231 minor • 15 unknown severity
 - 147 property damage
 - 1 fatal crashes
 - EMT in the patient compartment



DAILY PRESS
Your Local News Leader

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Published: Tuesday, March 06, 2007

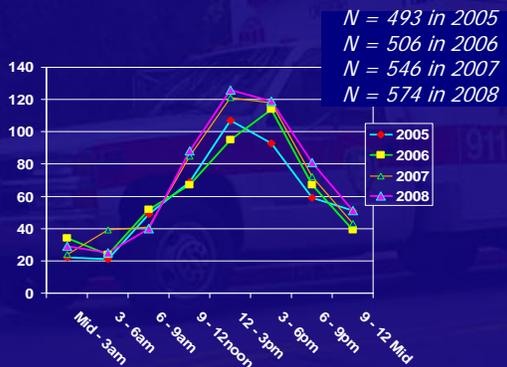
News Report: Nurse, patient die in ambulance accident

News: State, National, International, RSS, Submit News
 Sports: Sports, Conferences, Schedule, State, National, Submit News
 Classifieds: Job Openings, Real Estate, Weddings, Employment, Mortgages, Opinions, Letters, Obituaries, Classifieds
 Links: Web, E-mail, Site

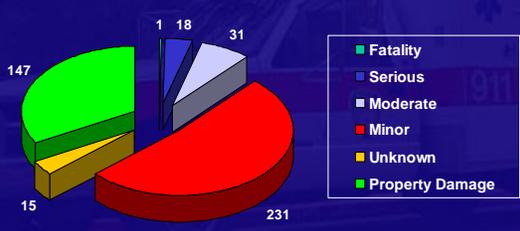
• Compare Quotes
 • Top Digital Camera
 • Petri Products
 • Laptop Prices
 • Wireless
 • Cellphones
 • Buy iPod Shuffle

A Rampart EMS ambulance was heavily damaged after it crashed into a tractor trailer on US-41 in Skandia Township (Michigan) Monday. OSF nurse Lisa Hanson, 32, Cornell, and patient Carrie Roberts, 38, Escanaba, were both killed in the accident.

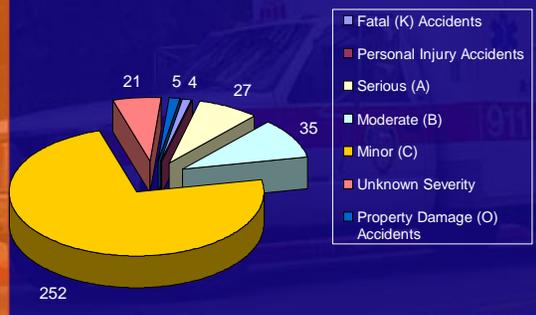
Ambulance Crashes By Time of Day



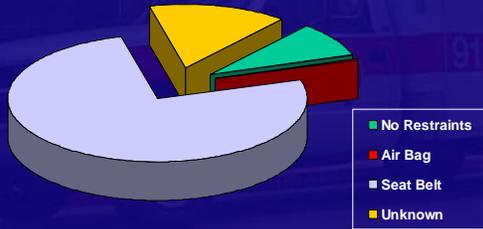
Ambulance Crash Severity



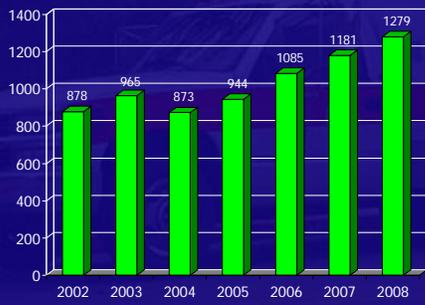
Ambulance Crash Severity



Use of Vehicle Safety Equipment

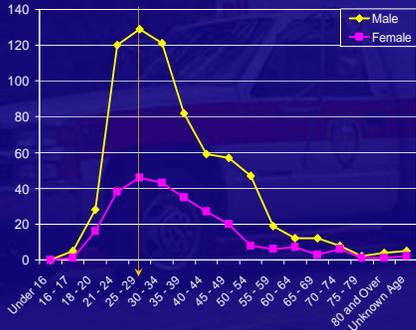


Occupant's Seatbelt Use Trend

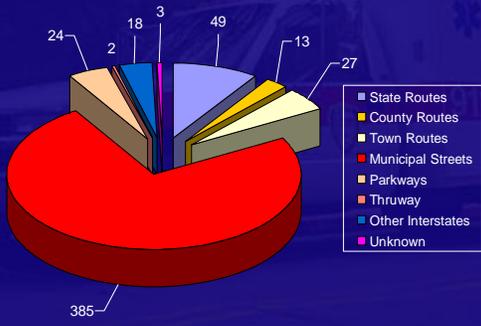




Ambulance Drivers by Gender/Age



Locations of Ambulance Crashes

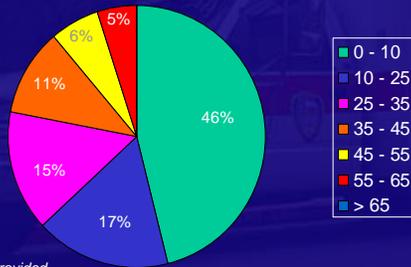




Manner of Collision

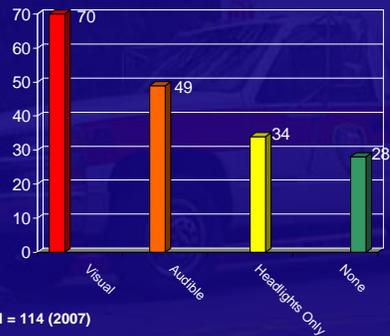
	Total # Crashes	Fatal	Personal Injury	Property Damage
Single Vehicle	60	1	35	223
2 Vehicles	437	0	247	190
3 or More Vehicles	49	0	40	9

Speed of Ambulance Prior to Crash*



* Data provided by the PA DOH Bureau of EMS

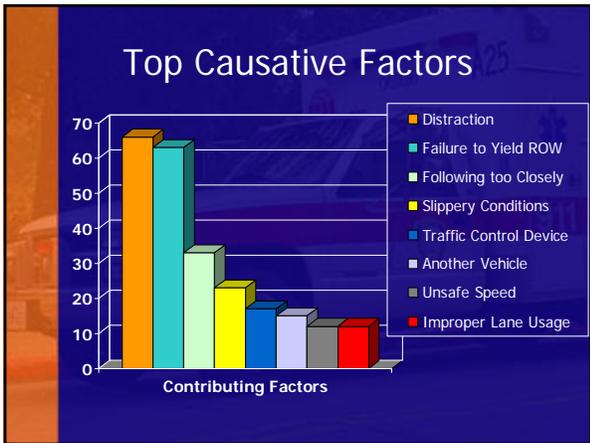
Warning Devices Used by Ambulance Prior to Crash*

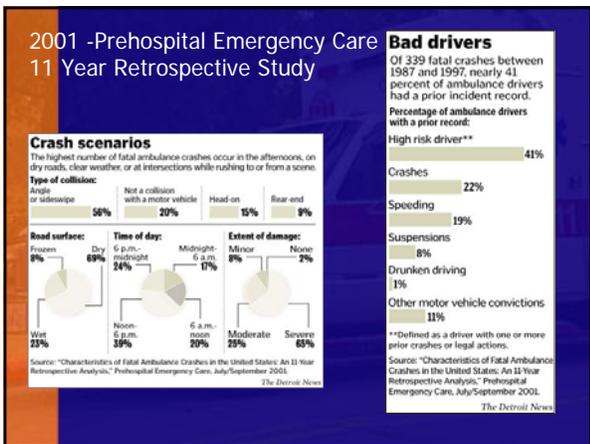


N = 114 (2007)

* Data provided by the PA DOH Bureau of EMS









Laws, Regulations and Rules

- State Board of Health – Virginia EMS Regulations – Part II EMS Agency, Vehicle and Personnel Standards
- 12 VAC 5-31-700. EMS Vehicle Safety
 - EMS vehicles shall be maintained in...
 - Good repair
 - Safe operating condition
 - Meet requirements of the State of Virginia
 - Exterior surfaces, including windows, mirrors and warning lights shall be kept clean of dirt and debris
 - Ground vehicle operating weight shall be no more than the manufacturer's gross vehicle weight (GVW) minus 700 lbs
 - ... emergency operation shall be exercised in compliance with the Code of Virginia and local motor vehicle ordinances.

Laws, Regulations and Rules

- 12 VAC 5 – 31-710. EMS Vehicle Occupant Safety
 - An occupant shall use mechanical restraints as required by the Code of VA
 - Equipment and supplies in the patient compartment shall be stored within a closed and latched compartment... while not in use
 - While the vehicle is in motion, equipment and supplies at or above the level of the patient's head... shall be secured in place...

Code of Virginia – 46.2-920

- §46.2-960. Certain vehicles exempt from regulations in certain situations; exemptions and additional requirements.

A. The driver of any emergency vehicle, when such vehicle is being used in the performance of public services, and when such vehicle is operated under emergency conditions, may, without subjecting himself to criminal prosecution:

Code of Virginia – 46.2-920

- A. The driver of any emergency vehicle, when such vehicle is being used in the performance of public services, and when such vehicle is operated under emergency conditions, may, without subjecting himself to criminal prosecution:

1. Disregard speed limits, while having due regard for safety of persons and property;
2. Proceed past any steady or flashing red signal, traffic light, stop sign, or device indicating moving traffic shall stop if the speed of the vehicle is sufficiently reduced to enable it to pass a signal, traffic light, or device with due regard to the safety of persons and property;

Code of Virginia – 46.2-920

- A. The driver of any emergency vehicle, when such vehicle is being used in the performance of public services, and when such vehicle is operated under emergency conditions, may, without subjecting himself to criminal prosecution:

3. Park or stop notwithstanding the other provisions of this chapter;
4. Disregard regulations governing a direction of movement of vehicles turning in specified directions so long as the operator does not endanger life or property;
5. Pass or overtake, with due regard to the safety of persons and property, another vehicle at any intersection;

Code of Virginia – 46.2-920

- A. The driver of any emergency vehicle, when such vehicle is being used in the performance of public services, and when such vehicle is operated under emergency conditions, may, without subjecting himself to criminal prosecution:
 6. Pass or overtake with **due regard** to the safety of persons and property, while en route to an emergency, stopped or slow-moving vehicles, by going to the left of the stopped or slow-moving vehicle either in a no-passing zone or by crossing the highway centerline; or

Code of Virginia – 46.2-920

- A. The driver of any emergency vehicle, when such vehicle is being used in the performance of public services, and when such vehicle is operated under emergency conditions, may, without subjecting himself to criminal prosecution:
 7. Pass or overtake with **due regard** to the safety of persons and property, while en route to an emergency, stopped or slow-moving vehicles, by going off the paved or main traveled portion of the roadway on the right. Notwithstanding other provisions of this section, vehicles exempted in this instance will not be required to sound a siren or any device to give automatically intermittent signals.

Code of Virginia – 46.2-920

- B. The exemptions granted to emergency vehicles by subsection A of this section shall apply only when the operator of such vehicle displays a flashing, blinking, or alternating emergency light or lights as provided in §§ 46.2-1022 and 46.2-1023 and sounds a siren, exhaust whistle, or air horn designed to give automatically intermittent signals, as may be reasonably necessary, and, only when there is in force and effect for such vehicle ...

...Such exemptions shall not, however, protect the operator of any such vehicle from criminal prosecution for conduct constituting **reckless disregard of the safety of persons and property**. Nothing in this section shall release the operator of any such vehicle from civil liability for failure to use reasonable care in such operation.

Code of Virginia – 46.2-920

- C. For the purposes of this section, the term "emergency vehicle" shall mean:
 4. Any ambulance, rescue, or life-saving vehicle designed or used for the principal purpose of supplying resuscitation or emergency relief where human life is endangered;

"Due Regard"

Due regard is defined by how a reasonable careful person performing under similar circumstances would act.



Ambulance Construction

- Common vocabulary and acronyms
- Vehicle design
- Interior design
- Equipment placement and storage
- New construction considerations

Common Vocabulary and Acronyms

- **Gross vehicle weight rating (GVWR)**
 - The maximum total weight allowable on the chassis.
- **Gross axle weight rating (GAWR)**
 - The maximum total weights that can be applied to each axle.
- **Curb weight**
 - The actual weight of the completed vehicle as built – before people and equipment

Common Vocabulary and Acronyms

- **Total customer usable payload**
 - The total weight that the end user can add to the vehicle, but not exceed the GVWR – this includes patient, crew, equipment and supplies.
- **Front axle customer usable payload**
 - The total weight that the end user can add to the vehicle's front axle, but not exceed the FGAWR.
- **Load requirements**
 - Type I and III ambulances with a chassis GVWR of 14,000 lbs or less must provide a payload of at least 1,750 lbs. Type I and III vehicles of a GVWR of 14,001 or more are considered "additional duty" (AD) and must provide a payload of at least 2,250 lbs.

Ambulance Construction

- Van or recreational vehicle chassis
- Gross Maximum Vehicle Weight ratings
 - Ford E-450... 154" wheel base – GVWR 15,000 lbs.
- Passenger safety and restraint devices
 - seat belts
 - driver and passenger air bags
 - anti lock braking systems



Same Old Construction Dilemmas

- High center of gravity
- Overweight
- Poor design
- Long stopping distances
- Blind spots



Interior Design and Safety

- Compartment door latches
- Equipment on counter tops
- Wall mounted equipment
- Crew bench and seat belts
- Cabinets above seating
- Stretcher and mounting brackets





Interior Layout

Braun Chief - 2008

Braun Chief - 2000

Note the advances in safety features!

Interior Concerns



- Sharp protruding items
- Sharp angled corners
- Unsecured equipment
- Poor personal restraint devices

CPR Seat Designs



"Action Walls"



Interesting Innovations

- Recessed oxygen connections



Crew Safety

- Passenger restraints
- Padding in appropriate places
- Rounded corners





- Appropriate locations for equipment and supplies
- Secure equipment brackets

New(er) Ideas In Safety

- Crew safety devises
 - > Passenger restraints
 - > Helmets





What About the Exterior?



What About the Exterior?



New Safety Innovations From Ambulance Manufacturers

- High visibility decal packages
- Increase structural strength and reinforcement of the modular components
- Improved passenger restraints for the patient care providers
- More ergonomic cabinetry designs
- Improved equipment restraining devices

Recent National Registry Study

- In 2004 NHTSA and NREMT conducted a study of recertifying EMTs regarding ambulance safety.
- 5, 533 were sent the "snap shot" questionnaire
- 1,773 EMTs or 32% responded

A 3/07 JEMS Article Reported

- While treating patients in the ambulance;
 - 78% sit in a side facing position
 - 12% reported using seatbelts all or part of the time
 - 26% said that their defibrillators were
- ... On the brighter side...
 - 74% reported that the defibrillator was secured
 - 84% said that their oxygen tanks were secured all or most of the time.

Avoiding a Crash

- Driver education programs
 - Emergency Vehicle Operator's Course (EVOC)
 - Coaching Emergency Vehicle Operators course (CEVO)
- Ongoing management
 - Driver feedback
 - Vehicle monitoring devices – "little black boxes"
 - Agency policies and procedures
 - State and regional EMS protocol considerations
- Emergency Medical Dispatch (EMD)
 - Pre-arrival instructions
 - Responding the appropriate resources
 - Classifying response modes

Public Education

- We need to make the public aware
 - laws regarding emergency vehicles
 - understanding what to do when one approaches
 - proper passing on a scene
 - parking and "standing" regulations
 - safe operation

The Real Price of Ambulance Crashes

- Loss of life and injury
- Negative impact on the local EMS system
- Liability costs
- Replacement of damaged vehicles and equipment
- Additional, less obvious costs...
 - Investigation of the crash
 - Litigation
 - Medical/disability costs
 - Finding and training replacement staff
 - Counseling
 - Increased insurance premiums
- ***Cost estimates are greater than \$500 million annually***

It Happens with Fire Trucks Too!



- South Carolina
- Minor injuries
- Seat belts



Important to You as EMS Providers

- due regard
- personal liability
- service liability
- public trust
- public safety
- property damage
- death and/or disability
- dispatch
- communications
- response patterns
- service SOP's
- weather conditions
- self awareness
- general health

References and Acknowledgements

- NYS Department of Motor Vehicles
- PA Department of Health, Bureau of EMS
Joseph Schmider, Director
- National EMS Memorial
- NYS EMS Memorial
- Nadine Levick, MD, MPH
Objective Safety, LLC
- Brian Maguire, Dr.PH, MSA, EMT-P
University of Maryland at Baltimore County
- Baxter Larmon, PhD, MICP
University of California, Los Angeles
- Jeffrey Clawson, MD - Medical Priority Consultants

Questions???



Thank You
So Much
for Coming
Today!

VEHICLE IDENTIFICATION



This is a Taxi
Use this service when:
You have a runny nose.
You have stabbed your toe.
You have Flu symptoms.
You are drunk.
You cut your finger.



This is an Ambulance
Use this service when:
You are having a heart attack.
At a road traffic accident.
You cut your arm off.
You are laying in a pool of blood.

LEARN THE DIFFERENCE
