

# Transportation safety performance – how does EMS compare to commercial fleets

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## ABSTRACT

**Background:** Emergency Medical Services (EMS) have been identified to have a high risk of crashes and related injury and fatality, however comparative data with commercial vehicles is scant.

**Objective:** To identify and contrast transportation safety data for EMS compared to large truck commercial vehicles.

**Methodology:** Search of published literature and online databases for EMS and commercial vehicle transportation safety data, 1996-2007. Trends for 1996-2007, and detailed comparative data for 2005 identified for EMS and large trucks. Data accessed from Fatality Analysis Reporting System, Traffic Safety Facts Reports, Federal Motor Carrier Safety Administration (FMCSA) Motor Carrier Management Information System (MCMIS) crash file data.

**Results:** Large Trucks, from 1996 to 2007, increased 23% and 22% in vehicles and miles travelled respectively, fatal and injury crashes decreased 7 % and 14% respectively, and fatal and injury crash rates decreased 47% and 30% respectively. Truck fatalities/100 million miles were 2.81 and 2.24, 1996 and 2006 respectively. EMS is exempt from MCMIS analysis, thus this trend data was not identifiable. For EMS, there were 337 fatalities 1996-2007. In 2005, there were 423,000 truck crashes with 5,240 fatalities for 8,481,999 registered trucks - 1.4% of truck crashes have a fatality, 0.06% trucks have a fatality, and 4.99% trucks have a crash. In 2005, an estimated, 3,500 ambulance crashes with 49 fatalities for 50,000 ambulances - 1.4% crashes have a fatality, 0.1% ambulances have a fatality, and 7% ambulances have a crash. Estimates for ambulance fatality/mile traveled were 3 to 50 fold that of large trucks, with injuries/mile traveled double this difference. Truck occupants were 16% of truck related crash fatalities. Ambulance occupants were 33% of ambulance related crash fatalities.

**Conclusion:** There is a wide disparity in transportation safety data capture and analysis between EMS and commercial transport. FMCSA provides extensive detail, denominator data and oversight of many aspects of commercial carrier safety data and performance for which EMS is exempt. EMS fleets have higher crash and fatality rates per vehicle than commercial large truck fleets, and appear to have higher rates of injury and fatality per mile traveled, and double the ratio of large truck occupant/non-occupant crash fatalities.

## BACKGROUND

Emergency Medical Services (EMS) have been identified to have a high risk of crashes and related injury and fatality, however comparative data with commercial vehicle safety performance is scant.

### Federal Motor Carrier Safety Administration (FMCSA)

1. Established Jan 2000 as a separate administration within the U.S. DOT, pursuant to the Motor Carrier Safety Improvement Act of 1999
2. Primary mission is to reduce crashes, injuries, and fatalities involving large trucks and buses.
3. Develops and enforces data-driven regulations that balance motor carrier (truck and bus companies) safety with industry efficiency
4. Harnesses safety information systems to focus on higher risk carriers in enforcing the safety regulations
5. Targets educational messages to carriers, commercial drivers, and the public
6. Partners with stakeholders including Federal, State, and local enforcement agencies, the motor carrier industry, safety groups, and organized labor on efforts to reduce bus and truck-related

Table 1. Federal Motor Carrier Safety Administration Outline

### FMCSA Exemptions

Unless otherwise specifically provided, the rules do not apply to —

- (f)(1) All school bus operations as defined in §390.5;
- (f)(2) Transportation performed by the Federal government, a State, or any political subdivision of a State, or an agency established under a compact between States
- (f)(3) The occasional transportation of personal property by individuals not for compensation nor in the furtherance of a commercial enterprise;
- (f)(4) The transportation of human corpses or sick and injured persons;
- (f)(5) The operation of fire trucks and rescue vehicles while involved in emergency and related operations;

Table 2. Exemptions from FMCSA Data Analysis

### OBJECTIVE

To identify and contrast transportation safety performance data for EMS compared to large truck commercial vehicles.

### METHODS

Search of published literature and online databases for EMS and commercial vehicle transportation safety data, 1996-2007. Trends for 1996-2007, and detailed comparative data for 2005 identified for EMS and large trucks. Data accessed from Fatality Analysis Reporting System, Traffic Safety Facts Reports, Federal Motor Carrier Safety Administration (FMCSA) Motor Carrier Management Information System (MCMIS) crash file data.

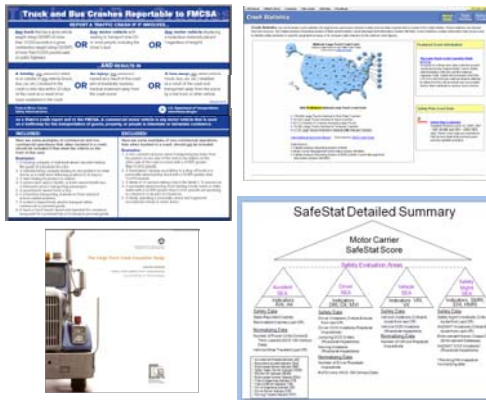


Fig 1. FMCSA Data Capture and Analysis Systems

### Motor Carrier Management Information System (MCMIS)

FMCSA operates and maintains the MCMIS

MCMIS is a collection of safety information including state-reported crashes, compliance review and roadside inspections results, enforcement data, and motor carrier census data

The Crash Profiles use the National Governors' Association (NGA) recommended data elements reported to FMCSA by states through the SAFETYNET computer reporting system

Table 3. MCMIS Safety Performance Data

## RESULTS

### Large trucks, from 1996 to 2007:

An increase of 23% and 22% in vehicles and miles travelled respectively  
 Fatal and injury crashes decreased 7 % and 14% respectively  
 Fatality and injury crash rates decreased 47% and 30% respectively  
 Truck fatalities/100 million miles were 2.81 and 2.24, 1996 and 2006 respectively.

In 2005 - there were 423,000 truck crashes with 5,240 fatalities for 8,481,999 registered trucks - 1.4% of truck crashes have a fatality, 0.06% trucks have a fatality, and 4.99% trucks have a crash. Truck occupants were 16% of truck related crash fatalities.

### For EMS, from 1996-2007:

EMS is exempt from FMCSA safety oversight for ambulance transport safety, and thus MCMIS analysis. Hence this trend data was not identifiable. Over this period, 337 fatalities were identified in FARS.

In 2005 - there were an estimated, 3,500 ambulance crashes with 49 fatalities for ~50,000 ambulances – 1.4% ambulance crashes have a fatality, 0.1% ambulance vehicles have a fatality, and 7% ambulances have a crash. Ambulance occupants were 33% of ambulance related crash fatalities.

### Per mile traveled estimates -

Fatality/mile traveled estimates:  
 Large trucks - 2.2 fatal crashes/100 million miles traveled in 2005  
 Ambulance - 7.7 to 109 fatal crashes/100 million ambulance miles traveled. Ambulances have 3 to 50 fold the rate/mile travelled of large truck fatal crashes

Injury estimates:  
 37 truck crash injuries/100 million miles  
 Ambulance estimates of crash injury of 308 to 4,360 injuries/100 million ambulance miles traveled

### FMCSA Reportable Crash

Must involve:  
 a truck (a vehicle designed, used, or maintained primarily for carrying property, with a gross vehicle weight rating or gross combination weight rating of more than 10,000 lbs.) or  
 bus (a vehicle with seats for at least nine people, including the driver)

The crash must result in:  
 at least one fatality  
 one injury where the person injured is taken to a medical facility for immediate medical attention; or  
 one vehicle having been towed from the scene as a result of disabling damage suffered in the crash.

Table 4. Reportable Crash Criteria for FMCSA

## DISCUSSION

The findings in this study are of concern as they not only point to the relative poor safety of ambulance transport – but also they highlight a serious disparity in the manner in which transportation safety is overseen in the commercial vehicle industry in contrast to EMS. No formal federal oversight, absence of structured accepted transport systems safety data capture, with scant and incomplete data capture by FARS are hallmarks of ambulance transport safety oversight challenges. Furthermore, it is likely that these data presented in this study are only a part of the picture – as it is clear from mining the data field definitions and State based data capture fields that an ambulance crash may in fact be coded as a truck or van crash, or even a fire vehicle or simply be coded as a 'working vehicle' and not be identified specifically as an ambulance. Given this - it does appear that the ambulance transport safety situation is even worse than these data suggest.



Fig 2. There are more comprehensive transport safety performance data for moving cattle than for moving patients

## LIMITATIONS

- FMCSA exemption for EMS
- Estimate data only for ambulance miles travelled
- Definition of an 'ambulance crash'
- MMUCCs category for ambulance unclear
- Disparate State data capture of ambulance 'field'
- 'Wake' crashes not included in data
- Potential undercount of ambulance crash fatality and injury estimates
- Private vs. municipal not identifiable
- Volunteer vs career not identifiable

## CONCLUSION

Ambulance transport is hazardous when compared to other commercial vehicles. Based on these data ambulance transportation safety performance per ambulance vehicle and per estimated ambulance mile travelled is more hazardous than large trucks. FMCSA provides extensive detail, denominator data and oversight of many aspects of commercial carrier safety data and performance for which EMS is exempt. Monitoring the safety of any interventions in EMS transport is severely hampered by this situation

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