Analysis of Ambulance Crash Data

Final Report

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FOREWORD

Motor vehicle crashes involving ambulances used for Emergency Medical Services (EMS) pose serious risk to both the crew and the patients. Data collection for ambulance crashes are regularly reported on a local or statewide basis and a need exists to compile and coordinate this data on a national basis. This project provides summary information that identifies available data sources for ambulance crashes, provides a limited analysis of the data, and recommends optimum data formats.

The Fire Protection Research Foundation expresses gratitude to members of the project Technical Panel for their guidance throughout the project, and all others who contributed to this research effort. Special thanks are expressed to the National Fire Protection Association (NFPA) for providing the project funding through the NFPA Annual Code Fund.

The content, opinions and conclusions contained in this report are solely those of the author.

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EXECUTIVE SUMMARY

The delivery of emergency medical services (EMS) is a key functional activity within the safety infrastructure of modern civilization. Responding to emergency incidents and the subsequent transport of injured victims to hospitals and similar health care facilities involve inherent risks. Of particular interest is motor vehicle crashes involving ambulances used for EMS.

Understanding the magnitude and severity of this risk is essential to addressing the overall problem and formulating the necessary policy to address the problem. Data collection for ambulance crashes are typically reported on a local or statewide basis, and a need exists to compile and coordinate this data on a national basis. Crashes involving ambulances are the central focus of this study, with specific attention on the collection of ambulance crash data and the methods used to collect this data.

For this study, a "crash" is recognized as any reportable adverse event that causes vehicular property damage and/or injury to either the EMS crew or civilians. This is intended to include both with and without the transport of patients, and for single or multiple vehicle events such as collisions, rollovers, submersions or fire. It is intended to exclude events independent of the transport function, such as pre-existing life-threatening condition of a civilian victim, or an act of violence like a shooting independent of the transport function. Also excluded are indirect injuries or fatalities beyond the crash scene due to a delayed response of medical care.

The goal of this project is to provide information that will improve the safety of EMS crews and their patients. Objectives to achieve this goal include identifying available data sources, providing limited analysis of the data, recommending optimum data formats, and providing summary data if available.

Certain observations became apparent as a result of this study. For example, every state has a Traffic Records Committee which coordinates crash-related data and serves as a useful point of contact within a particular state, and each state has a lead agency responsible for EMS activities, which once again serves as an important point of contact for ambulance crash data.

Data that are gathered among the available sources needs to be used with significant care, especially when attempting to address trends in the data which may have been collected in ways that could distort an analysis. As an example, in one state (Delaware) an investigation revealed that historical ambulance crash data was based on input that was incorrectly interpreting ambulance "response" as being "involved" in a motor vehicle crash, i.e. the ambulance simply responded to the call and was thus "involved". In another state (New Jersey), data is only captured for licensed providers which do not include private companies.

The deliverables for this project provide a comprehensive overview of existing efforts involving data collection methods at the national, state and local level, along with observations and recommendations relating to the future direction of these data collection efforts. The following are the key observations that have been discussed throughout this report and summarized here:

National Data Collection

- The information collection infrastructure for ambulance crash data is relatively well evolved, but at the same time has room for future enhancements and improvements.
- At the national level, the NEMSIS (National EMS Information System) program provides well established guidelines for the collection of EMS data.
- At the national level, the MMUCC (Model Minimum Uniform Crash Criteria) program provides well established guidelines for the collection of emergency responder vehicle crash data.

State-Based Data Collection

- Ambulance crash data collection at the state level is significant in quantity.
- From a national perspective a lack of uniformity exists among and within the states.
- State-based ambulance crash information collection appears to be occurring on two basic fronts: through the state dept. of public health, often including or in collaboration with the state EMS agency, and also through police accident reports (PARs) that are typically collected through the state dept of transportation.
- In some cases these separate data collection streams are coordinating and sharing information, and it other cases they are effectively independent.
- Efforts to promote and use the MMUCC program guidelines by individual states should continue.

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1. Introduction and Background

The delivery of emergency medical services (EMS) is a key functional activity within the safety infrastructure of modern civilization. This involves providing emergency care for injured residents and citizens followed by transport to health care facilities (e.g., hospitals) whose purpose is to provide optimum medical care.

Responding to these emergency incidents and the subsequent transport of injured victims to hospitals and similar health care facilities involve inherent risks. Speed of delivery in both directions is paramount and requires rapid and efficient deployment with ambulances and other transport equipment proceeding rapidly while using emergency lights and sirens.

As a result, motor vehicle crashes involving ambulances used for EMS pose a serious risk to both the crew and the patients. Understanding the magnitude and severity of this risk is essential to addressing the overall problem and formulating the necessary policy to address the problem.

Data collection for ambulance crashes are typically reported on a local or statewide basis, and a need exists to compile and coordinate this data on a national basis. Information such as the number of crashes, cause and contributing factors, and injuries or fatality of personnel and civilians can be found within local emergency service departments and at the state level (e.g., Office of Emergency Medical Services, a.k.a. OEMS), but a comprehensive national report of public and private ambulance crashes including fatalities, injuries, and contributing causes is lacking.

Such data are of interest to multiple groups and organizations. For example, the NFPA Technical Committee on Ambulances is seeking information that describes the existing data collection landscape to support the development of a new proposed document on the safe design of automotive ambulances. Other NFPA committees are also interested in this data, such as the NFPA Technical Committee on Fire Service Training, which is considering the development of a new section for ambulance driving in NFPA 1451, *Standard for a Fire Service Vehicle Operations Training Program*, and the NFPA Technical Committee on Fire Fighter Professional Qualifications, which is reviewing the requirements for NFPA 1002, *Standard for Fire Apparatus/Operator Professional Qualifications*.

The goal of this project is to provide information on data collection methodologies that will improve the safety of EMS crews and their patients. Objectives to achieve this goal include identifying available data sources, providing limited analysis of the data and data collection methods, recommending optimum data formats, and providing summary data if available.

To achieve this goal and these objectives, this project involves the following tasks:

1) *Identify Sources*. Identify and create a list of key resources and points of contact of local, regional, state, and national organizations that have previously collected ambulance crash data or may do so in the future;
2) *Compile Formats*. Create a compilation of the formats, approaches, and elements used by the identified organizations collecting data;
3) *Analysis*. Analyze the compilation for consistency and harmonization of the formats, approaches, and elements;
4) *Recommendations*. Establish a recommended optimum data collection format, approach, and data elements; and
5) *Summary Data*. Provide summary data if available.

This study is focused on data collection methods and is not intended to obtain and analyze actual data for the sake of drawing conclusions on ambulance crashes. In cases where actual data are referenced or addressed, the purpose will be to exemplify the methods used to collect data. The overall intent is to clarify the optimum structure or framework for use on a national level for the collection of ambulance crash data.

The geographic area addressed by this study is for ambulance crashes that occur within the United States. The data collection methods of interest are those addressing direct injuries and fatalities; the study scope does not include indirect injuries or fatalities beyond the crash scene due to a delayed response of medical care. Property damage is not excluded from this study, although the primary focus is on those incidents with direct injuries and fatalities.

The research project has been conducted under the auspices of the Fire Protection Research Foundation with guidance provided by a Project Technical Panel of subject-matter experts.

2. Overview of Emergency Responders and Data Collection Methods

Emergency Medical Services (EMS) is recognized as providing patient services that might include the provision of assessment, treatments, and other pre-hospital procedures, including ambulance transportation of patients.[1] These services often involve multiple separate organizations with a range of professional personnel that work together in a systematic manner to provide effective implementation.

Various descriptions and definitions of EMS can be found in the literature. For example, EMS is also defined as a national network of services providing aid from the first response to the selected care.[2] Additional EMS characteristics include a staff trained in emergency care, and being linked into the local and regional emergency communication system.

From an overall perspective, the system that supports EMS involves coordinated activities working in unison providing service to individuals requiring emergency medical care. An EMS system is defined as "a comprehensive, coordinated arrangement of resources and functions which are organized to respond in a timely, staged manner to medical emergencies regardless of their cause."[3]

Transportation is a key component of the EMS system, and in most cases this is handled by a motor vehicle such as an ambulance. In some situations, especially those requiring technical rescue, other transport methods might be used (e.g., remote wilderness, hand-carried litters, helicopters, aircraft, boats, and so on). This study is focused on motor vehicle ambulances as the method of transport; other methods of transport are considered outside the study scope.

Similar to other key terms, multiple definitions of ambulance are found in the literature, though they are all relatively similar with only subtle differences. For example, NFPA 450, *Guide for Emergency Medical Services and Systems*, defines an ambulance as "a vehicle designed, equipped, and operated for the treatment of ill or injured persons."[4] Another mainstream definition can be found in *Mosby's Emergency Dictionary* which defines an ambulance as "an emergency vehicle used to take patients to a hospital or other treatment center in cases of accident, injury, or severe illness."[5]

Crashes involving ambulances are the central focus of this study, with specific attention on the collection of ambulance crash data and the methods used to collect these data. Reliable on-going data, representative of the real-world micro and macro issues, are critical to setting meaningful policy and organizational decision-making.[6]

For this study, a "crash" is recognized as any reportable adverse event that causes vehicular property damage and/or injury to either the EMS crew or civilians. This is intended to include events with or without the transport of patients and single or multiple vehicle events such as collisions, rollovers, submersions, or fire. It is intended to exclude events independent of the transport function, such as a pre-existing life-threatening condition of a civilian victim or an act of violence such as a shooting independent of the transport function. Also excluded are indirect injuries or fatalities beyond the crash scene due to a delayed response of medical care.

Background on Emergency First Responders

The safety infrastructure comprises all activities that keep us safe from harm. To some extent, safety is proactively designed into almost all products and can range from passive design characteristics, such as the type of materials used in consumer goods (e.g., toys), to active safety features, such as automatic sprinkler systems in buildings.

These passive and active safety characteristics and features are intended to prevent hazards from occurring, or to mitigate them and keep them from escalating. In contrast, other parts of our safety infrastructure provide reactive manual intervention to address these hazards once they are beyond the protection capabilities of built-in passive and active safety measures.

Virtually anywhere in the United States, a person can pick-up the telephone to report an emergency and can expect someone to respond, even in extremely remote wilderness areas where response will take a significant amount of time. The professionals who respond to these emergencies are "emergency first responders," also referred to as "first responders."

Emergency first responders are defined as "a group designated by a community as those who will first respond to an incident," and are usually composed of emergency medical service providers, the fire service, and/or local police.[7] These personnel are engaged as the front-line resources responding to any given emergency. They are further defined in NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents* as: "those persons, including members of fire departments, police departments, other law enforcement agencies, hazardous materials response teams, emergency medical services, and other organizations that have public safety responsibilities and who would respond to rescue and treat victims, and who would protect the public during an emergency incident."[8]

Emergency first responders are an important part of our safety infrastructure. They generally operate by responding to initiate action, control, and mitigation of a particular hazard or problem. Emergency first response organizations are arguably reactionary in overall composition, based on a high percentage of staffing and equipment devoted to response operations like EMS, rescue, and fire suppression.[9] However, certain key line functions are proactive, such as community health and wellness programs that involve inspection, prevention, education, and fire- and crime-mitigation campaigns supporting these programs.

From an overall context, EMS is one of three key groups in the spectrum of emergency first responders, along with fire service and law enforcement. From a traditional perspective these three groups are separate, but in reality there is significant crossover. This is especially the case with EMS and the fire service, which have trended in this direction in recent years with single organizations in a particular community providing both rescue (EMS) and fire protection services. Figure 2-1 summarizes these three groups within the framework of the traditional safety infrastructure.

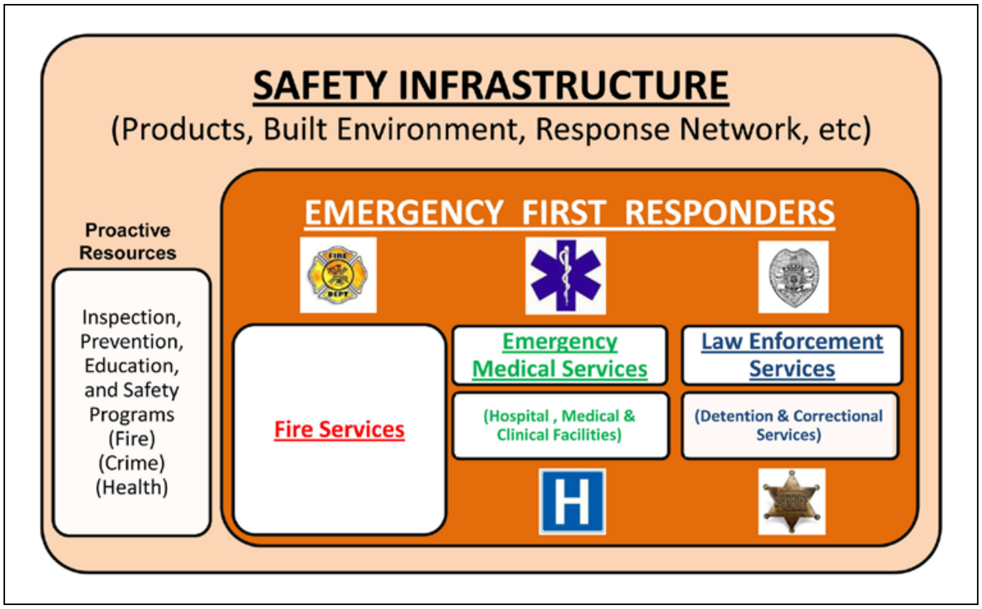

Figure 2-1: Overall Safety Infrastructure with Emergency Response Personnel

Emergency first responders are those professionals providing immediate service to mitigate an emergency event. Others responding to the scene of the emergency as follow-up or secondary support are considered "emergency responders" but not "emergency first responders." Examples are tow and salvage operators, electric utilities for downed power lines, or fire investigators.

Several other occupational groups are also directly involved with the safety infrastructure, although they don't normally respond to the scene of an event (except within their own facilities) and thus are one step removed as "first responders." For example, hospital, clinical and medical personnel are the ultimate recipients of emergency victims. Although they are not normally "responding" directly to the scene of an emergency incident, they are nevertheless a critical part of the emergency response chain.

Federal regulations (29 CFR 1910.120(q)) administered by the U.S. Occupational Health and Safety Administration (OSHA) recognize healthcare workers and hospital employees receiving victims as "first receivers". Meanwhile, the "first responders" are the emergency medical technicians, fire fighters and police officers responding to an emergency.[10]

Profile of Emergency Medical Services

One approach for defining how EMS provides their services for a particular jurisdiction is the manner in which they operate and their primary funding basis. Based on a 2003 survey of state EMS officials, the EMS community operates according to three basic types of EMS organizational approaches (with their approximate percent of the overall total indicated parenthetically) as follows: privately-held or contract organizations (~49%); fire department based (~45%); and municipal based other than fire department (~6%).[11]

The types of EMS organizations are illustrated in Figure 2-2. In some cases the distinction between the services provided in a particular community has some overlap, such as when the publicly-supported fire department provides basic ambulance service but depends on private-contracted ambulance service for advanced life support. Thus, the values in this breakdown are considered to be approximations.

A further breakdown of the types of EMS includes whether the professionals involved are career, volunteer, or a combination of both. The types of EMS indicated by the National Registry of Emergency Medical Technicians are: (1) government EMS; (2) fire and police linked service; (3) voluntary EMS; (4) private ambulance service; (5) combined emergency services; and (6) hospital based service.[12]

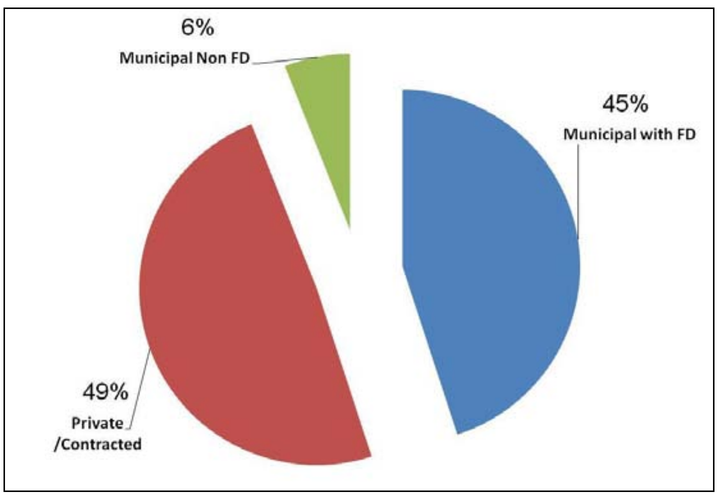

Figure 2-2: Types of EMS Organizations

In many jurisdictions, fire and rescue response services operate as distinctly separate organizational entities. Conversely, it is also common for them to be combined into a single organization. Based on data collected for the period between 2005 and 2007, 59% of the fire departments in the United States also provide emergency medical services. This is subdivided as 44% of fire departments handle EMS and another 15% provide EMS and advanced life support. This is shown in Figure 2-3, which illustrates the percent of departments that have combined fire services and emergency medical services.[13]

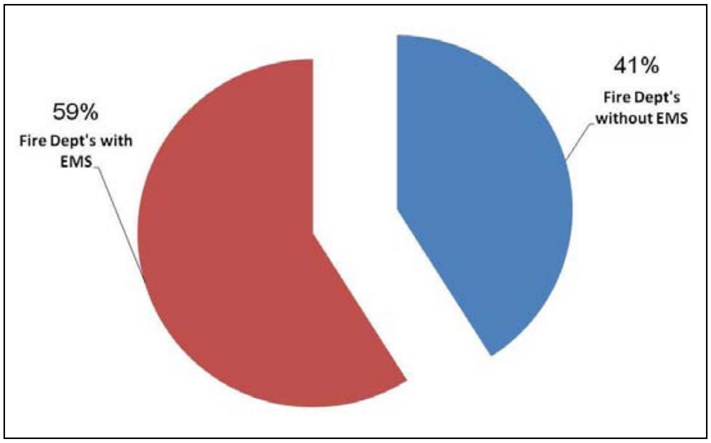

Figure 2-3: Combined Fire Services and Emergency Medical Services[14]

Ambulances operating under emergency conditions are exposed to greater risks than conventional traffic due to the nature of their operation. The rate of ambulance collisions per miles driven is perceived to be several times that of civilian drivers. Based on information provided by the American Ambulance Association that was collected through insurance organizations protecting ambulance services, it is estimated that over 10,000 ambulance-related collisions occur annually, with many of these resulting in injury or death.[15]

For EMS operations integral with fire department operations, data are available that provide additional useful profile information describing the EMS function. Based on the "Third Needs Assessment of the U.S Fire Service," roughly two-thirds (~69%) of all fire departments indicate that that EMS is a role that they perform.[16] Table 2-1 provides summary data on the percentage of fire departments that provide EMS, by community. The percentage of the fire departments that provide EMS has been steadily increasing in recent years, based on similar Needs Assessments completed in 2001 and 2005.[17] The most likely community size to have a fire department that does not perform EMS is in small rural communities with less than 2500 population, but even for these small fire departments a majority, or 60%, now provide EMS.

Table 2-1: Fire Departments that Provide EMS[18]

	Fire Depts. without EMS		Fire Depts. with EMS		Total	
Community Population	**Number of Depts.**	**Percent**	**Number of Depts.**	**Percent**	**Number of Depts.**	**Percent**
500,000 or more	2	3.8%	51	96.2%	53	100%
250,000 to 499,999	2	3.2%	60	96.8%	62	100%
100,000 to 249,000	2	1.3%	235	98.7%	238	100%
50,000 to 99,999	26	5.8%	421	94.2%	447	100%
25,000 to 49,999	107	9.9%	978	90.1%	1,085	100%
10,000 to 24,999	524	17.8%	2,427	82.2%	2,951	100%
5,000 to 9,999	1,032	27.5%	2,723	72.5%	3,755	100%
2,500 to 4,999	1,466	30.1%	3,409	69.9%	4,875	100%
Under 2,500	5,148	39.7%	7,816	60.3%	12,964	100%
Total	**8,310**	**31.4%**	**18,120**	**68.6%**	**26,430**	**100%**

Additional data are available through the latest Needs Assessment on the number of ambulances used by fire departments in each community, based on responses to their survey from 4,237 fire departments.[19] Table 2-2 illustrates the average number of ambulances or other patient transport vehicles per fire department, according to the population of the community. These averages are calculated over all departments in the particular community size category, and since a larger percentage of fire departments in smaller communities do not provide EMS (up to 40% in communities under 2,500), understandably they have a lower average number of ambulances per fire department.

Table 2-2: Average Number of Ambulances in Fire Departments[20]

Community Population	Average Number of Ambulances
500,000 or more	33.67
250,000 to 499,999	11.50
100,000 to 249,000	4.23
50,000 to 99,999	2.47
25,000 to 49,999	2.01
10,000 to 24,999	1.23
5,000 to 9,999	0.77
2,500 to 4,999	0.49
Under 2,500	0.32
Overall Average Total	**0.75**

The professional qualifications of EMS personnel and their organizations are generally well-established. From a categorical standpoint this is referred to as "level of care provided" and "service levels." These concepts define the provision of patient care services as determined by provider certification and licensure.[21]

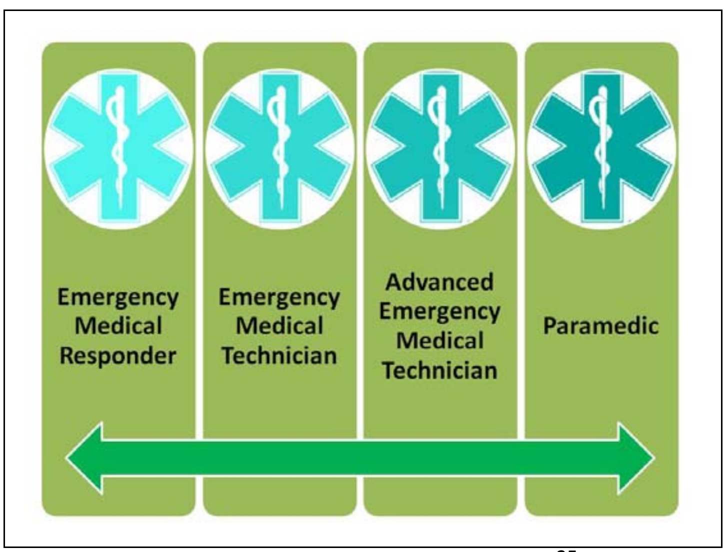

Figure 2-3: EMS Provider Levels[25]

State and local jurisdictional authorities normally provide the programmatic oversight for certification and licensure of personnel to perform within their specific scope of practice levels.

Consequently, in the United States the certification and licensure of EMS delivery varies from state to state.[22] However, they all generally consider the following four basic categories of provider levels: Emergency Medical Responder; Emergency Medical Technician; Advanced Emergency Medical Technician; and Paramedic.[23] These are illustrated in Figure 2-3, EMS Provider Levels. These latest category titles were recently updated, and some may be more familiar with the previous titles: First Responder; Basic Emergency Medical Technician (EMT-B); Intermediate Emergency Medical Technician (EMT-I); and Paramedic (EMT-P).[24]

Although not necessarily indicative of the number of overall EMS professionals, one interesting indicator of the magnitude of each of these provider levels is through the widely recognized certifications provided by the National Registry of Emergency Medical Technicians. Their data indicate in 2010 there were the following certified professionals at each of these provider levels:[26]

- Emergency Medical Responder – 9,666
- Emergency Medical Technician – 220,547
- Advanced Emergency Medical Technician – 18,708
- Paramedic – 72,544

Background on Data Collection Methods

Reliable representative data and their analysis provide clarification of the problem at-hand, but data recorded over time also provide clarification of trends. Once a problem is identified (e.g. ambulance crashes are higher in certain states during certain seasons), an obvious question is whether the situation is getting better or worse over time.

Information collected over time must have a consistent base of comparison during the years covered. The sampling techniques used to create the database need to, as much as possible, avoid shifts and modifications over time that could compromise trend analysis. The better and more comprehensive the data collection methods are designed from the outset, the better will be the ability to analyze trends.[27]

The general approach being taken with the national collection of ambulance crash data is top-down, or top-driven. The analysis of data involving a top-down approach begins with a summary of big numbers and then subdivides the totals into their major parts.[28] This type of approach provides the broadest perspective on the overall problem. Accordingly, this study is based on a review of existing national data collection efforts supplemented by existing efforts that are on-going on a state or local level.

For any subject, there are inherent challenges in designing an approach for collecting national data that maintains its effectiveness over time. Addressing subtle yet critical details up front is paramount, since the passage of time will continually test the efficacy of the overall approach.[29] Details that are not obvious during the initial stages can become magnified in subsequent collection periods and possibly introduce questions on the data being used for policy decisions.

In subsequent years after the launch of the data collection effort, fundamental revisions may not be an attractive option, since they could possibly compromise the year-to-year comparisons that are essential for on-going analysis.

Definitions of the information being collected provide an example of the details addressed up front within the design of a particular data collection effort. In the case of ambulance crashes, the definition of an "ambulance" and "crash" are important. For the definition of ambulance, we had earlier indicated that it is "a vehicle designed, equipped, and operated for the treatment of ill or injured persons."[30]

For this study, we are further defining "ambulance" as a motor vehicle approved for travel on public roadways. On this basis it excludes, for example, vehicles not intended for motorized transport over public roadways such as farm equipment, construction equipment, or all-terrain off-road vehicles. Further, this excludes motor vehicles not intended for this purpose, such as private passenger cars. In certain historic large-scale disasters, a wide spectrum of non-ambulance vehicles have been used to transport injured victims, such as the 1942 Cocoanut Grove disaster which also utilized taxis and newspaper delivery trucks.[31]

The term "crash" as used with a motor vehicle is intended to indicate a collision that disrupts the functionally of the unit. The data collection methods of interest in this study are crashes that result in direct injuries and fatalities. Here, "direct injuries and fatalities" is intended to include only the injuries and fatalities caused by the crash itself, and not those resulting away from the crash scene due to a delayed response of medical care for the original emergency incident.

Activity among existing national data collection efforts indicates a growing interest on placing more emphasis on "serious injury crashes." Justification for this approach is based on very little difference between a fatal crash and a serious injury crash, and considering both would substantially increase the robustness of most crash analyses. At this time a standard definition of "serious injury crashes" in use across the country is lacking.

One additional factor that is altering the overall data collection landscape is technological innovation. Enhancements that promote more efficient individual data collection efforts will likewise enhance broad data collection efforts. For example, the on-going and future digitization of electronic communications and dispatch data allows for noteworthy efficiencies with broad data collection efforts. The continued evolution of computer hardware and software is allowing improved automated linkage of data involving topics such as vehicle crash reports, hospital activity, medical claims and other data-rich resources.[32]

Information Resources

Numerous organizations provide either direct or indirect support for the EMS community by addressing ambulance crash related information. These have been established and have evolved over the years to fulfill certain express needs. The organizational types are quite varied and include private non-profit membership associations, trade groups, state or federal government agencies, collective bargaining bodies, commercial enterprises, and so on.

In addition to entities with a national orientation, there are multiple groups and organizations that are active on a state or local level. For example, an ambulance-based association for EMS professionals can be found in a variety of states. Their purpose is to represent the interests of their constituents and provide a forum for additional networking and dialogue. More specifically, the following states have active ambulance/EMS association: Arizona, Arkansas, California, Colorado, Iowa, Kentucky, Maine, Michigan, Minnesota, Missouri, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Texas, Vermont, Wisconsin, and Wyoming.[33]

Table 2-3 provides a brief summary of selected national organizations that provide noteworthy direct support for today's EMS activities and ambulance crash related information in the United States. In addition, most of these organizations provide a website that includes links to other related organizations, some of which may be worthy of further possible consideration.[34]

Table 2-3: Selected Summary of Organizations Related to Ambulance Crash Information

American Ambulance Association (AAA) (www.the-aaa.org) A membership association representing ambulance services in the United States. Established in 1979, the association serves more than 75%of the U.S. population, with its representative membership consisting of emergency and nonemergency care and medical transportation services. It has developed the Commission on Accreditation of Ambulance Services (CAAS), which became an independent entity in 1990.
American Association of State Highway and Transportation Officials (AASHTO) (www.transportation.org) A nonprofit U.S.-based association of state and federal transportation agencies with a primary goal to foster the development, operation, and maintenance of an integrated national transportation system. It develops technical standards and addresses transportation involving air, highways, public transportation, rail, and water.
American Automobile Association Foundation for Traffic Safety (AAAFTS) (www.aaafoundation.org) Established in 1947, the foundation is a not-for-profit, publicly-supported charitable educational and research organization, dedicated to saving lives and reducing injuries on the roads.
American College of Emergency Physicians (ACEP) (www.acep.org) A national membership organization founded in 1968 that promotes the interests of emergency physicians, based on a membership of more than 28,000 emergency physicians, residents and medical students.
American Heart Association (AHA) (www.americanheart.org) A national voluntary health agency founded in 1924 whose mission is to reduce disability and death from cardiovascular diseases and stroke. It offers programs addressing cardiac care in the pre-hospital environment, provides published peer-reviewed scientific journals, and recommends changes to cardiac care based on scientific research.
American Medical Association (AMA) (www.ama-assn.org) Founded in 1847 and among the oldest medical related organizations in North America. Their mission is to promote the art and science of medicine and the betterment of public health.

American Public Health Association (APHA) (www.apha.org) Founded in 1872, they are among the oldest and most diverse organizations of public health professionals. Its focus is to assist U.S. residents, families, and their communities from preventable, serious health threats. It pushes for universal accessibility of community-based health promotion and disease prevention activities and preventive health services.

Association of Transportation Safety Information Professionals (ATSIP) (www.atsip.org) A membership organization for professionals working within the areas of traffic safety data collection, management, and analysis, to further the development and sharing of traffic records system procedures, tools, and professionalism. Founded in 2009, it had previously existed as a subcommittee under the National Safety Council.

ASTM International (American Society of Testing and Materials) (www.astm.org) A membership society that is one of the world's largest voluntary standards developing organizations. With a membership of approximately 30,000, it administratively supports more than 130 technical committees responsible for more than 12,000 standards.

Center for Disease Control and Prevention (CDC) (www.cdc.gov) An agency within the U.S. Department of Health and Human Services that promotes issues of interest to EMS professionals.

Commission on Accreditation of Ambulance Services (CAAS) (www.caas.org) An independent accreditation commission that provides indication of an organization's compliance with various standards and performance measures. It was created in 1984 under the American Ambulance Association and became a separate organization in 1990.

Consumer Product Safety Commission (CPSC) (www.cpsc.gov) A commission within the U.S. federal government whose mission is to protect the public from unreasonable risks of injury or death from the types of consumer products under the agency's jurisdiction, which include products that pose a fire, electrical, chemical, or mechanical hazard. The CPSC collaborates with NIOSH to collect non-fatal work-related injury data through the National Electronic Injury Surveillance System (NEISS).

EMS Coalition (www.emsworld.com/print/EMS-World/EMS-Coalition-Breaks-Ground/1$5994) A quasi-formal organization of EMS professionals that first started meeting in 2010 for the purpose of prioritizing the recommendations made in the 2006 report, *Emergency Medical Services at the Crossroads*, issued by the Institute of Medicine's Committee on the Future of Emergency Care in the United States Health System. EMS Magazine and EMSWorld assist with organizational administration.

Federal Communications Commission (FCC) (www.fcc.gov) The Public Safety and Homeland Security Bureau is a division of the FCC involved with EMS, and their primary mission is to ensure continuous operations and restore critical communications systems and services in the event of an emergency.

Federal Emergency Management Agency (FEMA) www.fema.gov An agency within the U.S. Department of Homeland Security whose initial beginnings can be traced back to the Congressional Act of 1803, and whose primary mission is to reduce the loss of life and property and protect the United States from all hazards, including natural disasters, acts of terrorism, and other man-made disasters.

Federal Highway Administration (FHA) (www.fhwa.dot.gov) A division of the United States Department of Transportation addressing highway transportation, the FHA serves as the custodian for the nation's highway transportation system.

Federal Interagency Committee on Emergency Medical Services (FICEMS) (www.ems.gov/ficems) Established in 2005 by the U.S. Department of Transportation Reauthorization, Public Law 109-59 (Section 10202), its purpose is to ensure coordination among U.S. federal agencies involved with state, local, tribal, and regional emergency medical services and 9-1-1 systems.

Fire and Emergency Manufacturers and Services Association (FEMSA) (www.femsa.org) A trade association representing more than 130 companies, FEMSA provides products to EMS and fire professionals worldwide.

General Services Administration (GSA) (www.gsa.gov) Operating under the Department of Commerce, it serves as the landlord for the U.S. federal government. GSA purchases ambulances for the U.S. federal government, and its ambulance purchase specification has become widely recognized as de-facto design requirements for these vehicles.

Governors Highway Safety Association (GHSA) (www.statehighwaysafety.org) A U.S.-based non-profit organization whose members are the state highway safety offices of the 50 states, U.S. territories, and Indian nations. GHSA implements programs to address behavioral highway safety issues (e.g., occupant protection, impaired driving, speeding, etc.) and provides leadership and advocacy to improve traffic safety, influence national policy, enhance program management and promote best practices.

Health Resources and Services Administration (HRSA) (www.hrsa.gov) An agency within the U.S. Department of Health and Human Services responsible for improving access to health care services for people who are uninsured, isolated, or medically vulnerable. HRSA is comprised of six bureaus and 13 offices, providing leadership and financial support to health care providers in every state and U.S. territory.

Highway Loss Data Institute (HLDI) (www.iihs.org/about_hldi.html) A nonprofit research organization organized in 1972 that is an affiliate of the Insurance Institute for Highway Safety. HLDI publishes insurance loss statistics on most passenger vehicles on US roads and administers a database of more than 150 million individual passenger vehicles representing about 80% of all privately insured road vehicles, which is considered one of the largest repositories of such information in the world.

Indian Health Services (IHS) (www.ihs.gov) An agency within the U.S. Department of Health and Human Services responsible for providing federal health services to American Indians and Alaska natives.

Insurance Institute for Highway Safety (IIHS) (www.iihs.org) An independent, nonprofit, scientific, and educational organization dedicated to reducing deaths, injuries, and property damage from crashes on the nation's highways. IIHS supports its mission through scientific studies of insurance data representing the human and economic losses resulting from the operation of different types of vehicles.

International Association of Emergency Medical Services Chiefs (IAEMSC) (www.iaemsc.org) A professional membership and advocacy organization serving the chief officers of the EMS community, with a focus on career and volunteer EMS constituents worldwide.

International Association of Fire Chiefs (IAFC) (www.iafc.org) A membership association of approximately 13,000 members established in 1873, representing the fire service leadership, serving career and volunteer chiefs, chief fire officers, company officers and managers of emergency service organizations throughout the international community. The EMS section was established in 1985 and is one of the largest membership sections within IAFC. The IAFC also sponsors the Commission on Fire Accreditation International (CFAI), which provides performance measures for the evaluation of fire and emergency services organizations.

International Association of Fire Fighters (IAFF) (www.iaff.org) A membership organization established in 1918, representing the interests of more than 298,000 full-time professional fire fighters and paramedics protecting the majority of North America's population.

National Association of Emergency Medical Service Physicians (NAEMSP) (www.naemsp.org) An organization established in 1984 of physicians and other professionals partnering to provide leadership and foster excellence in and out of hospital emergency medical services.

National Association of Emergency Medical Technicians (NAEMT) (www.naemt.org) A membership association of 32,000 EMS professionals founded in 1975 and dedicated to representing the professional interests of all EMS practitioners, including paramedics, emergency medical technicians, first responders, and other professionals working in pre-hospital emergency medicine.

National Association of State Emergency Medical Service Officials (NASEMSO) (www.nasemsd.org) A nonprofit organization founded in 1980 representing state and territorial EMS agencies and their officials in 56 jurisdictions, including state directors, medical directors, and training coordinators. Prior to 2006 the organization was known as the National Association of State EMS Directors.

National EMS Advisory Council (NEMSAC) (www.ems.gov/nemsac) A nationally recognized council established in April 2007, composed of EMS representatives and consumers providing EMS oriented advice and recommendations to NHTSA, its host organization. NEMSAC provides a forum for the development, consideration, and communication of information from a knowledgeable and independent perspective for advancing EMS systems nationwide.

National EMS Information System (NEMSIS) (www.nemsis.org) A data collection initiative created to promote the unification of EMS data. Administration is provided through a technical assistance center jointly hosted by the University of Utah and the University of North Carolina. The genesis of its origin can be traced prior to 2001, but at that time the effort appeared under the NEMSIS banner through the combined efforts of a public private partnership involving the National Association of State EMS Officials, National Highway Traffic Safety Administration (NHTSA), and the Trauma/EMS Systems program of the Health Resources and Services Administration's (HRSA) Maternal Child Health Bureau.

National Fire Protection Association (NFPA) (www.nfpa.org) A nonprofit membership association established in 1896 with about 85,000 members, dedicated to the mission of making the world safe from fire and explosions through public education, research, and consensus-based model codes and standards. NFPA's nearly 300 technical committees provide more than 300 codes and standards, of which about 80 are directly focused on the needs of the emergency response community.

National Highway Traffic Safety Administration (NHTSA) (www.nhtsa.gov) Operating within the Department of Transportation, the NHTSA Office of EMS (OEMS, at www.ems.gov) and its predecessor agency has pursued its mission since 1966, to reduce death and disability by providing leadership and coordination to the EMS community through assessing, planning, developing, and promoting comprehensive, evidence-based emergency medical services and 9-1-1 systems.

National Institute for Occupational Safety and Health (NIOSH) (www.cdc.gov/NIOSH) An agency of CDC whose purpose is to generate new knowledge in the field of occupational safety and health and to transfer that knowledge into practice for the betterment of workers. NIOSH accomplishes its mission through scientific research, developing guidance and authoritative recommendations, disseminating information, and responding to requests for workplace health hazard evaluations. NIOSH collaborates with CPSC to collect non-fatal work-related injury data through the National Electronic Injury Surveillance System (NEISS).

National Registry of Emergency Medical Technicians (NREMT) (www.nremt.org) A widely recognized certifying organization formed in 1970, NREMT provides a standardized framework for the certification of professional EMS providers.

National Volunteer Fire Council (NVFC) (www.nvfc.org) A non-profit membership association comprised of 49 state volunteer fire fighter organizations and other affiliated members, representing the interests of the volunteer fire, EMS and rescue services. The EMS/Rescue Section provides volunteers in an EMS delivery system with information, education, services, and representation to enhance their professionalism.

Transportation Research Board (TRB) (www.trb.org) A major division of the U.S. National Research Council serving as an independent adviser to the federal government and others on scientific and technical questions of national importance. The TRB is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. Its mission is to provide leadership in transportation innovation and progress through research and information exchange. It is the administrative host for the Transportation Research Information Services (TRIS), which provides transportation-related library and data information.

U.S. Fire Administration (USFA) www.usfa.dhs.gov An entity of the U.S. Department of Homeland Security's Federal Emergency Management Agency, with a mission to foster a solid foundation in prevention, preparedness, and response by providing national leadership to local fire and emergency services.

3. Nationally Based Data Collection Activities

There are currently several existing data collection programs that relate to the topic of ambulance crashes. A significant portion of this activity exists at the state and local level, although there are various data collection activities at the national level that address crashes involving motor vehicular ambulances. Data collection efforts for EMS with a state-based focus have evolved partly because of the general characteristics of the governmental framework in the United States. This is part of the challenge of coordinating data and similar information on a national level, for all emergency first responders including EMS.

From an international perspective, there are often inquiries about the genesis of the emergency responder infrastructure within the United States. As background, the general arrangement of U.S. governance has the federal government at the top, followed by state government (excluding territories), then county government, and finally local government involving cities, towns, or villages. This overall approach was established in 1789 as a federal republic under a strong democratic tradition, and is based on a legal system using English Common Law.[35]

After the federal level, the next level of government is with the states, which includes each of the fifty states and the government of the District of Columbia (and excludes territories for sake of this discussion). While the federal government provides certain centralized functions such as foreign relations, currency regulation, and defense, state government has significant autonomy and addresses issues such as public safety, industry, business, public utilities, state criminal code, property regulations, and so on. The local government entities within each state provide direct support to their residents with services such as fire/rescue protection, law enforcement, education, public health, sanitary regulations, and housing.

The interaction between these levels of government depends of the constitutions and charters of the respective governing bodies. In the United States, the Tenth Amendment of the U.S. Constitution allows the states to exercise their reserved powers, including police powers. Consequently, topics of public safety, such as EMS and other emergency responders (e.g., law enforcement and fire service), receive primary attention at the state level (based on the state constitution) and local level as delegated by the particular state.[36]

In summary, the focus on public safety activities like EMS is more generally rooted at the state and local level, and not the federal level. Yet important tasks still remain at the federal level, such as coordinating national data. Collecting data for EMS on a national level faces the natural obstacle of individual states handling this function directly themselves, usually with significant diversity.

Even with the inherent challenges of on-going data collection efforts occurring at the state level, a strong need to coordinate this data on a national basis is readily obvious. Several national EMS data collection efforts exist based on both public and private sector arrangements. A review of some of these national data collection efforts follow here.

Federal Government National Data Collection

There are several noteworthy national data collection efforts that relate to the topic of ambulance crashes. The most robust and transparent of these have been developed and administered by a federal government agency. However, despite the clear strengths of these various efforts, they each have certain unique characteristics that at this time include various limitations.

Fatality Analysis Reporting System (FARS) and National Automotive Sampling System General Estimates System (NASS GES)

The Fatality Analysis Reporting System (FARS) and the National Automotive Sampling System General Estimates System (NASS GES) are perhaps among the most recognized national data collection activities in the United States addressing adverse motor vehicular traffic events. These systems are administered by the National Highway Traffic Safety Administration (NHTSA)

NHTSA is the agency within the U.S. Department of Transportation whose mission is to save lives, prevent injuries, and reduce vehicle-related crashes on U.S. highways and roads.[37] The agency has been a leader for issues relating to vehicular safety, and its data collection activities have been similarly noteworthy. For the topic of EMS, the NHTSA Office of EMS (OEMS) and its predecessor agency has pursued its mission since 1966, to reduce death and disability by providing leadership and coordination to the EMS community in assessing, planning, developing, and promoting comprehensive, evidence-based emergency medical services and 9-1-1 systems.[38]

The FARS and NASS GES are both publicly available and widely utilized database programs. For more than three decades, FARS has been among the most referenced sources for U.S. vehicular fatal crash data; and since 1988, NASS GES has been a key source for non-fatal injury crash data.

Both the FARS and NASS GES systems have used fairly similar sets of data elements, but they have each evolved with different coding details, which required separate coding, software, documentation, and analysis. Starting in 2006, NHTSA began working with the Federal Motor Carrier Safety Administration (FMCSA) and the Federal Highway Administration (FHWA) to establish similar data standardization for the two systems. This work is on-going.[39]

The guideline used by almost all states for their crash report forms and databases is the Model Minimum Uniform Crash Criteria (MMUCC).[40] The current work to synchronize the FARS and NASS GES is being done so that both systems will align with the MMUCC. The first phase of this coordination effort was completed in 2009 and involved 45 common data elements.[41]

The FARS data (focusing on fatalities) and the NASS GES data (focusing on injuries) are arguably the most comprehensive national data being collected today. Despite its breadth and depth on particular subjects such as ambulance crashes, there are statistical details that are not available. The total number of fatal crashes involving ambulances can be ascertained by FARS. More work is needed to establish a complete national count of fatality, injury and property-damage only crashes.[42] Thus, while fatality and injury data can be retrieved or estimated, the exact number of incidents remains elusive.

Table 3-1: Summary of Ambulance Crash Data from NHTSA FARS and NASS GES, 1990-2009

	Single Vehicle Ambulance Crash				Multi Vehicle Ambulance Crash				TOTAL			
Use Type	**Fatal**	**Injury ***	**$ Loss Only***	**Total**	**Fatal**	**Injury ***	**$ Loss Only***	**Total**	**Fatal**	**Injury ***	**$ Loss Only***	**Total**
Not in Emergency Use	70	794	2,638	**3,502**	195	8,560	15,614	**24,269**	265	9,355	18,252	**27,871**
In Emergency Use	51	1,653	3,265	**4,970**	273	16,235	27,915	**44,423**	324	17,889	31,180	**49,393**
Unknown	---	471	2,299	**2,770**	1	1,255	3,520	**4,776**	1	1,726	5,819	**7,546**
TOTAL	**121**	**2,919**	**8,202**	**11,242**	**469**	**26,051**	**47,049**	**73,568**	**590**	**28,969**	**55,251**	**84,810**

* Note: "Injury" and "$ Loss Only" are estimates.

An important characteristic of the FARS and NASS GES data collected through U.S. federal agencies like NHTSA is its transparency. Unlike data collected through private channels (e.g. manufacturers, insurance, etc.), private or personal information is removed and data summaries are generally accessible. Table 3-1 provides a summary of ambulance crash data from NHTSA FARS and NASS GES for the twenty-year period from 1990 to 2009. This data information is reflected in greater detail in Annex B.

Table 3-2: Example of Use of Ambulance Crash Data (for U.S. in 2009)[44]

	Incidents Using Lights/Sirens	Total Incidents
Ambulance Crashes with Fatalities	16	29
Ambulance Crashes with Injuries	488	959
Ambulances in All Crashes	1,404	3,029
Ambulance Driver Fatality	1	3
Ambulance Crew Other Than Driver Fatality	5	10
Other Ambulance Passenger Fatality	9	17
Non-Motorist Fatality	3	5
Total Ambulance Crash Fatalities	16	35
Total Ambulance Crash Injuries	918	1,579

The FARS and NASS GES data from NHTSA are widely used. For example, summary data provided by the National Safety Council directly uses this summary information in their literature. Table 3-1, Example of Use of Ambulance Crash Data (in U.S. in 2009), provides a summary for National Safety Council literature, based on data from NHTSA FARS and NASS GES.[43]

National EMS Information System (NEMSIS)

The National EMS Information System (NEMSIS) was established to promote the unification on EMS data. Their focus is on establishing a framework for the evolution of effective national EMS data that includes coordination with state-based data collection efforts. It is estimated that more than three-quarters of the states have some type of data system in place right now at various levels of sophistication. Many states are currently working to revise data elements, improve data capture, and ensure compliance with the future NEMSIS dataset.[45]

The genesis of its origin can be traced prior to 2001, but at that time the effort appeared under the NEMSIS banner through the combined efforts of a public private partnership involving the National Association of State EMS Officials, National Highway Traffic Safety Administration (NHTSA), and the Trauma/EMS Systems program of the Health Resources and Services Administration's (HRSA) Maternal Child Health Bureau. Today, administration is provided through a technical assistance center jointly hosted by the University of Utah and the University of North Carolina. Funding is provided through NHTSA, HRSA, and the CDC to support each state's efforts to collect, retain, and send data to the national database. A wide range of professional organization and federal agency partners also participate with NEMSIS.[46]

Work through NEMSIS is on-going, and the latest available information is the version 3 Data Dictionary, XML Schema, and supporting documentation.[47] This has included the creation of a detailed data dictionary, development of schemas, recommended software arrangements, and other details supporting an EMS Pre-hospital Dataset.[48]

In the meantime, vehicular crashes involving ambulances is one detail in the complex overall data collection effort involving EMS. NEMSIS has a focus on these other aspects of EMS activity, such as patient care and condition, and less on vehicular crashes. For example, two major federally sponsored data definitions that describe data points for collection on patient encounters are the Uniform Prehospital Data Elements developed by NHTSA87 and the Data Elements for Emergency Department Systems (DEEDS) developed by the Centers for Disease Control.[49]

National Electronic Injury Surveillance System (NEISS)

The National Electronic Injury Surveillance System (NEISS) is a national probability sample that uses patient injury information from participating NEISS hospitals in the U.S. and its territories.[50] The Consumer Product Safety Commission administers and provides oversight for the NEISS and collaborates with the National Institute for Occupational Safety and Health on a supplement to NEISS to collect surveillance data on nonfatal work-related injuries and illnesses treated in U.S. hospital emergency departments. The occupational supplement is referred to as NEISS-Work, or Work-Related Injury Statistics Query System (Work-RISQS).[51]

Specifically, NEISS-Work is a national stratified probability sample of 67 hospitals in the U.S. and its territories that have a minimum of six beds and that operate a 24-hour emergency department. Hospitals in the sample were selected from approximately 5,300 rural and urban U.S. hospitals after stratification by total annual emergency department visits. The occupational injury hospital sample is a subset (2/3) of the hospital sample used by CPSC for capture of product-related injuries. Work-related cases are identified from admissions information and emergency department chart review by hospital coders. A workers' compensation claim is not required for inclusion.[52]

NEISS-Work is designed to produce national estimates. A national estimate is obtained by extrapolating the number of cases seen in the 67 hospitals by using the statistical weight of each case. The statistical weight varies depending upon the size of the hospital and the number of patients typically treated in their emergency department. In other words, each case captured in a sample hospital may represent 20 to more than 100 cases seen in other U.S. hospitals. By summing the weights for similar cases, a national estimate is obtained for a specific demographic group, type of injury, injury circumstances, or all injuries and illnesses.

In its current arrangement, NEISS-Work has limitations with regard to how the surveillance system captures ambulance transport related incidents. The “transportation” incident numbers per year are generally too small to be reported or are “barely” reportable. Further, ambulance crash data are part of the larger event category of “transportation incidents,” which is not exclusive to ambulances, even though for EMS worker injuries they are probably mostly due to ambulance related incidents. Nevertheless, NEISS-Work provides another basic approach for capturing ambulance crash data, and presents a future opportunity for data collection through an alternative hospital-based framework.

National Fire Incident Reporting System (NFIRS)

The National Fire Incident Reporting System (NFIRS) is administered through the U.S. Fire Administration, which operates within the Federal Emergency Management Agency under the U.S. Department of Homeland Security. NFIRS is the standard national reporting system used by fire departments in the U.S. to report fires and other incidents to which they respond and to maintain records of these incidents in a uniform manner.[53]

NFIRS is considered the world's largest national annual database of fire incident information. State participation in NFIRS is voluntary, and each year approximately 23,000 fire departments input data. On average these participating fire departments report an annual average of 19 million incidents and one million fires each year, accounting for an estimated 75% of all reported fires.[54] Because a majority of fire departments also provide EMS, some data is captured on EMS events in addition to fire events. However, despite the extensive nature of the NFIRS tool, it is lacking the necessary detail to provide value on the topic of ambulance crashes.

The latest version for NFIRS is 5.0, and this includes an EMS component. The initial foundation for NFIRS was laid by the Federal Fire Prevention and Control Act of 1974 (P.L. 93-498) and authorizes the National Fire Data Center in the United States Fire Administration (USFA) to gather and analyze information on the magnitude of the Nation's fire problem, as well as its detailed characteristics and trends.[55]

In its infancy, fire department activity reporting was limited to fires only, at least on a national level, yet the need to justify all activities and expenditures grew over time. Many local fire departments began to collect data on their own, using the NFIRS program to attempt to gather management information in ways that had not been anticipated.[56]

Recognizing that EMS activities represent a significant portion of what fire departments are currently doing, an EMS reporting module was included in NFIRS 5.0. The starting point for development of the EMS module was the Final Report of the 1993 Uniform Pre-Hospital EMS Data Conference sponsored by the NHTSA.[57] The essential data elements indicated in this and other earlier activity have been retained as much as practicable in the latest version. The current NFIRS EMS module is not intended to replace or otherwise interfere with state or local EMS patient care reporting requirements, nor is it intended to be a comprehensive EMS patient care report. Instead the module should be considered as a core element around which a complete patient care report can be built.

Bureau of Labor Statistics (BLS)

The Bureau of Labor Statistics (BLS) of the U.S. Department of Labor is the principal federal agency addressing the broad field of labor economics and statistics. As an independent statistical agency, it is responsible for measuring working conditions, labor market activity, and economic price changes. BLS accomplishes its mission by collecting, analyzing, and disseminating essential economic information to support public and private decision-making.[58]

BLS provides statistical data on the pool of professionals available in the workplace. It maintains multiple databases, which can be of assistance on some aspects of certain national data collection efforts. However, typically the databases are relatively high-level and provide limited details on a particular sub-category such as EMS workers. Nevertheless, data collection approaches may want to consider this resource.

Non-Government Based National Data Collection

There are a number of EMS data collection efforts that exist or are proposed outside the federal government. Some of these are relatively rigorous with the intent of providing full statistical analysis, while other data collection efforts are much more informal and proceed on the basis of providing on-going case studies. Several examples are offered here.

Highway Loss Data Institute (HLDI)

The Highway Loss Data Institute (HLDI) is a nonprofit research organization organized in 1972 that is an affiliate of the Insurance Institute for Highway Safety. HLDI publishes insurance loss statistics on most passenger vehicles on U.S. roads and administers a database of more than

150 million individual passenger vehicles representing about 80% of all privately insured road vehicles.[59]

The HLDI database is considered one of the largest repositories of such information in the world. The institute addresses a wide range of topics of interest to its supporting insurance companies, including auto-theft and other non-safety oriented concerns. Although HLDI maintains a database with a significant number of data elements, access to this information is limited since it is meant for the supporting constituents. Further, the relationship to EMS and ambulance crash data appears to be peripheral to their primary focus.[60]

International Association of Emergency Medical Service Chiefs (IAEMSC)

A new EMS data collection initiative called the National EMS Health Surveillance System was recently launched under the administrative leadership of the International Association of Emergency Medical Service Chiefs (IAEMSC). IAEMSC has partnered with a private organization specializing in data collection to develop a national EMS health surveillance system.[61]

The purpose of this initiative is to create a national repository of data related to occupational illnesses, injuries, or deaths from all EMS providers in the United States. This project will enable EMS organizations from the United States to voluntarily report occupational illnesses, injuries, and deaths using a common web-based tool. This is intended to fill the gap by providing the opportunity for all EMS organizations of all system configurations a framework for reporting occupational illnesses, injuries, and deaths.[62]

On-Line Information Collection

Various publication organizations have taken advantage of the World Wide Web to capture and post information relating to ambulance crashes. This includes on-line publications such as EMTCity.com, EMSWorld.com, and EMSNetwork.org. They provide an interactive forum for on-going data on crashes involving ambulances. These on-line publications likewise provide summary articles that reveal additional data points.[63]

In general, this information only indirectly lends itself to efforts to conduct any manner of statistical analysis. There have been, however, efforts to more formally use this data through more conventional analysis. In particular, one study has provided a retrospective analysis of ambulance crash characteristics in the U.S. as defined by the popular press.[64] This not only provides an analysis of certain data relating to ambulance crashes, but it also reflects on the efficacy of the use of data gathered through the popular press and on-line information collection.

As a case study example of the information available through on-line information collection, the on-line news publication EMSNetwork has been active since 2001. This internet-based publication includes an active web log and news wire service that provides a convenient public bulletin board for news articles that address crashes involving ambulances.[65]

Although the information they gather does not appear to be undergoing automatic filtering and synthesis, it does provide interesting and informative summaries and case studies of identified events. Of course, this particular statistical sample set is relatively undefined and therefore does not readily lend itself to formal statistical analysis. However, as a minimum it can be utilized for purposes of cross-reference to clarify or trace additional data through other more institutional collection programs.

An example of the implied value of the EMSNetwork news information is further exemplified in Table 3-3.[66] This information was collected over a one year period by an individual EMS/fire department based on a daily review of the on-line articles addressing incidents in the United States. For the one-year period of November 2009 through October 2010, this information yields additional details for 242 crash events involving motor vehicle ambulances, with 40 civilian deaths and 222 civilian injuries, and 14 EMS staff deaths and 188 EMS staff injuries.

Table 3-3: Summary of Daily News Articles for Motor Vehicle Ambulance Crashes[67]

Date	Location	Civilian Injuries	Civilian Deaths	Emergency Staff Injuries	Emergency Staff Deaths	Additional Comments
2-Nov-2009	Boston, MA	1				
3-Nov-2009	Jacksonville, AK		1			
4-Nov-2009	San Carlos, AZ			2		
4-Nov-2009	Winchester, MA	1				
6-Nov-2009	Victorville, CA					No Injuries
6-Nov-2009	Villa Rica, GA		1			
6-Nov-2009	Tacoma, WA	1		1		
6-Nov-2009	Topeka, KS			1		
6-Nov-2009	Bessemer, AL					Unknown Injuries
10-Nov-2009	Jacksonville, FL	4				
10-Nov-2009	East Grand Forks, ND	2				
14-Nov-2009	Woodland, WA	1				
16-Nov-2009	Manchester, OH			1		
16-Nov-2009	Silver Springs, Wash DC					No Injuries
16-Nov-2009	Cape County, MO					No Injuries
19-Nov-2009	Libertyville, IL			1		
19-Nov-2009	N. Rochester, MN					Unknown injuries
19-Nov-2009	Harrison Township, OH			2		
19-Nov-2009	Quincy, IL					No Injuries
21-Nov-2009	Port Arthur, TX	1				
21-Nov-2009	N. Hampton County, PA	1				3 crew evaluated
21-Nov-2009	Huntington, WV	1		2		
26-Nov-2009	Aurora, CO					No Injuries
2-Dec-2009	Jacksonville, FL	3	1	1		
3-Dec-2009	Washington Township, OH	3	1	1		
7-Dec-2009	Syracuse, NY	1		4		
8-Dec-2009	Ellicott City, MD					No Injuries
8-Dec-2009	South Londonderry, PA	6		1		

Date	Location	Civilian Injuries	Civilian Deaths	Emergency Staff Injuries	Emergency Staff Deaths	Additional Comments
10-Dec-2009	Toms River, NJ					No Injuries
10-Dec-2009	Joliet, IL	1		2		
11-Dec-2009	DeKalb, IL					No Injuries
11-Dec-2009	Allegan County, MI					Unknown Injuries
11-Dec-2009	Missouri	4		2		
15-Dec-2009	Brooklyn, NY		1			
17-Dec-2009	North Austin, TX					Unknown Injuries
21-Dec-2009	Ridgewood, NJ	1		1		
21-Dec-2009	Basking Ridge, NJ					No Injuries
24-Dec-2009	Dixon, MO					No Injuries
24-Dec-2009	Milaca, MN					Unknown Injuries
26-Dec-2009	Indianapolis, IN					No Injuries
26-Dec-2009	Johnson County, NC	3		3		
28-Dec-2009	Kettering, OH					No Injuries
28-Dec-2009	Schuylkill County, PA		1	1		
28-Dec-2009	Greenburgh, NY					No Injuries
28-Dec-2009	Douglas County, GA	3			1	
29-Dec-2009	Tennessee		1		1	
31-Dec-2009	El Paso County, CO					No Injuries
31-Dec-2009	Las Vegas, NV					No Injuries
4-Jan-2010	Maplewood, NY					No Injuries
4-Jan-2010	Piqua, OH					No Injuries
5-Jan-2010	Georgetown Township, MI					No Injuries
6-Jan-2010	Fairplay, AR	3		2		
9-Jan-2010	Jackson County, MI	1		1		
9-Jan-2010	Morgan County, KY	1		2		
9-Jan-2010	South Park, CO	3		2		
9-Jan-2010	Iron River, MN	1		2		
9-Jan-2010	Egg Harbor, NJ			2		
13-Jan-2010	Lakewood Ranch, FL	1		2		
14-Jan-2010	Des Moines, IA					No Injuries
14-Jan-2010	White Township, NJ		1	2		
16-Jan-2010	Muskogee, OK			1		
18-Jan-2009	Nashua, NH	1		2		
20-Jan-2009	Keene, NH			1		
20-Jan-2010	Louisville, KY			2		
20-Jan-2010	Prince George, MD	2		2		
21-Jan-2010	Nederland, TX			1		
21-Jan-2010	Augusta, GA					Unknown Injuries
21-Jan-2010	Blissfield, MI					No Injuries
21-Jan-2010	Utica, NY	2		1		
21-Jan-2010	Tulare, CA	1		1		
22-Jan-2010	Genoa Kingston, IL			3		
22-Jan-2010	Brockton, MA					No Injuries

Date	Location	Civilian Injuries	Civilian Deaths	Emergency Staff Injuries	Emergency Staff Deaths	Additional Comments
25-Jan-2010	Burlington, CT					Unknown Injuries
26-Jan-2010	Portland, OR			2		
31-Jan-2010	Elkview, WV					No Injuries
31-Jan-2010	Laporte, IA					No Injuries
31-Jan-2010	New Britain, CT					No Injuries
31-Jan-2010	Lexington, KY	1				
1-Feb-2010	Fall River, MA	1		2		
2-Feb-2010	Halifax, FL			1		
2-Feb-2010	Westmoreland, NY	1				
9-Feb-2010	Fargo, ND	1		2		
7-Feb-2010	Washington DC					No Injuries
7-Feb-2010	Middle Township, NJ	1				
7-Feb-2010	Natick, MA	2		2		
7-Feb-2010	Unknown Location					No Injuries
7-Feb-2010	Daytona Beach, FL					No Injuries
12-Feb-2010	Milton, MA	4		2		
13-Feb-2010	Dunn, NC		2	2		
16-Feb-2010	Illinois	2				
16-Feb-2010	Kettering, OH					Unknown Injuries
16-Feb-2010	North Carolina					No Injuries
16-Feb-2010	Gladstone, MI	1		1		
16-Feb-2010	Chicago, IL	4				
16-Feb-2010	Chicago, IL	6				
17-Feb-2010	Gallatin County, OH	1		1		
17-Feb-2010	Houston, TX			1		
17-Feb-2010	New York					Unknown Injuries
19-Feb-2010	Broward, FL	1		3		
21-Feb-2010	Jamestown, ND					No Injuries
21-Feb-2010	Illinois	1				
22-Feb-2010	Columbus, OH					No Injuries
22-Feb-2010	Somers, CT			1		
23-Feb-2010	Nephi, UT			4		
25-Feb-2010	Westmoreland, NY					Unknown Injuries
28-Feb-2010	Prosser, WA	1				
1-Mar-2010	Bethlehem, PA	2				
3-Mar-2010	Fort Pierce, FL		1	1		
6-Mar-2010	Upper Cleveland, NC			1		
7-Mar-2010	Florida			1		
7-Mar-2010	Huron Valley, MI	1		1		
18-Mar-2010	Horry County, SC		1			
18-Mar-2010	Richmond, VA					Unknown Injuries
18-Mar-2010	Lawton, OK	1	1			
18-Mar-2010	Montgomery County, NC			2		
18-Mar-2010	Fairbanks, AK					No Injuries

Date	Location	Civilian Injuries	Civilian Deaths	Emergency Staff Injuries	Emergency Staff Deaths	Additional Comments
18-Mar-2010	Maumee, OH	2		2		
18-Mar-2010	Rainbow, AL	1		2		
18-Mar-2010	Louisville, KY	2		2		
22-Mar-2010	Dallas, OR	3		3		
23-Mar-2010	Virginia Beach, WV	1		2		
25-Mar-2010	Liberty, KY	1				
25-Mar-2010	Wake Forest, NC					Unknown Injuries
25-Mar-2010	Belmond, IA	1				
29-Mar-2010	Anderson County, SC					Unknown Injuries
30-Mar-2010	Lexington, KY	2		1		
1-Apr-2010	San Diego, CA				1	
2-Apr-2010	Petersburg, VA					No Injuries
2-Apr-2010	Syracuse, NY	1				
5-Apr-2010	Bushkill, PA	1				
8-Apr-2010	Miami Township, OH					No Injuries
9-Apr-2010	Portland, Maine					No Injuries
12-Apr-2010	Royersford, PA			1		
14-Apr-2010	Conway, AK	1				
15-Apr-2010	Sullivan City, IN	1		2		
16-Apr-2010	Kirksville, MO	1				
17-Apr-2010	Paterson, NJ			1		
24-Apr-2010	Cleveland, OH			1		
24-Apr-2010	Raleigh, NC					No Injuries
24-Apr-2010	Fort Drum, NY	1	1	2		
27-Apr-2010	Cabell, WV					No Injuries
27-Apr-2010	Anaheim, FL	2				
29-Apr-2010	Columbus, OH					No Injuries
5-May-2010	Charlotte, NC	1				
7-May-2010	Lexington, KY			1		
9-May-2010	Brookston, MN		1			
9-May-2010	Columbia, MO	2				
9-May-2010	Pocatello, ID					No Injuries
13-May-2010	Beaver, IA		1	2	1	
14-May-2010	Floyd, GA					No Injuries
17-May-2010	Park Slope, NY				1	
17-May-2010	Dunnellon, FL				2	
19-May-2010	Duquesne, PA	1		2		
20-May-2010	Belmont County, WV		1			
22-May-2010	Bristol, VA	1		2		
23-May-2010	Desert Center, CA	1		1		
23-May-2010	Syracuse, NY	1		2		
24-May-2010	Louisville, KY	3		2		
24-May-2010	Chicago, IL	1		1		
30-May-2010	Aurora, IN					No Injuries

Date	Location	Civilian Injuries	Civilian Deaths	Emergency Staff Injuries	Emergency Staff Deaths	Additional Comments
30-May-2010	Midtown, TN	1				
30-May-2010	Sophia, WV					No Injuries
31-May-2010	Richmond, CA					No Injuries
8-Jun-2010	McAlley, TX		1	2		
9-Jun-2010	Denver, CO	1		2		
13-Jun-2010	Jackson Township, NJ		1			Motorcycle crash
16-Jun-2010	Dunbar, WV	3				
17-Jun-2010	Waco, TX		1			
20-Jun-2010	Smyrna, DE	1				
21-Jun-2010	Lincoln City, MO	2		1		
21-Jun-2010	Columbus, OH	1				
30-Jun-2010	Los Angeles, CA				`	Unknown Injuries
1-Jul-2010	West Windsor, NJ					No Injuries
2-Jul-2010	Woodbury, NY	1				
2-Jul-2010	Rutherford, TN	2		2		
4-Jul-2010	James Island, SC	1				
7-Jul-2010	Watertown, NY	1				
7-Jul-2010	Brunswick, MN	1				
7-Jul-2010	Brentwood, NY	3	1	1		
7-Jul-2010	Charleston Co, SC	1		1		
7-Jul-2010	Pollocksville, NC	3		4		
7-Jul-2010	Dayton, OH	3				
8-Jul-2010	Nebraska					No Injuries
10-Jul-2010	Hartford, CT					No Injuries
10-Jul-2010	Wisconsin					No Injuries
10-Jul-2010	Tennessee	15				
13-Jul-2010	Tennessee	2				
16-Jul-2010	New Jersey			1		
19-Jul-2010	Michigan	1				
26-Jul-2010	Pittsburg, PA	1				
26-Jul-2010	Texas		1			
26-Jul-2010	Queensburg, NY	2		1		
26-Jul-2010	Nevada					Unknown Injuries
27-Jul-2010	Pennsylvania					Unknown Injuries
27-Jul-2010	Hyannis, MA					Unknown Injuries
28-Jul-2010	Texas	6				
31-Jul-2010	Washington	1	2	1		
3-Aug-2010	Ohio		1		1	
6-Aug-2010	Ohio			1		
8-Aug-2010	Maryland	5		3		
8-Aug-2010	Kansas City, MO	2		2		
9-Aug-2010	Alaska		2	3		
12-Aug-2010	Cornelius, NC					No Injuries
14-Aug-2010	Staten Island, NY	1				

Date	Location	Civilian Injuries	Civilian Deaths	Emergency Staff Injuries	Emergency Staff Deaths	Additional Comments
14-Aug-2010	North Dakota	2				
19-Aug-2010	Lincoln, NB					No Injuries
21-Aug-2010	Becker County, MN					Unknown Injuries
21-Aug-2010	Illinois	1		1		
28-Aug-2010	Springfield, MA			1		
28-Aug-2010	Maryland			4		
30-Aug-2010	Texas	1	1			
5-Sep-2010	Arkansas				3	
5-Sep-2010	Georgia	1				
13-Sep-2010	Maryland		1	1		
13-Sep-2010	West Virginia	1		1	1	
15-Sep-2010	New York	1	1	2		
16-Sep-2010	Ohio	1	1	2		
16-Sep-2010	Maryland		3	2		
19-Sep-2010	Alabama			1		
19-Sep-2010	North Carolina			3		
22-Sep-2010	Floyd, GA			2		
4-Oct-2010	South Carolina	6	2	1		
4-Oct-2010	Kentucky	4		2		
6-Oct-2010	Ohio	2		1	1	
9-Oct-2010	Connecticut	1		2		
9-Oct-2010	Arizona	6		2		
9-Oct-2010	Pennsylvania	2	1	2		
11-Oct-2010	Tennessee			2		
11-Oct-2010	Illinois	1	1	1	1	
13-Oct-2010	North Carolina	1	1	1		
14-Oct-2010	Florida					No Injuries
15-Oct-2010	Georgia	3		2		
18-Oct-2010	Connecticut					No Injuries
18-Oct-2010	Florida	2		3		
19-Oct-2010	Nebraska	1				
20-Oct-2010	Massachusetts		1	2		
20-Oct-2010	Pennsylvania			2		
21-Oct-2010	Utah			1		
22-Oct-2010	Pennsylvania					No Injuries
23-Oct-2010	Delaware	5				
29-Oct-2010	Maryland					No Injuries
29-Oct-2010	Minnesota					Unknown Injuries
31-Oct-2010	Ohio	1		2		
Totals	**242**	**222**	**40**	**188**	**14**	

4. State and Local Data Collection Activities

A key operating feature to the overall data collection infrastructure is the information collected on a state and local basis. This data information provides a fundamental backbone for the stream of information that feeds into an overall national data collection effort.

Data collection efforts relating to ambulance crashes are commonly processed through certain state government agencies, and in some cases they are processed locally with the particular state. Data collected among multiple states are needed for nationally based programs, and are important for identifying problems, establishing performance measures, allocating resources, evaluating program progress, and implementing effective countermeasures. However, from a national perspective, a lack of uniformity exists among and within the states, and this hinders on-going efforts to use a collective and cohesive data set for broadly embraced, programmatic improvements.

Model Minimum Uniform Crash Criteria (MMUCC)

Foremost among nationally-based efforts to coordinate state-based data addressing ambulance crashes and related topics is the Model Minimum Uniform Crash Criteria (MMUCC). The program provides a minimum recommended standardized data set for describing motor vehicle crashes and the vehicles, persons and environment involved in the event.[68]

MMUCC is funded and supported by the NHTSA and jointly managed by NHTSA and the Governors Highway Safety Association (GHSA) with input from other offices in the U.S. Department of Transportation, including the Federal Highway Administration (FHA), Federal Motor Carrier Safety Administration (FMCSA), and Research and Innovative Technology Administration (RITA). The first edition of this program was released in 1998, followed by the second edition in 2003 and third edition in 2008. An updated fourth edition is scheduled for release in the spring of 2012.

The MMUCC program uses a voluntary and collaborative effort that seeks to generate uniform crash data that is credible, reliable, and accurate for data-based safety decisions at the national, state, and local levels. The use of the minimum recommended data set in MMUCC is voluntary, but incentives exist for its use. Most notably, the "Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users" (SAFETEA-LU) was signed into law by President Bush in 2005, and Section 408 requires that a state must certify that it has adopted and uses identified model data elements to receive Traffic Safety Information System Improvement Grants. MMUCC elements were identified by US DOT as one set of model crash-related data elements that apply to Section 408, while in similar fashion NEMSIS was identified for EMS-related data.[69]

A collaborative effort involving stakeholders is providing significant input into the new fourth edition of MMUCC. Stakeholder groups include federal agencies, state governor representatives, state dept. of transportations, state dept. of motor vehicles, emergency responders, medical community representatives, safety professionals, and others. The current Third Edition addresses 107 data elements that include 75 data elements to be collected at the scene, 10 data elements to be derived from the collected data, and 22 data elements to be obtained after linkage to driver history, injury, and roadway inventory data.[70]

State-Based Data Collection

Ambulance crash data and the associated collection methods appear to vary considerably among states and territories. Yet despite this diversity, there are common themes and attributes on how these data collection frameworks have evolved.

Information collection for ambulance crashes appears to be occurring on two basic fronts: through the state dept. of public health, often including or in collaboration with the state EMS agency, and also through police accident reports (PARs) that are typically collected through the state dept of transportation. In some cases these separate data collection streams are coordinating and sharing information, and in other cases they are effectively independent.

There are certain governmental entities that can be found in most if not all states and territories. For instance, every state has a Traffic Records Committee which coordinates crash-related data and serves as a useful point of contact within a particular state.[71] Further, each state has a lead agency responsible for EMS activities, which once again serves as an important point of contact for ambulance crash data.[72]

Published articles in the mainstream literature directly addressing state-oriented data collection methods provide a useful case-study perspective for how states utilize the available national frameworks to implement their own state-based data collection efforts to address their specific needs. For example, one recent study in the state of Michigan identified critical factors associated with the occurrence of emergency vehicle crashes, to distinguish among the characteristics of crashes involving different types of emergency vehicles, and to determine those factors affecting the injury severity resulting from emergency vehicle crashes.[73]

In the Michigan study, the most prevalent types of crashes were identified as angle, head-on, and sideswipe collisions, and were typified by involving high-risk driving behaviors (e.g., speeding, non-use of safety restraint devices, etc). In this study, emergency vehicle crashes had a higher likelihood of occurring near intersections, in darkness, and during the evening rush hour. Among other factors, injuries tended to be most severe at high speeds and with angle collisions.

As part of this study, an effort has been made to contact each state to clarify how they are handling their data collection for ambulance crashes and the points of contact within the state. This information is captured in Table 4-1, which summarizes the on-going efforts within each U.S. state to collect data on ambulance crashes.

Table 4-1: Summary of State Ambulance Crash Data Collection

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
Alabama	No	DOT	No information collected. Referred to the DPS	www.nhtsa-tsis.net/crashforms/Pages/state/al/AL.htm
Alabama	**YES; Lead Collection Point for State Crash Data**	DPS	The Center for Advanced Public Safety's website was used to create a report for 1999 – 2008. Changes to the form in June, 2009 such as the addition of Emergency status, while helpful for the future, created un-trusted data for 2009 + 2010. From 2011 onward it will be accepted.	www.dps.state.al.us/Home/wfContentTableItem.aspx?ID=10&PLH1=ADMINACCIDENTSUMMARY#INFO
Alabama	No	DPH OEMS	While they mandate that the PAR report be sent to them if there is an injury or fatality, they do not keep any databases besides paper files.	www.adph.org/ems/Default.asp?id=803
Alabama	Yes	CARE, Research and Develop-ment	CARE is a complex but very in-depth computer database program which can be used to sort through Alabama's PARs to create filtered outputs for ambulances. Both the program and database have to be downloaded then worked with to create the output in MS Access. Interested in EMS data collection and would like to be kept in mind for future data collection programs.	caps.ua.edu/downloads/downloads.aspx
Alaska	No	DOT Data Services	While they produce annual reports for the statewide auto crashes, ambulances simply are not a category specified in the PAR therefore no report can be made for ambulances. The PAR is currently MMUCC 2 compliant but a new version that is MMUCC 3 compliant (has ambulance category) is out for review.	www.nhtsa-tsis.net/crashforms/Pages/state/ak/AK.htm www.dot.alaska.gov/stwdplng/transdata/crash.shtml
Alaska	No	EMS Program	Interested in this kind of information, but they do not currently collect it.	www.chems.alaska.gov/
Arizona	No	DOT	While the PAR collects whether it is an emergency vehicle or not, it does not subdivide it into ambulances. Therefore, no report can be collected through the PARs.	www.nhtsa-tsis.net/crashforms/Pages/state/az/AZ.htm
Arizona	No	Bureau of EMS	While they are beginning to collect NEMSIS data, they do not collect anything regarding the crash.	www.azdhs.gov/bems/index.htm
Arkansas	No	State Police Traffic Records	While the PAR collects whether it is an emergency vehicle, it does not break it down into an ambulance category.	www.nhtsa-tsis.net/crashforms/Pages/state/ar/AR.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	Unknown	EMS	Status unconfirmed regarding an additional EMS incident form.	www.healthy.arkansas.gov/programsServices/hsLicensingRegulation/EmsandTraumaSystems/Pages/default.aspx
California	**YES; Lead Collection Point for State Crash Data**	Highway Patrol Information Services Unit	They have a unit type of ambulance for 2003 onward, but warned to only rely on the 2007 onward for full completeness.	www.nhtsa-tsis.net/crashforms/Pages/state/ca/CA.htm www.chp.ca.gov/publications/form190.html
	Unknown	EMS Authority	Status unconfirmed regarding Incident and EMS form.	www.emsa.ca.gov/
Colorado	No	DOT Safety & Traffic Engineering Branch	They do not collect ambulance accident data within the PAR system even though there is an ambulance category in the CMV overlay C on the NHTSA website. No information available.	www.nhtsa-tsis.net/crashforms/Pages/state/co/CO_DR2447_2_1_2006_sub_4_25_07_0005.jpg www.coloradodot.info/library/traffic/traffic-manuals-guidelines/safety-crash-data
	No	State Patrol	Confirmed that yes the PAR should include the information from the CMV overlay if it was an ambulance. The state police only have information from their own calls which is about 1/3 of the total calls for the state. A reportable accident includes fatality/injury/or if the vehicle was towed. The DOT, DOR, or FMCSA are better contacts for statewide.	www.colorado.gov/cs/Satellite/StatePatrol-Main/CBON/1251593175702
	No	Dept of Revenue	Unconfirmed if they have any information regarding ambulances based on the CMV overlay.	www.colorado.gov/cs/Satellite/Revenue-MV/RMV/1177024843137
	No	DPH EMS	All the MMUCC criteria is within the PAR with the DOT, so a separate form isn't necessary. They have some voluntary reporting but nothing standardized or mandated.	www.cdphe.state.co.us/em/certificationeducation/index.html
	No	EMS Org in state	Ambulance licensing is run on a county level not by the state.	www.emsac.org/index.php

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
Connecticut	No	DOT	Handle the PAR data, but can only narrow down to emergency vehicles and it is not ambulance specific. No report available. Currently in transition to having CT University control all the PAR records in a centralized location. Uses Route and Kill Analytical System. PR1 always filled out, PR2 if any fatalities.	www.nhtsatsis.net/crashforms/Pages/state/ct/CT.htm
	No	DPH OEMS	Usually notified by phone when the incident first occurs to decide if a larger investigation is necessary, then has the PAR sent to them afterward. There is no computerized system, simply the PARs in file folders sorted by year.	www.ct.gov/dph/cwp/view.asp?a=3127&q=387362
Delaware	No	EMS Dept	Currently there is no state form that is sent to the EMS Dept. Would like to obtain this information but the infrastructure is not set up. State has mostly volunteer depts. who typically only keep internal records.	dhss.delaware.gov/dph/ems/ems.html
	No	State Fire Preven-tion Commis-sion	An ambulance regulatory group for the state. Confirmed that state does not collect information regarding crash data.	statefirecommission.delaware.gov/
	No	DOT	Currently no way to track crash data due to having switched reporting systems in the past few years. The NHTSA version is an older version whereas the new one does not have an emergency vehicle option. Since 2009 State Police have been using CARS (Crash Analysis Reporting System).	www.nhtsa-tsis.net/crashforms/Pages/state/de/DE.htm www.deldot.gov/home/contact_info/contact.shtml
	YES; Lead Collection Point for State Crash Data	State Police	While "Ambulance" has been a category for years, an investigation into the data collection last year (2010) found that officers were using it to record if an ambulance came to the scene, not if the ambulance itself was in the crash. For that reason, data collected prior to 2010 is not reliable. They use the ECRASH electronic reporting system.	dsp.delaware.gov/reports.shtml
Florida	Yes	DPH Bureau of EMS	Department receives and maintains the database for an EMS Incident Reporting System, which includes EMS crashes. Working to integrate it with the PARs, hopefully within the next year. Data elements are collected based on NEMSIS MUCC dataset, and currently get input from 50% of the state. NFIRS is also filled out for each incident but at a local level.	www.doh.state.fl.us/demo/ems/Providers/datahome.html#DContact www.floridaemstars.com/

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	YES; Lead Collection Point for State Crash Data	DOT	PAR collects the "Special Function of a Motor Vehicle" which includes ambulance. Reports that are needed can be requested through the Office of Statistics.	www.nhtsa-tsis.net/crashforms/Pages/state/fl/FL.htm
Georgia	**YES; Lead Collection Point for State Crash Data**	DOT	Ambulance category is an available data field within information regularly collected.	www.nhtsa-tsis.net/crashforms/Pages/state/ga/GA.htm
	No	OEMS	DOT is the best contact for this information. There is no separate incident form collected.	ems.ga.gov/programs/ems/contactus.asp
Hawaii	**YES; Lead Collection Point for State Crash Data**	DOT	Ambulance is a special function category.	www.nhtsa-tsis.net/crashforms/Pages/state/hi/HI.htm
	No	EMS Branch	They do not collect any data, and only provide administration. The department for each island is the best source of data.	hawaii.gov/health/family-child-health/ems/index.html#factsheets
	No	EMS	Private companies are the best source, and in particular the four largest companies covering the islands (AMR, Hawaii County FD, Federal Fire, and EMS).	
	Unknown	AMR	Status unconfirmed.	www.amrhawaii.net/
Idaho	**YES; Lead Collection Point for State Crash Data**	DOT	Ambulance specified under vehicle type.	www.nhtsa-tsis.net/crashforms/Pages/state/id/ID.htm
	No	EMS Bureau	Licenses all ambulance companies (private, commercial, public) which upon renewal each year provides the number of accidents from the previous year. However, detailed analysis of this data is not provided.	healthandwelfare.idaho.gov/Medical/EmergencyMedicalServices/tabid/117/Default.aspx healthandwelfare.idaho.gov/AboutUs/PublicRecordsRequest/OnlinePublicRecordsRequestForm/tabid/756/Default.aspx

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
Illinois	**YES; Lead Collection Point for State Crash Data**	DOT	Ambulance specified under vehicle type.	www.nhtsa-tsis.net/crashforms/Pages/state/il/IL.htm
	No	DPH EMS	Compile the reports from DOT data and works closely with the DOT. Further clarification of status is unconfirmed.	www.idph.state.il.us/ems/index.htm app.idph.state.il.us/emsrpt/form-crash-ac.asp
Indiana	**YES; Lead Collection Point for State Crash Data**	Open Portal Solutions	State Police indicate a third party is contracted to collect and manage all the data from the Crash reports. Have access to all the PAR data back until 2003.	openportalsolutions.com/
	No	DHS EMS	Status unconfirmed.	www.in.gov/dhs/3525.htm
Iowa	**YES; Lead Collection Point for State Crash Data**	DOT	Ambulance is a category on the PARs. The report form was changed in 2001 therefore the earliest reliable data is 2002.	www.nhtsa-tsis.net/crashforms/Pages/state/ia/IA.htm
	No	Bureau of EMS	Require a copy of the PAR be sent to them for possible investigation if necessary; however, no database is kept. They do not have a separate EMS incident form.	www.idph.state.ia.us/ems/default.asp
Kansas	**YES; Lead Collection Point for State Crash Data**	DOT	Began using a new data form in 2009 that breaks down ambulance in Vehicle Use. Previous data analysis based on interpreting narratives.	www.nhtsa-tsis.net/crashforms/Pages/state/ks/KS.htm
	No	EMS Associa-tion	Does not have any information on crashes, recommended contacting the Board of EMS.	www.kemsa.org/contact.html
	Unknown	KBEMS	Status unconfirmed.	www.ksbems.org/ems/
Kentucky	No	Transport-ation Cabinet, Highway Safety Division	Division has full access to state PARs and able to handle data queries or reports. However, data is limited to unit type of "Emergency Vehicle - In Response" (and Non-Response), without detail for ambulance.	www.nhtsa-tsis.net/crashforms/Pages/state/ky/KY.htm
	Unknown	EMS Bureau	Status unconfirmed.	kbems.kctcs.edu/

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	YES; Lead Collection Point for State Crash Data	State Police	Through their online crash report system, all their PAR data can be searched specifically for ambulances.	crashinformationky.org/KCAP/KYOPS/SearchWizard.aspx www.kentuckystatepolice.org/data.htm
Louisiana	No	State Police	Only provide input for PAR, and not analysis or reports which are provided by the LSU research group. Ambulances are included in the category for "Emergency Vehicle in Use" without further specifics.	www.nhtsa-tsis.net/crashforms/Pages/state/la/LA.htm
	No	OPH Bureau of EMS	Statistical information or a trauma registry are not coordinated among the private and third-party ambulance companies that provide most service. So far have not been successful mandating data collections.	www.dhh.state.la.us/offices/contacts.asp?ID=220
	No	DOT	Source of reports using the PARs, but confirmed that queries are limited due to the broad category of "Emergency Vehicle in Use" on the PAR which includes ambulances among other response vehicles.	www.nhtsa-tsis.net/crashforms/Pages/state/la/LA.htm
	Unknown	Acadian Ambu-lance	Status unconfirmed.	www.acadian.com/acadian
	No	LSU Highway Safety Research Group	Limitations of existing data confirmed based on data collection effort not further defining "emergency vehicle".	lhsc.lsu.edu/
Maine	**YES; Lead Collection Point for State Crash Data**	DOT	Currently transitioning into a new system that will begin recording specialized vehicles involved in the crash, using MMUCC version 3. Previous data requires identifying an ambulance from the narratives based on "Emergency Vehicle Involved".	www.maine.gov/mdot/mainedotorg.htm#rio
	No	OEMS	They do not collect any crash data, nor do they require completion of an EMS incident form.	www.maine.gov/dps/ems/contact.html
	Yes	State Police	Collects PARs for each incident into a searchable database. Currently transitioning into a new system in 2011.	www.nhtsa-tsis.net/crashforms/Pages/state/me/ME.htm
Maryland	**YES; Lead Collection Point for State Crash Data**	State Highway Admin., Traffic Records	A standard report can be generated which includes nearly every piece of data collected on the PAR. Ambulance is a category under vehicle type (both emergency and non-emergency).	www.nhtsa-tsis.net/crashforms/Pages/state/md/MD.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	No	Maryland Institute for Emer-gency Medical Services Systems (MIEMSS)	Commercial Ambulance Dept. has a form that is required for a vehicle collision and personal injuries. The information is received, investigated for accuracy, and then put into folders for each commercial company's record. However, no database exists in support of this captured data.	www.miemss.org/home/Home/WhoWeAre/tabid/74/Default.aspx www.miemss.org/home/LinkClick.aspx?fileticket=F0deMc9MBwI%3D&tabid=68&mid=499
	Unknown	DOT, Data Center	Status unconfirmed.	www.dbm.state.md.us/phonebook/IndDetails.asp?EmpID=14989&OID=2681
Massachusetts	**YES; Lead Collection Point for State Crash Data**	RMV, Accident Records	Status unconfirmed.	www.nhtsa-tsis.net/crashforms/Pages/state/ma/MA.htm
	No	OEMS, Evaluation & Research	Requires a form submittal for serious EMS incidents involving ambulance crashes with injury/fatality/property damage. However, this data is not captured in a database. They have connected PAR and EMS data from 2006-2010, and linked their trauma registry to the PARs from 2008-2010.	www.mass.gov/?pageID=eohhs2terminal&L=5&L0=Home&L1=Government&L2=Departments+and+Divisions&L3=Department+of+Public+Health&L4=Programs+and+Services+K+-+S&sid=Eeohhs2&b=terminalcontent&f=dph_emergency_services_g_about&csid=Eeohhs2 www.mass.gov/Eeohhs2/docs/dph/emergency_services/forms/incident_report.pdf
Michigan	**YES; Lead Collection Point for State Crash Data**	University of Michigan Transport Research Institute	Collected data includes a variable for ambulance under Special Vehicles. All PAR report data is available online. EMS is almost all private in Michigan.	www.michigantrafficcrashfacts.org/datatool/build www.michigantrafficcrashfacts.org/ www.nhtsa-tsis.net/crashforms/Pages/state/mi/MI.htm
	Unknown	EMS	Status unconfirmed.	www.michigan.gov/mdch/0,1607,7-132-2946_5093_28508-47476--,00.html

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
Minnesota	Unknown	Driver and Vehicle Services	Special Vehicle Use covers Ambulance both in and out of Emergency use. Otherwise status is unconfirmed.	www.nhtsa-tsis.net/crashforms/Pages/state/mn/MN.htm
	YES; Lead Collection Point for State Crash Data	Office of Traffic Safety, Traffic Records	Handles the PAR data and publishes an annual report with basic fatality/injury/property-damage data, and able to provide specific reports on request.	dps.mn.gov/divisions/ots/reports-statistics/Pages/default.aspx
Mississippi	**YES; Lead Collection Point for State Crash Data**	DPS	Data collected on emergency vehicles is not specific to ambulances. Otherwise status is unconfirmed.	www.nhtsa-tsis.net/crashforms/Pages/state/ms/MS.htm
	No	Dept of EMS	Required to be notified of an ambulance crash and collect some limited data, though do not maintain a database.	msdh.ms.gov/msdhsite/_static/47.html
Missouri	**YES; Lead Collection Point for State Crash Data**	State Highway Patrol	Provide extensive annual report for Emergency Service Vehicle Crashes posted on their website.	www.nhtsa-tsis.net/crashforms/Pages/state/mo/MO.htm www.mshp.dps.missouri.gov/MSHPWeb/SAC/publication_traffic_960grid.html
	Unknown	Missouri EMS	Status unconfirmed.	www.missouriems.com/
	No	Bureau of EMS	Highway Patrol reports are the best information for ambulance crashes. Patient data covered through CODES database.	health.mo.gov/safety/ems/ health.mo.gov/data/policies.php
Montana	**YES; Lead Collection Point for State Crash Data**	Highway Patrol, Records Manage-ment Section	State Highway Traffic Safety Office is able to provide data and reports. They include Ambulance under vehicle body style in data.	www.nhtsa-tsis.net/crashforms/Pages/state/mt/MT.htm
	No	DPH EMS	Do not collect data on crashes and do not have an incident data collection form.	www.dphhs.mt.gov/ems/
	Yes	DOT	Have access to Highway patrol's PAR reports, which have ambulance under body type. Otherwise, status unconfirmed.	www.mdt.mt.gov/publications/datastats.shtml
Nebraska	**YES; Lead Collection Point for State Crash Data**	Dept of Roads, Highway Safety Division	Ambulances data can be queried and provided in a report. Otherwise status unconfirmed.	www.nhtsa-tsis.net/crashforms/Pages/state/ne/NE.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	No	EMS, Data Collection	They do not have a specific incident form or ambulance crash data Confirmed that while they do collect some patient information for EMS,	www.hhs.state.ne.us/ems/emsindex.htm
Nevada	No	DPS, Traffic Records	While they work closely with the DOT and their crash data, the DOT is the main contact.	www.nhtsa-tsis.net/crashforms/Pages/state/nv/NV.htm
	Yes	OEMS	The OEMS dept does require a separate incident form be filled out for every accident involving an ambulance within 4 days of occurrence. No fatal accidents recorded recently, only injury and PDO. He requires a written request sent to him for crash data. Status unconfirmed.	health.nv.gov/EMS_EmergencyMedical.htm
	YES; Lead Collection Point for State Crash Data	DOT, Safety Engineer-ing Office	They do have a section for ambulances on the PARs to be queried.	www.nevadadot.com/About_NDOT/NDOT_Divisions/Planning/Safety_Engineering/Safety_Engineering.aspx www.nevadadot.com/uploadedFiles/NVCrash_Media_Crash_Request.pdf
New Hampshire	No	Dept. of Safety, DMV	Collect all NH's crash data, but only address commercial vehicles and not specific to ambulances. A new system is being implemented in approximately 18 months that will have a special function category for ambulances.	www.nhtsa-tsis.net/crashforms/Pages/state/nh/NH.htm www.nh.gov/safety/divisions/dmv/index.html
	No	Bureau of EMS	They do not currently collect data and the DMV is the source of all the crash data through PARs.	www.nh.gov/safety/divisions/fstems/ems/contactus.html www.nh.gov/safety/divisions/fstems/ems/research/index.html
New Jersey	No	OEMS	No data is collected that is currently published or public information. A Crash Data Warehouse is being created that will combine PAR, DMV, and EMS data records but not yet available. Only licensed state agencies are required to report incidents (approximately 50%), while non-licensed are not.	www.nj.gov/health/ems/index.shtml web.doh.state.nj.us/apps2/forms/subforms.aspx?pro=ems#basic-provider

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	Yes	DOT, Accident Records	Ambulances are recorded in the PAR under special function use. Raw non-processed data is posted on their website.	www.nhtsa-tsis.net/crashforms/Pages/state/nj/NJ.htm www.state.nj.us/transportation/refdata/accident/rawdata01-03.shtm
New Mexico	No	DOT Traffic Safety Bureau, Statistics Section	Report are available and are generated through the university.	www.nhtsa-tsis.net/crashforms/Pages/state/nm/NM.htm
	YES; Lead Collection Point for State Crash Data	UNM Division of Govern-ment Research	Lead collection point for crash data in New Mexico, and they provide the DOT's information through their "Uniform Accident Reports". They can subdivide their data for ambulances.	www.unm.edu/~dgrint/dgr.html
	No	DOH EMS Bureau	Maintains an EMS run report database, but it does not capture ambulance crashes.	nmems.org/Contact%20us.htm
New York	No	DMV	DMV collects data but the DPH Bureau of EMS handles data and creates reports.	www.nhtsa-tsis.net/crashforms/Pages/state/ny/NY.htm
	YES; Lead Collection Point for State Crash Data	DPH, Bureau of EMS:	Mandated to report both PAR and a Reportable Incident Form for any incident where an EMS provider is injured.	www.health.state.ny.us/nysdoh/ems/main.htm www.health.state.ny.us/forms/doh-4461.pdf
North Carolina	**YES; Lead Collection Point for State Crash Data**	DOT, Safety Evaluation Group	Ambulance total/fatal/injury crashes are collected in the vehicle type section of the yearly report crash facts, and special reports are also available.	www.nhtsa-tsis.net/crashforms/Pages/state/nc/NC.htm www.ncdot.org/doh/preconstruct/traffic/safety/crashdata/
	No	OEMS	Currently there data collection does not include a classification breakdown for emergency vehicles involved in a crash. Connected with the PAR system so they can investigate a specific incident as needed. They also coordinate a Trauma Registry System.	www.ncdhhs.gov/dhsr/EMS/staff.htm www.ncems.org/pdf/Trauma/NCTR_Data_Dictionary_5-14-2007.pdf
North Dakota	No	DOT	Ambulance crash data is based on analyzing individual narratives. "Unit Configuration" on the PARs narrows the field to "Emergency Vehicle," but at this time their system is unable to narrow it to ambulances.	www.nhtsa-tsis.net/crashforms/Pages/state/nd/ND.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	Yes	DoH EMS and Trauma	Starting two years ago they provide ambulance collision report entry on their website. The information gathered is input into an access database and can be referenced as needed.	www.ndhealth.gov/EMS/Reports/AmbulanceCollision.aspx
Ohio	Yes	Delaware OH, Fire Dept.	Provide compilation of fire/EMS runs via website which, although not directly applicable, promotes need for compiling transparent data.	www.delawareohio.net/Departments/Fire/fireemsruns.aspx
	YES; Lead Collection Point for State Crash Data	DPS	Crash statistics are posted via website that allows for queries for specific reports.	ext.dps.state.oh.us/crashreports/crashreports.aspx ohiohighwaysafetyoffice.ohio.gov/index.stm#
	No	DPS EMS	Does not collect any separate EMS Incident forms or the PARs.	www.ems.ohio.gov/contacts.stm#
	Unknown	DOT, Office of Traffic Engineering	Status unconfirmed.	www.nhtsa-tsis.net/crashforms/Pages/state/oh/OH.htm
	No	Medical Transport-ation Board	Does not have any mandates/requirements for submittal of data. While they do receive some data, no organized database exists.	omtb.ohio.gov/
	No	State Patrol	Generates statistical maps and charts from the information is from the DPS data.	statepatrol.ohio.gov/statistics/default.asp
Oklahoma	**YES; Lead Collection Point for State Crash Data**	Highway Safety Office	Data collected only addresses “crashes” that occur on public roads. In 2007, the PAR was revised to include if vehicle was in emergency use.	www.nhtsa-tsis.net/crashforms/Pages/state/ok/OK.htm
	No	Dept of Health, EMS	While they periodically receive a paper copy of an ambulance report from the HSO, they do not collect any incident report forms or ambulance accidents data.	www.ok.gov/health/Protective_Health/Emergency_Medical_Services/
Oregon	**YES; Lead Collection Point for State Crash Data**	DOT	Provide reports on fatality/injury/property damage involving emergency vehicles.	www.nhtsa-tsis.net/crashforms/Pages/state/or/OR.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	No	EMS	Collect incident forms for changes made within EMS depts., but it is not in a searchable database. The form is required when reporting an accident but does only includes limited data fields.	public.health.oregon.gov/ProviderPartnerResources/EMSTraumaSystems/Pages/emsstaff.aspx public.health.oregon.gov/ProviderPartnerResources/EMSTraumaSystems/EMSTrainingCertification/Pages/forms.aspx
Pennsylvania	**YES; Lead Collection Point for State Crash Data**	Bureau of Highway Safety & Traffic Engineer-ing, Crash Division	Ambulances are captured under "Special Usage" on the PAR. The data can also be pulled from existing Ambulance crash reports or a more specific report.	www.nhtsa-tsis.net/crashforms/Pages/state/pa/PA.htm
	No	Bureau of EMS	Organizations are required to report incidents using an EMS incident form. This is collected in a database that can be queried, but only recent information on crashes is considered credible. While they create the reports, the data is originally from the Bureau of Highway Safety.	www.portal.state.pa.us/portal/server.pt/community/emergency_medical_services/14138
Rhode Island	No	DPS	Does not collect data of traffic incidents.	www.dps.ri.gov/contact/
	Yes	DPH	Have some available reports though concerned that data may be incomplete.	www.health.state.ri.us/emergency/medicalservices/
	Unknown	DOT	Collect and record traffic reports, but there is no category within the PAR system to narrow down the query results for ambulances crashes.	www.nhtsa-tsis.net/crashforms/Pages/state/ri/RI.htm
South Carolina	**YES; Lead Collection Point for State Crash Data**	Dept. of Public Safety, Statistical Research	Able to provide reports on ambulance crashes, including factors such as collision type, harmful event, weather, road condition, route categories, etc.	www.nhtsa-tsis.net/crashforms/Pages/state/sc/SC.htm
	No	Division of EMS and Trauma	Do not collect any crash report information, and only collect patient care with an EMS focus rather than the crash itself. Active use of NEMSIS for data collection. No EMS incident report form.	www.scdhec.gov/health/ems/data.htm
South Dakota	**YES; Lead Collection Point for State Crash Data**	Dept. of Public Safety	For data collection they provide categories for ambulances and if in emergency use.	www.nhtsa-tsis.net/crashforms/Pages/state/sd/SD.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	No	Dept. of Public Safety	Data collection includes all vehicle incidents with fatalities/injuries/$1000+ in damage, though this is not coordinate in a database. Currently attempting to implement NEMSIS statewide	dps.sd.gov/emergency_services/emergency_medical_services/contact.aspx
Tennessee	**YES; Lead Collection Point for State Crash Data**	Dept. of Safety & Homeland Security, Office of Research and Statistics	Data collection includes a category for ambulance under special use. The report format was changed in 2003 so anything before that would be difficult. Data collection is not mandatory.	www.nhtsa-tsis.net/crashforms/Pages/state/tn/TN.htm
	No	Division of Health Statistics	No information regarding vehicle crashes, though they collect information on patient fatalities and injuries through EMS,.	health.state.tn.us/ems/
Texas	**YES; Lead Collection Point for State Crash Data**	DOT	Provide ambulance crash data that includes details such as body style and if it was in emergency use.	www.nhtsa-tsis.net/crashforms/Pages/state/tx/TX.htm www.txdot.gov/drivers_vehicles/crash_records/form.htm www.txdot.gov/txdot_library/drivers_vehicles/publications/crash_statistics/default.htm
	No	EMS	Responsible for EMS dept licensing, and ambulance crashes are required to be reported within 24 hours if there is an injury or fatality, or 5 days for property damage only. Data is submitted through a Notification Changes Form, but there is no database compilation available.	www.dshs.state.tx.us/emstraumasystems/11conference.shtm www.dshs.state.tx.us/WorkArea/DownloadAsset.aspx?id=58091
Utah	**YES; Lead Collection Point for State Crash Data**	DPS	Ambulance crash data is available, though this was updated in 2006 so valid information exists from that point onward.	www.nhtsa-tsis.net/crashforms/Pages/state/ut/UT.htm
	No	DPH	No information is collected through the DPH on vehicle crashes specifically.	health.utah.gov/ems/data/
Vermont	**YES; Lead Collection Point for State Crash Data**	Agency of Transport-ation	Collect data and provide applicable reports using PAR data for ambulance crashes.	www.nhtsa-tsis.net/crashforms/Pages/state/vt/VT.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
	No	DPH/ OEMS & Injury Preven-tion	No programmatic data submittals of collection are required, and only track higher profile incidents.	healthvermont.gov/hc/ems/ems_index.aspx
Virginia	No	OEMS	Currently do not collect any information regarding ambulance crashes and do not have a separate EMS Incident report form. They do require that each dept keeps a record of any repairs that are done to the vehicles so that during an inspection that information can be referenced.	www.vdh.state.va.us/OEMS/
	YES; Lead Collection Point for State Crash Data	DMV Transport-ation Safety Services	Collect data and provide reports. Ambulances are covered as Emergency Vehicles and in special function category.	www.nhtsa-tsis.net/crashforms/Pages/state/va/VA.htm
Washington	**YES; Lead Collection Point for State Crash Data**	DOT Statewide Travel & Collision Data Office	Collect data and provide reports based on multiple data points.	www.nhtsa-tsis.net/crashforms/Pages/state/wa/WA.htm www.wsdot.wa.gov/mapsdata/collision/collisiondatarequest.htm
	No	DHS OEMS	Do not collect any ambulance crash data. They are active in using WEMSIS but it currently does not collect crash data.	www.doh.wa.gov/hsqa/emstrauma/default.htm
West Virginia	Unknown	DOT Division of Highway	Status unconfirmed.	www.nhtsa-tsis.net/crashforms/Pages/state/wv/WV.htm
	Unknown	OEMS	Status unconfirmed.	www.wvoems.org/
Wisconsin	**YES; Lead Collection Point for State Crash Data**	DOT/DMV Incident Records	Produce an annual report detailing the number of accidents (including an ambulance category) by crash severity, and more detailed reports are available upon request. The PAR does not have an ambulance category, but when input into the database, the recorder reads the narrative and unit type to break out ambulance specifics.	www.nhtsa-tsis.net/crashforms/Pages/state/wi/WI.htm www.dot.wisconsin.gov/safety/motorist/crashfacts/index.htm www.dot.wisconsin.gov/safety/motorist/crashfacts/crashfacts-archive.htm
	No	DHS EMS Section /Health and Family Services	Working to link EMS patient incident data with the PAR.	www.dhs.wisconsin.gov/ems/EMSsection/EMS_Section.htm

State	Amb. Crash Database?	Point of Contact	Comments	Website (Forms)
Wyoming	**YES; Lead Collection Point for State Crash Data**	DOT	Collect data and provide reports. Ambulance is categorized under vehicle owner, emergency use, and special functions.	www.dot.state.wy.us/wydot/safety/safety_statistics www.nhtsa-tsis.net/crashforms/Pages/state/wy/WY.htm
	No	EMS Public Health Division	Collect EMS and ambulance trip data and are working to link to the patient care information and to the PAR. Do not collect any information on the crash itself, although they do use MMUCC in both EMS and PAR reports.	www.health.wyo.gov/sho/ems/emsdata.html

The collection of information in Table 4-1 allows observations to be made of certain possible trends. For example, the data collected in several states (i.e., Alabama, Delaware, Idaho, Iowa, Kansas, Maine, Maryland, and North Carolina) through their Police Accident Reports use common data collection fields for ambulance crashes, and in particular, for "first harmful event" and "primary contributing circumstance" fields.

This information reveals certain details. For instance, based on the information collection of the "first harmful event" field, nearly 70% of the accidents claimed collision with another moving vehicle as the most harmful event. The "second harmful event" was collision with a parked vehicle at approximately 7%, followed by collision with a fixed object at 6%, and collision with an animal at approximately 5%.

The "primary contributing circumstance" field reveals that most common were "unseen object/person/vehicle" and "failed to yield the right of way," each at approximately 20% of the crashes. These were followed closely by "driver inattention/distraction/fatigue" and "animals (wild or domestic)" at approximately 18% each. Other less common factors included: "followed too close," "avoid vehicle/object/non-motorist," "speed too fast for conditions," "fail to heed sign or signal," and "improper lane change or use."

However, the data that are gathered among multiple different sources needs to be used with significant care, including the discussion above. This is especially important when attempting to address trends in the data, which may have been collected in ways that could distort a trend analysis. An example would be the data collection identified in the state of Delaware. For years they have included a category for "ambulance" in their crash data collection, but a recent investigation revealed that the data input recorded if an ambulance came to the scene, not if the ambulance itself was in the crash. This exemplifies the sensitivity required when reviewing this historical data collected under relatively disparate data collection methods.

In some states, further statistical information was available from the points of contact identified in Table 4-1, based on their respective database available for further queries. Where possible, this information was obtained and reviewed with a focus on the number of ambulance crashes between 2000 through 2010. This information is tabulated in Table 4-2, Summary of Selected State Ambulance Crash Data. Table 4-2 is intended to exemplify the type of data available through individual state databases.

For the thirty-one states that had available data included in Table 4-2, the diversity of the level of detail is significant. Some provided relatively straight-forward summaries, while others included very specific sub-category detail. Some only provided totals, while others only had data for some but not all the years between 2000 and 2010. Further, some states either don't have data collected on ambulance crashes, or confirmed that the data they do have are not useable for summaries or details relating to ambulance crashes, and thus are not included in Table 4-2.

The six states that confirmed no available practical data sets are: Alaska, Arizona, Arkansas, Connecticut, Louisiana, and New Hampshire. The thirteen states from whom data was not able to be obtained, and/or have not confirmed data availability, include: Colorado, Florida, Indiana, Massachusetts, Minnesota, Mississippi, Nebraska, New Jersey, New York, North Dakota, Ohio, Rhode Island, and West Virginia.

The tabulated information in Table 4-2 is divided according to crash severity, based on the numbers of fatalities, injuries, or crashes with property damage only (PDO). Note that these numbers do not reflect the actual number of overall crashes, since a single crash event could involve multiple fatalities, injuries, or vehicles. Other information not used but available from these state databases includes crash of cause, emergency use status of vehicle, and number of vehicles involved in the crash.

Table 4-2: Summary of Selected State Ambulance Crash Data

State	Crash Severity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Alabama	Fatality	0	2	0	1	1	4	0	2	1	-	-
	Injury	30	30	31	26	34	36	27	21	28	-	-
	PDO	120	79	97	89	130	112	99	117	106	-	-
	Total	150	111	128	116	165	152	126	140	135	-	-
Alaska	*Confirmed no practical data sets available*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Arizona	*Confirmed no practical data sets available*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-

State	Crash Severity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Arkansas	*Confirmed no practical data sets available*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
California	Fatality	-	-	-	0	2	2	2	3	2	4	0
	Injury	-	-	-	36	39	71	68	108	88	73	42
	PDO	-	-	-	87	135	200	174	244	254	245	171
	Total	-	-	-	123	176	273	244	355	344	322	213
Colorado	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Connecticut	*Confirmed no practical data sets available*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Delaware	Fatality	-	-	-	-	-	-	-	-	-	-	0
	Injury	-	-	-	-	-	-	-	-	-	-	7
	PDO	-	-	-	-	-	-	-	-	-	-	14
	Total	-	-	-	-	-	-	-	-	-	-	21
Florida	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Georgia	Fatality	-	-	-	-	-	-	-	-	-	-	-
	Injury	-	-	-	-	-	-	-	-	-	-	-
	PDO	-	-	-	-	-	-	-	-	-	-	-
	Total	280	272	287	263	323	332	285	313	289	307	198
Hawaii	Fatality	-	-	-	-	-	-	-	-	-	-	-
	Injury	-	-	-	-	-	-	-	-	-	-	-
	PDO	-	-	-	-	-	-	-	-	-	-	-
	Total	10	7	12	15	18	13	13	14	5	-	-
Idaho	Fatality	0	0	0	0	1	0	0	0	0	1	0
	Injury	1	5	1	2	4	5	6	4	0	1	0
	PDO	10	8	4	9	7	14	12	11	6	5	7
	Total	11	13	5	11	12	19	18	15	6	7	7
Illinois	Fatality	-	-	-	-	2	2	0	2	2	1	2
	Injury	-	-	-	-	176	205	173	143	175	150	156
	PDO	-	-	-	-	386	402	418	373	379	227	224
	Total	-	-	-	-	564	609	591	518	556	378	382

State	Crash Severity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Indiana	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Iowa	Fatality	-	-	0	0	0	0	0	0	0	1	1
	Injury	-	-	9	5	11	6	8	4	3	13	9
	PDO	-	-	16	7	8	6	10	6	7	23	25
	Total	-	-	25	12	19	12	18	10	10	37	35
Kansas	Fatality	-	-	-	0	0	0	0	0	0	0	0
	Injury	-	-	-	4	1	5	2	1	3	4	5
	PDO	-	-	-	11	14	18	11	12	14	14	19
	Total	-	-	-	15	15	23	13	13	17	18	24
Kentucky	Fatality	-	3	2	2	1	4	2	2	1	0	0
	Injury	-	30	31	33	23	28	24	30	28	30	18
	PDO	-	153	163	120	171	167	150	187	181	217	123
	Total	-	186	196	155	195	199	176	219	210	247	141
Louisiana	*Confirmed no practical data sets available*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Maine	Fatality	-	-	-	0	0	0	0	1	0	0	0
	Injury	-	-	-	33	22	16	16	22	28	33	41
	PDO	-	-	-	25	19	26	16	24	29	20	14
	Total	-	-	-	58	41	42	32	47	57	53	55
Maryland	Fatality	-	0	0	0	3	2	0	1	2	0	3
	Injury	-	42	68	60	54	53	62	68	52	45	50
	PDO	-	262	255	326	279	310	342	313	330	357	313
	Total	-	304	323	386	336	365	404	382	384	402	366
Massachusetts	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Michigan	Fatality	-	-	-	-	3	6	0	0	1	1	3
	Injury	-	-	-	-	53	52	54	38	62	51	34
	PDO	-	-	-	-	244	279	250	264	272	290	244
	Total	-	-	-	-	300	337	304	302	335	342	281
Minnesota	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-

State	Crash Severity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mississippi	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Missouri	Fatality	-	-	0	1	1	1	0	2	2	2	-
	Injury	-	-	30	38	40	23	27	27	22	45	-
	PDO	-	-	138	121	112	106	110	126	125	121	-
	Total	-	-	168	160	153	130	137	155	149	168	-
Montana	Fatality	0	0	0	0	0	0	0	0	0	0	0
	Injury	4	4	9	4	1	0	2	23	0	3	8
	PDO	6	6	8	8	12	3	13	8	9	15	9
	Total	10	10	17	12	13	3	15	31	9	18	17
Nebraska	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Nevada	Fatality	0	0	0	0	0	0	0	0	0	0	0
	Injury	5	10	9	7	6	4	4	8	7	0	1
	PDO	12	15	18	15	11	8	6	21	10	6	0
	Total	17	25	27	22	17	12	10	29	17	6	1
New Hampshire	*Confirmed no practical data sets available*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
New Jersey	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
New Mexico	Fatality	1	-	-	-	1	-	-	-	-	-	-
	Injury	5	5	4	1	1	2	2	6	4	3	2
	PDO	4	8	8	7	8	21	10	13	20	7	20
	Total	10	13	12	8	10	23	12	19	24	10	22
New York	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
North Carolina	Fatality	2	1	1	3	2	3	1	1	1	0	2
	Injury	59	57	52	65	66	59	53	71	54	46	56
	PDO	104	91	76	109	113	93	112	111	138	117	142
	Total	165	149	129	177	181	155	166	183	193	163	200

State	Crash Severity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
North Dakota	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Ohio	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Oklahoma	Fatality	-	0	1	2	1	0	0	2	1	0	0
	Injury	-	17	14	17	10	9	22	66	39	83	74
	PDO	-	39	42	30	37	42	39	68	54	64	70
	Total	-	56	57	51	48	51	61	136	94	147	144
Oregon	Fatality	-	-	1	0	0	0	0	0	0	0	0
	Injury	-	-	1	9	4	6	6	7	11	7	11
	PDO	-	-	7	5	8	5	15	8	19	7	9
	Total	-	-	9	14	12	11	21	15	30	14	20
Pennsylvania	Fatality	-	-	-	-	-	-	-	-	-	-	-
	Injury	-	-	-	-	-	-	-	-	-	-	-
	PDO	-	-	-	-	-	-	-	-	-	-	-
	Total	160	244	356	292	235	219	195	218	208	209	193
Rhode Island	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
South Carolina	Fatality	-	1	2	0	2	1	0	1	4	2	3
	Injury	-	38	44	43	43	50	44	53	51	38	45
	PDO	-	71	81	95	87	96	85	93	92	122	101
	Total	-	110	127	138	132	147	129	147	147	162	149
South Dakota	Fatality	-	-	-	-	-	-	0	0	0	0	0
	Injury	-	-	-	-	-	-	0	0	0	1	2
	PDO	-	-	-	-	-	-	4	0	4	6	3
	Total	-	-	-	-	-	-	4	0	4	7	5
Tennessee	Fatality	-	-	-	3	0	1	1	0	1	3	1
	Injury	-	-	-	36	40	45	24	32	40	33	49
	PDO	-	-	-	111	118	136	160	144	153	152	195
	Total	-	-	-	150	158	182	185	176	194	188	245
Texas	Fatality	-	-	-	-	-	-	2	0	3	3	2
	Injury	-	-	-	-	-	-	-	-	-	-	-
	PDO	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	250	250	295	252	354

State	Crash Severity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Utah	Fatality	-	-	-	-	-	-	0	0	0	0	-
	Injury	-	-	-	-	-	-	10	11	9	9	-
	PDO	-	-	-	-	-	-	10	31	29	16	-
	Total	-	-	-	-	-	-	20	42	38	25	-
Vermont	Fatality	0	0	0	0	0	0	1	1	-	-	-
	Injury	1	1	2	0	1	3	0	1	-	-	-
	PDO	-	-	-	-	-	-	-	-	-	-	-
	Total	1	1	2	0	1	3	1	2	-	-	-
Virginia	Fatality	-	-	-	-	-	-	0	0	0	1	1
	Injury	-	-	-	-	-	-	31	22	57	52	53
	PDO	-	-	-	-	-	-	53	53	114	92	73
	Total	-	-	-	-	-	-	84	75	171	145	127
Washington	Fatality	-	-	0	1	0	0	0	0	0	0	1
	Injury	-	-	25	25	15	17	21	19	22	20	18
	PDO	-	-	53	30	44	45	42	47	44	42	52
	Total	-	-	78	56	59	62	63	66	66	62	71
West Virginia	*Unable to obtain data or confirm availability*	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Wisconsin	Fatality	0	0	0	0	0	2	0	0	0	-	-
	Injury	3	3	3	5	5	2	4	8	2	-	-
	PDO	11	8	12	9	5	3	5	9	15	-	-
	Total	14	11	15	14	10	7	9	17	17	-	-
Wyoming	Fatality	2	0	0	1	0	0	1	0	0	0	0
	Injury	29	20	24	21	25	28	28	24	7	2	5
	PDO	53	79	83	91	82	96	115	102	20	11	7
	Total	84	99	107	113	107	124	144	126	27	13	12

Totals	**# of States**	**12**	**16**	**20**	**23**	**26**	**26**	**30**	**29**	**29**	**26**	**25**
	Total	**912**	**1611**	**2080**	**2361**	**3300**	**3505**	**3730**	**4015**	**4031**	**3702**	**3283**
	Avg. Crashes/ State/ Year	**76**	**101**	**104**	**103**	**127**	**135**	**124**	**138**	**139**	**142**	**131**

It is noted that the data collected from the various states cover an appreciable spectrum with a noteworthy range of values in any one particular field. Care should be used on the interpretation of this data, recognizing the ranging and relatively diverse conditions under which they have been collected. For example, states with very aggressive and robust data collection efforts would be expected to have higher values, versus others that struggle with certain data collection features.

5. Summary Observations

The information collection infrastructure for ambulance crash data is relatively well evolved, but at the same time has room for future enhancements and improvements. At the national level, key initiatives such as NEMSIS and MMUCC provide well established guidelines for the collection of EMS data and vehicle crash data, respectively. This guidance information provides clear direction for state- and local-based data collection efforts.

Ambulance crash data collection at the state level is significant, but from a national perspective, a lack of uniformity exists among and within the states. This hinders on-going efforts to use a collective and cohesive data set for broadly embraced programmatic improvements. State-based data provides a fundamental backbone for the stream of information that feeds into an overall national data collection effort.

The focus on improving accuracy, credibility, and reliability of EMS and ambulance crash data is not new and has been proceeding for decades.[74] Significant effort has been expended over this time period, resulting in the current infrastructure that balances the individuality of the U.S. states and territories with the need for broad policies that are effective on a national scale.

An additional influence has been the overall changing landscape for the technologies used for collecting and handling data. On-going improvements with information-technology hardware and software have altered the landscape in the ability to capture and coordinate data collection.[75] New technology is providing the ability to coordinate data not possible before. An example is the processing of emergency responder dispatch data, electronically captured on a large scale, and coordinating these data with other data sets such as EMS data or vehicle crash data.[76]

Assessing the characteristics between the individual state data collection efforts is a challenging task based on their current operational diversity. One document that provides a useful assessment was issued by NHTSA in July 2011 and provides a review of the state-level accomplishments in improving data systems used in traffic safety decision making.[77] Because its focus is more expansive than simply ambulance crashes, its value toward this specific subject is limited. Nevertheless, the report measures improvements in crash, roadway, driver, vehicle, citation/adjudication, and injury surveillance datasets.

Certain observations became apparent as a result of this study. For example, every state has a Traffic Records Committee which coordinates crash related data and serves as a useful point of contact within a particular state, and each state has a lead agency responsible for EMS activities, which once again serves as an important point of contact for ambulance crash data.

Data that are gathered among the available multiple different sources needs to be used with significant care, especially when attempting to address trends in the data which may have been collected in ways that could distort an analysis. As an example, in one state (Delaware) an investigation revealed that historical ambulance crash data was based on input that was incorrectly interpreting ambulance "response" as being "involved" in a motor vehicle crash, i.e. the ambulance simply responded to the call and was thus "involved". In another state (New Jersey), data is only captured for licensed providers which do not include private companies.

The deliverables for this project provide a comprehensive overview of existing efforts involving data collection methods at the national, state and local level, along with observations and recommendations relating to the future direction of these data collection efforts. The following are the key observations that have been discussed throughout this report and summarized here:

National Data Collection

- The information collection infrastructure for ambulance crash data is relatively well evolved, but at the same time has room for future enhancements and improvements.
- At the national level, the NEMSIS program provides well established guidelines for the collection of EMS data.
- At the national level, the MMUCC program provides well established guidelines for the collection of emergency responder vehicle crash data.

State-Based Data Collection

- Ambulance crash data collection at the state level is significant in quantity.
- From a national perspective a lack of uniformity exists among and within the states.
- State-based ambulance crash information collection appears to be occurring on two basic fronts: through the state dept. of public health, often including or in collaboration with the state EMS agency, and also through police accident reports that are typically collected through the state dept of transportation.
- In some cases these separate data collection streams are coordinating and sharing information, and it other cases they are effectively independent.
- Efforts to promote and use the MMUCC program guidelines by individual states should continue.

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Additional Reading References from Peer and Non-Peer Publications

The following is a summary of the readily available literature identified during this study addressing EMS interests and applicable to ambulance crash concerns.

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Annex A: Common Definitions

The following are terms used throughout this report and/or are commonly used relative to the subject matter applicable to this report.

In some cases multiple definitions are found in the common literature. Where multiple defined terms exist, preference is given to federal or state publications and widely recognized consensus-developed codes and standards. In some cases multiple definitions of the same term are provided.

Advanced Cardiac Life Support (ACLS). A nationally recognized curriculum to teach advanced methods of treatment for cardiac and other emergencies. (Section 3.3.46.1, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Advanced Life Support (ALS). Emergency medical treatment beyond basic life support level as defined by the medical authority having jurisdiction. (Section 3.3.61.1, NFPA 1500 *Standard on Fire Department Occupational Safety and Health Program*, NFPA, Quincy MA, 2007 edition)

Ambulance. A vehicle designed, equipped, and operated for the treatment and transport of ill and injured persons. (Section 3.3.3, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Ambulance. Refers to vehicles: (1) whose sole purpose is to provide ambulance service and which is always presumed to be in special ambulance use at all times, or (2) vehicles serving dual purposes such as a hearse used for both funeral and emergency purposes, which is only codes when used for the latter purpose. This includes both publicly and privately owned vehicles. (MMUCC, "Model Minimum Uniform Crash Criteria", Third Edition, 2008, website: www.mmucc.us/mmucc-training/lessons/vehicleinfo/specialuse_files/specialuse06.htm, cited: 26 July 2011)

Ambulance. An emergency vehicle used to take patients to a hospital or other treatment center in cases of accident, injury, or severe illness. (Yvorra, J., "Mosby's Emergency Dictionary: Quick Reference for Emergency Responders", C. V. Mosby Company, St Louis MO, 1989, pg. 17)

Ambulance Service. An organization that exists to provide patient transportation by ambulance. (Section 3.3.4, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Basic Life Support (BLS). Emergency medical treatment at a level as defined by the medical authority having jurisdiction. (Section 3.3.61.2, NFPA 1500 *Standard on Fire Department Occupational Safety and Health Program*, NFPA, Quincy MA, 2007 edition)

Emergency. A condition or situation in which an individual perceives a need for immediate response. (Section 3.3.24, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Emergency First Responders. Those persons, including members of fire departments, police departments, other law enforcement agencies, hazardous materials response teams, emergency medical services, and other organizations that have public safety responsibilities and who would respond to rescue and treat victims, and who would protect the public during an emergency incident." (NFPA 1994, "Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents", National Fire Protection Association, Quincy MA, Section 3.3.30.1, 2007 edition)

Emergency First Responders. A group designated by a community as those who will first respond to an incident, and are usually composed of emergency medical service providers, the fire service, and/or local police,. (Nolan, D.P., Encyclopedia of Fire Protection", Thompson Delmar Learning, Clifton Park NY, 2nd edition, 2006, pg. 129)

Emergency Medical Services (EMS). Providing patient services that might include the provision of assessment, treatment such as first aid, CPR, BLS, ALS, and other prehospital procedures, including ambulance transportation of patients. (Section 3.3.26, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Emergency Medical Services (EMS). A national network of services providing aid from the first response to the selected care. The staff is trained in emergency care. EMS is linked by a local or regional communications system. There is usually an emergency number. (Yvorra, J., "Mosby's Emergency Dictionary: Quick Reference for Emergency Responders", C. V. Mosby Company, St Louis MO, 1989, pg. 144)

Emergency Medical Services (EMS). Emergency medical service is widely regarded as including the full spectrum of emergency care from recognition of the emergency, telephone access of the system, provision of prehospital care, through definitive care in the hospital. It often also includes medical response to disasters, planning for and provision of medical coverage at mass gatherings, and interfacility transfers of patients. However, for the purposes of this document, the definition of EMS is limited to the more traditional, colloquial meaning: prehospital health care for patients with real or perceived emergencies from the time point of emergency telephone access until arrival and transfer of care to the hospital. (NHTSA, *"National EMS Research Agenda"*, Definition of EMS for this Document, National Highway Transportation Safety Administration, Washington DC, 31 Dec 2001, website: www.nhtsa.gov/people/injury/ems/ems-agenda/definition_of_ems.htm, cited: 22 August 2011)

Employee Illness and Injury. A work-related illness or injury requiring evaluation or medical follow-up. (Section 3.3.30, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

EMS System. A comprehensive, coordinated arrangement of resources and functions that are organized to respond in a timely, staged manner to medical emergencies regardless of their cause. (Section 3.3.70.1, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Multiple Casualty. Injury or death of more than one individual in an incident. (Section 3.3.50, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Unit. A staffed and equipped emergency response vehicle. (Section 3.3.76, NFPA 450, *Guide for Emergency Medical Services and Systems*, NFPA, Quincy MA, 2009 edition)

Annex B: Ambulance Crash Data

The information summarized in this Annex is intended to provide examples of the data available through the Fatality Analysis Reporting System (FARS) and the National Automotive Sampling System General Estimates System (NASS GES, a.k.a. GES). These systems are administered by the National Highway Traffic Safety Administration (NHTSA) and readily accessible to professionals seeking this information. For more than three decades FARS has been among the most referenced sources for U.S. vehicular fatal crash data, and since 1988 NASS GES has been a key source for non-fatal injury crash data.

The information included in this Annex as an example has been randomly selected for the time period of 1990 through 2009. There is a multitude of valid approaches for presenting this data, depending on the ultimate objectives for its use. It is recommended that anyone needing access to various data compilations contact and work through NHTSA staff to assure that it is processed and interpreted in a manner that does not exceed its intended use.

This Annex is intended to provide an interesting cross section of data sets that relate to the topic of ambulance crashes. The following is a summary of the tables that follow:

- Table B-1: Ambulance Crash Data from NHTSA FAR and NASS GES, 1990-2009
- Table B-2: Ambulance Seating Position Fatality Data from NHTSA FAR, 1990-2009
- Table B-3: Ambulance Seating Position Injury Data from NHTSA NASS GES, 1990-2009
- Table B-4: Ambulance Person Type Fatality Data from NHTSA FAR, 1990-2009
- Table B-5: Ambulance Person Type Injury Data from NHTSA NASS GES, 1990-2009
- Table B-6: Ambulance Crash Event Data from NHTSA FAR and NASS GES, 1990-2009

Conclusions that are drawn from this data (and for that matter, any data set) should be done so with care, and with recognition of how the data was collected and any potential limitations. As one clear example, in Table B-3 on ambulance seating position injuries, the totals indicate that for 1990 through 2009 there were 13,449 persons injured in the front seat who were restrained, while 1,144 persons were injured in the front seat that were unrestrained.

On the surface and without further interpretation this might suggest it is safer to be unrestrained, which common sense tells us is untrue. What the data does not immediately tell us is the severity of the injuries and other important qualifying factors. For instance, it would not be surprising if most front seat passengers are restrained (resulting in a 13:1 ratio of restrained to unrestrained front seat passenger injuries), but that the restrained front seat passengers suffered a majority of minor injuries while those unrestrained suffered a majority of severe injuries. This specific data item provides a good example of how data can be misinterpreted if care is not used to present it in its proper context.

Table B-1: Ambulance Crash Data from NHTSA FAR and NASS GES, 1990-2009

AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES
BY CRASH YEAR, AMBULANCE IN EMERGENCY USE, CRASH SEVERITY, AND VEHICLES INVOLVED
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF AND
GENERAL ESTIMATES SYSTEM (GES) 1990-2009

Crash Year by Emergency Use		Vehicles Involved and Crash Severity								Total			
		Single Vehicle Crash				Multiple Vehicle Crash							
		Fatal Crash	Injury Crash	Property Damage Only Crash	Total	Fatal Crash	Injury Crash	Property Damage Only Crash	Total	Fatal Crash	Injury Crash	Property Damage Only Crash	Total
1990	**Not in Emergency Use**	5	-	-	5	8	307	660	975	13	307	660	980
	In Emergency Use	1	85	284	370	11	413	606	1,030	12	499	889	1,400
	Total	6	85	284	375	19	721	1,265	2,005	25	806	1,549	2,380
1991													
	Not in Emergency Use	6	118	119	243	15	879	297	1,191	21	997	416	1,434
	In Emergency Use	2	134	-	136	16	203	1,055	1,273	18	337	1,055	1,409
	Total	8	252	119	379	31	1,082	1,352	2,464	39	1,334	1,470	2,843
1992													
	Not in Emergency Use	3	-	-	3	14	404	-	418	17	404	-	421
	In Emergency Use	3	-	372	375	22	752	2,091	2,865	25	752	2,462	3,240
	Unknown	-	-	-	-	-	-	278	278	-	-	278	278
	Total	6	-	372	378	36	1,156	2,368	3,561	42	1,156	2,740	3,938
1993													
	Not in Emergency Use	3	135	-	138	12	274	278	564	15	409	278	702
	In Emergency Use	4	114	-	118	12	1,400	1,937	3,349	16	1,514	1,937	3,467
	Total	7	249	-	256	24	1,674	2,215	3,913	31	1,923	2,215	4,169
1994													
	Not in Emergency Use	7	24	22	53	7	946	1,127	2,080	14	970	1,149	2,132
	In Emergency Use	1	-	-	1	22	548	697	1,266	23	548	697	1,267
	Total	8	24	22	54	29	1,493	1,824	3,346	37	1,517	1,845	3,400
1995													
	Not in Emergency Use	9	-	228	237	9	265	377	651	18	265	605	888
	In Emergency Use	4	89	-	93	14	593	2,526	3,133	18	683	2,526	3,226
	Unknown	-	-	-	-	-	27	-	27	-	27	-	27
	Total	13	89	228	330	23	886	2,903	3,812	36	975	3,130	4,142
1996													
	Not in Emergency Use	2	38	88	128	8	691	1,191	1,890	10	729	1,279	2,018
	In Emergency Use	2	-	378	380	13	518	1,421	1,952	15	518	1,799	2,332
	Unknown	-	-	-	-	-	-	5	5	-	-	5	5
	Total	4	38	466	508	21	1,209	2,617	3,847	25	1,247	3,083	4,355
1997													
	Not in Emergency Use	-	-	78	78	12	110	2,140	2,262	12	110	2,218	2,340
	In Emergency Use	2	106	-	108	15	1,240	1,096	2,351	17	1,347	1,096	2,459
	Total	2	106	78	187	27	1,350	3,236	4,613	29	1,457	3,314	4,799
1998													
	Not in Emergency Use	2	-	333	335	7	451	1,050	1,509	9	451	1,383	1,843
	In Emergency Use	2	81	273	355	14	1,675	654	2,343	16	1,756	927	2,699
	Total	4	81	605	690	21	2,126	1,704	3,852	25	2,207	2,310	4,542
1999													
	Not in Emergency Use	1	-	-	1	6	903	771	1,680	7	903	771	1,681
	In Emergency Use	1	113	-	114	8	788	1,491	2,288	9	902	1,491	2,402
	Unknown	-	-	52	52	-	47	906	953	-	47	958	1,005
	Total	2	113	52	167	14	1,738	3,168	4,921	16	1,852	3,220	5,088

(Continued)

NOTE: The above 'Injury' and 'Property Damage Only' crash numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

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Table B-1: Ambulance Crash Data from NHTSA FAR and NASS GES, 1990-2009 (cont.)

AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES
BY CRASH YEAR, AMBULANCE IN EMERGENCY USE, CRASH SEVERITY, AND VEHICLES INVOLVED
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF AND
GENERAL ESTIMATES SYSTEM (GES) 1990-2009

Crash Year by Emergency Use		Vehicles Involved and Crash Severity								Total			
		Single Vehicle Crash				Multiple Vehicle Crash							
		Fatal Crash	Injury Crash	Property Damage Only Crash	Total	Fatal Crash	Injury Crash	Property Damage Only Crash	Total	Fatal Crash	Injury Crash	Property Damage Only Crash	Total
2000													
	Not in Emergency Use	3	162	-	165	11	650	1,102	1,763	14	811	1,102	1,927
	In Emergency Use	1	17	644	662	14	1,196	1,952	3,162	15	1,213	2,596	3,824
	Unknown	-	-	266	266	-	99	430	529	-	99	695	794
	Total	4	179	910	1,092	25	1,945	3,483	5,453	29	2,123	4,393	6,545
2001													
	Not in Emergency Use	3	129	284	415	9	78	370	457	12	207	654	872
	In Emergency Use	4	35	-	39	9	895	1,890	2,794	13	930	1,890	2,832
	Unknown	-	-	-	-	-	111	104	215	-	111	104	215
	Total	7	163	284	454	18	1,084	2,364	3,466	25	1,247	2,647	3,920
2002													
	Not in Emergency Use	3	19	-	22	7	561	119	687	10	580	119	708
	In Emergency Use	-	109	139	249	10	1,287	1,302	2,599	10	1,396	1,441	2,848
	Unknown	-	75	301	376	-	13	117	130	-	88	418	506
	Total	3	203	440	646	17	1,861	1,538	3,416	20	2,064	1,978	4,062
2003													
	Not in Emergency Use	4	-	9	13	7	126	-	133	11	126	9	146
	In Emergency Use	7	109	553	669	9	1,112	1,147	2,268	16	1,222	1,700	2,937
	Unknown	-	73	240	313	-	276	18	294	-	348	258	607
	Total	11	182	802	995	16	1,514	1,165	2,695	27	1,696	1,967	3,690
2004													
	Not in Emergency Use	1	-	595	596	12	62	1,172	1,246	13	62	1,767	1,842
	In Emergency Use	3	99	246	348	16	387	1,410	1,813	19	486	1,656	2,161
	Unknown	-	-	229	229	-	15	-	15	-	15	229	244
	Total	4	99	1,070	1,173	28	464	2,582	3,074	32	563	3,652	4,247
2005													
	Not in Emergency Use	7	9	5	21	12	542	1,738	2,292	19	551	1,743	2,313
	In Emergency Use	4	252	270	526	20	895	536	1,452	24	1,147	807	1,978
	Unknown	-	-	309	309	-	144	9	153	-	144	318	461
	Total	11	261	584	856	32	1,581	2,284	3,896	43	1,841	2,867	4,752
2006													
	Not in Emergency Use	2	56	275	333	10	566	1,055	1,631	12	622	1,330	1,964
	In Emergency Use	1	123	-	124	9	694	1,349	2,051	10	816	1,349	2,175
	Unknown	-	4	274	278	-	61	311	372	-	65	585	650
	Total	3	183	549	735	19	1,321	2,715	4,054	22	1,504	3,264	4,789
2007													
	Not in Emergency Use	2	-	249	251	10	256	455	721	12	256	704	972
	In Emergency Use	2	85	-	87	16	358	1,709	2,083	18	443	1,709	2,170
	Unknown	-	249	5	253	-	80	606	686	-	329	611	940
	Total	4	334	253	591	26	694	2,770	3,491	30	1,028	3,024	4,082
2008													
	Not in Emergency Use	3	105	355	463	11	124	1,392	1,528	14	229	1,748	1,991
	In Emergency Use	2	69	107	178	12	804	2,157	2,973	14	873	2,263	3,150
	Unknown	-	70	-	70	-	211	591	802	-	282	591	873
	Total	5	245	462	711	23	1,139	4,140	5,303	28	1,384	4,602	6,014

(Continued)

NOTE: The above 'Injury' and 'Property Damage Only' crash numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

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Table B-1: Ambulance Crash Data from NHTSA FAR and NASS GES, 1990-2009 (cont.)

AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES
BY CRASH YEAR, AMBULANCE IN EMERGENCY USE, CRASH SEVERITY, AND VEHICLES INVOLVED
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF AND
GENERAL ESTIMATES SYSTEM (GES) 1990-2009

Crash Year by Emergency Use		Vehicles Involved and Crash Severity								Total			
		Single Vehicle Crash				Multiple Vehicle Crash							
		Fatal Crash	Injury Crash	Property Damage Only Crash	Total	Fatal Crash	Injury Crash	Property Damage Only Crash	Total	Fatal Crash	Injury Crash	Property Damage Only Crash	Total
2009													
	Not in Emergency Use	4	-	-	4	8	366	319	693	12	366	319	697
	In Emergency Use	5	33	-	38	11	475	891	1,377	16	508	891	1,415
	Unknown	-	-	624	624	1	171	145	317	1	171	769	941
	Total	9	33	624	666	20	1,012	1,355	2,387	29	1,045	1,980	3,053
Total													
	Not in Emergency Use	70	794	2,638	3,502	195	8,560	15,614	24,369	265	9,355	18,252	27,871
	In Emergency Use	51	1,653	3,265	4,970	273	16,235	27,915	44,423	324	17,889	31,180	49,393
	Unknown	-	471	2,299	2,770	1	1,255	3,520	4,776	1	1,726	5,819	7,546
	Total	121	2,919	8,202	11,242	469	26,051	47,049	73,568	590	28,969	55,251	84,810

NOTE: The above 'Injury' and 'Property Damage Only' crash numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

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Table B-2: Ambulance Seating Position Fatality Data from NHTSA FAR, 1990-2009

FATALITIES IN AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES
BY CRASH YEAR, SEATING POSITION, AND RESTRAINT USE
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF 6

Crash Year by Seating Position		Restraint Use			
		Restrained	Unrestrained	Unknown	Total
1990	Front Seat	-	-	1	1
	Other Passenger or Cargo Area	-	4	1	5
	Total	-	4	2	6
1991					
	Front Seat	1	2	-	3
	Second-Fourth Seat	1	1	-	2
	Other Passenger or Cargo Area	2	3	-	5
	Total	4	6	-	10
1992					
	Front Seat	1	1	2	4
	Other Passenger or Cargo Area	-	6	1	7
	Total	1	7	3	11
1993					
	Front Seat	1	-	-	1
	Other Passenger or Cargo Area	1	6	1	8
	Unknown	-	-	1	1
	Total	2	6	2	10
1994					
	Front Seat	-	1	-	1
	Second-Fourth Seat	-	1	1	2
	Other Passenger or Cargo Area	3	1	-	4
	Total	3	3	1	7
1995					
	Front Seat	2	2	-	4
	Second-Fourth Seat	-	1	1	2
	Other Passenger or Cargo Area	2	3	-	5
	Unknown	-	1	-	1
	Total	4	7	1	12
1996					
	Front Seat	2	2	-	4
	Other Passenger or Cargo Area	1	1	-	2
	Total	3	3	-	6
1997					
	Front Seat	-	1	1	2
	Second-Fourth Seat	-	1	-	1
	Other Passenger or Cargo Area	2	3	1	6
	Total	2	5	2	9
1998					
	Front Seat	1	3	-	4
	Other Passenger or Cargo Area	-	4	1	5
	Total	1	7	1	9
1999					
	Other Passenger or Cargo Area	1	1	-	2
	Total	1	1	-	2
2000					
	Front Seat	-	1	-	1
	Second-Fourth Seat	1	-	-	1
	Other Passenger or Cargo Area	-	3	1	4
	Total	1	4	1	6

(Continued)

This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-2: Ambulance Seating Position Fatality Data from NHTSA FAR, 1990-2009 (cont.)

FATALITIES IN AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES
BY CRASH YEAR, SEATING POSITION, AND RESTRAINT USE
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF

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Crash Year by Seating Position		Restraint Use			
		Restrained	Unrestrained	Unknown	Total
2001					
	Front Seat	-	2	-	2
	Other Passenger or Cargo Area	1	6	1	8
	Total	1	8	1	10
2002					
	Other Passenger or Cargo Area	1	1	-	2
	Unknown	-	1	-	1
	Total	1	2	-	3
2003					
	Front Seat	2	1	-	3
	Other Passenger or Cargo Area	1	4	3	8
	Total	3	5	3	11
2004					
	Front Seat	1	-	2	3
	Other Passenger or Cargo Area	1	4	1	6
	Total	2	4	3	9
2005					
	Front Seat	2	3	-	5
	Second-Fourth Seat	-	1	-	1
	Other Passenger or Cargo Area	2	7	-	9
	Total	4	11	-	15
2006					
	Front Seat	2	2	-	4
	Other Passenger or Cargo Area	2	2	-	4
	Total	4	4	-	8
2007					
	Front Seat	-	1	-	1
	Second-Fourth Seat	-	1	-	1
	Other Passenger or Cargo Area	3	9	1	13
	Total	3	11	1	15
2008					
	Front Seat	1	-	-	1
	Other Passenger or Cargo Area	1	2	-	3
	Total	2	2	-	4
2009					
	Front Seat	3	1	1	5
	Second-Fourth Seat	1	-	-	1
	Other Passenger or Cargo Area	3	3	1	7
	Total	7	4	2	13
Total					
	Front Seat	19	23	7	49
	Second-Fourth Seat	3	6	2	11
	Other Passenger or Cargo Area	27	73	13	113
	Unknown	-	2	1	3
	Total	49	104	23	176

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Table B-3: Ambulance Seating Position Injury Data from NHTSA NASS GES, 1990-2009

PERSONS INJURED IN AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES BY CRASH YEAR, SEATING POSITION (UNIMPUTED), AND RESTRAINT USE GENERAL ESTIMATES SYSTEM (GES) 1990-2009

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Crash Year by Seating Position		Restraint Use			
		Restrained	Unrestrained	Unknown	Total
1990	Front Seat	511	195	-	706
	Second-Fourth Seat	114	176	-	290
	Other Passenger or Cargo Area	-	55	-	55
	Unknown	-	198	-	198
	Total	625	623	-	1,249
1991					
	Front Seat	546	241	-	787
	Second-Fourth Seat	7	280	-	286
	Unknown	-	121	24	145
	Total	552	643	24	1,219
1992					
	Front Seat	378	103	307	788
	Second-Fourth Seat	-	19	-	19
	Other Passenger or Cargo Area	-	27	-	27
	Unknown	99	-	-	99
	Total	477	149	307	933
1993					
	Front Seat	935	357	94	1,386
	Second-Fourth Seat	71	68	-	139
	Other Passenger or Cargo Area	-	-	23	23
	Unknown	-	13	-	13
	Total	1,006	438	117	1,562
1994					
	Front Seat	825	106	-	931
	Second-Fourth Seat	201	11	-	212
	Other Passenger or Cargo Area	-	284	-	284
	Total	1,027	401	-	1,428
1995					
	Front Seat	399	-	-	399
	Second-Fourth Seat	-	212	55	267
	Other Passenger or Cargo Area	-	246	-	246
	Total	399	458	55	911
1996					
	Front Seat	232	-	203	435
	Second-Fourth Seat	89	12	81	182
	Other Passenger or Cargo Area	17	6	-	22
	Unknown	86	22	-	108
	Total	424	39	283	747
1997					
	Front Seat	658	-	-	658
	Other Passenger or Cargo Area	-	259	193	452
	Unknown	-	272	-	272
	Total	658	531	193	1,382
1998					
	Front Seat	371	-	-	371
	Second-Fourth Seat	-	286	-	286
	Other Passenger or Cargo Area	47	-	-	47
	Total	417	286	-	703

(Continued)

NOTE: The above numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

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Table B-3: Ambulance Seating Position Injury Data from NHTSA NASS GES, 1990-2009 (cont.)

PERSONS INJURED IN AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES BY CRASH YEAR, SEATING POSITION (UNIMPUTED), AND RESTRAINT USE GENERAL ESTIMATES SYSTEM (GES) 1990-2009 9

Crash Year by Seating Position		Restraint Use			
		Restrained	Unrestrained	Unknown	Total
1999					
	Front Seat	624	9	-	634
	Second-Fourth Seat	4	-	-	4
	Other Passenger or Cargo Area	92	435	-	528
	Unknown	-	-	273	273
	Total	721	445	273	1,438
2000					
	Front Seat	998	-	178	1,176
	Other Passenger or Cargo Area	406	74	125	605
	Total	1,403	74	304	1,781
2001					
	Front Seat	629	-	316	944
	Second-Fourth Seat	5	5	-	11
	Other Passenger or Cargo Area	-	3	-	3
	Total	634	9	316	959
2002					
	Front Seat	1,644	-	-	1,644
	Second-Fourth Seat	15	-	-	15
	Other Passenger or Cargo Area	56	249	7	312
	Unknown	331	-	-	331
	Total	2,046	249	7	2,302
2003					
	Front Seat	840	18	12	870
	Second-Fourth Seat	12	263	-	274
	Other Passenger or Cargo Area	85	149	4	238
	Total	937	430	16	1,383
2004					
	Front Seat	307	-	-	307
	Second-Fourth Seat	-	99	-	99
	Other Passenger or Cargo Area	5	27	5	36
	Total	312	126	5	442
2005					
	Front Seat	1,562	12	562	2,136
	Second-Fourth Seat	65	-	-	65
	Other Passenger or Cargo Area	20	263	10	293
	Total	1,647	275	572	2,494
2006					
	Front Seat	514	-	-	514
	Second-Fourth Seat	4	-	257	261
	Other Passenger or Cargo Area	5	68	232	305
	Unknown	12	-	-	12
	Total	536	68	489	1,093
2007					
	Front Seat	360	50	-	410
	Second-Fourth Seat	-	20	-	20
	Other Passenger or Cargo Area	89	93	3	185
	Total	449	163	3	615

(Continued)

NOTE: The above numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

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Table B-3: Ambulance Seating Position Injury Data from NHTSA NASS GES, 1990-2009 (cont.)

PERSONS INJURED IN AMBULANCES INVOLVED IN MOTOR VEHICLE TRAFFIC CRASHES BY CRASH YEAR, SEATING POSITION (UNIMPUTED), AND RESTRAINT USE GENERAL ESTIMATES SYSTEM (GES) 1990-2009 10

Crash Year by Seating Position		Restraint Use			Total
		Restrained	Unrestrained	Unknown	
2008					
	Front Seat	819	52	-	871
	Second-Fourth Seat	106	181	49	337
	Other Passenger or Cargo Area	49	279	127	456
	Total	974	513	177	1,664
2009					
	Front Seat	298	-	-	298
	Second-Fourth Seat	10	-	-	10
	Other Passenger or Cargo Area	127	123	25	275
	Total	435	123	25	583
Total					
	Front Seat	13,449	1,144	1,671	16,264
	Second-Fourth Seat	704	1,632	441	2,777
	Other Passenger or Cargo Area	997	2,641	755	4,393
	Unknown	528	627	297	1,452
	Total	15,679	6,044	3,164	24,886

NOTE: The above numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

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Table B-4: Ambulance Person Type Fatality Data from NHTSA FAR, 1990-2009

FATALITIES IN TRAFFIC CRASHES INVOLVING AMBULANCES
BY CRASH YEAR, PERSON TYPE, CRASH TYPE, AND EMERGENCY USE
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF

Crash Year by Person Type		Vehicles Involved and Emergency Use						Total		
		Single Vehicle Crash			Multiple Vehicle Crash					
		Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total
1990	Ambulance Driver	-	-	-	1	-	1	1	-	1
	Ambulance Passenger	1	-	1	3	1	4	4	1	5
	Occupant of Other Vehicle	-	-	-	9	11	20	9	11	20
	Nonoccupant	4	1	5	-	-	-	4	1	5
	Total	5	1	6	13	12	25	18	13	31
1991										
	Ambulance Driver	-	-	-	1	-	1	1	-	1
	Ambulance Passenger	4	-	4	3	2	5	7	2	9
	Occupant of Other Vehicle	-	-	-	18	19	37	18	19	37
	Nonoccupant	2	2	4	-	-	-	2	2	4
	Total	6	2	8	22	21	43	28	23	51
1992										
	Ambulance Driver	-	-	-	1	1	2	1	1	2
	Ambulance Passenger	3	-	3	4	2	6	7	2	9
	Occupant of Other Vehicle	-	-	-	11	20	31	11	20	31
	Nonoccupant	-	3	3	1	1	2	1	4	5
	Total	3	3	6	17	24	41	20	27	47
1993										
	Ambulance Passenger	3	2	5	2	3	5	5	5	10
	Occupant of Other Vehicle	-	-	-	10	10	20	10	10	20
	Nonoccupant	-	2	2	2	1	3	2	3	5
	Total	3	4	7	14	14	28	17	18	35
1994										
	Ambulance Driver	-	-	-	-	1	1	-	1	1
	Ambulance Passenger	3	1	4	-	2	2	3	3	6
	Occupant of Other Vehicle	-	-	-	6	21	27	6	21	27
	Nonoccupant	4	-	4	1	1	2	5	1	6
	Total	7	1	8	7	25	32	14	26	40
1995										
	Ambulance Driver	2	-	2	-	1	1	2	1	3
	Ambulance Passenger	5	2	7	1	1	2	6	3	9
	Occupant of Other Vehicle	-	-	-	12	15	27	12	15	27
	Nonoccupant	3	3	6	-	-	-	3	3	6
	Total	10	5	15	13	17	30	23	22	45
1996										
	Ambulance Driver	1	1	2	-	1	1	1	2	3
	Ambulance Passenger	1	-	1	-	2	2	1	2	3
	Occupant of Other Vehicle	-	-	-	13	15	28	13	15	28
	Nonoccupant	1	1	2	1	-	1	2	1	3
	Total	3	2	5	14	18	32	17	20	37
1997										
	Ambulance Driver	-	-	-	1	-	1	1	-	1
	Ambulance Passenger	-	2	2	3	3	6	3	5	8
	Occupant of Other Vehicle	-	-	-	8	13	21	8	13	21
	Nonoccupant	-	2	2	-	-	-	-	2	2
	Total	-	4	4	12	16	28	12	20	32

(Continued)

This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-4: Ambulance Person Type Fatality Data from NHTSA FAR, 1990-2009 (cont.)

FATALITIES IN TRAFFIC CRASHES INVOLVING AMBULANCES
BY CRASH YEAR, PERSON TYPE, CRASH TYPE, AND EMERGENCY USE
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF

Crash Year by Person Type		Vehicles Involved and Emergency Use						Total		
		Single Vehicle Crash			Multiple Vehicle Crash					
		Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total
1998										
	Ambulance Driver	-	-	-	-	2	2	-	2	2
	Ambulance Passenger	1	2	3	1	3	4	2	5	7
	Occupant of Other Vehicle	-	-	-	5	12	17	5	12	17
	Nonoccupant	1	-	1	-	1	1	1	1	2
	Total	2	2	4	6	18	24	8	20	28
1999										
	Ambulance Passenger	-	-	-	1	1	2	1	1	2
	Occupant of Other Vehicle	-	-	-	5	7	12	5	7	12
	Nonoccupant	1	1	2	-	-	-	1	1	2
	Total	1	1	2	6	8	14	7	9	16
2000										
	Ambulance Driver	-	-	-	1	-	1	1	-	1
	Ambulance Passenger	2	-	2	2	1	3	4	1	5
	Occupant of Other Vehicle	-	-	-	7	16	23	7	16	23
	Nonoccupant	1	1	2	1	1	2	2	2	4
	Total	3	1	4	11	18	29	14	19	33
2001										
	Ambulance Driver	-	-	-	-	1	1	-	1	1
	Ambulance Passenger	2	3	5	1	3	4	3	6	9
	Occupant of Other Vehicle	-	-	-	8	8	16	8	8	16
	Nonoccupant	1	1	2	1	-	1	2	1	3
	Total	3	4	7	10	12	22	13	16	29
2002										
	Ambulance Passenger	1	-	1	1	1	2	2	1	3
	Occupant of Other Vehicle	-	-	-	8	8	16	8	8	16
	Nonoccupant	2	-	2	-	1	1	2	1	3
	Total	3	-	3	9	10	19	12	10	22
2003										
	Ambulance Driver	-	-	-	1	-	1	1	-	1
	Ambulance Passenger	2	5	7	1	2	3	3	7	10
	Occupant of Other Vehicle	-	-	-	5	10	15	5	10	15
	Nonoccupant	2	2	4	-	-	-	2	2	4
	Total	4	7	11	7	12	19	11	19	30
2004										
	Ambulance Driver	-	-	-	-	2	2	-	2	2
	Ambulance Passenger	1	2	3	-	4	4	1	6	7
	Occupant of Other Vehicle	-	-	-	12	13	25	12	13	25
	Nonoccupant	-	1	1	1	-	1	1	1	2
	Total	1	3	4	13	19	32	14	22	36
2005										
	Ambulance Driver	2	1	3	-	1	1	2	2	4
	Ambulance Passenger	3	3	6	1	4	5	4	7	11
	Occupant of Other Vehicle	-	-	-	12	17	29	12	17	29
	Nonoccupant	4	1	5	-	-	-	4	1	5
	Total	9	5	14	13	22	35	22	27	49

(Continued)

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Table B-4: Ambulance Person Type Fatality Data from NHTSA FAR, 1990-2009 (cont.)

FATALITIES IN TRAFFIC CRASHES INVOLVING AMBULANCES
BY CRASH YEAR, PERSON TYPE, CRASH TYPE, AND EMERGENCY USE
FATALITY ANALYSIS REPORTING SYSTEM (FARS) 1990-2008 FINAL AND 2009 ARF

Crash Year by Person Type		Vehicles Involved and Emergency Use								
		Single Vehicle Crash			Multiple Vehicle Crash			Total		
		Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total
2006										
	Ambulance Driver	-	1	1	1	-	1	1	1	2
	Ambulance Passenger	1	1	2	2	2	4	3	3	6
	Occupant of Other Vehicle	-	-	-	7	7	14	7	7	14
	Nonoccupant	1	-	1	1	1	2	2	1	3
	Total	2	2	4	11	10	21	13	12	25
2007										
	Ambulance Driver	-	-	-	-	1	1	-	1	1
	Ambulance Passenger	1	2	3	1	10	11	2	12	14
	Occupant of Other Vehicle	-	-	-	10	11	21	10	11	21
	Nonoccupant	1	-	1	-	1	1	1	1	2
	Total	2	2	4	11	23	34	13	25	38
2008										
	Ambulance Driver	-	-	-	1	-	1	1	-	1
	Ambulance Passenger	2	-	2	-	1	1	2	1	3
	Occupant of Other Vehicle	-	-	-	13	9	22	13	9	22
	Nonoccupant	1	2	3	-	3	3	1	5	6
	Total	3	2	5	14	13	27	17	15	32
2009										
	Ambulance Driver	-	-	-	2	1	3	2	1	3
	Ambulance Passenger	2	2	4	3	3	6	5	5	10
	Occupant of Other Vehicle	-	-	-	7	9	16	7	9	16
	Nonoccupant	2	3	5	1	-	1	3	3	6
	Total	4	5	9	13	13	26	17	18	35
Total										
	Ambulance Driver	5	3	8	10	12	22	15	15	30
	Ambulance Passenger	38	27	65	30	51	81	68	78	146
	Occupant of Other Vehicle	-	-	-	186	251	437	186	251	437
	Nonoccupant	31	26	57	10	11	21	41	37	78
	Total	74	56	130	236	325	561	310	381	691

This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-5: Ambulance Person Type Injury Data from NHTSA NASS GES, 1990-2009

PERSONS INJURED IN TRAFFIC CRASHES INVOLVING AMBULANCES
BY CRASH YEAR, PERSON TYPE, CRASH TYPE, AND EMERGENCY USE
GENERAL ESTIMATES SYSTEM (GES) 1990-2009

Crash Year by Person Type		Vehicles Involved and Emergency Use						Total		
		Single Vehicle Crash			Multiple Vehicle Crash					
		Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total
1990	**Ambulance Driver**	-	-	-	129	218	347	129	218	347
	Ambulance Passenger	-	143	143	162	596	758	162	740	901
	Occupant of Other Vehicle	-	-	-	398	541	938	398	541	938
	Total	-	143	143	688	1,355	2,043	688	1,498	2,187
1991										
	Ambulance Driver	118	-	118	287	183	470	405	183	588
	Ambulance Passenger	-	134	134	432	65	497	432	199	631
	Occupant of Other Vehicle	-	-	-	848	298	1,147	848	298	1,147
	Total	118	134	252	1,566	547	2,113	1,685	681	2,365
1992										
	Ambulance Driver	-	-	-	23	227	250	23	227	250
	Ambulance Passenger	-	-	-	122	560	683	122	560	683
	Occupant of Other Vehicle	-	-	-	380	393	774	380	393	774
	Nonoccupant	-	-	-	-	27	27	-	27	27
	Total	-	-	-	526	1,208	1,734	526	1,208	1,734
1993										
	Ambulance Driver	135	101	236	118	343	461	253	443	697
	Ambulance Passenger	135	101	236	118	511	629	253	611	865
	Occupant of Other Vehicle	-	-	-	545	1,467	2,011	545	1,467	2,011
	Nonoccupant	-	13	13	-	-	-	-	13	13
	Total	271	215	486	780	2,320	3,100	1,051	2,535	3,586
1994										
	Ambulance Driver	81	-	81	609	125	734	690	125	815
	Ambulance Passenger	-	-	-	16	597	613	16	597	613
	Occupant of Other Vehicle	-	-	-	1,445	462	1,907	1,445	462	1,907
	Nonoccupant	24	-	24	-	-	-	24	-	24
	Total	105	-	105	2,069	1,184	3,254	2,174	1,184	3,358
1995										
	Ambulance Driver	-	-	-	-	90	90	-	90	90
	Ambulance Passenger	-	89	89	55	677	732	55	767	821
	Occupant of Other Vehicle	-	-	-	265	917	1,182	265	917	1,182
	Total	-	89	89	320	1,684	2,004	320	1,773	2,093
1996										
	Ambulance Driver	-	-	-	107	52	159	107	52	159
	Ambulance Passenger	38	-	38	305	245	550	343	245	588
	Occupant of Other Vehicle	-	-	-	665	505	1,170	665	505	1,170
	Total	38	-	38	1,077	802	1,879	1,115	802	1,917
1997										
	Ambulance Driver	-	82	82	52	330	382	52	412	464
	Ambulance Passenger	-	82	82	125	712	836	125	794	918
	Occupant of Other Vehicle	-	-	-	74	1,840	1,914	74	1,840	1,914
	Nonoccupant	-	24	24	-	-	-	-	24	24
	Total	-	188	188	251	2,881	3,132	251	3,069	3,321
1998										
	Ambulance Driver	-	-	-	2	169	171	2	169	171
	Ambulance Passenger	-	81	81	49	403	451	49	483	532
	Occupant of Other Vehicle	-	-	-	742	1,733	2,475	742	1,733	2,475
	Total	-	81	81	793	2,305	3,097	793	2,385	3,178

(Continued)

NOTE: The above numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-5: Ambulance Person Type Injury Data from NHTSA NASS GES, 1990-2009 (cont.)

PERSONS INJURED IN TRAFFIC CRASHES INVOLVING AMBULANCES
BY CRASH YEAR, PERSON TYPE, CRASH TYPE, AND EMERGENCY USE
GENERAL ESTIMATES SYSTEM (GES) 1990-2009

Crash Year by Person Type		Vehicles Involved and Emergency Use						Total		
		Single Vehicle Crash			Multiple Vehicle Crash					
		Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total
1999										
	Ambulance Driver	-	91	91	107	203	310	107	294	401
	Ambulance Passenger	-	-	-	203	834	1,037	203	834	1,037
	Occupant of Other Vehicle	-	-	-	1,019	570	1,589	1,019	570	1,589
	Nonoccupant	-	22	22	-	-	-	-	22	22
	Total	-	113	113	1,329	1,607	2,936	1,329	1,720	3,049
2000										
	Ambulance Driver	162	-	162	325	162	486	487	162	648
	Ambulance Passenger	162	-	162	751	221	972	913	221	1,133
	Occupant of Other Vehicle	-	-	-	629	1,521	2,150	629	1,521	2,150
	Nonoccupant	-	52	52	-	-	-	-	52	52
	Total	323	52	375	1,705	1,904	3,608	2,028	1,955	3,983
2001										
	Ambulance Driver	129	35	163	5	401	406	133	436	569
	Ambulance Passenger	23	35	58	21	311	332	44	346	390
	Occupant of Other Vehicle	-	-	-	184	1,337	1,521	184	1,337	1,521
	Total	152	69	221	210	2,048	2,258	362	2,118	2,480
2002										
	Ambulance Driver	20	64	84	101	819	920	121	883	1,004
	Ambulance Passenger	130	110	241	135	922	1,058	266	1,033	1,299
	Occupant of Other Vehicle	-	-	-	588	690	1,278	588	690	1,278
	Nonoccupant	19	19	38	-	-	-	19	19	38
	Total	169	194	362	825	2,431	3,256	994	2,624	3,618
2003										
	Ambulance Driver	52	89	141	16	477	493	68	566	634
	Ambulance Passenger	177	-	177	45	527	572	222	527	749
	Occupant of Other Vehicle	-	-	-	395	577	972	395	577	972
	Nonoccupant	-	20	20	-	-	-	-	20	20
	Total	229	109	338	456	1,581	2,037	685	1,690	2,375
2004										
	Ambulance Driver	-	-	-	10	146	156	10	146	156
	Ambulance Passenger	-	99	99	10	178	188	10	277	287
	Occupant of Other Vehicle	-	-	-	95	450	546	95	450	546
	Total	-	99	99	115	774	889	115	873	988
2005										
	Ambulance Driver	9	254	263	218	644	863	227	898	1,126
	Ambulance Passenger	-	252	252	322	794	1,116	322	1,046	1,368
	Occupant of Other Vehicle	-	-	-	598	667	1,265	598	667	1,265
	Total	9	506	515	1,139	2,105	3,244	1,148	2,611	3,759
2006										
	Ambulance Driver	20	105	126	61	200	261	81	305	387
	Ambulance Passenger	24	211	235	73	398	471	98	608	706
	Occupant of Other Vehicle	-	-	-	643	733	1,375	643	733	1,375
	Nonoccupant	40	18	57	-	18	18	40	36	76
	Total	85	333	418	777	1,348	2,126	862	1,682	2,543

(Continued)

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This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-5: Ambulance Person Type Injury Data from NHTSA NASS GES, 1990-2009 (cont.)

PERSONS INJURED IN TRAFFIC CRASHES INVOLVING AMBULANCES
BY CRASH YEAR, PERSON TYPE, CRASH TYPE, AND EMERGENCY USE
GENERAL ESTIMATES SYSTEM (GES) 1990-2009

Crash Year by Person Type		Vehicles Involved and Emergency Use						Total		
		Single Vehicle Crash			Multiple Vehicle Crash					
		Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total	Not in Emergency Use	In Emergency Use	Total
2007										
	Ambulance Driver	-	-	-	96	188	284	96	188	284
	Ambulance Passenger	-	-	-	108	222	331	108	222	331
	Occupant of Other Vehicle	-	-	-	352	164	516	352	164	516
	Nonoccupant	249	85	334	-	-	-	249	85	334
	Total	249	85	334	556	574	1,130	805	659	1,464
2008										
	Ambulance Driver	52	3	55	15	245	260	67	248	315
	Ambulance Passenger	320	64	385	233	732	964	553	796	1,349
	Occupant of Other Vehicle	-	-	-	335	766	1,101	335	766	1,101
	Nonoccupant	14	38	53	-	-	-	14	38	53
	Total	386	106	493	583	1,743	2,325	969	1,849	2,818
2009										
	Ambulance Driver	-	33	33	157	92	249	157	125	282
	Ambulance Passenger	-	66	66	16	219	235	16	285	301
	Occupant of Other Vehicle	-	-	-	532	506	1,038	532	506	1,038
	Nonoccupant	-	-	-	6	-	6	6	-	6
	Total	-	98	98	711	817	1,528	711	915	1,626
Total										
	Ambulance Driver	777	858	1,635	2,438	5,312	7,750	3,216	6,170	9,385
	Ambulance Passenger	1,010	1,467	2,476	3,301	9,724	13,025	4,311	11,190	15,501
	Occupant of Other Vehicle	-	-	-	10,733	16,136	26,869	10,733	16,136	26,869
	Nonoccupant	345	291	636	6	45	51	351	336	687
	Total	2,132	2,615	4,748	16,478	31,217	47,695	18,611	33,832	52,443

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This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-6: Ambulance Crash Event Data from NHTSA FAR and NASS GES, 1990-2009

AMBULANCES INVOLVED IN NONFATAL MOTOR VEHICLE TRAFFIC CRASHES, 1999-2009
BY CRITICAL EVENT, AMBULANCE IN EMERGENCY USE, AND CRASH SEVERITY
GENERAL ESTIMATES SYSTEM (GES) 1999-2009

Critical Event by Emergency Use		Crash Severity: Injury Crash	Crash Severity: Property Damage Only Crash	Total
This veh lost control due to Disabling Vehicle Failure (e.g., wheel fell off)	Unknown	-	240	240
	Total	-	240	240
This veh lost control due to Poor Road Conditions (puddle, pot hole, ice, etc.)				
	Not in Emergency Use	5	379	384
	In Emergency Use	94	-	94
	Unknown	4	274	278
	Total	104	653	757
This veh lost control due to Excessive Speed				
	Not in Emergency Use	16	5	21
	In Emergency Use	322	-	322
	Unknown	128	-	128
	Total	467	5	471
This veh lost control due to Other cause of control loss				
	Not in Emergency Use	23	-	23
	Total	23	-	23
This veh traveling Over the Lane Line on Left Side of Travel Lane				
	Not in Emergency Use	39	304	343
	In Emergency Use	186	960	1,145
	Unknown	19	435	454
	Total	243	1,698	1,941
This veh traveling Over the Lane Line on Right Side of Travel Lane				
	Not in Emergency Use	311	917	1,229
	In Emergency Use	286	823	1,110
	Unknown	-	595	595
	Total	598	2,336	2,934
This veh traveling Off the Edge of the Road on the Left Side				
	Not in Emergency Use	267	97	364
	In Emergency Use	116	266	382
	Total	383	363	746
This veh traveling Off the Edge of the Road on the Right Side				
	Not in Emergency Use	9	-	9
	In Emergency Use	30	367	397
	Unknown	-	52	52
	Total	39	419	458
This veh traveling End Departure				
	Not in Emergency Use	-	225	225
	Total	-	225	225
This veh traveling Turning Left at Intersection				
	Not in Emergency Use	104	5	109
	In Emergency Use	344	1,756	2,100
	Unknown	-	243	243
	Total	448	2,004	2,452
This veh traveling Turning Right at Intersection				
	Not in Emergency Use	-	639	639
	In Emergency Use	32	1,262	1,294
	Unknown	-	273	273
	Total	32	2,174	2,206

(Continued)

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Table B-6: Ambulance Crash Event Data from NHTSA FAR and NASS GES, 1990-2009 (cont.)

AMBULANCES INVOLVED IN NONFATAL MOTOR VEHICLE TRAFFIC CRASHES, 1999-2009
BY CRITICAL EVENT, AMBULANCE IN EMERGENCY USE, AND CRASH SEVERITY
GENERAL ESTIMATES SYSTEM (GES) 1999-2009

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Critical Event by Emergency Use		Crash Severity: Injury Crash	Crash Severity: Property Damage Only Crash	Total
This veh traveling Crossing Over (Passing Through) Interesection				
	Not in Emergency Use	242	141	383
	In Emergency Use	1,251	1,129	2,380
	Unknown	66	139	204
	Total	1,560	1,408	2,968
This veh traveling This Vehicle Decelerating				
	Not in Emergency Use	264	235	499
	In Emergency Use	78	363	440
	Unknown	109	-	109
	Total	451	597	1,049
Other MV in Lane- Other Vehicle Stopped				
	Not in Emergency Use	1,034	912	1,946
	In Emergency Use	-	468	468
	Unknown	75	521	595
	Total	1,109	1,900	3,009
Other MV in Lane- Traveling In Same Direction With Lower Steady Speed				
	Not in Emergency Use	-	81	81
	In Emergency Use	21	272	293
	Unknown	106	80	187
	Total	128	433	561
Other MV in Lane- Traveling In Same Direction While Decelerating				
	Not in Emergency Use	387	278	665
	In Emergency Use	66	265	331
	Unknown	5	197	202
	Total	458	740	1,198
Other MV in Lane- Traveling In Same Direction With Higher Speed				
	Not in Emergency Use	541	1,518	2,059
	In Emergency Use	365	444	808
	Unknown	12	317	329
	Total	918	2,279	3,197
Other MV in Lane- Traveling In Opposite Direction				
	Not in Emergency Use	78	-	78
	In Emergency Use	109	112	221
	Unknown	5	-	5
	Total	191	112	304
Other MV in Lane- Backing				
	Not in Emergency Use	-	5	5
	Total	-	5	5
Other MV encroaching into Ln- From Adjacent Lane (Same Direction) - Over LEFT Lane Line				
	Not in Emergency Use	-	5	5
	In Emergency Use	124	25	149
	Unknown	4	266	270
	Total	129	296	425
Other MV encroaching into Ln- From Adjacent Lane (Same Direction) - Over RIGHT Lane Line				
	Not in Emergency Use	152	861	1,014
	In Emergency Use	581	3,955	4,535
	Unknown	21	619	641
	Total	754	5,436	6,190

(Continued)

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This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-6: Ambulance Crash Event Data from NHTSA FAR and NASS GES, 1990-2009 (cont.)

AMBULANCES INVOLVED IN NONFATAL MOTOR VEHICLE TRAFFIC CRASHES, 1999-2009
BY CRITICAL EVENT, AMBULANCE IN EMERGENCY USE, AND CRASH SEVERITY
GENERAL ESTIMATES SYSTEM (GES) 1999-2009

Critical Event by Emergency Use		Crash Severity: Injury Crash	Crash Severity: Property Damage Only Crash	Total
Other MV encroaching into Ln- From Opposite Direction - Over Left Lane Line				
	Not in Emergency Use	284	1,154	1,438
	In Emergency Use	563	147	709
	Unknown	462	16	478
	Total	1,308	1,317	2,625
Other MV encroaching into Ln- From Opposite Direction - Over Right Lane Line				
	In Emergency Use	13	60	73
	Unknown	53	-	53
	Total	66	60	126
Other MV encroaching into Ln- From Parking Lane				
	Not in Emergency Use	-	536	536
	In Emergency Use	351	267	618
	Unknown	-	9	9
	Total	351	812	1,163
Other MV encroaching into Ln- From Crossing street, Turning into Same Direction				
	Not in Emergency Use	59	211	269
	In Emergency Use	438	305	743
	Unknown	28	-	28
	Total	525	516	1,041
Other MV encroaching into Ln- From Crossing street, Across Path				
	Not in Emergency Use	506	-	506
	In Emergency Use	3,523	1,991	5,514
	Unknown	108	6	114
	Total	4,138	1,997	6,134
Other MV encroaching into Ln- From Crossing street, Turning into Opposite Direction				
	Not in Emergency Use	18	203	221
	In Emergency Use	281	54	335
	Unknown	105	-	105
	Total	404	257	661
Other MV encroaching into Ln- From Driveway, Alley Access,Etc.-Turning Into Same Direction				
	In Emergency Use	-	156	156
	Total	-	156	156
Other MV encroaching into Ln- From Driveway, Alley Access, Etc. - Straight Across Path				
	In Emergency Use	290	-	290
	Total	290	-	290
Other MV encroaching into Ln- From Driveway,Alley Access,Etc.-Turning Into Opposite Direct				
	Not in Emergency Use	162	342	504
	In Emergency Use	-	224	224
	Unknown	5	-	5
	Total	166	566	732
Other MV encroaching into Ln- Encroachment by Other Vehicle - Details Unknown				
	In Emergency Use	10	-	10
	Total	10	-	10
Ped cyc other non-motorist- Pedestrian In Roadway				
	Not in Emergency Use	47	-	47
	In Emergency Use	184	-	184
	Unknown	263	-	263
	Total	494	-	494

(Continued)

NOTE: The above numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Table B-6: Ambulance Crash Event Data from NHTSA FAR and NASS GES, 1990-2009 (cont.)

AMBULANCES INVOLVED IN NONFATAL MOTOR VEHICLE TRAFFIC CRASHES, 1999-2009
BY CRITICAL EVENT, AMBULANCE IN EMERGENCY USE, AND CRASH SEVERITY
GENERAL ESTIMATES SYSTEM (GES) 1999-2009

Critical Event by Emergency Use		Crash Severity: Injury Crash	Crash Severity: Property Damage Only Crash	Total
Ped cyc other non-motorist- Pedestrain - Unknown Location				
	In Emergency Use	17	-	17
	Total	17	-	17
Ped cyc other non-motorist- Pedalcyclist or Other NonMotorist In Roadway				
	In Emergency Use	18	-	18
	Total	18	-	18
Obj or Animal- Animal In Roadway				
	Not in Emergency Use	105	284	389
	In Emergency Use	27	816	843
	Unknown	-	545	545
	Total	132	1,645	1,777
Obj or Animal- Object in Roadway				
	Not in Emergency Use	-	121	121
	Total	-	121	121
Other Critical Event				
	Not in Emergency Use	57	806	863
	In Emergency Use	213	1,308	1,522
	Unknown	110	710	820
	Total	381	2,824	3,205
Unknown				
	In Emergency Use	2	-	2
	Unknown	10	-	10
	Total	13	-	13
Total				
	Not in Emergency Use	4,712	10,265	14,977
	In Emergency Use	9,936	17,793	27,729
	Unknown	1,699	5,536	7,235
	Total	16,347	33,594	49,941

NOTE: The above numbers are not actual counts, but estimates of the actual counts. The estimates are calculated from data obtained from a nationally representative sample of crashes collected through NHTSA's General Estimates System (GES). Estimates should be rounded to the nearest 1,000. Estimates less than 500 indicate that the sample size was too small to produce a meaningful estimate and should be rounded to 0.

This report was generated by NCSA's Information Services Team, DRID; CATS# 2011.00060; AMBULANCE_ACC_2009.SAS; TTL; 02/08/2011 5:44 PM

Annex C: Sample State Level EMS Crash Data Form

The following data form is provided as an example of state level efforts to collect data on ambulance crashes, with this example from the Commonwealth of Pennsylvania in 2004.

3/24/04 (Rev)

DEPARTMENT OF HEALTH
...in pursuit of good health

EMS VEHICLE COLLISION AND/OR PERSONAL INJURY REPORT FORM

Send Original To Regional EMS Council

This Report Must Be Filed Within 24 Hours of Incident and Within 8 Hours If Fatality Involved.

Date Of Accident/Injury Mo Day Year	Day of the Week M T W Th F Sa Su ☐ ☐ ☐ ☐ ☐ ☐ ☐	Hour- Military Time	Did Vehicle Driver Complete an EMSO Approved EVOC Course ☐ Yes ☐ No

I. Service Information

Service Name: Affiliate Number:

Name/Title of Person Completing Report:

Telephone: Email: Pager:

Address:

City: State: Zip:

IF COMPLETING PERSONNEL INJURY REPORT ONLY PROCEED TO SECTION V

II. Vehicle Info.

EMSO Vehicle Decal Number: | Vehicle Drivable after Accident: ☐ Yes ☐ No | VIN #:

Approximate Damage Amount: ☐ \$0-\$1,000 ☐ \$1,000-\$5,000 ☐ \$5,000-\$10,000 ☐ \$10,000-\$25,000 ☐ >\$25,000

III. Motor Vehicle Accident incident Information

Number of Vehicles Involved:
EMS:
Other Emergency Service:
Civilian:

Impact Type:
☐ Front to Rear ☐ Side Impact
☐ Sideswipe ☐ Head-On
☐ Rollover ☐ Other

Involved Collision With:
☐ Animal ☐ Vehicle in Traffic
☐ Natural Object (tree etc) ☐ Overturned in Road
☐ Fixed Object (pole etc) ☐ Parked Vehicle
☐ Pedestrian ☐ Left Road-No Impact
☐ Bicycle ☐ Other:

Street Name or Route Number where Accident Occurred: | MCD Code Where Accident Occurred:

Nearest Intersection or Mile Marker: | Number of Lanes:

Did Incident Occur at Intersection: ☐ Yes ☐ No

Approximate Speed Prior to Incident: ☐ 0-10 ☐ 10-25 ☐ 25-35 ☐ 35-45 ☐ 45-55 ☐ 55-65 ☐ >65

Traffic Controls: ☐ Stop Sign ☐ Yield Sign ☐ Signal Light ☐ Other Warning Sign/Signal ☐ Traffic pre-emption device (Opticom or EMS controlled)

If at Traffic Signal-Signal Facing EMS Vehicle at Time of Incident: ☐ Red ☐ Yellow ☐ Green

Weather: ☐ Clear ☐ Foggy ☐ Cloudy ☐ Rain ☐ Snow ☐ Ice

Light Conditions: ☐ Daylight ☐ Dark-Road Lighted ☐ Dusk/Dawn ☐ Dark-Road Unlighted

Road Surface: ☐ Dry ☐ Wet ☐ Icy ☐ Snow

Warning Devices In Use: ☐ Visual (Red Lights) ☐ Audible (Siren) ☐ Headlights Only ☐ None

Mode of Service at Time of Incident:
☐ Responding to Emergency ☐ Transporting Patient-Emergency
☐ Responding to Non-emergency ☐ Transporting Patient-Non-Emergency
☐ Parked at Incident ☐ Parked-Other than at Incident
☐ Routine Driving ☐ Backing
☐ Training ☐ Other

Figure C-1: Example of State Vehicle Collision and/or Injury Report Form

3/24/04 (Rev)

IV-Description

Description of the Event:

____

____

____

The following injury reports must be completed for all EMS personnel and others injured.

V. Injury Information

Injury A

EMS: ☐ Yes ☐ No

Age	Sex	Injury Severity:	Injury Related To:		Ejected	*Position in Vehicle if MVA: Enter #
	☐ M ☐ F	☐ Fatal ☐ Serious ☐ Moderate ☐ Minor	☐ MVA ☐ Fall ☐ Needle stick ☐ Lifting Patient ☐ Ordinary Lifting	☐ Pedestrian Struck ☐ Body Fluid Exp. ☐ Hazardous Mat. ☐ Assault ☐ Other	☐ Yes ☐ No	_______

Injury B

EMS: ☐ Yes ☐ No

Age	Sex	Injury Severity:	Injury Related To:		Ejected	*Position in Vehicle if MVA: Enter #
	☐ M ☐ F	☐ Fatal ☐ Serious ☐ Moderate ☐ Minor	☐ MVA ☐ Fall ☐ Needle stick ☐ Patient Lifting ☐ Ordinary Lifting	☐ Pedestrian Struck ☐ Body Fluid Exp. ☐ Hazardous Mat. ☐ Assault ☐ Other	☐ Yes ☐ No	_______

Injury C

EMS: ☐ Yes ☐ No

Age	Sex	Injury Severity:	Injury Related To:		Ejected	*Position in Vehicle if MVA: Enter #
	☐ M ☐ F	☐ Fatal ☐ Serious ☐ Moderate ☐ Minor	☐ MVA ☐ Fall ☐ Needle stick ☐ Patient Lifting ☐ Ordinary Lifting	☐ Pedestrian Struck ☐ Body Fluid Exp. ☐ Hazardous Mat. ☐ Assault ☐ Other	☐ Yes ☐ No	_______

Vi. Police Report Information

Did Police Investigate This Incident: ☐ Yes ☐ No — **Police Report Attached: ☐ Yes ☐ No**

If Police Report Was Filed and Copy Not Attached, Complete the Following:

Investigating Police Agency:

Address:

City: ______________ **State:** ______________ **Zip:** ______________

Citations Issued: ☐ Yes ☐ No — **Issued To:** ☐ EMS Driver ☐ Other Driver

ViI. Sign

I believe the information provided above to be accurate and correct:

Sign:______________________ **Title:**______________ **Date:**__________

***Vehicle Position Identification Information:**

1=Driver's seat
2=Front seat passenger
3=Squad bench seated
4=Squad bench supine (patient)
5=Backseat, squad unit
6=Captain's chair
7=Squad bench/seat
8=Driver's side
9=Litter
10=Standing, patient compartment
11=Other

Use additional sheets as necessary if more than three injured individuals.

Figure C-1: Example of State Vehicle Collision and/or Injury Report Form (cont.)

Instructions for Completion of the EMS Vehicle Collision And/or Personnel Injury Report Form

General Information:

Date of Accident/Injury: Please enter the month, day and year in this block, e.g., (mm/dd/yyyy)

Day of the week: Indicate the appropriate box for the day of the week that the accident/injury occurred.

Hour: Enter in military time the time that the accident/injury occurred e.g., 0900, 1300, 1830, 1945, etc.

Did the Vehicle Driver Complete an EMSO Approved EVOC Course: indicate yes or no in the corresponding box.

Section I-Service Information:

Service Name: Enter the name of the ambulance service.

Affiliate Number: Enter the 5-digit affiliate number assigned to the ambulance service.

Name/Title of Person Completing Report: Enter the name of individual who is completing this report.

Telephone Number: E-Mail Address/ Pager Number: Enter the appropriate information.

Address: enter the complete address information for the ambulance service.

NOTE: If completing personnel injury report only proceed to section V.

Section II-Vehicle Information:

EMSO Vehicle Decal Number: Enter the seven-digit number from the licensure decal of the vehicle involved in the accident.

Vehicle Drivable After Accident: Indicate the appropriate box.

VIN #: Enter the vehicle identification number of the vehicle involved in the accident as found on the vehicles owners card or the vehicle.

Approximate Damage Amount: Indicate the appropriate box, which corresponds to the approximate damage amount in dollars due to the accident.

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Figure C-1: Example of State Vehicle Collision and/or Injury Report Form (cont.)

Section III-Motor Vehicle Accident Information:

Number of Vehicles Involved: Enter the number of vehicles to include emergency services and others involved in the accident.

Involved Collision With: Indicate the appropriate box that the vehicle was involved in the collision with.

Impact Type: Indicate the appropriate box as to the type of impact occurred by the vehicle.

Street Name or Route Number Where Accident Occurred: Enter the exact street or road location where the accident occurred.

MCD Code Where Accident Occurred: Enter the five-digit Minor Civil Division where the accident occurred, e.g., 48934 (Walnutport Borough in Northampton County).

Nearest Intersection or Mile Marker: Enter the nearest road intersection or the corresponding road mile marker where the accident occurred.

Number of Lanes: Enter the number of lanes on the street/road where the accident occurred.

Did Accident Occur at Intersection: Indicate the appropriate box.

Approximate Speed Prior to Accident: Indicate the appropriate box for the speed of the vehicle prior to the accident.

Traffic Controls: Indicate the appropriate box for the traffic controls that were in operation at the time of the accident.

Traffic Signal: Indicate the color of the traffic signal facing the vehicle at time of the accident.

Weather: Indicate the appropriate weather condition at the time of the accident.

Light Conditions: Indicate the appropriate light conditions at the time of the accident.

Road Surface: Indicate the appropriate road surface at the time of the accident.

Warning Devices In Use: Indicate the warning device(s) in use on the vehicle at time of the accident.

Mode of Service at Time of Accident: Indicate the mode in which the vehicle was responding prior to the accident.

Figure C-1: Example of State Vehicle Collision and/or Injury Report Form (cont.)

Section IV-Description of the Event

Provide a detailed description of the events regarding the accident and how it occurred. (Use additional sheets if necessary).

Section V-Injury Information

The following information must be provided for any individual injured as a result of the accident or was injured by another means not related to an EMS vehicle collision:

- Check whether the injured person was a member of the EMS crew.
- Enter the age of the injured person.
- Check the severity of the injury.
- Check the appropriate box related to how the injury occurred.
- If an EMS vehicle collision, indicate if the injured person was ejected from a vehicle.
- From the list at the bottom of the form, indicate the position of the injured person in the ambulance and enter the appropriate number on the line provided.

Provide this same information for additional individuals on the form. Use additional sheets, if there are more than 3 injured personnel.

Section VI-Police Report Information

Did Police Investigate This Incident: Check the appropriate box.
Police Report Attached: Check the appropriate box.
Police Report Filed but not Attached:

- Enter the name of the investigating police agency.
- Enter the address, city, state and zip code of the policy agency.
- Indicate whether a citation was issued.
- To whom the citation was issued.

Section VII-Sign

The individual will sign the form; enter his/her title and the date that the form was signed.

For assistance contact your regional EMS council or the Pennsylvania Department of Health at **www.health.state.pa.us**

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Figure C-1: Example of State Vehicle Collision and/or Injury Report Form (cont.)