Subcommittee: Ambulance Crash Subcommittee [Ad-hoc]
Advisory Title: *Development of a Comprehensive National Ambulance Crash Data Collection Platform to Better Understand Current Crashes and Guide Future Preventive Strategies*
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National Emergency Medical Services (EMS) Advisory Council
FINAL
Advisory and Recommendations

Title: **Development of a Comprehensive National Ambulance Crash Data Collection Platform to Better Understand Current Crashes and Guide Future Preventive Strategies**

As prepared by the Ad-hoc Subcommittee on **Ambulance Crashes**

A. Executive Summary

Ambulance (ground-based ambulance) crashes endanger EMS clinicians, patients, and the public. A better understanding of why these crashes occur and how they can be prevented is limited by inconsistent reporting and variability in data collection standards nationwide. The actual magnitude of this problem is impossible to quantify as there is currently no federal reporting mandate or mechanism to capture such incidents. The purpose of this advisory is to recommend steps that should be taken to standardize the reporting of these events when they occur, improve the consistency of the data collected and make state, local, tribal, and territorial (SLTT) governments aware of the federal resources which currently exist to support ambulance crash investigations.

When an ambulance crashes, many considerations arise including patient safety, a safe work environment for EMS clinicians, and public injury prevention. This advisory will focus on better understanding the problem of ambulance crashes in general, how best to collect data relevant specifically to ambulance crashes and, most importantly, how to institute preventive measures directed at decreasing both the number and severity of ambulance crashes going forward.

B. Recommendations

U.S. Department of Transportation (USDOT) and National Highway Traffic Safety Administration (NHTSA)

Recommendation 1:
The USDOT and NHTSA should improve the process for more comprehensive collection and analysis of national ambulance crash data.

Recommendation 2:
The USDOT and NHTSA should define and institute a federal mandate for reporting ambulance crashes and work with SLTT governments to support capturing such events through existing and proposed reporting frameworks.

NHTSA

Recommendation 1:
NHTSA should convene and support an Ambulance Crash Subject Matter Expert (SME) panel to:

a) Identify specific data elements about ambulance crashes for collection.
b) Clearly define the data elements to be collected.
c) Identify the best data platform to store and analyze collected data elements.
d) Make recommendations regarding the use of vehicle monitoring systems (video/audio/vehicle data) in ambulances and how this data should be incorporated.

Recommendation 2:
NHTSA should incentivize SLTT governments to utilize the Model Minimum Uniform Crash Criteria (MMUCC), 6th edition, as a framework for collecting vehicle crash data. This newly released version contains data elements specific to emergency vehicle crashes**.**

Recommendation 3:
NHTSA should be sufficiently funded to standardize, expand, and adequately market existing and proposed federal ambulance crash investigation programs.

Recommendation 4:
NHTSA should develop and fund a national reporting system to share what is learned from the collection and analysis of ambulance crash data with interested members of the EMS community and the public.

Federal Interagency Committee on Emergency Medical Services (FICEMS)

Recommendation 1:
FICEMS should encourage SLTT governments to mandate ambulance crash reporting for all public and private ambulance agencies that receive federal funding in any form.

Recommendation 2:
FICEMS should work with SLTT governments to protect ambulance crash reporting participation as part of the quality improvement process, thereby safeguarding participating EMS agencies and entities involved in the data entry and analysis from discovery and other aspects of litigation. The methods used to protect performance improvement/quality assurance (PI/QA) data in the healthcare setting should be used to protect ambulance crash data obtained through federal reporting mandates.

NHTSA Office of Emergency Medical Services (OEMS):

Recommendation 1:
OEMS should encourage the use of standardized national education programs for ambulance-based EMS clinicians focusing on ambulance operator and occupant safety that, at a minimum, should include an EMS vehicle driver training component, emphasis on the proper use of restraints within EMS vehicles and current best practices for the use of emergency vehicle warning systems (lights and siren).

Recommendation 2:
OEMS should fund the development and distribution of a public service announcement (PSA) campaign aimed explicitly at EMS clinicians and focusing on EMS vehicle crash prevention and EMS vehicle operator and passenger safety.

Recommendation 3:
OEMS should encourage national ambulance design and safety standards - currently produced by the General Services Administration (GSA), the Commission on Accreditation of Ambulance Services (CAAS), and the National Fire Protection Association (NFPA) - to be continually revised and implemented to improve the safety of ambulance occupants.

Recommendation 4:
OEMS should work to have the final outputs of this initiative placed into the national EMS core curriculum and be required education for all levels of EMS certification (Driver education, reporting system utilization/awareness, etc.).

C. Scope and Definition

Scope:

When an ambulance crashes, the EMS clinicians in that vehicle, along with the patient they are transporting, are at risk for severe injury or death. In addition, surrounding motorists and pedestrians may also be put at risk. The full scope of this problem in the US is difficult to fully understand because there is no national reporting requirement for such events and no national standard for data collection. This advisory will attempt to address these and related issues. The committee found the following as part of their due diligence and research into the advisory subject matter:

- Ambulance crashes are a concern for all involved parties.
- It is difficult to understand the root cause of ambulance crashes given the lack of funding, the lack of standardized and integrated data collection processes, and the lack of a mandate to report serious crashes.
- The current voluntary reporting system provides no tort protection for those involved in ambulance crashes and quality improvement efforts, discouraging participation due to potential exposure to liability.
- An EMS-specific Special Crash Investigation (SCI) program currently exists but is not widely known about by the industry. Additionally, the effectiveness of the existing EMS SCI program is limited due to a lack of funding.
- SLTT governments would benefit from a national effort to create a defined dataset, database collection system, reporting system and research infrastructure (a.k.a. Ambulance crash data collection platform) dedicated to the science of developing countermeasures aimed at reducing the morbidity, mortality, and property damage associated with ambulance crashes.

Definitions:

Ambulance: A ground-based vehicle engaged in transporting a sick or injured patient. This advisory is **NOT** intended to address issues related to air ambulances.

Ambulance crash: For the purposes of this advisory, the term “ambulance crash” will apply to an ambulance which is involved in a collision that results in reportable injury or death to an occupant of the ambulance. Expansion of this definition to include vehicular damage and

injury or death to those outside the ambulance during the collision may also be appropriate for inclusion. From a data collection standpoint, we recommend that the SME panel charged with defining data points for collection develop a clear definition to facilitate data collection in the future.

D. Analysis

In a recent analysis of Ground Ambulance Crashes published by NHTSA, the authors queried several federal sources including NHTSA's Fatality Analysis Reporting System (FARS), the National Automotive Sampling System (NASS), General Estimates System (GES) and the Crash Report Sampling System (CRSS) for data related to ambulance crashes between 2012 and 2018. These authors also reviewed all Office of Special Crash Investigation (SCI) ground ambulance crash reports during this period. While this work involved analysis of data from many disparate sources, the authors were able to identify several priority concerns related to ambulance crashes including EMS vehicle driver training, restraint use by occupants of the EMS vehicle and the appropriate use of emergency vehicle warning systems (lights and siren) during emergency vehicle operation.

There is currently no national process or requirement for reporting of ambulance crashes. Each state, territorial or tribal region collects its own crash data and there is no requirement that the data about ambulance crashes be shared in any way. It is also unclear whether ambulance crashes are consistently identified as a separate entity within the myriad of current systems used to collect crash data. The recommendations in this advisory address this concern by advocating for a national ambulance crash reporting mandate, the development of infrastructure to allow standardized capture and analysis of this important data and funding for a sustainable mechanism to support the collection and analysis of this data. Whether the existing National Emergency Medical Services Information System (NEMSIS) could be modified to capture this data or whether new systems would need to be developed would need to be explored in support of this effort. At a minimum, the committee felt that ambulance crashes that result in death or injury should be included in the data collection process. The most recent update of the Model Minimum Uniform Crash Criteria (MMUCC, 6th edition) now includes specific emergency vehicle crash data points for collection. It may help to address this identified gap. The committee felt that SLTT governments should be incentivized to adopt and incorporate this updated version of the MMUCC into their crash data collection process. Furthermore, data reported to the federal government related to individual ambulance crashes should be protected from discovery in the same way that patient information is protected through the performance improvement/quality assurance (PI/QA) process.

Ambulances are frequently constructed by adding a custom patient compartment to a standard vehicle frame and chassis. While federal safety standards are in place for the foundation vehicle, there are no federal safety standards that deal with the patient compartment of the ambulance. Several national organizations, however, have developed and maintained individual standards (GSA, CAAS, NFPA) that address the design and occupant safety within the patient/EMS clinician space. Information obtained through an ongoing analysis of national ambulance crash data would help inform efforts to make ambulances safer overall. Specifically, it would allow a better understanding of how best to assure the safety of both patients and EMS clinicians while riding in an ambulance.

NHTSA currently funds the Office of Special Crash Investigations program which facilitates investigations of severe and fatal injury ambulance crashes upon request from the NHTSA Office of EMS. There is a process used to help identify ambulance crashes that warrant further investigation, but activating new investigations needs to be more consistent nationwide. This advisory supports the need for such a federal resource. It would further advocate for the expansion of this program, an updated triage tool to help identify ambulance crashes that would benefit from further investigation and improved marketing of this resource to the EMS community.

The findings of the efforts above to better understand ambulance crashes and how to prevent them generated by this advisory should be transparent. NHTSA should develop and fund a national reporting system designed to share what is learned from the collection and analysis of ambulance crash data with interested members of the EMS community and the public at large. In addition, the final outputs of this initiative should be added to the national EMS core curriculum and be required learning for all levels of EMS certification (Driver education, reporting system utilization/awareness, etc.).

Lastly, the committee acknowledges that the current definition of an ambulance in this advisory is limited to the specific vehicle used to transport a sick or injured patient. It is understood, however, that many other types of vehicles participate in response to medical emergencies. It is hoped that ambulances, as defined in this advisory, and data collection related to how and why they crash, can serve as a foundation for expansion over time to include a broader range of EMS response vehicles.

E. Strategic Vision

We support the development and funding of a standardized process for the national reporting of ambulance crashes and a standardized method for the collection and analysis of national ambulance crash data for use in the development of countermeasures that could prevent these incidents from occurring in the future, thereby lowering morbidity, mortality, and the financial impacts of such events.

Standardizing the requirements for the reporting of ambulance crashes nationwide, as well as the process for collecting and analyzing data relevant to these crashes, will provide the ability to understand better the prevalence of these events as well as the contributing factors leading to these crashes. This will improve EMS personnel and patient safety while offering potential preventative strategies.

F. Strategic Goals

Goal 1- Within one year, NHTSA should fund and convene a Subject Matter Expert (SME) panel with the following goals:

- Clearly define which ambulance crashes should be included in a national database.
- Identify which specific data elements about ambulance crashes should be collected.
- Clearly define the data elements to be collected.
- Identify the best data platform to allow for storage and analysis of collected data elements. Include recommendations for integrating currently existing systems with potentially new data collection systems to support this work.
- Make recommendations regarding the use of vehicle monitoring systems (video/audio/vehicle data) in ambulances and how this data should be incorporated.

Goal 2 – Within one year, NHTSA OEMS should define a mechanism to incentivize SLTT governments to adopt the Model Minimum Uniform Crash Criteria (MMUCC), 6th edition, which now includes emergency vehicle crash data.

Goal 3 - Within one year, NHTSA OEMS should fund the development and distribution of a public service announcement (PSA) campaign aimed explicitly at EMS clinicians and focusing on EMS vehicle crash prevention and EMS vehicle operator and passenger safety.

Goal 4- Within two years, NHTSA OEMS should be sufficiently funded to standardize,

expand, and properly market existing and proposed federal ambulance crash investigation programs.

Goal 5 - Within two years, NHTSA should fund the enhancement, integration, and expansion of SLTT government EMS ambulance crash data collection systems and processes to support and enable mandatory crash reporting.

Goal 6 - Within two years, USDOT & NHTSA entities should develop quality improvement protection regulations for agencies that are mandated to report ambulance crash data to limit discovery and liability associated with EMS agency participation in mandated quality improvement efforts.

Goal 7 – Within three years, NHTSA should consolidate the current ambulance crash reporting mechanisms into a comprehensive national ambulance crash data reporting platform through the development of a unified and standardized dataset, database, and data collection process framework to be used for the collection and analysis of findings on future ambulance crash investigations.

Goal 8 – Within five years, FICEMS should require participation in SLTT government ambulance crash reporting systems to receive any federal funding.

Goal 9 – Within five years, NHTSA should fund research and countermeasure development to prevent future ambulance crashes using the data captured from SLTT government ambulance crash data collection systems and databases.

Goal 10 - Within five years, NHTSA should advocate for ambulance manufacturers and standards development bodies to utilize SLTT government ambulance crash data frameworks, research, and countermeasures to reduce future ambulance crashes.

Goal 11 - Within five years, NHTSA in cooperation with the OEMS, should fund development of national quality measures that reflect the data collection system’s efforts in reducing the harm associated with ambulance crashes.

G. References

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