# AUTOMATIC CRASH NOTIFICATION PROJECT: ASSESSING MONTANA'S MOTOR VEHICLE CRASH AND RELATED INJURY DATA INFRASTRUCTURE

FHWA/MT-13-005/6608

*Final Report*

*prepared for*
THE STATE OF MONTANA
DEPARTMENT OF TRANSPORTATION

*in cooperation with*
THE U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

*August 2013*

*prepared by*

Tom Seekins
University of Montana
Missoula, MT

and

Alan Blatt
Marie Flanigan
CUBRC
Buffalo, NY

RESEARCH PROGRAMS

MDT

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# Automatic Crash Notification Project:
# Assessing Montana's Motor Vehicle Crash and Related Injury Data Infrastructure

**Final Report**

**Prepared by:**

Tom Seekins
Rural Institute on Disabilities
University of Montana
Missoula, MT

Alan Blatt
and
Marie Flanigan
CUBRC
Buffalo, NY

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16. Abstract

Highway crashes exact an enormous human and financial cost. The problem is proportionately more acute in rural states. Points of intervention include immediate response to crashes and community supports to individuals injured in crashes. Two studies were conducted. The first examined the context of routing advanced automatic crash notification (AACN) messages into the emergency response system and demonstrating the feasibility of doing so. The second examined the referral process from medical treatment to community return. The effort to integrate AACN data into the existing emergency response system culminated in the demonstration of the receipt of simulated AACN information by the Missoula PSAP and the subsequent real-time sharing of this information with EMS and hospital-based stakeholders. The project also included the development of a computerized database infrastructure, which was designed to capture OnStar AACN crash data starting in July 2012.

The effort to develop and expand models for providing community supports to individuals injured in car crashes culminated in the development of new strategies for marketing the Resource Referral System – now the Brain Injury Help Line – and an assessment of the effectiveness of various strategies for recruiting hospital emergency department participation. Since the beginning of the project, overall referrals to the Help Line increased from 148 to 222. Finally, these data were used to estimate the budget needed to expand the service to meet the potential need. That estimate suggests either the BIAMT Hot Line is underfunded or it is overstretched.


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## Acronyms

| | |
|---|---|
| ACN | Automatic Crash Notification |
| AACN | Advanced Automatic Crash Notification |
| ACS | American College of Surgeons |
| AIS | Abbreviated Injury Scale |
| ALI | Automatic Location Identification |
| ALS | Advanced Life Support |
| ANI | Automatic Number Identification |
| APCO | Association of Public Communications Officials |
| BIAMT | Brain Injury Association of Montana |
| BOLO | Be on the Lookout |
| CAD | Computer Aided Dispatch |
| CARS | Condition Acquisition and Reporting System |
| CDC | Centers for Disease Control and Prevention |
| CISCO | Creative Information Systems Company |
| DPHHS | Department of Public Health and Human Services |
| ED | Emergency Department of a hospital |
| EMD | Emergency Medical Dispatch |
| EMS | Emergency Medical Services |
| FARS | Fatality Analysis Reporting System |
| GM | General Motors |
| GPS | Global Positioning System |
| HIPAA | Health Insurance Portability and Accountability Act |
| ITS | Intelligent Transportation System |
| MDT | Montana Department of Transportation |
| MESI | Missoula Emergency Services, Inc. |
| MVC | Motor Vehicle Crash |
| NASS/CDS | National Automotive Sampling System/Crashworthiness Data System |
| NEMSIS | National Emergency Medical Services Information System |

| | |
|---|---|
| NG911 | Next Generation 9-1-1 |
| OPHI-PCR | Online Prehospital Information-Patient Care Record |
| PAR | Police Accident Report |
| PCR | Patient  Care Report |
| PSAP | Public Safety Answering Point |
| RFS | Resource Facilitation Service |
| RID | Rural Institute on Disabilities at the University of Montana |
| RTAC | Regional Trauma Advisory Council |
| STCC | State Trauma Care Committee |
| TBI | Traumatic Brain Injury |
| TCS | Trauma Care System |
| TSP | Telematics Service Provider |
| Tx | Treatment |
| VEDS | Vehicular Emergency Data Set |
| VOIP | Voice Over Internet Protocol |

## Abstract

This is the final report for the Montana Advanced Automatic Crash Notification (AACN) Project. The long-term goals of this research were to reduce the time to deliver emergency care to motor vehicle crash victims; to make improved (better informed) triage, transport and treatment decisions where choices exist; and to improve long-term rehabilitation outcomes for motor vehicle crash survivors. The specific objectives of this project involved characterizing Montana's current data infrastructure and developing recommendations for incorporating new information technologies to enhance the trauma response system, expanding community rehabilitation services to crash victims, and exploring ways to integrate disability and rehabilitation providers' more fully into the Montana Trauma Care System.

In the first task, researchers reviewed documentation of data system and interviewed data managers to assess the status and processes of Montana's crash data infrastructure. They created a matrix of data elements of each independent system with recommendations for increasing the consistency across systems. They also produced a series of flow diagrams that characterized the system. These were used to design the introduction of AACN data.

In another task, the researchers demonstrated the introduction and use of AACN data. Researchers conducted extensive planning sessions with representatives from organizations that represented the emergency response system to construct the procedures for introducing AACN data. Next, they conducted a simulated live demonstration of the procedures. The results showed only small changes to existing protocols are necessary to ensure the OnStar data is captured and made available for use in field triage and transport decision-making and post event research. After the demonstration, the system was implemented for nine months in Missoula, Montana to test its functionality. While four SOS and four "Good Samaritan" calls were received, no crash events involving AACN were recorded during this period. Nonetheless, given that the approach for getting AACN information to emergency medical providers is both simple and inexpensive, operation of the system in Missoula should be continued.

Researchers also conducted three investigations designed to develop and expand models for providing community supports to individuals injured in car crashes. First, the researchers worked with staff of the Brain Injury Association of Montana (BIAMT) to conduct a survey of participation in the Brain Injury Help Line by Emergency Departments of hospitals across the State. This showed the majority of referrals came from four hospitals. BIAMT developed a campaign to expand participation in the Brain Injury Help Line. Overall referrals to the Help Line increased from 148 to 222 annually. In the final study, the researchers used these data to estimate the budget needed to expand the service to meet the potential need. That analysis suggests if the service was expanded to include individuals with serious injuries from car crashes, it could be operated for $150,000 to $160,000 annually.

In summary, researchers concluded the simple and inexpensive approach described here enables AACN data to be captured and archived as well as shared in real time with emergency medical providers responding to motor vehicle crash scenes. Although the number of active AACN vehicles is apparently low in Missoula, efforts to further integrate AACN data into emergency medical response procedures might be pursued in other areas of Montana using the same approach to evaluate the systems actual performance. Finally, the Brain Injury Help Line should be funded at $160,000 annually.

# 1 Introduction

## 1.1 Background

Highway crashes exact an enormous human and financial cost. In 2009, the most recent year for which national data is available, 2.2 million Americans were injured in 10.8 million crashes. These crashes resulted in 250,000 Americans suffering life-threatening injuries and 35,900 deaths (National Highway Traffic Safety Administration, 2012). In addition to the tragedy associated with the crash deaths, many of those injured in crashes survive with long-term disabilities. These injuries have long-term impact on the quality of life for both the injured individuals and their families. For example, many are unable to return to work or are limited in the type of work they are able to do. The economic costs associated with serious crash injuries (excluding value for pain and suffering) amount to about $100 billion each year (Blincoe et al., 2002).

The problem is proportionately more acute in rural states. In particular, Montana, Louisiana, Arkansas, South Carolina, and West Virginia are among the states with the highest motor vehicle crash fatality rates in the nation. Figure 1 shows how these rural states rank relative to other states using the measure of fatality rate per 100 million vehicle miles traveled.

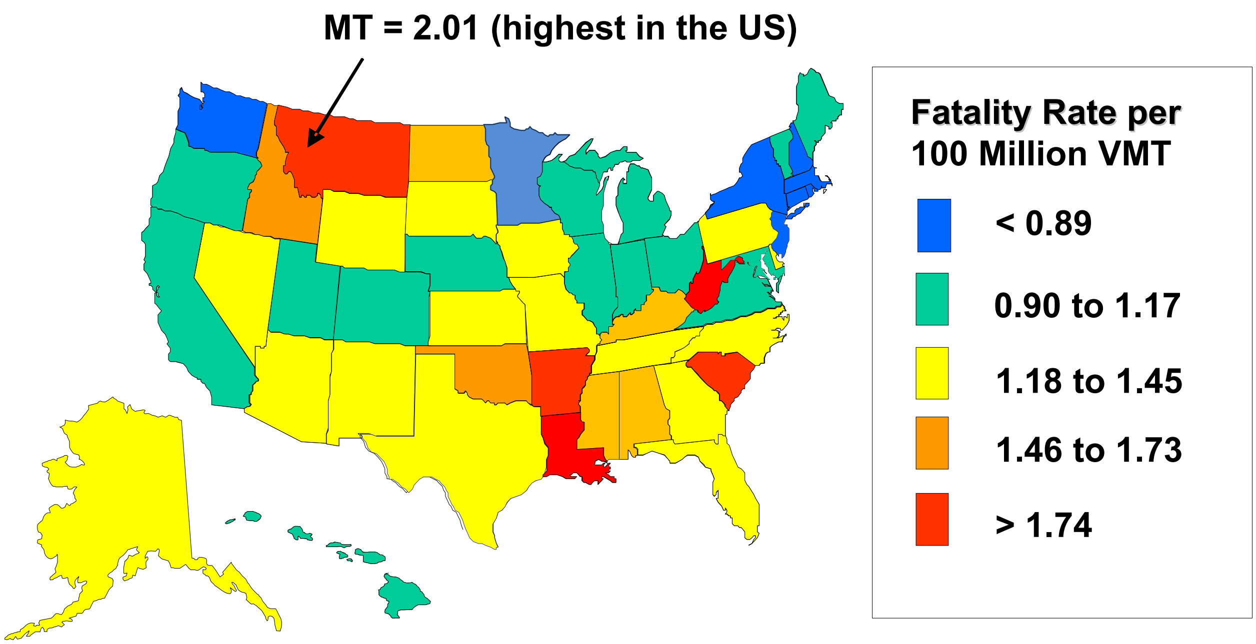


*Figure 1. Motor Vehicle Fatality Rates per 100 Million Vehicle Miles Driven (NHSTA, 2009)*

In Montana in 2010, there were 189 people killed and more than 7000 people injured in motor vehicle crashes (MDT, 2012). Similar numbers of fatalities and injuries occur in Montana every year.

Research indicates that key factors in reducing motor vehicle related deaths, injuries, and resulting disability include but are not limited to improved highway design and maintenance; improved crash detection; reduced time to deliver emergency care to crash victims; improved (better informed) triage, transport and treatment decisions; and expanded availability of and access to appropriate emergency medical and effective rehabilitation services (Blow et al., 1999; Davis et al., 2005; Evanco, 1996).

While each of these factors may be treated separately, maximizing emergency response performance may best be facilitated through the development of a comprehensive and inclusive trauma care system. New information technologies are emerging that offer opportunities to reduce crash deaths and disabilities. To take advantage of these new technologies, however, they must be integrated into the overall emergency response system. Moreover, the effort to take advantage of these new technologies may facilitate progress toward developing a comprehensive trauma care system. This calls for an examination of the data infrastructure and an exploration of methods to fit the new technology into that infrastructure, as well as an examination of the trauma system and how disability and rehabilitation providers might fit into it.

## 1.2 Emerging Technologies, Systems, and Tools

Many new information processing technologies are emerging that offer potential improvements to motor vehicle-crash and trauma response systems, including hand-held data collection and transmission devices, geographic information systems (utilizing real-time data from satellite-based global positioning systems), and more. One such system is Automatic Crash Notification and Advanced Automatic Crash Notification (ACN/AACN) systems.

Automatic Crash Notification (ACN) systems, with in-vehicle crash detection sensors, Global Positioning Satellite (GPS) receivers, and wireless telematics are an example of a new information technology that can facilitate emergency response and subsequent treatment. These systems automatically sense crashes in which air bags are deployed (or other pre-determined crash thresholds are exceeded), and immediately report the occurrence and location of the crash. Additionally, in a growing number of vehicles with AACN, detailed crash information such as crash severity (crash delta velocity), principal direction of force (frontal, side, rear impact), whether the vehicle rolled, whether multiple impacts occurred, etc., is also sent wirelessly with the automatic crash notification alert. This information is transmitted via an automatic cellular phone call from the crashed car to a Telematics Service Provider (TSP) such as OnStar or Cross Country Group.

As of October 2011, OnStar reported there were about 6 million AACN equipped vehicles on the road (Sustainable Brands, 2011). Recently they introduced an aftermarket product called 'For My Vehicle' (FMV) that could enable more than 100 million vehicles on the road to replace their rear view mirror with a new device that would provide the vehicle with ACN capabilities.

In addition to providing immediate notification and crash location information, ACN/AACN technology has the potential to improve emergency message routing and response after a serious car crash. Currently, as demonstrated in this project, AACN systems provide data that can be used together with new 'tools' to support the triage, transport, and treatment decisions of pre-hospital care providers and public safety personnel. These tools consist of computerized algorithms that take advantage of the information provided by AACN systems (in the crashed vehicle), as well as first responder observations at the scene, and couple these crash specific data with geo-coded databases of local Emergency Medical Services (EMS) and hospital resources (e.g., air medical services and trauma centers). Crucial to this capability is the development occupant injury severity predictors that are able to operate in near real time (Kononen et al., 2011; Augenstein et al., 2001). The development of these algorithms has prompted the American

College of Surgeons Committee on Trauma and the Centers for Disease Control and Prevention to issue new guidelines for Field Trauma Triage. These guidelines specifically acknowledge the utility of the crash telemetry data for improving trauma triage decisions (CDC, 2009; CDC, 2008).

## 1.3 Expanded Perspective to Support Follow-up for Crash Victims

The emphasis on response to injuries from motor vehicle crashes typically focuses on immediate care from the point of the event through medical treatment at a clinic or hospital. A public health model takes a broader view, a view that spans the time from crash events through rehabilitation and community reintegration. Public health defines prevention to include primary, secondary, and tertiary prevention. The goal of primary prevention is to prevent specific events (e.g., motor vehicle crashes) or conditions (e.g., injuries) from occurring. The goal of secondary prevention is to intervene as quickly as possible to limit the consequences of an adverse event. The goal of tertiary prevention is to provide services and support to reduce the negative consequences of the event or conditions, and to maximize the outcome of the response or treatment.

Consistent with secondary and tertiary prevention goals, it is expected that disabilities associated with motor vehicle crash injuries can be reduced by: 1) early detection of those crash-related injuries that might lead to disabilities and 2) making improvements in the coordination, tracking, and delivery of community rehabilitation, and integration services for crash victims. To accomplish this, researchers must first develop an understanding of the possible short and long-term disability consequences of specific motor vehicle crash injuries. In addition, a mechanism to identify and track motor vehicle crash victims with the potential for disability must be implemented across the state so survivors can be effectively matched with rehabilitation providers in their area and follow up support provided on a continuing basis.

## 1.4 Existing Montana Crash Infrastructure

A critical aspect of the Montana AACN project has been the recognition that all work performed on the project had to consider the existing Montana crash infrastructure as well as the plans for its evolution and improvement. With that in mind, the following discussion summarizes some of the key considerations of the infrastructure as they relate to the project.

The motor vehicle crash-related data infrastructure (as used here) consists of data derived from police accident reports, pre-hospital care reports, public safety 9-1-1 records, trauma registry information, hospital treatment and referral packages, rehabilitation records, and community disability support records. It also includes the tools, procedures, and protocols to collect, distribute, organize, utilize, and archive the information. As in most sectors of society, new information technologies are improving the performance of systems of all types. This is true for emergency response to motor vehicle crashes where new information technologies offer opportunities to reduce crash-related deaths and disabilities. As noted earlier, one such technology is Advanced Automatic Crash Notification.

To achieve the promise of AACN and other new technologies, however, the data that they provide and the procedures and protocols for their use must be integrated into a comprehensive and coherent emergency response system that spans the time from the crash event through rehabilitation and community reintegration. It is particularly important that the information generated through new technologies be compatible with existing emergency response and trauma care data systems. As such, the effort to take advantage of these new technologies may facilitate progress toward the development of such a comprehensive trauma care system.

## 1.5 Emergency Response, Trauma, and Rehabilitation Care in Montana

Serious motor vehicle crashes (MVC) begin a series of events that usually engages emergency response, trauma, and rehabilitative care systems. Figure 2 presents a rudimentary outline of expected pathways from crash injury and emergency response through community rehabilitation and integration. As the severity of injury resulting from a crash increases, survivors pass through increasingly more stages of the continuum.

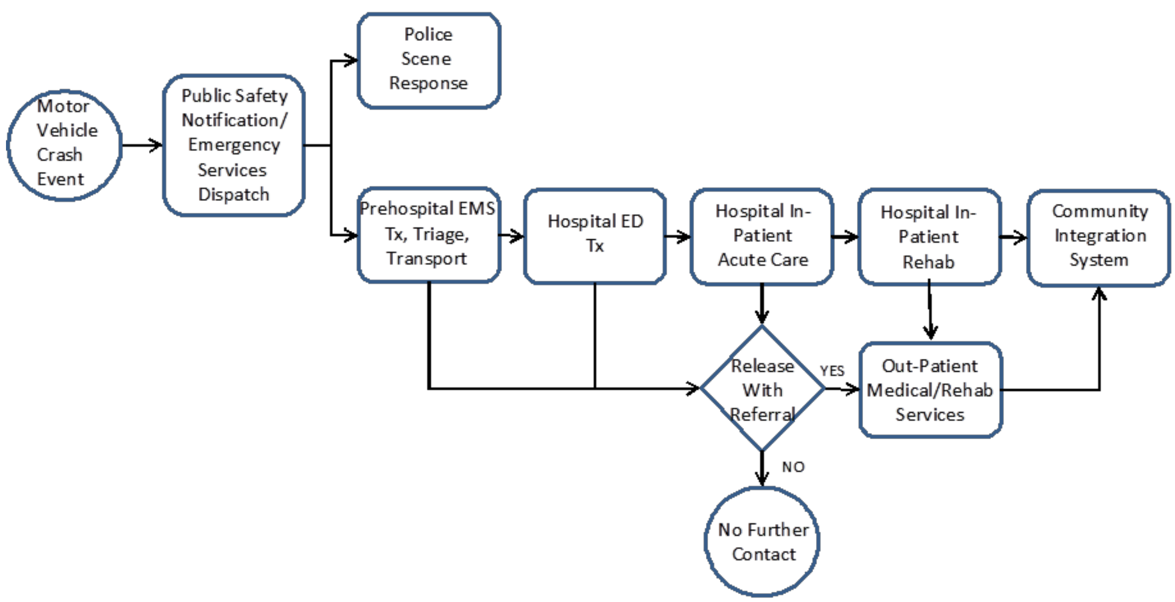


*Figure 2. Expected pathway from crash injury through rehabilitaiton*

To optimize the care and provide the best outcome for injured crash victims, a comprehensive trauma system is required. Ideally, such a system would provide a continuum of care from the initial emergency notification to pre-hospital care (at the scene and during transport), through emergency department treatment and definitive surgical care at an appropriate medical facility, and finally to rehabilitation and integration back into the community. Montana has begun developing such a comprehensive trauma care system (TCS).

### 1.5.1 The Montana Trauma System

While responding to a traumatic injury in a rural state such as Montana poses many challenges, the basic elements of a comprehensive care system are similar to those required in other states. These include detecting emergencies (sometimes in isolated areas where the event may not be observed), determining its location accurately, responding quickly with appropriate emergency care at the scene, and transporting the injured to medical treatment facilities where appropriate emergency trauma care and follow-up medical and rehabilitative care can be provided. The seamless transition between each phase of care, while making efficient use of health care resources, is one of the hallmarks of a modern trauma system.

The first comprehensive plan for a Montana statewide trauma care system was developed in 1994. This plan was addressed in comprehensive trauma system legislation in 1995. The plan encompassed trauma from all causes, including motor vehicle crashes. Unfortunately, the plan was not immediately funded. In 1999, the State legislature did authorize funding for developing and operating a trauma system, and the program has steadily grown through various funding mechanisms and a strong, statewide commitment by many volunteers.

Montana Codes Annotated (MCA) 50-6-401 established the Montana Trauma Care System that requires the Montana Department of Public Health and Human Services to plan, coordinate, implement, and administer a statewide trauma care system that involves all health care facilities and emergency medical services within the State. It also calls on the Department to develop a state trauma registry. Moreover, it articulates extended roles and responsibilities of the State Trauma Care Committee, calls for regional committees, and describes linkages with the emergency medical services advisory council.

Figure 3 shows the State's three trauma regions (Western, Central & Eastern), each of which is guided by a Regional Trauma Advisory Committee (RTAC). Montana's State Trauma Care Committee (STCC) oversees these committees, and provides advice and direction to the Montana trauma care and Emergency Medical Services (EMS) systems.[1]

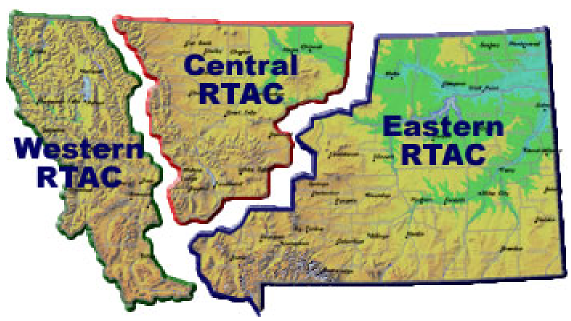


*Figure 3. Trauma Regions in Montana (adopted from Montana DPHHS website)[2].*

### 1.5.2 Rehabilitation and Disability Services in Montana

While not specifically mentioned in legislation, the trauma care system has consistently included rehabilitation. In practice, this has emphasized medical rehabilitation providers. Yet, for many, rehabilitation does not end with medical discharge. Rather, it often extends into the programs of many community-based rehabilitation providers, including such programs as the State vocational rehabilitation system and the Brain Injury Association of Montana (BIAMT). In fact, as Figure 2 suggests, entry into the Montana rehabilitation system often occurs first through one of these programs when unanticipated disabilities emerge because of injuries.

### 1.5.3 Data Systems in Montana

While there has been significant progress in developing an integrated trauma care system and parallel progress in creating an integrated data system that allows for monitoring and quality improvement, there remains room for improvement. In particular, advanced sensor and information technologies, which are coming of age, are expected to introduce new types of data that should be integrated into existing data systems in Montana. One such information

[1] http://www.dphhs.mt.gov/ems/emstrauma/traumaover.htm
[2] http://www.dphhs.mt.gov/ems/emstrauma/rtacmap.html

technology is referred to as Automatic Crash Notification and Advanced Automatic Crash Notification systems (ACN/AACN). Integrating data from these new technologies provides the opportunity to further upgrade the existing data infrastructure.

Various emergency responders and treatment facilities currently document both the crash event and resulting crash injuries (including patient follow-up). For the most part, these are separate and independent data records. Figure 4 shows the post-crash sequence of events from Figure 2, but with some additions. The events in the rounded rectangles (shaded pink) represent a key step in the chain of care that will ultimately provide input into the full crash-injury-rehab data record. Various data sources, which currently document each stage of the response, are indicated above each event.

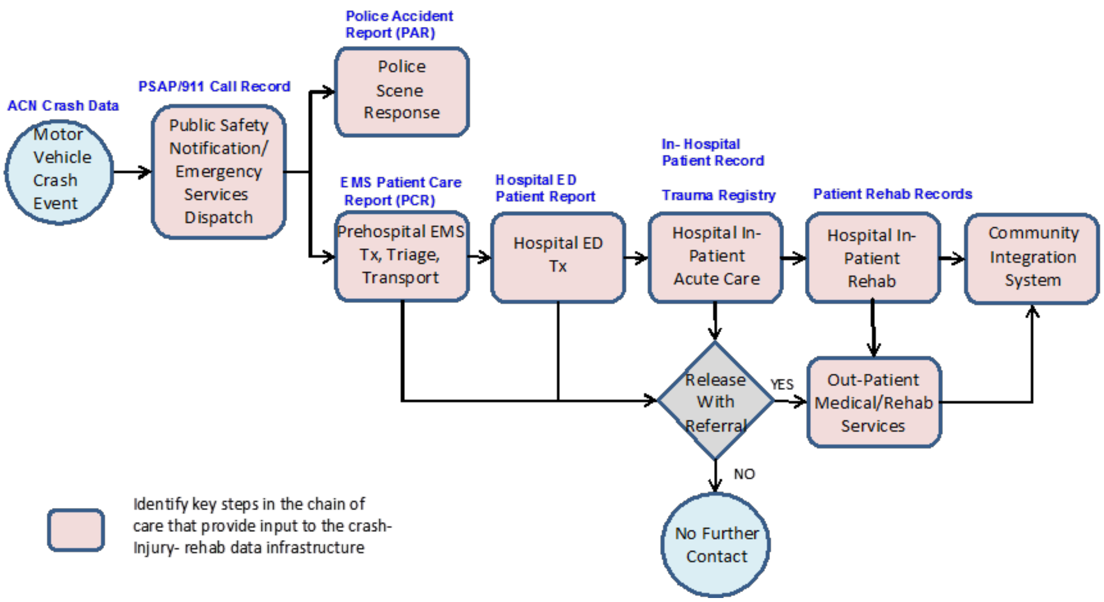


*Figure 4. Key Steps that Provide Input to the Crash Injury-Rehab*

As is typical in most states, these data sources are usually separate (some still on paper) and not well integrated or electronically linked. For example, the Emergency Medical Services and Trauma System Section of the Montana Department of Public Health and Human Services maintain a Statewide Trauma Registry. However, this registry is not currently linked with other data records that describe the crash event and follow-up treatment. One of the goals of this project was to explore opportunities for a comprehensive integrated MVC response data system that will provide this linkage and incorporate new data provided by emerging technologies such as ACN/AACN.

## 1.6 Goals of This Project

It is important to note the project team has worked closely with the research technical panel established by Montana Department of Transportation (MDT) to oversee the direction and progress of the project. With inputs provided by the technical panel, a team of engineers from CUBRC® in Buffalo, NY and public health researchers from the University of Montana in Missoula identified four major goals for the project. The goals included: 1) Characterize Montana's current motor vehicle crash-related data infrastructure, including procedures and protocols, and develop a framework for creating a comprehensive integrated motor vehicle crash-related response data system – including ACN/AACN - and submit it to stakeholders for review; 2) Provide selected demonstrations of the comprehensive integrated crash response data system (including disability measures) and illustrate its use for crash response, research, and analysis of system performance; 3) Expand the Montana Traumatic Brain Injury Registry and Resource Facilitation Program and assess the potential for integrating it into the Montana Trauma System; and 4) Investigate approaches for increasing participation of disability and medical rehabilitation providers in the trauma systems.

### 1.6.1 Overall Research Plan

Consistent with the four goals of the project a research plan was constructed. During the conduct of the project, it was necessary to modify the research plan to address suggestions provided by the Research technical panel. As noted in Figure 5, the research plan consisted of two phases, the first of which was addressed in this project. The Phase 1 activities consisted of four inter-related tasks. Each task addressed one project goal. Figure 5 illustrates the relationship between the four tasks and their primary products/outputs. Each task is identified by a circle and its primary products and outputs are shown in the rectangles. It should be noted that based on the Research Panel recommendations, Task 2 was revised and focused to provide and demonstrate the ability to receive OnStar crash data at PSAPs and distribute the data to prehospital and hospital-based stakeholders.

The following report sections present a justification for each task, statement of the objectives and activities designed to accomplish the task, detailed description of the methods used to achieve the stated objectives, and a description of expect findings and products.

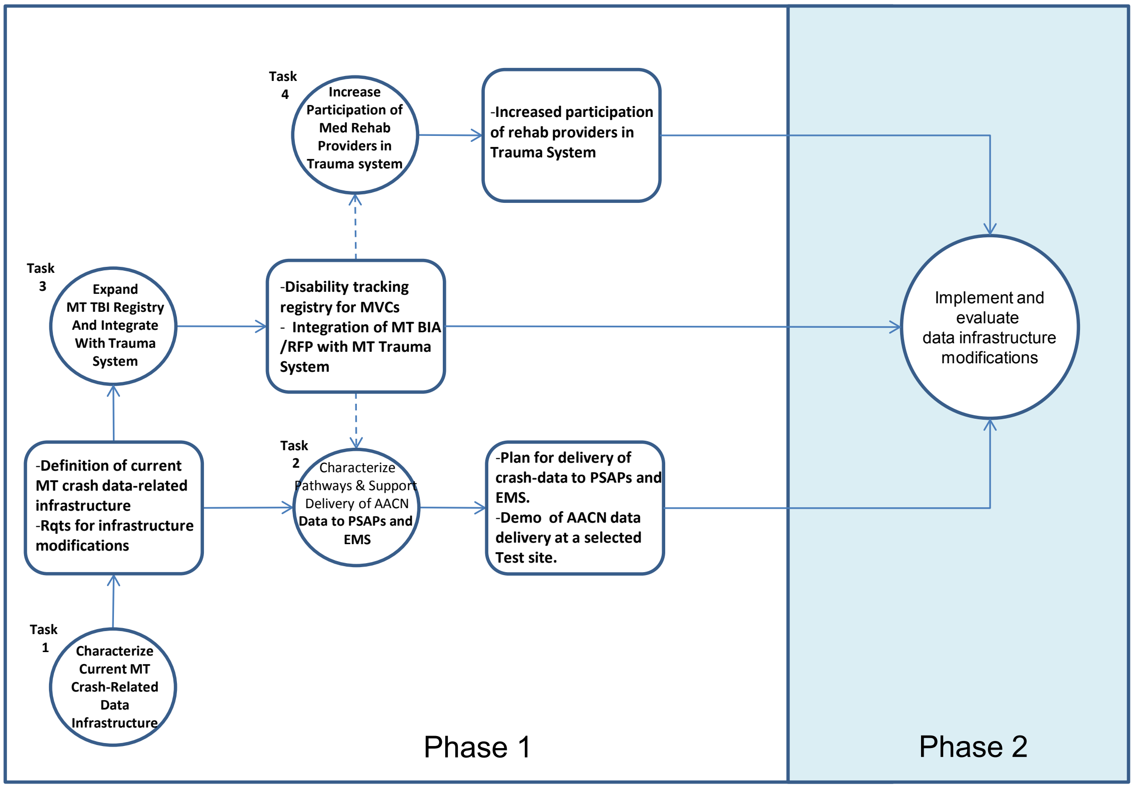


*Figure 5. Overview of revised tasks in the research plan*

# 2 Montana's Motor Vehicle Crash-Related Data

## 2.1 Infrastructure

One premise of this research is that new technologies (e.g., ACN/AACN) have emerged that have the potential to improve the efficiency and effectiveness of emergency response, treatment, and rehabilitation of people injured in motor vehicle crashes. These technologies will both change the information collected and change the way that information is managed. In the process, they have the potential to transform the systems of response and rehabilitation to increase their integration and effectiveness. In order to take the next step, however researchers must understand the existing trauma response data architecture.

Motor vehicle crash (MVC) data describe road vehicle collision events. MVC data are gathered and used throughout emergency response processes. They are derived from public safety 911 records, law enforcement motor vehicle crash reports, pre-hospital care reports, hospital records, and trauma registry information. The complete MVC data infrastructure also includes the tools, procedures, and protocols to collect, distribute, organize, utilize, and archive the information.

New information technologies are improving the potential and performance of emergency response to motor vehicle crashes. The new information technologies offer opportunities to reduce crash-related injury, disability, and death. Two such technologies are Automatic Crash Notification (ACN), and Advanced Automatic Crash Notification (AACN). ACN and AACN take advantage of emerging in-vehicle crash detection systems that automatically transmit data from motor vehicles involved in crashes. These technologies have the potential to provide actual crash data in near-real time to support the dispatch of emergency responder services and assist in triage, transport, and treatment decisions via earlier and more accurate data about MVC. Further, employing these data can potentially increase the integration and effectiveness of the response and rehabilitation systems. This has been shown in some communities in the United States, and is potentially true for Montana. Optimal utilization of these technologies requires a framework and a plan to create a comprehensive integrated MVC data infrastructure, whereby data from ACN/AACN, 911 call centers, emergency responders, and hospitals can be integrated.

The objective of Task 1 of the Montana Crash Notification Project was to characterize Montana's current MVC data infrastructure, procedures, and protocols in order to develop a framework (i.e., requirements) for creating a comprehensive integrated motor vehicle-crash response data system that includes ACN and AACN data. This document reports on these objectives.

## 2.2 Methods

Research methodology was descriptive and qualitative, focusing on experts and key informant interviews.

### 2.2.1 Technical Panel

First, researchers convened with the Research project Technical Panel to guide the direction and decisions that were pertinent to Task 1. Members of the Technical Panel are listed in Appendix A.

### 2.2.2 Key Informant Interviews

To characterize Montana's MVC data infrastructure, researchers gathered information from key informants about activities and tools associated with the collection and compilation of MVC data. The initial group of key respondents was selected in consultation with the research project technical panel. Key informants in this project were administrative leaders and key technical staff of agencies, programs, and organizations involved in collecting, analyzing, and using data concerning motor vehicle crashes in Montana. The data were gathered from key informants via face-to-face or telephone interviews.

Next, a snowball sampling technique was used to identify additional key informants to represent the known universe of Montana's MVC data infrastructure. From the initial interviews, it was discovered that significant variability exists across local direct service agencies, such as 911 call centers, fire, emergency medical services, and law enforcement. The research decision was made to include one or two representative agencies per provider type (e.g., 911 center, police, EMS, etc.) with the most consistent, standardized, and state of the art procedures and technology. As a result, when local direct service response systems are described, it should be understood to be a nearly best case scenario within Montana, and a scenario towards which other agencies of the same provider type are likely to be headed. A complete listing of key informants is found in Appendix A.

The interviews followed a protocol developed to permit the characterization of current activities and tools associated with the collection, compilation, and use of the Montana agency's MVC data. The interview focused on:

- Which MVC data are collected
- When MVC data are collected in relation to the actual MVC
- How MVC data are gathered, sent, and archived
- How MVC data are utilized
- Challenges or limitations with their MVC data
- What authority influences data collection, transmittal, use, and storage
- Affiliate agencies
- Future directions and expectations of the agency's MVC data
- Agency challenges to integrating ACN/AACN data.

Data dictionaries were requested and obtained from each represented agency.

### 2.2.3 Analysis

After interviews were conducted and supporting documents obtained, a system-oriented approach was employed to analyze the data and to describe Montana's MVC data infrastructure. The notes from the interviews were reviewed, analyzed, checked for accuracy with the key informant when necessary, and summarized into a written report. That report and summary, which describes the data infrastructure and data-related events and activities for each of the participating agencies, follow herein. It should be noted local Public Service Answering Points (PSAPs), or 9-1-1 centers, are the keystone of the emergency response system. Dispatchers link the individuals involved in motor vehicle collision events to emergency medical services and law enforcement. Therefore, the description of Montana's Crash Related Data Infrastructure is broken-down into time increments in relation to the 9-1-1 call.

Next, a Montana MVC Data Book was developed. The Data Book is a compilation of the data dictionaries provided by agencies that collect MVC data in Montana.[3]

The data dictionaries were cross-referenced with the Vehicular Emergency Data Set (VEDS) recommendations. VEDS is a national data standard that identifies *useful and critical* crash and medical elements needed to provide an effective emergency response to vehicular emergency incidents (ComCARE, 2004). Several key informants identified VEDS as a good guideline for incorporating ACN data across all Montana MVC agencies. VEDS was used in the proof of concept for the national Next Generation 911 Initiative, with the goal of enabling the transmission of voice, data, or video from different types of communication devices to PSAPs and onto emergency responders (9-1-1 and Enhanced 9-1-1 Programs, 2010). These elements are the data that show the most potential to improve emergency response and subsequently outcomes in severely injured crash patients (CDC, 2008).

The recommended format for VEDS is XML, which is the most widely accepted format for exchanging structured data between different computer systems in the world today. It is an open, non-proprietary standard shared by all major software providers. However, VEDS is not a data transmission protocol/standard. How TSPs decide to send data, and how agencies collect data, transmit data, link it to voice, handle it within their various agencies, etc. are all critical issues, but not ones addressed by VEDS. Still, this common data set will enable multiple methods of data transfer and handling (Blincoe et al., 2002).

The data elements in the Montana MVC Data Book were analyzed for common elements, disjunctions, and gaps in relation to the VEDS recommendations. See the description of the Data Book following the Summary section of this report.

Next, data flow diagrams were developed to display visually where and of what type the data related to MVCs in Montana are generated, communicated, acted upon, archived, and reported on. An agency's data diagram maps the movement of the data from initial collection through analysis, reporting, sharing, and then archiving. The data flow diagrams provide a visual representation of the Montana MVC data flow in relation to the timeline of the actual MVC event. Seven agencies' data flow diagrams, developed in this project from key informant interview data, are show in Appendix B.

## 2.3 Summary

### 2.3.1 Before the 911 call

Montana consumers have the option to purchase vehicles that are telematics equipped for automatic crash notification (ACN) or advanced automatic crash notification (AACN). If a consumer purchases a vehicle equipped with telematics, (s) he could subscribe to a telematics service provider (TSP), such as OnStar or ATX, which will provide the safety service the equipment permits. When consumers subscribe to a TSP, they give consent to the TSP to release their information to public safety agencies and to release their de-identified information for research purposes (Our Privacy Practices Notice of Privacy Statement, 2009).

[3] A copy of the complete Data Book may be obtained from The Rural Institute on Disabilities, University of Montana, Missoula, MT 59812 or by calling (800)-732-0323 Voice/TTY Toll-Free

In the event of a crash, a telematics equipped and subscribed vehicle automatically initiates an emergency wireless call to a TSP to deliver the vehicle's GPS location and crash-related data. ACN automatically sends information about airbag deployment and vehicle location to the TSP. AACN provides additional crash severity data generated from the in-vehicle telemetry, such as delta velocity, principle direction of force, and the number of impacts. The wireless call also opens voice communication between the occupants of the vehicle and the TSP advisor.

In the event of a crash, if determined necessary through communication, or lack thereof, with the occupant(s) of the vehicle, the TSP advisor contacts the Public Safety Answering Point (PSAP) nearest to the crash. The TSP Advisor connects the occupant(s) of the vehicle to the PSAP Call Taker via a wireless three-way conference call. The wireless call is connected to the PSAP one of two ways: a standard 10 digit number or directly routed to the 911 trunk. If the PSAP has adequately sophisticated equipment and Memorandums of Agreement (MOA) with Enhanced 911[4] (E911) service providers,[5] the TSP Advisor will connect directly to the 911 trunk and the call will come into the PSAP as a typical 911 call. If that equipment or MOAs are not in place, the call connects to the PSAP's standard 10-digit phone number. The 10-digit number is typically connected to a non-priority desk. The dispatcher is mandated to answer all calls that come directly to the 911 line before answering calls on the 10-digit line. Electronic data cannot be delivered across the standard 10-digit phone line, so then the TSP Advisor relays crash data verbally in that situation. However, when calls are routed to 911 trunks they are formatted to forward the caller's telephone number and location information with E911. This information automatically displays on the PSAP computer terminal at the time the call is received.

Initially, all TSPs contacted PSAPs via the 10-digit number. However, TSPs are working through Qwest or CenturyTel and Intrado Inc. to route TSP calls directly to the nearest PSAP on the 911 trunk. Qwest and CenturyTel are responsible for aggregating and routing emergency calls to the appropriate PSAP based on the county of jurisdiction of the 911 caller's address or location. Intrado Inc. is a third party database manager that provides E911 database management services for Qwest and CenturyTel. The E911 database contains end-user information (including name, address, telephone number, and occasionally special information from the local service provider or end-user) used to determine routing the call to the appropriate PSAP and provide the location information (Quest Communications International Inc., 2010).

While Intrado Inc. currently provides for automatic number identification (ANI) and automatic location information (ALI) to most Montana PSAPs, they can also provide for the transport, transmission, and routing of additional data from emergency telecommunications services, such as AACN data (Intrado Communications Inc, 2010). [6] Each PSAP has the decision-making

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[4] Enhanced 911 is a telecommunications based system that automatically associates a caller's telephone number (automatic number identification (ANI)) and location information (automatic location information (ALI)) and forwards the call and information to the PSAP nearest the caller. http://www.qwest.com/wholesale/pcat/911.html

[5] Enhanced 911 Service Providers include: Basic 911 Service Providers (Qwest or CenturyTel in Montana), and a third-party Enhanced 911 database manager (Intrado Inc., 2010)

[6] Ryan Olson (Montana Department of Administration 911 Program), discussion with authors, 2010. The business relationships between local PSAPs, Qwest or CenturyTel, and Intrado vary based on whether the PSAP's 9-1-1 service is through Qwest or CenturyTel. Approximately half Montana PSAPs are Qwest and half are CenturyTel. PSAPs with Qwest typically have more unique systems, whereas PSAPs with CenturyTel are more standardized systems. CenturyTel's more standardized system makes them a good starting point for testing/piloting projects.

authority and liability to accept what, if any, ACN/AACN data will automatically display on their computer.[7] As of March 2010, no Montana PSAP receives additional TSP data via their 911 trunk.

The Missoula PSAP was recommended for interview for this report by the State 911 Program office as one of the most advanced call centers in Montana. As other Montana PSAPs update their systems, they are likely to develop their infrastructure as Missoula has. Each PSAP is unique in when, what, how, and why they gather MVC data. Still, networking between PSAPs occurs at statewide PSAP manager meetings that occur at least bi-annually. When available, examples of how Montana PSAPs vary are provided in this report.

In Missoula, TSP calls come directly in on the 911 line; however, ANI/ALI information is the only ACN data that automatically displays on their computer terminal. The process for adding or making changes to capture ACN/AACN data would be fairly simple. No new technology would be necessary to take additional TSP data directly onto their ANI/ALI screen. They would follow the same process they currently use to add a new cell phone company. The PSAP would map the data and possibly modify the current database to accommodate the field sizes required for the TSP data. Training time would be required for the new elements.

Because the 54 PSAPs operate independently, the process of bringing telematics services to Montana involves multiple partners, agreements, and local initiatives. For the Missoula PSAP, authority to make changes to 911 data comes from the 911 center's manager and the local 911 Advisory Board, which is comprised of the County Sheriff, the Police Chief, a citizen member appointed by the County Commissioner, the County Disaster and Emergency Services Coordinator, representatives from the County Fire Protection Agency (city and rural), and a representative of Ambulance Services.

The Missoula PSAP is in the process of developing a six-year strategic plan that will encompass ways to take data from various telecommunication devices that would enhance public safety communication. For example, they are considering how to receive cell phone pictures and videos taken at the site of the emergency from victims, witnesses, or ERs. Strategic planning is more difficult for smaller Montana PSAPs due to time and funding.

There are no specific data formatting requirements. Missoula would like to use the JDXML, or the Justice Department's XML, format for data recording and storage. All the PSAPs and the ERs have access to the JDXML formatting, which is based on law enforcement or fire/medical tags. It is widely accepted as a good idea to use the JDXML format data, but it is not widely used at this time. The Missoula PSAP personnel have not found a vendor that can integrate data from JDXML, which is considered a competing software network.

### 2.3.2 During the 911 Call

In Missoula, when a call is initiated, the PSAP call taker immediately begins collecting MVC data into their computer aided dispatch (CAD) system via the PSAP's computer and phone systems. The phone system includes the Voice Over Internet Protocol (VOIP), which permits the ANI/ALI information. The ANI/ALI information is sent directly into their CAD system. The

[7] There are 54 PSAPs in Montana. Many of these PSAPs have a single county jurisdiction. Some have city jurisdiction that represent multiple counties.

CAD generates correct recommendations as to which emergency responders should be dispatched.

Much of the operational procedures of PSAPs are a function of the software and the call-taking equipment, which varies because they are supplied by many different CAD vendors. Both Missoula and Lewis and Clark, two of the larger PSAPs, use Logistics Systems Inc., which is a Tier One systems provider (Logistics System Inc., 2008).

There are no legal or regulatory requirements for MVC data gathered by Montana PSAPs. The data collected by PSAPs are primarily data requested by dispatch agencies as opposed to any state reporting requirements. The dispatch agencies themselves may have state requirements for and agreements with local PSAPs to provide the data. The core information collected by PSAPs that is common across Montana PSAPs includes:

- The nature of the incident (i.e., injury accident, non-injury accident, moving violation, burglary, etc.)
- Incident location information[8]
- The caller's name
- Re-contact address
- Callback phone number

These core data have their own fields on the information screens of the computer terminals and in archival databases. Other information, such as the nature of injuries, is entered into a comment field on the information screen. The comment field provides call takers with an unlimited ability to ask questions and put more information into the system for immediate use.[9]

According to the Montana Constitution, information from 911 emergency calls is part of the public record. However, the privacy of criminal justice information about persons involved in the incident or MVA is protected by state statute and national laws. The PSAP redacts criminal justice information such as driver's license and license plate numbers from data that are provided to any non-law enforcement agency, including fire and medical agencies. Any health information contained in the PSAP's call records is not protected by HIPAA since 911 centers do not provide direct hands-on patient care. Still, there is a generic protection because no name is ever linked to a specific injury. A patient's name is never provided over the air to responders and any information responders provide back to the PSAP during the call is simply sex, general age, and the extent of their injuries.

### 2.3.3 Dispatch

For Missoula County, all injury motor vehicle crashes receive the same level of response, which is considered Advanced Life Support (ALS) medical. While technically a tiered emergency

[8] Location information displays with the class of service. The class of service tells the Call Taker and Dispatchers whether the latitude and longitude provided come from the closest cellular tower to the caller, the location of the actual caller if the caller is using a cell phone, or the location of a landline telephone. Location information from cellular calls also comes with a certainty factor. The certainty factor uses data from a triangulation of three towers to estimate how accurate the latitude and longitude are. However, accurate latitude and longitude of the actual caller are not always possible in rural Montana because there are not always three cellular towers with which to triangulate of the call. Therefore, Montana PSAPs rely heavily on voice communication for accurate location information.

[9] It is difficult to search information listed in the comment section.

medical response exists, the Missoula PSAP errs on the side of caution and sends a full emergency response. Missoula is an Emergency Medical Dispatch (EMD) 911 center. EMD protocols help determine whether an incident requires basic EMS, ALS EMS, air medical, and/or fire department response. Only five or six Montana PSAPs provide EMD. PSAPs that adopt EMD typically err on the side of caution and send more emergency responders than may be necessary based on the nature of the incident rather than the confirmation of injury by the caller, a witness, or a first responder. PSAPs that have not adopted EMD often wait to dispatch responders until an injury is confirmed.

Association of Public Communication Officers (APCO) provides the protocols for EMD in Missoula. The Montana chapter of APCO holds statewide meetings approximately every three months at locations around the state. APCO protocols are currently listed on flip cards located on the PSAP Call Taker's workstation. When the call taker determines the nature of the incident (s)he flips to the corresponding APCO protocol and proceeds as directed.[10]

Most PSAPs in Montana have one person designated to receive and respond to 911 callers. If there is more than one person, the job is typically split into a call taker, who receives the call, and the dispatcher(s), who coordinate the dispatch of emergency responders. The call taker's job is to enter core information into the CAD system. In Missoula, there are three dispatch positions: 1) fire/medical and administrative line dispatch, 2) county sheriff law enforcement dispatch and intermediary Montana Highway Patrol, and 3) city police law enforcement dispatch. Depending on the time of day, there is additional staff for back up.[11] When the call taker enters the nature and location of the incident, the CAD system automatically notifies the dispatchers. In Missoula they strive to send core information to the rest of the room in under a minute.

PSAPs directly dispatch fire, medical, local police and sheriff department responders. Call for service information is relayed verbally by the PSAP dispatchers or electronically by the CAD system to the responding agencies. The call for service information includes:

- Call location,
- Call type,
- Comments, and
- Other dispatch agencies that are being recommended

The fire and medical dispatcher selects the voice tones for the voice paging system. These tones open the radio channel where they verbally announce the call for service information. In Missoula, call for service information is also automatically sent by the PSAP CAD system to "rip-and-run" printers located at the fire station and the ambulance company.

In Missoula, the CAD system recommends a law enforcement unit to respond. The law enforcement dispatcher selects the recommended unit or chooses a different unit if warranted. The dispatcher verbally relays the call for service information to the responding unit via the radio. The county police and sheriff departments are on the same county computer network as the PSAP, so call for service data is automatically sent to the responding unit's mobile terminal where the data populates the MVC reports.

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[10] The Missoula PSAP, as of April 2010, is integrating the EMD information from the flip cards directly into their CAD system.

[11] In smaller Montana PSAPs there typically is only one person that is the call taker and the dispatcher.

An air medical response is initiated based on the location and nature of the incident. Voice and digital pagers notify air medical immediately. The Missoula PSAP does not wait for notification by a responder on the scene to dispatch air medical due to warm-up time for the helicopter. In Missoula, air medical dispatch works on a rotating basis. On odd days, St. Patrick Hospital's Life Flight helicopter is dispatched in the event of an advanced life support emergency that occurs in the geographic area that they cover. On even days, Community Hospital's Care Flight helicopter is dispatched.

The PSAP dispatcher indirectly dispatches the Montana Highway Patrol through the Highway Patrol's dispatch center. The PSAP also indirectly dispatches tribal emergency services through tribal services. The PSAP dispatcher verbally relays call for service information via the phone or transfers the 911 caller directly to the dispatcher at the other agency.

The Missoula PSAP also has CAD Status, software that allows any agency dispatched by the PSAP to view emergency calls in live time as the incident is occurring. CAD Status can be installed on any computer that supports JAVA and has high-speed internet access. The software automatically updates every 30 seconds. If an agency is connected to CAD Status, they have the ability to print the call for service data as it is ongoing.

From the time, the PSAP notifies each agency until the agency is actually en route varies. Volunteer agencies staffed with volunteers who may have to leave other jobs to respond to an emergency may have a guideline to strive for five to ten minutes, whereas a paid agency with dedicated emergency response staff may strive for a minute. Once agencies are dispatched, the PSAP collects time information. Time information includes:

- Time dispatched,
- Time in route,
- Time on scene,
- Time they leave the scene, and
- Time they are headed to the hospital, or
- Time they become available to respond to another call.

### 2.3.4 Emergency Medical Services (EMS)

EMS and fire departments print and manually enter the call for service data into their electronic reporting systems.[12] There is a lot of variability in the software and equipment used by each EMS provider because each has decision-making authority and liability. Still, all Montana EMS providers are licensed by the Montana Department of Public Health and Human Services' (DPHHS) EMS and Trauma Systems Section. As a licensing agency, DPHHS sets basic data collection requirements, and they encourage and guide best practices.

The Montana EMS and Trauma Systems Section encourages EMS providers to take advantage of a new, custom, license-free data collection and compilation software package, Online Prehospital Information—Patient Care Record (OPHI-PCR). The DPHHS EMS office developed OPHI-PCR. It is a cost effective, efficient performance improvement tool that is accessed online. "OPHI enables EMS services to electronically collect patient care information. Not only useful for documentation of patient care, this module will ultimately meet essential needs for service

[12]Chris Lounsbury (Missoula PSAP), discussion with authors, 2010. In Missoula, interfaces between software used by fire and medical agencies and the PSAP CAD vendor do exist, but are not utilized. An interface would enable electronic transmission of the data and eliminate the dual manual entry of the same data.

evaluation and performance improvement." (Montana DPHHS, 2010) The license-free nature of the software enables the state EMS and Trauma Systems Section to update data fields for data collection as needed without vendors' proprietary challenges.

The data elements included in the OPHI-PCR software is National Emergency Medical Services Information System (NEMSIS) compliant. The NEMSIS database is widely accepted among states and vendors as the gold standard for EMS data. The entire NEMSIS database is around 400 data elements. OPHI-PCR includes a subset of these data elements. Of the elements in the OPHI-PCR, the state aims to direct EMS providers to report a minimum dataset of about 70 NEMSIS data elements to a state database.[13] These data will primarily include:

- Time information
- Demographics of a patient
- Location of the incident
- Location the patient to which the patient is transported
- Status of the patient

The OPHI-PCR software includes a comprehensive reporting package that can be utilized as a performance improvement tool. The reporting package allows EMS providers to track their own performance and make comparisons to the performance of other anonymous EMS providers. Performance improvement is an incentive for EMS providers to utilize the OPHI-PCR software to collect and report data. As more providers use OPHI-PCR, the Montana EMS database receives data from a larger percentage of EMS providers. Eventually Montana will push EMS data to a national dataset. Currently 30 out of the 250 Montana EMS providers use OPHI-PCR. Many more are expected to use OPHI-PCR as they recognize the many benefits it offers.

### 2.3.5 Police and Sheriff

In Missoula, local law enforcement personnel open the MVC report with pre-populated crash data from the PSAP on the mobile computer terminal located in their vehicle. The local law enforcement emergency responder enters additional crash data at the scene of the crash via the mobile computer, or via computers located at their departments after the crash is cleared.

MVC reports are each given a unique incident code used to access the report. The incident code is automatically generated based on the nature of the incident. Additional MVC data can be added to the electronic MVC reports as needed. Some Montana local law enforcement agencies do not have electronic MVC reports. These local agencies record MVC data on paper MVC reports provided by the state at the scene of the crash, or soon after the crash.

All paper and electronic MVC reports are submitted to the Montana Highway Patrol for MVC investigation. If there is a criminal aspect of the MVC, the local law enforcement agency also investigates the incident. The MT Highway Patrol is currently developing a web-based version of the MT MVC report for all Montana police and sheriff departments to access from any computer with internet access. The web-based MVC reports will automatically be entered in the Highway Patrol's server upon submission. While paper MVC report forms may still be used to gather crash data at the scene of the crash, the web-based MVC report will eliminate paper submission of MVC reports to the Highway Patrol.

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[13] This change in reporting requirements will require a change in policy. The Montana EMS and Trauma Systems Section is in the process of making this change

### 2.3.6 Highway Patrol

The PSAP verbally relays call for service information to the Montana Highway Patrol dispatcher. The Highway Patrol dispatch center currently does not receive data through the phone system, where data (i.e., ANI/ALI) would display on the computer screen when the call is answered. However, they are working with the State 911 Program to become equipped to receive call data directly through the phone system. The most important MVC data for Highway Patrol from the PSAP are:

- Exact location
- Injury
- Traffic blockages

The Highway Patrol dispatcher immediately inputs the data into the statewide Highway Patrol smartCAD system. Features of the smartCAD system include:[14]

- Multi-agency system
- Unlimited 911/E911 PSAP interfaces
- Integrated mapping and GEO-location for all calls
- Unlimited agencies with tracking for unique agency report numbers
- Synchronized real-time CAD (Call and Unit) status on all mobile computers
- 911 system interface
- 911 wireless phase II ready
- Station alarm interface and call faxing
- AVL plotting and tracking
- Immediate update to workstations on call assignment or status change
- Integrated NCIC/State interface
- Configurable run cards for LE, Fire and EMS
- Color-codes calls by priority as defined by the agency
- Automatic GEO file validation of addresses
- Dispatcher notification of Be on the Lookout (BOLO), caution notes, and vehicle history
- Captures and stores demographic data for identification and prevention of racial profiling
- Integration with other SmartCOP modules
- Configuration allowing for agency-specified complaint types, disposition codes, quick-keys, and call/unit priority colors
- Transmission of BOLOs to MCT
- Customizable views of specific zones or an entire district
- Tracking of assigned and unassigned officers
- Apparatus recommendations based on status, location and other definable properties

The Montana Highway Patrol smartCAD automatically updates a public website[15] with traffic incident information (MT Department of Justice, 2010). The website displays a statewide map

[14] For more information about smartCAD features visit http://www.cts-america.com/smartcad.asp#Overview
[15] http://doj.mt.gov/enforcement/highwaypatrol/incidents/default.asp

marked with the approximate location of recent MVCs reported by the MT Highway Patrol. The website also displays a table that lists:

- Incident number
- Date
- Dispatch time
- Arrival time
- Incident type
- Location
- Remarks

Current MVC information is available on the live map for approximately 2 hours. Anyone can search the website for traffic incidents based on time or location of the incident within the last 10 days. The same information displays on the screen, the only difference is the displayed map is not in "live time".

The Highway Patrol dispatcher assigns a trooper to respond to an incident via radio, or troopers actively scan for MVCs in their area on the trooper's mobile computer terminal and mark themselves in route.

Troopers collect MVC data using the SmartCOP software, the crash module. The SmartCOP crash module is 100% Model Minimum Uniform Crash Criteria (MMUCC) compliant. MMUCC is a voluntary guideline that helps states collect consistent crash data for a wide range of traffic safety planning applications (MMUCC, 2008). The crash module contains edit rules that force troopers to enter required data.[16] The module also allows for any additional data (i.e. video, pictures) to electronically be attached to the MVC report.

Troopers are trained to open the crash module on the mobile computer terminal and electronically save the GPS of the vehicle location immediately upon arrival at the scene of a MVC. The majority of the crash report is filled in at the scene of the crash using the mobile data computers. However, troopers can recall crash reports from the mobile computers or on a PC at the station to enter additional MVC data. Crash reports can be printed in the vehicles. Troopers complete the crash investigation which, depending on the type of crash, could take minutes or days. Typically they try to have a five day limit on all crashes with the exception of fatalities, where there is a 30 day limit. When the MVC investigation is complete, the trooper gives it to his/her sergeant for approval and electronic submission.

Crash reports are compiled in Microsoft SQL and Crystal Reports. Crash reports are routinely digitally reported to the Montana Department of Transportation. Summary reports can be generated by the MT Highway Patrol for a specific location or area for a specified time period (i.e., hourly, daily, weekly, or monthly). The MT Highway Patrol can provide individual reports with date, time, location, and injury information including severity without identifiers. Individuals involved in MVCs can obtain a complete crash report by providing appropriate

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[16] Changes to the data collected by the crash module would need to be approved by the Major. The approval process includes verifying compliance with state laws, availability of technology, MMUCC compliance, and a cost benefit analysis. The Highway Patrol system has the necessary technology to make data changes in their collection system. The major challenges of making changes to their system are cost and personal rights when sharing the data.

identification. Insurance companies can also obtain crash reports with a signed release form from the individual(s) involved in the MVC.

### 2.3.7 Tribal Services17

If a MVC occurs on one of the seven reservations in Montana, which represents 6% of Montana's population, the PSAP dispatches Montana Highway Patrol and contacts the tribal law enforcement by phone. Tribal emergency response centers are not networked into the 911 system. The centers are connected to a standard 10-digit telephone number. Each of the seven federally recognized Tribes in Montana is its own sovereign nation, so each has its own law enforcement and emergency response system.[18]

MVC response is immediately more difficult on reservations because identifying a specific location is difficult. The Montana Highway Patrol does not recognize all the road systems on reservations and mile markers are sometimes missing. Also, cellular coverage is very limited on reservations.

Once at the scene of the crash, Highway Patrol and Tribal Law Enforcement coordinate and determine jurisdictional authority. If a non-tribal member is involved in the MVC, then the Highway Patrol reports the MVC. If all individuals involved in the MVC are tribal members, then Tribal Law Enforcement reports the crash. Sometimes MVCs are reported by both Highway Patrol and Tribal Law Enforcement. A 2008 Montana Tribal MVC study found that between 10-20% of tribal data was not accounted for in Highway Patrol data[19]. To get the most complete MVC data from reservations, it is important to review both sources.

The collection, compilation, and utilization of MVC data are unique to each tribe. Each reporting system is completely separate from the state and each other. The Crow Agency partnered with the state to develop a software system to enter tribal MVC data. The system was developed by Creative Information Systems Company (CISCO), a networking and communications technology and services provider (CISCO, 2010). However, the CISCO software is not being used due to the lack of training, not enough personnel, or inadequate equipment.

Tribal MVC data are primarily collected on paper forms. However, filling out and compiling MVC reports are not consistent. Tribal MVC data are archived after 3 years at the Bureau of Indian Affairs in Albuquerque, New Mexico. Tribes do not report MVC data to the Montana Department of Transportation.

Fire and medical emergency responders are dispatched from the PSAP or the tribal emergency response center based on location. The Indian Health Service hospitals will provide emergency care for non-tribal injured individuals. Likewise, non-Tribal hospitals will provide care to injured Tribal members.

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[17] For more information about tribal emergency response visit
http://www.ihs.gov/MedicalPrograms/InjuryPrevention/Documents/BIAFY08HSP.pdf
http://www.indiantech.org/

[18] To incorporate ACN/AACN data into the Tribal emergency response system contact the Montana Wyoming Tribal Leaders Council. More information about the Council can be found at http://www.mtwytlc.com/

[19] Darcy Merchant interview by authors, August 19, 2009.

## 2.4 After the 9-1-1 call

### 2.4.1 Reports

PSAPs collect time data until injured individuals are transferred to the hospital, or the scene of the crash is cleared. The Missoula PSAP's policy is to transmit the completed call for service data to emergency responding agencies as soon as the last fire or medical unit clears the call. The call for service at the end of the call contains location, nature of the incident, comments, and time information. The PSAP sends the data electronically to a printer located at the EMS and a printer located at fire departments.

PSAPs are the source of data used in routine reports that are requested by direct dispatch agencies. Other affiliated agencies, such as Highway Patrol, can request copies of call documentation for their reports. The PSAP typically faxes a printout of the call for service record. Finally, researchers or the public can request a print call for service record through the County Attorney's office.

### 2.4.2 Archive

The length of time that a PSAP retains a data record for each call is unique to each PSAP. Some keep audio recordings for two years, other PSAPs that do not have a lot of memory on their voice recorder might go a month and then delete it. Some digitize their voice records and some print out their call details and store them on a shelf. Some PSAPs might not even be able to print out call details.[20] The Missoula PSAP's active data goes back to 2000. This active data can be accessed directly at the center. Any records prior to 2000 can be pulled out of archives. Call records are tracked by complainant name, location, and the incident code.

After the 911 call, MVC data continue to being collected by hospitals. Hospital records and the Montana Trauma Registry capture the most complete picture of the extent of MVC injury outcomes. Hospital and Trauma data also capture MVC data from injured individuals involved in MVCs that do not activate the 911 system. However, hospital data are protected by privacy laws so are difficult to access.

## 2.5 Hospital Data

### 2.5.1 Hospital Emergency Department

Pre-hospital MVC data are given by EMS providers to the hospital in print form and verbally relayed. In some hospitals, EMS personnel enter pre-hospital data into a computer dedicated for EMS use at the hospital. These data are recorded with the patient care record of an injured individual.

The Montana Hospital Emergency Department (ED) and Discharge Dataset is currently owned by the Montana Hospital Association. Currently about 10% of hospitals in Montana voluntarily submit data to the dataset. While legislation that would mandate reporting of hospital ED and discharge data to a state database did not pass at the last session, funding for the dataset was

[20] One common point for the data storage may be Intrado. If a wireless caller gets dropped and the PSAP doesn't have the technology to bring up the old records and start troubleshooting, they can get information from Intrado, which keeps a record of the data that routed through them.

approved. Thus, the state DPHHS is in the process of increasing the amount of voluntary reporting. The dataset currently does not connect any injuries to MVCs.

Confidentiality and privacy of both patients and hospitals are strongly protected by law.

### 2.5.2 Trauma Registry

The most complete injury outcome dataset in Montana is the Montana Trauma Registry.[21] However, the trauma registry collects information from only a subset of trauma patients. This subset is comprised of patients with the most severe injuries by any fashion—this includes the most severe injuries sustained from MVCs. Patients with severe injuries are those who need surgery, stay more than three days in the hospital, or die.

If a person is injured in a MVC and taken to an American College of Surgeons (ACS) certified hospital, trauma data are entered into the Trauma Registry directly via Collector software. Trauma coordinators typically enter the data on a routine basis (i.e., daily, weekly, etc.). In large Montana hospitals, such as Billings or Great Falls, trauma data are submitted continuously as trauma incidents occur. In smaller hospitals trauma data are submitted at least quarterly.

Trauma data from large Montana trauma hospitals are generally more detailed because they typically have patients for longer periods of time, do more tests and procedures, and know more about outcomes of patients. Smaller hospitals that are not ACS certified mail a paper form with trauma information to the state's EMS and Trauma Systems Section where it is manually entered into the Registry. These data are generally less detailed as patients are usually transferred from the smaller hospitals to larger trauma hospitals.

The state Trauma Registry is currently moving to a web-based system that enables all hospitals with internet access to submit their own trauma data. The web-based system will eliminate paper submissions of trauma data to the EMS and Trauma Systems Section. It will be more time and resource efficient. The web-based system will also improve the quality of the data being submitted, as Collector automatically validates the data.

The Trauma Registry is a high end performance improvement tool for trauma hospitals. Collector has a comprehensive reporting package that makes it easy for hospitals to track their own performance and compare themselves to the performance of other hospitals. Still, the registry is strongly protected by state statute and is proprietary. While hospitals have unlimited access to their own individual and compiled data, they only have access to statistical non hospital specific data that are submitted by other hospitals. For example, a reporting hospital can compare their own trauma data to data from a similar sized hospital, or to data from the same state or region, etc. The internal performance design coupled with a strong protection of the data provides hospitals will a good incentive to report and utilize trauma registry data. As a result, 90% of the 56 hospitals in Montana routinely submit trauma data.

There is no standard nationwide trauma dataset. However, most trauma registries around the country use Digital Innovations' Collector software, so the data are somewhat standardized. There is also a national trauma databank owned by the ACS that gathers the somewhat standardized data. The state EMS and Trauma Systems Section sends Montana trauma data

[21] The trauma registry would be the best indicator of whether ACN data are accurate for severe injury predictions in Montana.

gathered in Collector to the national databank. Montana trauma data are compared to national data and summary reports are sent back to each hospital on a routine basis.

Trauma registry data are used in policy decision-making or for specific preventable death studies. These data are strongly protected, so studies are typically internal.[22] Montana trauma data are reviewed at the Regional Trauma Advisory Council (RTAC) quarterly meetings to confirm validity and develop action plans.

## 2.6 Data Book

The Montana MVC Data Book (Appendix C) is a resource developed by the Task 1 project team of Amanda Golbeck, Kathy Humphries, and Julie Stevens. It contains specific MVC data element information from MVC crash databases in Montana.

The Book is an EXCEL workbook. Each agency that collects MVC data in Montana has a separate worksheet in the workbook that lists the MVC data elements collected by that agency. The information in the Book was abstracted from data dictionaries provided by each agency and verified by appropriate professionals representing each agency.

The Book contains a summary worksheet, labeled 'SUMMARY'. The SUMMARY worksheet, which is the first worksheet in the Book, cross-references the Montana MVC data elements and the VEDS- recommended data elements. The SUMMARY worksheet may be used to identify:

- Useful and critical crash elements currently being collected in Montana, and
- Useful and critical crash elements not currently being collected in Montana.

VEDS data elements are given in the first two columns of the SUMMARY worksheet. The VEDS elements are grouped according to category, which is listed in column 1. The categories are highlighted in the row directly above the group of elements falling within that category, which are listed in column 2. For example, 'latitude' in column 2, row 17 refers to the latitude of the incident because it is listed under the highlighted 'Incident Data' category in column 1. The rest of the columns (columns 3 and higher) in the SUMMARY worksheet correspond to the agencies collecting MVC data.

The entry that falls within the intersection of a row and column in the SUMMARY worksheet indicates where the VEDS data element indicated by that row is found on the agency worksheet indicated by that column. For example, row 17 represents latitude of the incident, and column C represents OnStar. A'12' in row 17/column C indicates that the OnStar entry for latitude of the incident is found in row 12 of the OnStar worksheet. A blank in row 17/column C indicates that OnStar does not collect data on latitude of the incident. In this way, each row identifies all Montana MVC agencies that provide a given VEDS data element, specifying where to find that element within each of the agency worksheets.

In addition to the SUMMARY worksheet, each agency worksheet contains a 'VEDS Element' column that identifies the VEDS data element that corresponds with the MVC data element listed

[22] For example, information about the severity of injury and seatbelts was researched to provide evidence for Montana seatbelt legislation. In terms of this project, in order to honor the restrictions on trauma registry data it would be easier to look at how the state could warehouse some of the ACN data internally and research injury prediction internally vs. sending the data elsewhere.

in each row. For example, row 23 of the ‘MSO 911’ worksheet identifies the data element for the address of the incident. The address of the incident corresponds to VEDS data elements: incident location, incident latitude, incident longitude, and incident location description.

### 2.6.1 Flow Diagrams

Data flow diagrams have been developed to display visually the data processes related to motor vehicle crashes (MVC) in Montana: How data are generated, communicated, acted upon, archived, and reported. An agency’s data flow diagram maps the movement of the data from initial collection through analysis, reporting, sharing, and then archiving. The data flow diagrams provide a visual representation of the Montana MVC data flow in relation to the timeline of the actual MVC event. Seven agencies’ data flow diagrams were developed in this project from key informant interviews.

## 2.7 Comments

One concern voiced about ACN’s owner medical history data is that you never know who’s actually going to be in the vehicle. Still, in Missoula, Missoula Aging Services gathers voluntary medical information from the disabled and elderly to share with the PSAP. This information is entered into their CAD system so if an emergency call comes from that number or residence it automatically notifies the call taker that the incident may involve people with disabilities or special medical conditions. This information is useful information for hospitals or medical responders for what they might expect upon arrival.

A/ACN data would be beneficial for more efficient location identification and more accurate historical vehicle data. The telemetry data reported from the car would be helpful in MVC investigations. Finally, linking data from the beginning of the MVC clear through the long-term injury outcomes of individuals involved in the MVC would be helpful for policy decision-making, such as seat belt legislation.

## 2.8 Recommendations

Four recommendations come from this task. First, in Montana, agencies or parties either individually or collectively contribute to MVC data infrastructure, but not in a highly connected way. Steps toward a more cohesive infrastructure will permit a more comprehensive integrated motor vehicle crash-related data system for Montana that includes A/ACN. Employing these data can potentially increase the integration and effectiveness of the response and rehabilitation systems.

Second, most of the agencies appear to be in a transitional state with MVC data. EMS is rolling out OPHI-PCR. Highway Patrol recently started using only the SmartCOP Crash module and is developing a web-based version for access by all law enforcement personnel. Highway Patrol is also working to update their dispatch center to begin taking data directly into their system. The hospital ED and discharge database is still being developed. These transitions provide an opportunity for integrating A/ACN data into the Montana MVC data infrastructure. For example, one barrier identified by interviewees was training staff to effectively use new data. Perhaps any additional training needed for ACN data could be rolled into the training that will occur with these transitions that are already in progress.

Third, most of the agencies already collect data elements that could be useful for linking across databases. These data elements include: the date, time, and latitude and longitude of the incident.

The data dictionary locations are show below. The Data Book worksheet is identified in bold with the row number of the data elements for potential linking in parentheses.

- **OnStar** (10-13)
- **MSO 9-1-1** (433, 55, 23)
- **EMS OPHI-PCR** (143, 140, 218)
- **Police and Sheriff** (5-7, 81-83)
- **Highway Patrol SmartCop Crash** (4, 17-18)
- **Trauma** (62,[23] 63)

The only agency that does not have data identified as MVC data is the Hospital ED and Discharge dataset.

Finally, Intrado, the data service provider for the PSAPs, may work with the Montana Highway Patrol dispatch center to send additional TSP data directly to their future ANI/ALI screens. It may be possible for the TSP to send the same MVC data simultaneously to the PSAP and the Highway Patrol. For PSAPs that do not adopt EMD and wait for an officer at the scene to confirm an injury before sending fire/medical responders, this could decrease response time.

[23] Place of injury, which may or may not contain latitude and longitude

# 3 Pathways and Support for Delivery of Crash Telemetry Data to PSAPS and EMS

Now is a particularly important and appropriate time for Montana to undertake the development of a detailed plan for upgrading the crash-related data infrastructure and demonstrating its utility. As noted previously in Chapter 1, the national trauma triage guidelines have recently been amended by the American College of Surgeons and the CDC to include the consideration of ‘vehicle telemetry data consistent with high risk of injury’ as a criterion for making the decision to transport an injured victim to a trauma center (CDC, 2009). Furthermore, a national Technical Panel convened by the CDC, made up of representatives from 9-1-1 call centers, EMS, emergency medicine, trauma surgery, engineering, public health, vehicle telematics providers, NHTSA, and an EMS for children program, recommended vehicle telemetry data be used to assist the dispatch of appropriate emergency services to crashes (CDC,2008). They concluded AACN shows promise in improving outcomes in severely injured crash patients by:

- Predicting the likelihood of serious injury in vehicle occupants
- Decreasing response times by pre-hospital care providers
- Assisting with field triage destination and transport decisions
- Decreasing time to definitive trauma care
- Decreasing death and disability from motor vehicle crashes

The planning for this data infrastructure upgrade is also timely, given the Next Generation 9-1-1 (NG 9-1-1) program is developing technology that will allow call takers and dispatchers at 9-1-1 Centers to send and receive data, digital pictures and video, email and text messages, and other modern communications from computers and handheld devices instead of relying solely on the traditional 9-1-1 voice-only telephone calls. This technology will greatly facilitate the delivery of vehicle crash telemetry data to the appropriate 9-1-1 PSAPs. It is of interest to note Helena, MT was one of five PSAPs selected to test a NG 9-1-1 network prototype design (USDOT, 2009).

As Chapter 1 illustrated, there are a variety of traditional data sources for near-real time crash and crash-related injury data. These include 9-1-1 PSAPs, police agencies, EMS, and hospital emergency departments. The purpose of this task was to identify and demonstrate how – using currently available technology - AACN telemetry information can be acquired and shared with responders in real time, as well as archived for post event use and future inclusion in Montana’s upgraded crash data infrastructure.

## 3.1 Background

Before describing the methods used to provide crash telemetry data to emergency providers, it is necessary to provide relevant background information on the Advanced Automatic Crash Notification (AACN), as well as a brief description of the injury prediction algorithms that use this data.

Figure 6 summarizes the vehicle based AACN data available for transfer to a PSAP and EMS. These data include crash location, crash delta velocity, direction of impact, whether airbag deployed or a rollover occurred, and whether there were multiple impacts. The items in bold italic font are fields that are typically not included in an AACN transmittal to an outside agency but are available to the Telematics Service Provider (TSP). The vehicle data captured by AACN systems, coupled with occupant data (that may be obtained verbally by emergency call takers like gender and occupant age) and other available data such as vehicle make/model and weight, are being used to predict the probable injury severity sustained by crash vehicle occupants. Because they use data transmitted from the car at the time of the crash, the injury severity prediction is usually available to EMS before anyone arrives at the crash scene.

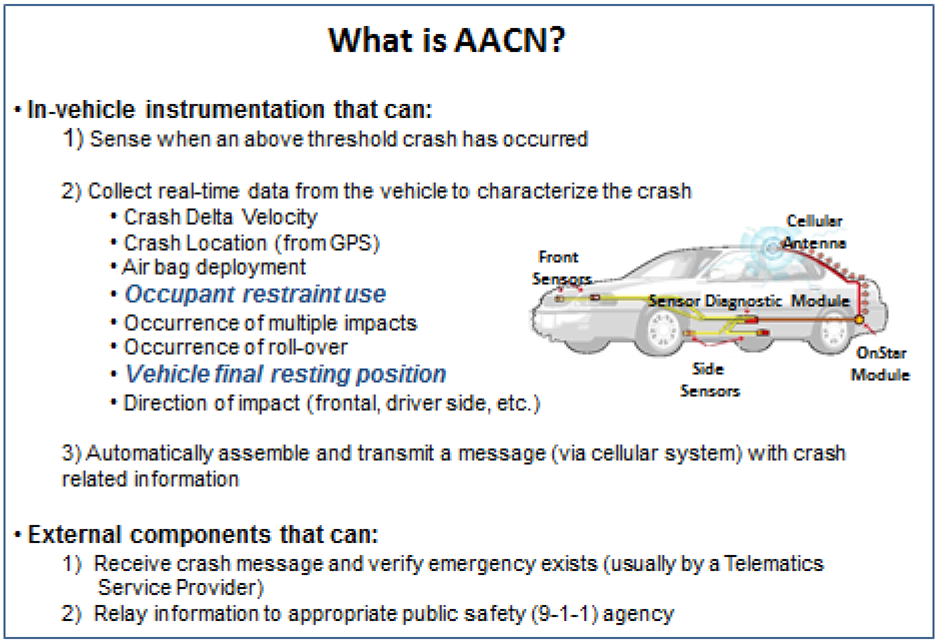


*Figure 6. In-vehicle and external components of AACN system*

Information on the severity of injuries, if provided to dispatchers and responders when first notified, could guide decisions regarding the type of resources to deploy (e.g., should air medical and trauma center be notified), as well as indicate the need for speed in the response (i.e., are lights and sirens really necessary?)[24] (CDC, 2009).

Translating crash telemetry data into physical forces experienced by an occupant in a crash and subsequent estimation of an injury severity score requires an injury prediction algorithm. The pioneering work by (Malliaris et al., 1997) led to the development of the first injury prediction algorithm. Malliaris and his team conducted a multiple logistic regression analysis of data from the National Automotive Sampling System/Crashworthiness Data System (USDOT, 1998). For several decades, NASS/CDS has reported on motor vehicle crash injuries, their associated severities, the crash conditions which produced them (as determined by crash investigators), and other occupant and vehicle information. This was done for a sample of all crashes occurring in the U.S. each year. Using the NASS/CDS data, the most influential variables for crash injury assessment were identified and quantified (e.g., *estimated* crash delta velocity, principal direction of force (PDOF), occupant age, seat belt use, multiple impacts, etc.). This assessment led to the creation of an injury prediction algorithm called URGENCY which used the Abbreviated Injury

[24] Note The data used to predict injury, such as crash delta V, direction of impact, etc., is only acquired by AACN systems (not ACN (including aftermarket FMV) or SOS).

Scale (AIS) as a measure of injury (Champion et al., 1999; (Augenstein et al., 2001). Expecting data from crash telemetry and other sources (e.g., conversations with vehicle occupants), the URGENCY algorithm was configured to estimate the probability that the 'maximum AIS' (MAIS) was ≥ 3 (indicating serious injury). MAIS is the highest AIS code sustained by one person on any part of the body.[25]

Recently, OnStar and University of Michigan researchers developed a multivariate logistic regression model, based on the NASS-CDS data (1999-2008) to predict the probability that a crash-involved vehicle will contain one or more occupants with serious or incapacitating injuries (Kononen et al., 2011). In this model, an Injury Severity Score (ISS) ≥ 15 is defined as a serious injury.[26] Following the recommendations of the CDC-led National Technical Panel on Field Triage, the parameters used in the OnStar/UMI crash injury prediction are crash delta velocity, crash direction (front left, right, rear), multiple vs. single impacts, seat belt use (which is detected by vehicle sensors), presence of an occupant ≥ 55 years old, presence of at least one female in the vehicle, and vehicle type (car, pickup truck, van, sport utility). Some of this information is available from the AACN unit, some from voice contact with the occupants (e.g., age, gender). The algorithm is applicable to planar crashes only (no rollovers) and all vehicles makes and models (not just GM). Although the model predicts a continuous value of probability of injury (as does URGENCY), in practice, a cut point is used to differentiate vehicles that meet the 'serious injury' criteria from vehicles that do not. This limiting of the injury severity prediction (ISP) output to two states is an attempt to provide a clear, actionable result for operational use. The cut point recommended by the CDC Technical Panel (based roughly on clinical experience) is 0.2 or 20% probability that a vehicle has an occupant with an ISS score ≥ 15 and therefore requires triage to a trauma center. This cut point may well change after additional validation efforts are completed.

The OnStar ISP is now provided to the PSAP call taker by the OnStar advisor and would therefore be captured in any approach that went through the PSAP.

## 3.2 Methods

There were four major activities in Task 2. These included 1) characterizing candidate pathways for providing OnStar crash telemetry data to the 9-1-1 PSAP and emergency response agencies in real time and selecting one of these pathways for a demonstration, 2) developing a web-based AACN database framework to enable archiving and post-event access to AACN data, 3) simulating a live OnStar call into a PSAP test site to demonstrate the capture and real time sharing of AACN data with EMS and hospital medical providers, and 4) establishing a process for the capture, use and archive of OnStar AACN data going forward.

### 3.2.1 Characterizing Pathways for AACN Information in Montana

Building on the background presented in Chapter 2, candidate pathways for bringing AACN data into Montana and making it available to emergency responders for both operational and research use were reviewed. Operational use (as used here), means crash telemetry data is made available to 911 call takers, dispatchers, responders, and receiving hospitals to support real-time dispatch,

[25] See http://www.aaam1.org/ais/.

[26] The Injury Severity Score (ISS) is the sum of the squares of the AIS level of the three most significant coded occupant injuries. The AIS (Abbreviated Injury Scale) runs from 1 to 6, with 1 Minor, 2 Moderate, 3 Serious, 4 Severe, 5 Critical, 6 Unsurvivable.

field triage and hospital treatment decisions. Research use implies acquisition, storage, and linkage of crash telemetry data for non-real-time analysis. The intent was to identify options, which maximize the utility of the crash telemetry data which is now available, while planning for a future where the amount of AACN data available digitally will grow, algorithms to process the data will be fully validated, and national protocols to use the data will be firmly established.

There are three basic pathways for getting AACN information into Montana. There is the Traditional route (via a phone call on an administrative line to the PSAP), the 'Priority Access' route (where selected AACN data goes directly into the PSAP 911 trunk line) and the 'Condition Acquisition and Reporting Systems (CARS)' route, where AACN data goes to a state server usually operated by the state Department of Transportation. The three approaches are discussed briefly below.

***Traditional*** - General Motor's OnStar was the first commercial ACN system in the U.S. and originated the traditional route for communicating a crash alert to a PSAP. Typically, a crash is detected by sensors supporting the vehicle's airbag deployment systems. An emergency message is automatically sent using a vehicle-based cellular phone call to the OnStar (TSP) Call Center. Besides the Global Positioning System (GPS) crash location (latitude and longitude), other data included in the digital message to the TSP are crash delta velocity, principal direction of force (PDOF), whether a rollover occurred (for some vehicle models), whether there were multiple impacts, and other crash and vehicle-related details. Upon receipt of the automated telematics call, OnStar call takers attempt to establish voice contact with the vehicle. If occupants confirm that injuries are present and assistance is needed (or if occupants do not respond), OnStar contacts the appropriate Public Safety Answering Point (PSAP) by calling a designated number for that PSAP. This call from OnStar traditionally came into the PSAP on an administrative phone line, NOT on an emergency or 911 trunk line. The implication here is if this administrative phone line is in use, the OnStar call may not get through in a timely manner. Once the voice connection between OnStar and the PSAP is made, if desired by the PSAP, OnStar establishes a conference call between the PSAP, OnStar and the crashed vehicle.

***Priority Access*** - Priority Access is a mechanism developed by Intrado, a provider of 911 technology solutions for traditional phone companies, wireless carriers, satellite and cable operators, Voice-over-Internet Protocol (VOIP) service providers, and public safety and government agencies. Intrado has been working with the telematics service providers to route emergency calls from a TSP call center *into* the 911 trunk system at the appropriate PSAP (OnStar, 2007). The call would then come into the PSAP as an emergency call. The major TSPs (OnStar, ATX, and Hughes Telematics) are all participating in this effort.

Priority Access is being implemented in stages. Stage 1 routes the voice call from the TSP advisor (who still dials the designated 800# for the PSAP) into the 911 emergency trunk line rather than into an administrative line. Thus, an OnStar call is delivered directly to the 911 call taker screen along with the OnStar advisor's call-back number and a visual display of "Telematics call" and "OnStar Call Center" indicators. The OnStar advisor then provides verbal details on the crash to the PSAP call taker. Requirements for this routing to be implemented are 1) the PSAP must have Voice-Over-Internet-Protocol (VOIP) capability and 2) Wireless Enhanced 911 must be established (OnStar, 2009). Stage 1 Priority Access has now been implemented in 46 of 57 PSAPS in Montana, including Missoula (Intrado, 2010a).

As originally defined, Stage 2 Priority Access includes the capabilities of Stage 1 OnStar voice call into 9-1-1 trunk line, along with electronic delivery of the X,Y coordinates of the crash (OnStar, 2007). However, Stage 2 may be expanded to include digital delivery of additional AACN fields[27]. Achieving Stage 2 has been a very slow process and is currently only operational (i.e., providing digital crash coordinates only) in a few locations[28] (Intrado, 2010b). With regard to the ultimate goal of electronic delivery of the full AACN dataset, Intrado is currently working with OnStar and ATX on AACN message content (data fields to be delivered), and on an architecture and procedures for enabling delivery of the AACN digital data to the PSAPs[29]. An interface will be needed at the PSAP to bring the data to the desktop and display the AACN data fields, which will be automatically populated when fully implemented). At this time, it is not clear when delivery of the full AACN dataset will be operational. It should be noted that displaying new AACN data fields at the PSAP will require changes to the 9-1-1 call taker's screen and local stakeholder approvals must be obtained.

***Condition Acquisition and Reporting System (CARS)*** - CARS is an Intelligent Transportation System (ITS), standards-based, condition reporting system that allows authorized users (typically transportation departments) of participating member state agencies to enter, view, and disseminate critical road, travel, weather, and traffic information (CARS, 2010). CARS users access the system using a standard web browser (i.e., no local software is required) to enter condition reports or view reports entered around the state. As of 2012, seventeen transportation agencies have deployed or are currently in the process of deploying the CARS system. CARS users include Alaska, the City of Calgary, Idaho, Indiana, Iowa, Kentucky, Louisiana, Maine, Minnesota, New Hampshire, New York, the New York State Thruway Authority, Rhode Island, Sacramento,, Vermont, and Washington State. Montana, however, is not a CARS member state.

OnStar recognized the CARS system might be a way to get OnStar data to a number of states. They entered into an agreement with the operator of CARS (Castle Rock) to provide the CARS system with OnStar messages received from crashes in CARS participating states. OnStar implemented software in their message center to automatically sort and transmit crash data to the CARS national server located in Atlanta, Georgia. The participating CARS states that want to receive the crash message data can then request that the crash data be sent to them. Typically, state systems will use CARS to identify and map crash locations as part of their incident traffic management systems. However, it is important to note, the provision of AACN data to the CARS system is considered to be completely separate from the primary mechanism for alerting the 9-1-1 system through the TSP (OnStar) voice call to the appropriate PSAP.

There have been several projects undertaken which use CARS to provide emergency medical service (EMS) responders with access to OnStar data for use in real time operational response. Three such projects are Minnesota May Day 911, the Alabama ACN Project and, most recently, the Idaho ACN Project (MnDOT, 2005; Funke et al., 2005; Virshbo, 2010).

The first two were research programs with field tests that have now concluded; the effort in Idaho (which has a centralized statewide EMS dispatch center and is co-located with the transportation management center (TMC)) has been implemented as a permanent operational system. It should be noted those who receive AACN data through CARS, would have the option

[27] David Sehnert (Intrado), private communication with authors, June 2011.
[28] Cathy Bishop (OnStar), private communication with authors, January 2012.
[29] David Sehnert (Intrado), private communication with authors, June 2011.

of using the URGENCY algorithm to calculate an injury severity. This is, in fact, done in Idaho. However, seat belt use is not included in the AACN data provided to CARS by OnStar (for privacy reasons) and so this parameter cannot be used in the URGENCY calculation unless it is acquired after responders arrive at the scene.

### 3.2.2 Options for Getting AACN Data to Responders

Using the pathways described above, the research team developed a set of options (with tradeoffs) for getting AACN information into the hands of responders. Table 1on the following page lists Options 1 through 4. The column headings across the top of the table follow the flow of crash-related data as the response to the crash event unfolds. It starts with the initial PSAP crash notification and steps through PSAP receipt of the traditional 'primary' crash information (such as crash location, witness information, etc.). This is followed by PSAP receipt of AACN data and receipt of AACN data by agency dispatchers (for first responders, police and EMS), as well as receiving hospitals. This latter group is referred to as 'stakeholders' in the table. The next to last column addresses how the AACN data can be incorporated into a research database (to support performance and effectiveness studies). The final column provides comments regarding what the option requires or produces. Reference numbers in brackets point to footnotes at the bottom of the table. The light shading of a cell in the table indicates  no action by the team is necessary to accomplish the task. Darker shading of a cell indicates the task requires actions to be performed by the team as part of current effort.

The PSAP was assumed to have a Priority Access Stage 1 capability as a starting point. As indicated previously, many of the PSAPs in Montana, including Missoula, are at Stage 1. Thus for Options 1 through 4, the initial crash notification from the TSP comes into the PSAP over the 911 trunk line, and is labeled as an emergency 'Telematics Call' (or Stage 1 Priority Access). As indicated by the lighter shading, no action is required by the team for this step (all options).

The survey conducted as part of Task 1, noted the use of 'CAD Status' software at some PSAPs (e.g., Missoula). CAD Status allows any agency dispatched by the PSAP to view emergency calls on the PSAP screen live (via internet), as the incident is unfolding (Golbeck, 2010). The notation "share image of PSAP screen with stakeholders" shown for the Priority Access Stage 1B option, assumes the availability of this type of software.

*Table 1. Options for Transmitting AACN Telemetry Data*

***Step-wise Flow of Crash Related Data***

| *Options* | *PSAP Crash Notification /Alert* | *PSAP Receipt of 'Primary' Crash Information* | *PSAP Receipt of Detailed AACN Data* | *EMS, Public Safety 1st Responder Dispatchers, & Receiving Hospital Receipt of AACN Data* | *Research Database Acquisition of AACN Data* | *Comments* |
|---|---|---|---|---|---|---|
| **1.Priority Access Stage 1A** | TSP Voice Call to PSAP into 911 trunk line appears as emergency 'Telematics Call' | Traditional verbal information [1] from TSP provided to PSAP over 911 trunk (not Admin line). Recorded per normal protocol | Additional verbal AACN data from TSP ($\Delta V$, crash direction, etc.) handwritten on paper forms by PSAP call taker [4] | Verbal transmission of AACN data from PSAP call taker to stakeholders for real time operational use. | Acquire hand-written PSAP AACN record (post event), and enter data into research database | -No changes to PSAP CAD System required.<br>-AACN data provided verbally to stakeholders in real time.<br>-Electronic AACN Research Database (DB) created. |
| **2.Priority Access Stage 1 B** | TSP Voice Call to PSAP into 911 trunk line appears as emergency 'Telematics Call' | Traditional verbal information [1] from TSP to PSAP provided over 911 trunk line. Recorded per normal protocol | Additional verbal AACN data from TSP ($\Delta V$, crash direction, etc.) entered into CAD/computer by PSAP call taker [4]. Entries made into predefined data fields or comment field. | -Share image of PSAP screen with stakeholders (via web service) [5] OR<br>-Extract electronic data elements from PSAP CAD database & export to web site accessible by stakeholders. | Transfer data (in screen images) to research database [7], OR<br>-Export AACN data elements from web site server to research database | -May require changes to PSAP CAD screen (unless only Comment field used)[5].<br><br>-Creation of web site provides AACN data visually (or digitally) to stakeholders<br><br>Electronic AACN Research DB created. |
| **3. Priority Access Stage 2 Not Currently Available [6]** | TSP Voice Call to PSAP into 911 trunk line appears as emergency 'Telematics Call' | Selected AACN data transmitted electronically over 911 trunk line to PSAP screen: Latitude/ Longitude, other?) [2] | Remaining verbal AACN data from TSP (ISP, $\Delta V$, crash direction, etc.) entered into computer by PSAP call taker [4] | -Share image of PSAP screen with stakeholders (via web service) [5] OR<br>-Extract electronic data elements from PSAP CAD database & export to web site accessible by stakeholders. | Transfer data (in screen images) to research database [7], OR<br>-Export AACN data elements from web site server to research database | -Changes to PSAP CAD screen required.<br>-Some AACN data (location, other?) provided digitally to PSAP reducing data entry required.<br>-Creation of web site provides AACN data visually (or digitally) in real time to stakeholders<br>-Electronic AACN Research DB created. |
| **4.CARS + Priority Access Stage 1 OnStar Only** | OnStar Voice Call to PSAP into 911 trunk line appears as emergency 'Telematics Call' | Traditional verbal information [1] from OnStar to PSAP provided over 911 trunk line, perhaps supplemented by web browser access to CARS AACN display screens [3] | View AACN CARS data via web browser. | View AACN CARS data via web browser | Extract data from CARS server and transfer to research database | -Pipeline from CARS national server to MT must be established.<br>-Data entry by PSAP call taker reduced.<br>-Full AACN call record available to stakeholders in real time.<br>-Electronic AACN Research DB created. |

☐ Does not require any action by research team

■ Requires tasks to be performed by the team as part of current effort

**Notes for Table 1.**

[1] 'Primary' Crash data refers to the data currently available to PSAP call takers (e.g., crash location, etc.)

[2] Originally, Stage 2 was only to digitally deliver X,Y coordinates of crash. It is not known at this time (Jul 8, 2011) whether additional AACN data elements may be included in the Priority Access electronic message; details of crash message content are currently under review by Intrado, the TSPs (OnStar/ATX), and other interested parties.

[3] Once OnStar initiates call to PSAP, OnStar advisors forwards AACN data to CARS (if crash is in a CARS state). The key to the use of the CARS option is to provide stakeholders access to the website displaying the AACN data.

[4] This step will require cooperation of the OnStar advisor to provide AACN data and willingness of PSAP call taker to request and record it. Expect data will be entered into PSAP CAD system, but may be separate.

[5] AACN data entered as 'prescribed free text' in the 'Comment' field on the CAD screen would enable consistent (post-event) extraction of AACN data from comment field using an automated software script (e.g., verbal statement from TSP that "crash delta velocity was 38 mph and OnStar injury severity prediction is 32%" could be entered 'DV=38mph', 'ISP=32%'. Actual number of keystrokes may even be fewer than typically used now by call taker.

[6] Given that selection and format of AACN data element fields for inclusion in Stage 2, 3 electronic message are still under review, AACN defined fields created on PSAP screen in this option will likely need to be changed when Stage 2, 3 fully implemented. This approach may, therefore, be a little premature.

[7] Sharing (viewing) PSAP screen can be done live using CAD Status if this software is installed at PSAP. Otherwise, image of screen (with updates) can be transmitted to a stakeholder (password-protected) website where it can be preserved after the event.

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### 3.2.3 Evaluation of Pathways and Definition of Approach for Montana

CARS provided a valuable route for making detailed AACN data from OnStar available to research projects in Minnesota and Alabama. These projects demonstrated the value of AACN data for emergency response. CARS has also proven to be a viable *operational* route for getting detailed AACN data to the EMS responders in Idaho where the EMS dispatch process for the state is centralized. However, given the distributed nature of emergency dispatch and decision-making in Montana, the CARS route does not appear easy (and may not be cost-effective) to implement and maintain, given that Montana is not using CARS for any other incident or highway management support (unlike Idaho). With CARS resident on a state server with no linkage to the 9-1-1 system, concerns related to how responding agencies will be alerted that data is available and will responding agencies have the time or opportunity to access a website to view data in the middle of a response, are issues which must be considered. On the plus side, some AACN display, archive, and injury prediction software (i.e., URGENCY) would be available from Idaho which would reduce some implementation costs. However, CARS is limited to receiving OnStar data only (no ATX or Hughes data), and there are no guarantees of future support by OnStar. CARS also does not, at this time, receive the OnStar ISP. If the URGENCY algorithm is used in place of ISP, seat belt use is not included because of privacy reasons, in the AACN data provided to CARS and cannot be used in the URGENCY calculation unless seat belt use is acquired from a conversation with vehicle occupants.

Priority Access is an attractive route because it gets the initial crash alert into the 9-1-1 emergency system and when Stage 2 and 3 are fully implemented, will forward AACN electronic data to the local PSAP CAD system rather than to a computer at a state or municipal agency. Priority Access is also moving along a pathway which will merge/be consistent with Next Generation 9-1-1 and is therefore a solution for the future. It furthermore provides a route which accommodates all AACN systems and telematics service providers (OnStar, ATX, and Hughes Telematics) as well as all operational models (e.g., TSP vs. Ford Sync model). Finally, Priority Access, when fully implemented, is expected to electronically deliver the Injury Severity Prediction (ISP), which uses seat belt status as input to the ISP algorithm.

The benefits and drawbacks of the two primary (non-traditional) pathways, namely Priority Access and the CARS system, are summarized in Table 2**.**

*Table 2. Benefits and Drawbacks of Pathways*

| **Priority Access (to 9-1-1 PSAP)** | | **CARS (to a State Server)** | |
|---|---|---|---|
| Benefits | Drawbacks | Benefits | Drawbacks |
| • Will provide access to OnStar ISP algorithm<br>• Expected to provide access to other AACN systems (besides OnStar)<br>• No recurring costs<br>• Pathway to future NG911<br>• PSAP may share record with local EMS stakeholders. | •Would require PSAP to record verbal data from TSP into digital record until Stage 2 is operational. | • Currently provides detailed digital crash data.<br>• Some display, archive & ISP algorithm software may be available from Idaho | •No Linkage to 9-1-1 or emergency agencies. Issues with alerts & access to data.<br>• Both acquisition costs & ongoing costs need to be confirmed /addressed.<br>• Currently limited to OnStar data only. No guarantees of future support by OnStar.<br>• Not expected to receive the OnStar ISP data. |

In May 2011, the Research project technical panel selected Priority Access using CAD Status. As this option was pursued, it became apparent (during discussion with PSAP staff) that any changes made to the PSAP screen (i.e., the addition of new data fields) would be a lengthy process because of the approvals needed to modify an operational 9-1-1 screen. Although this modification will have to be done when the full AACN data set is ready for delivery electronically, it seemed premature to do so now when requirements and standards for this delivery were not yet fully defined. However, an opportunity to develop an interim (and simple) solution for electronically capturing AACN data presented itself. If verbally-received AACN information (such as crash delta velocity, ISP, etc.) is entered in a prescribed manner into the 'Comment' field on the PSAP screen, this data could be shared with emergency responders in near real time via CAD Status and consistently documented electronically in the PSAP call record, without significantly adding to the PSAP call-taker's work load. Post-event, the AACN data could be extracted from the 'Comment' field using (as suggested by PSAP staff), an automated software script which searches for the 'prescribed text' and exports it with rest of crash record to a file for inclusion in the AACN research database. This crash record could also be made available for incorporation into the patient medical record to document mechanism of injury. This hybrid (part manual, part automated) approach for recording verbally-provided AACN data provides a relatively simple mechanism to collect the data of interest when relatively few crash events are experienced (as is the case, at present, in Montana). This approach could also be implemented in PSAPs with varied types of computer or CAD systems.

Once State 2/33 Priority Access is available and local approvals to change PSAP screen are obtained, AACN data will automatically populate designated fields on the PSAP screen. When this occurs, PSAP call takers and emergency responders will already be quite familiar with the data and its use.

### 3.2.4 Selection of PSAP Test Site for Demonstration

Criteria for PSAP selection included: 1) interest and willingness of the site (and its response agencies) to participate in the project, 2) site should be located in a geographic area that experiences a relatively large number of crash events and 3) site should be located in an area that has a trauma center.

Data on the total number of fatal and injury crashes for the candidate locations were compiled from various Montana state sources. Cities with trauma centers in Montana were then identified. Table 3 provides a tabulation of this information. The shaded areas indicate maximum values in each column.

*Table 3 Data to Support Site Selection*

| City with Trauma Center | County | Trauma Center (TC) Levels (b) | Fatal Crashes (K)* (2008-2009) in County (a) | Serious Injury Crashes* (K+A+B) in County (2008-2009) (a) | Total Non-Fatal Injury Crashes (A+B+C)* (2008-2009) (a) | County Population (7/1/2009) (c) | Other Considerations |
|---|---|---|---|---|---|---|---|
| Missoula | Missoula | II, III | 31 | 771 | 1425 | 109623 | -Proximity to UMT staff.<br>-Two TCs (II, III) |
| Billings | Yellowstone | II, II | 43 | 658 | 2018 | 144797 | -Two TCs (II, II) |
| Kalispell | Flathead | III | 36 | 583 | 980 | 89624 | |
| Great Falls | Cascade | II | 13 | 421 | 1046 | 82178 | |
| Bozeman | Gallatin | III | 16 | 357 | 776 | 90343 | |
| Butte | Silver Bow | III | 12 | 135 | 291 | 32949 | |

Sources:
a) Crash Data: http://www.mdt.mt.gov/publications/datastats/crashdata.shtml (K=killed, A=incapacitating injury, B=non-incapacitating injury, C=possible injury, O=no injury.)
b) Trauma Center Data: http://www.facs.org/trauma/verified.html
c) Population Data: http://ceic.mt.gov/EstimatesCntyPop.asp

After reviewing the candidate locations, the research team and the project technical panel concurred that the demonstration be conducted in Missoula County. Inquiries were made with OnStar to estimate the total number of AACN calls that might be expected in Montana. In a recent one-year period (June 2010 to end of May 2011) Montana had a little less than 100 actual AACN events[30]. This number is expected to increase as more vehicles with the advanced systems make their way into the fleet. However, this figure can be used now to estimate how many AACN crashes might be expected per month in Missoula County. According to 2010 crash statistics for Montana, the total number of fatal plus(+) injury crashes for the whole state of Montana was 5133 of which 601 (11.7%) occurred in Missoula County (MDT, 2010). The total number of fatal plus (+) incapacitating injury crashes for the state was 943 of which 163 (17.2%) occurred in Missoula County. Scaling the annual number of AACN crashes in Montana using these percentages, it is expected that Missoula County will see somewhere between 11 and 17 of the expected 100 AACN crashes in Montana in a year (or between 0.975 and 1.43 crashes per month).

30 Jeff Joyner (OnStar), email message to authors, June 10, 2011.

### 3.2.5 Approach for Archiving AACN Data

A mechanism is required for archiving the AACN data as it is collected so that it is available in a form useful for review by clinicians interested in mechanism of injury, as well as for researchers working to validate injury severity prediction algorithms. Stakeholders were engaged in an iterative process to design and test a password-protected, web-based data archive. Beta testing of the archive was performed using mock data and access was provided to both the stakeholders and members of the technical panel. Several modifications to the website and data archive were made in response to their feedback.

The information technology (IT) staff at the Missoula PSAP created an automated software script that scans the PSAP database for OnStar calls. This script is automatically run once each week and the Excel file it produces is emailed to the organization maintaining the server for the MT-AACN database even if no OnStar calls are received, in which case, the contents of the data fields are blank. (The database is currently housed at CUBRC but will eventually transition to MT DPHHS). This extraction of selected information from the PSAP call record database and emailing of summary reports follows standard (approved) PSAP reporting procedures. Figure 7 on the next page shows the 'Home' page for the website. The black navigation bar at the top allows the user to access the 'Home', 'About', 'Stakeholders', 'Background', and 'Contact Us' pages without logging into the site. Clicking either 'Login' or 'Data' will bring up the username/password page which enables registered users to view the AACN records.

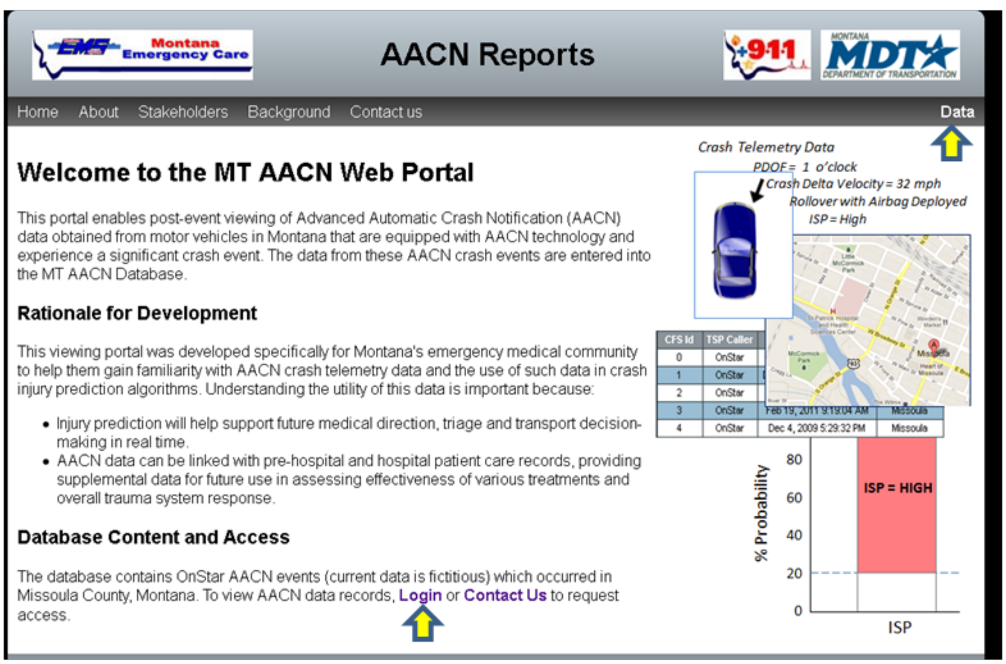



*Figure 7. Home page of the MT AACN database website*

Figure 8 shows an image of material contained on the 'About' page including information on the origin of the AACN data which will be housed in the database.

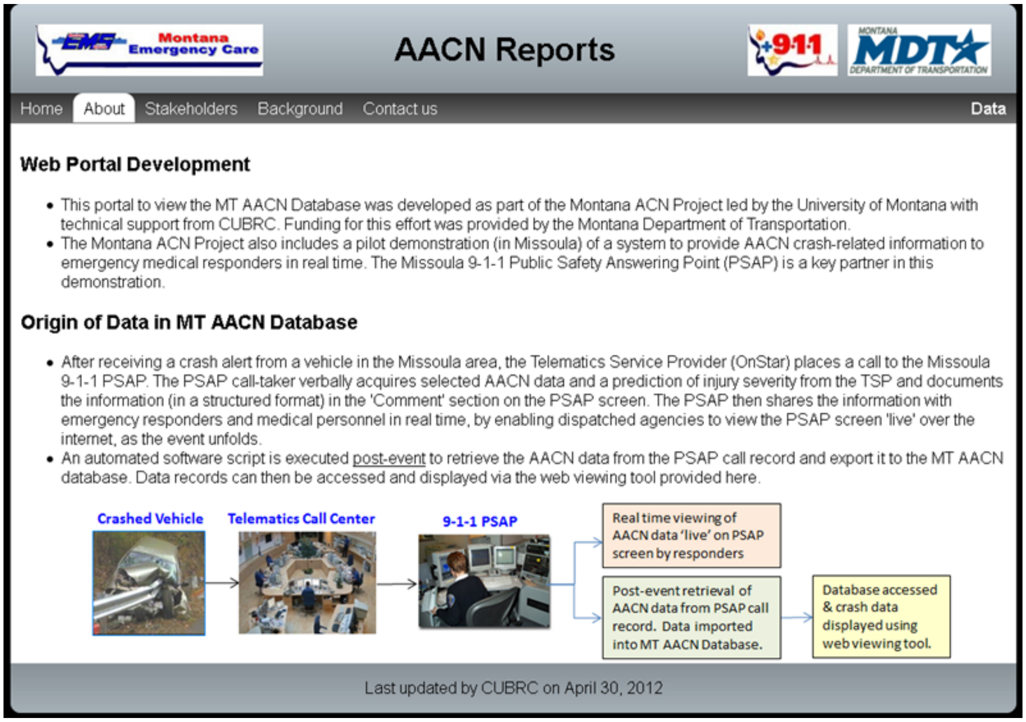



*Figure 8. Webpage portal and the origin of AACN data*

Figure 9 shows the page which appears when 'Data' or 'Login' is clicked on the Home page and Username and Password is entered. The table at the top lists all the AACN records currently in the database. Note that crash records shown in the figure are simulated test data for illustration purposes, not actual AACN events. The column headers in the table can be used to sort the records. There is also a Search tool which allows the user to display only those crashes with selected criteria (e.g., Multiple Impact = True, or Crash Delta Velocity greater than XX mph, or ISP = High, etc.). Note: Current version of OnStar ISP algorithm is valid for 'planar' crashes only (Kononen et al., 2011). It is possible that ISP will not be provided by OnStar (at this time) if Rollover=True.

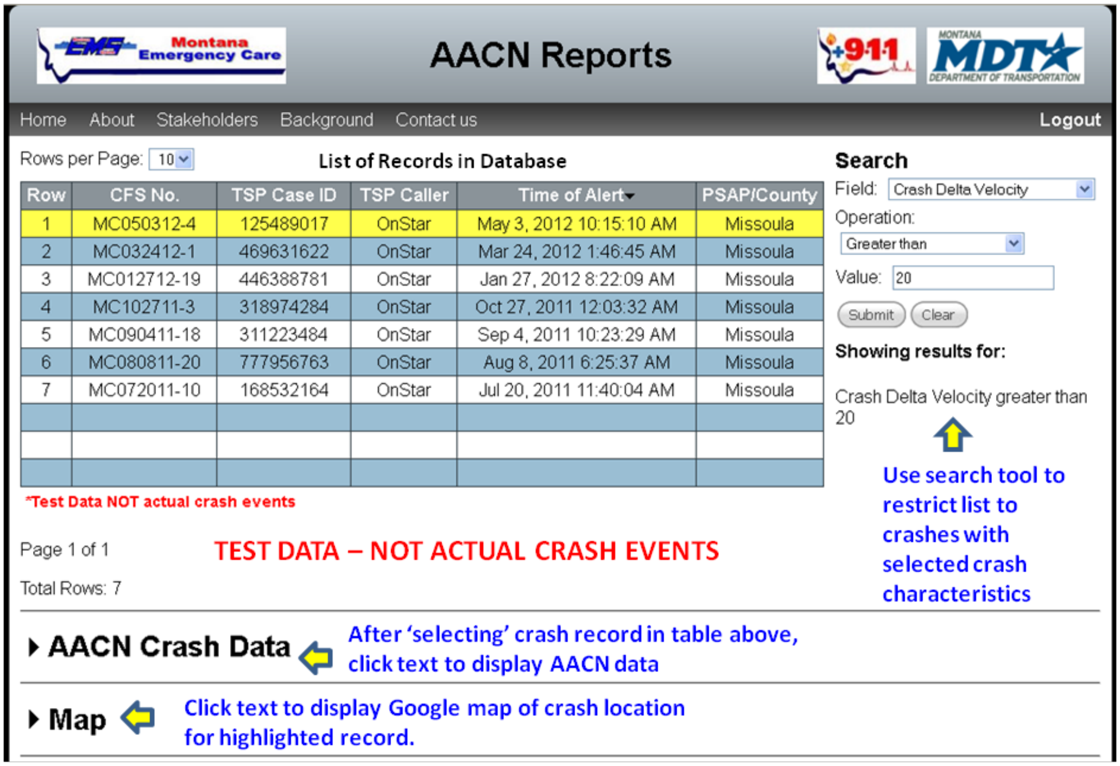



*Figure 9. List of simulated crashes in database.*

Figure 10 shows how the AACN data for a selected AACN crash record is displayed (again, data is from a simulated crash event) and Figure 11, on the following page, shows a Google map of the simulated crash location.

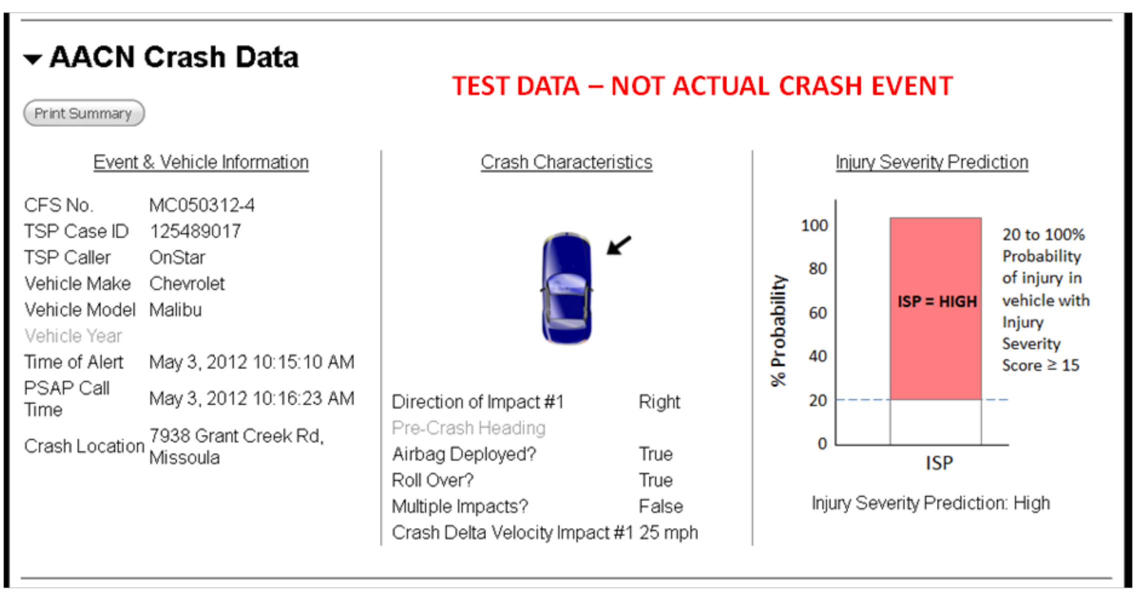



*Figure 10. AACN data for crash record 'selected' in previous figure.*

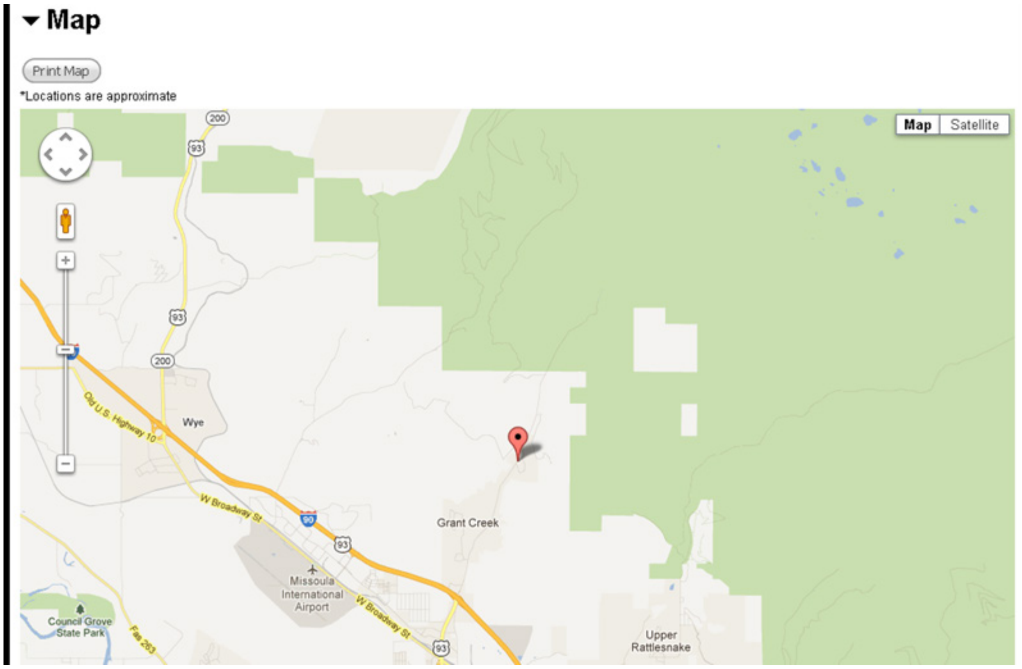



*Figure 11. Google Map showing Crash Location*

## 3.3 Test Call Demonstration

### 3.3.1 Preliminary Organization & Planning

The CUBRC research staff visited Missoula and met with each of the local stakeholders at their facilities to secure their involvement in the organization and execution of an OnStar AACN test call demonstration where AACN data is acquired at the PSAP and shared with emergency agencies and hospitals. The stakeholders (full list in Appendix A) included Chris Lounsbury (PSAP), Don Whalen (Missoula Emergency Services Incorporated), John Bleicher (St. Patrick's Hospital), Traci Jasnicki and John Stred (Community Hospital), and Larry Peterman (LifeFlight). During the visits, the researchers presented the proposed test and solicited inputs from the local stakeholders on both the content and plan of operations, which resulted in several refinements.

Following the site visit to Montana, CUBRC staff continued to work with Chris Lounsbury, Missoula Emergency Services Director, to plan the Missoula demonstration. They negotiated an arrangement to integrate the AACN demonstration into ongoing PSAP protocol and planned for recording of the AACN data received verbally from the OnStar Advisor using "prescribed" free text in the 'Comment' field on the PSAP CAD screen. A live image of the PSAP screen would then be shared with stakeholders for real time operational access to the AACN data. This data would subsequently be extracted from electronic PSAP records and archived in the MT AACN Database for later use in analysis and research. In response to stakeholder requests, the research staff also developed a tutorial on injury severity prediction (Blatt, 2011) and another on the concept of operations for the collection and use of OnStar-provided Injury Severity Prediction (ISP) (Blatt and Flanigan, 2012). The intent was to use these tutorials to help orient emergency response staff prior to the demonstration.

A script was prepared for the AACN test call, which described the simulated crash event. Table 4 (Section 2) summarizes the simulated AACN data which was to be requested by the PSAP call taker during his/her conversation with the OnStar Advisor. Also shown in the figure is other simulated test data routinely ‘acquired’ by the call taker (Section 1) and by EMS at the scene (Section 3).

The script also contained specific instructions for each of the participants at the various sites. It basically provided a demonstration time line and actions that would be taken by each participant. A copy of the full script is contained in Appendix C.

*Table 4. AACN test call data provided in script to particpants*

| 1. Standard Data - Currently received or acquired by PSAP Call Taker from OnStar Caller | | |
|---|---|---|
| Item | Sample input | Notes |
| Caller Name | OnStar TEST | CAD data field automatically populated (Priority Access Phase 1) |
| Call Back Number | 800-xxx-yyyy | CAD data field automatically populated (Priority Access Phase 1) |
| Vehicle Make | Chevrolet | Verbally acquired; entered into CAD / Comment Field |
| Vehicle Model | Malibu | Verbally acquired; entered into CAD / Comment Field |
| OnStar Case Number | 125489017 | Verbally acquired; entered into Comment Field |
| PSAP Call Date | mo/day/year | CAD data field automatically populated |
| PSAP Call Time | hr:min | CAD data field automatically populated |
| Incident Street | 7938 Grant Creek Rd | Verbally acquired; entered into CAD |
| Incident City | Missoula | Verbally acquired; entered into CAD |
| Number Injured | 2 | Verbally acquired (if TSP contact with vehicle occupants); entered in CAD |

| 2. Additional AACN Parameters - Verbally requested from OnStar and entered in PSAP 'Comment Field' using pre-defined notation (2nd column) below: | | |
|---|---|---|
| Item | Sample input | Notes |
| Injury Severity Prediction | ISP HIGH | Reported (by OnStar) as HIGH or LOW (but computed as percentage). |
| Multiple Impacts? | MIMP No | |
| Crash Delta Velocity (mph) | DV1 25 | Units are miles/hour. (Can be a DV2 if Multiple Impacts (i.e. if MIMP Yes) |
| Direction of Impact | DIR IMP1 from Right | Choices are Front, Right, Left or Rear. (Can be a DIR IMP2 if MIMP=Y; Here only first (or max) impact delta V and direction recorded) |
| Rollover? | Rollover Yes | See Note** |
| Time of Alert | (hrs:min) | Time alert received at TSP (OnStar). |

| 3. Other Test Data 'Acquired' by EMS (simulated at scene) | | |
|---|---|---|
| Item | Sample Input | Notes |
| Patient 1 | -Unbelted male, 45 yrs old, ejected<br>-Injuries / vitals (defined by EMS);<br>-Transport by air (LifeFlight) to St Patrick's Hospital<br>-Chevrolet Malibu | Passenger, OnStar Vehicle |
| Patient 2: | -Belted male, 50 yrs old;<br>-Injuries / vitals (defined by EMS)<br>-Transported by ground (MESI) to Community Medical<br>-Chevrolet Malibu | Driver, OnStar vehicle |
| Patient 3: | -Belted female, 65 yrs old;<br>-Injuries / vitals (defined by EMS);<br>-Transported by ground (MESI) to St Patrick Hospital.<br>-Ford Focus | Driver, Non-OnStar vehicle.<br>TRANSPORT NOT SIMULATED IN TEST CALL |

### 3.3.2 AACN Message Routing Demonstration

The Advanced Automatic Crash Notification (AACN) message routing demonstration was conducted in Missoula, MT on May 3, 2012. The demonstration was conducted to illustrate how crash telemetry data from a motor vehicle equipped with OnStar could be effectively captured for use by emergency responders and medical providers in real time, as well as archived for later use by clinicians and researchers. The demonstration took place at five Missoula locations, namely: Missoula 9-1-1 Public Safety Answering Point (PSAP), Missoula Emergency Services, Inc. (MESI) Ground Ambulance Depot, Community Medical Center, Life Flight Air Medical Base, and St. Patrick's Hospital. Missoula City Police observed the call at the 9-1-1 PSAP. Participants at the PSAP included Chris Lounsbury (Missoula County Emergency Services Director), the 9-1-1 call taker on duty, and Drew Koepke (PSAP Technology Coordinator). Figure 12 and Figure 13 summarize the key activities performed at each of the sites.

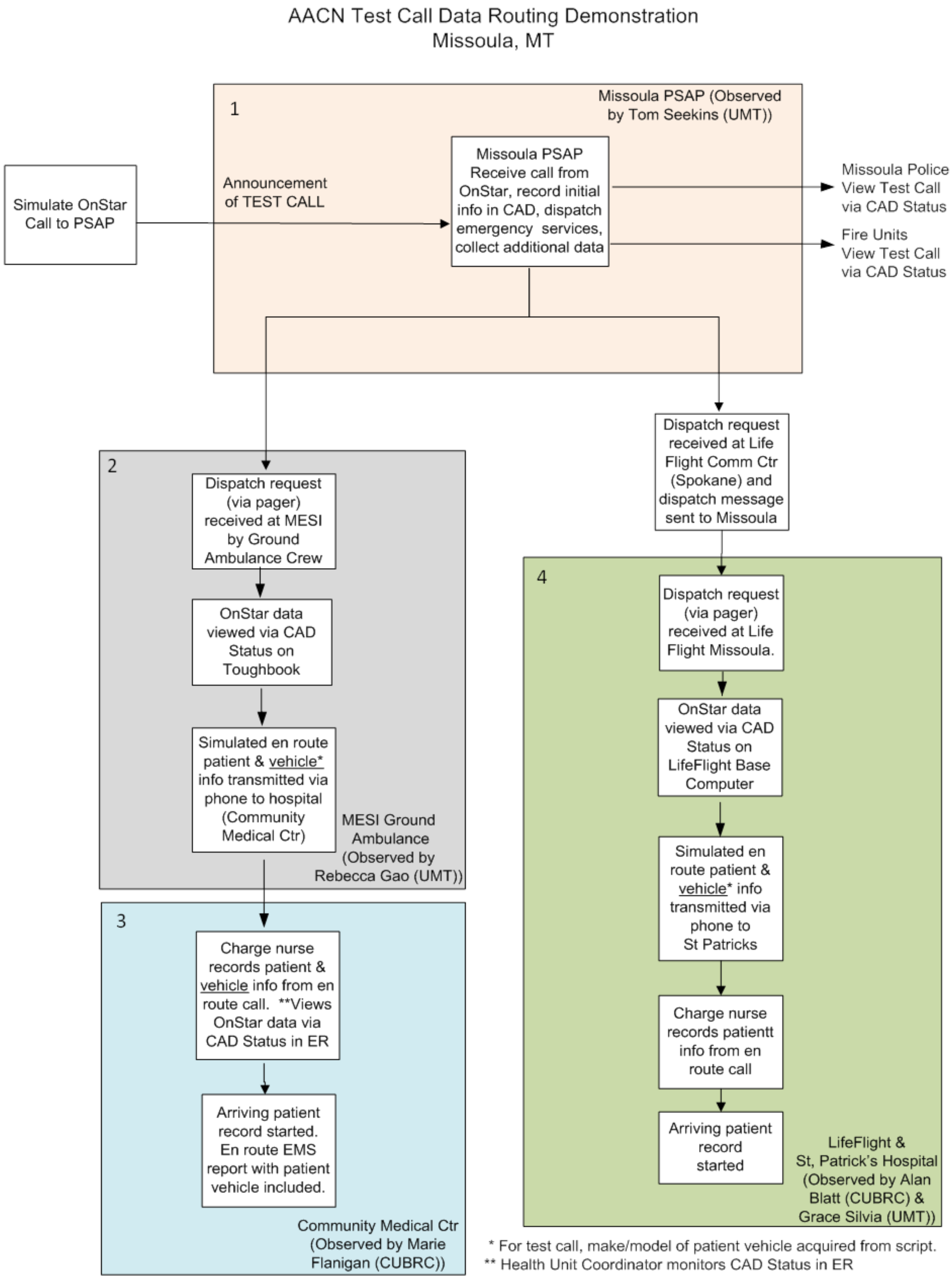



*Figure 12. Activities at AACN Data Routing Demonstration Sites in Missoula*

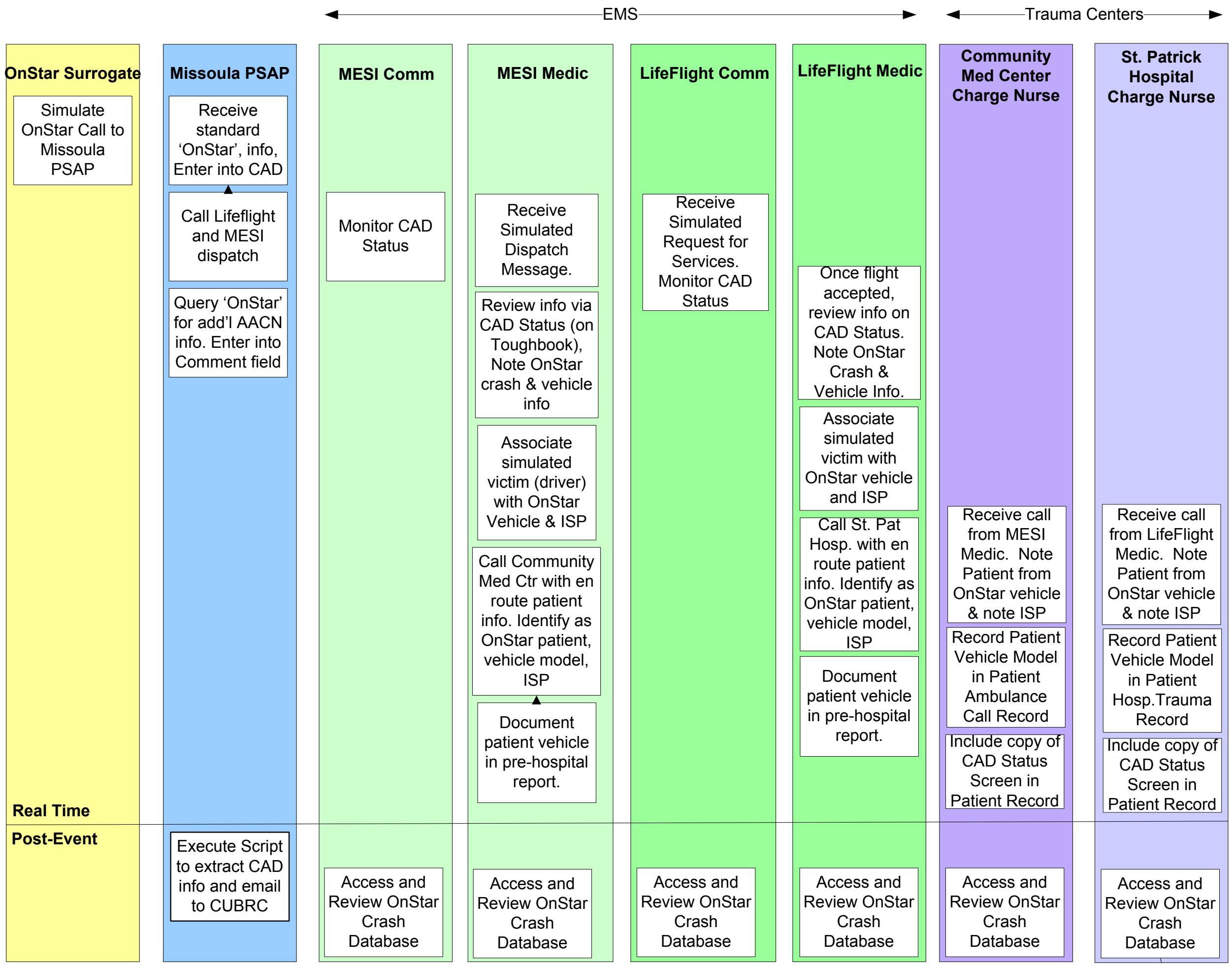



*Figure 13. Actvities at AACN data routing sites as they evolved*

## 3.4 Results and Findings

### 3.4.1 Linkage of AACN Data to Vehicle Occupant

One of the key findings of the test call actually became apparent during the planning for the demonstration. In a multi-vehicle crash, the AACN crash telemetry data and the resulting ISP only applies to the occupants of the OnStar AACN-equipped vehicle. What was not appreciated previously was that once the occupants were removed from the vehicles, traceability of occupant to vehicle could be lost unless someone at the scene makes note of which crash victim came out of the AACN-equipped vehicle. Furthermore, if both vehicles in a crash are AACN-equipped, there will be two ISP values. It will therefore be necessary to note the actual make and model of each vehicle and document which patient came out of which vehicle so that the correct ISP is applied to the correct patient. As a result, one of the requirements placed on the EMS responders participating in the test call, was that they must learn the make/model of the vehicle their patient was in and communicate it to the charge nurse at the hospital, either during the en route patient report or when the ambulance (or helicopter) arrives at the hospital. For the purposes of the demonstration, the make/model of each vehicle was provided in the script. However, the requirement to determine make/model of the patient vehicle at an actual emergency scene cannot be placed solely (if at all) on the EMS provider since care of the injured patient comes first.

Alternatively, if all first responders, police, and EMS who respond to a scene are made aware of the importance of this information, someone is likely to have the time to verify and communicate this information verbally to the paramedic. Protocols for how this might be accomplished most effectively should be left to the local response agencies.

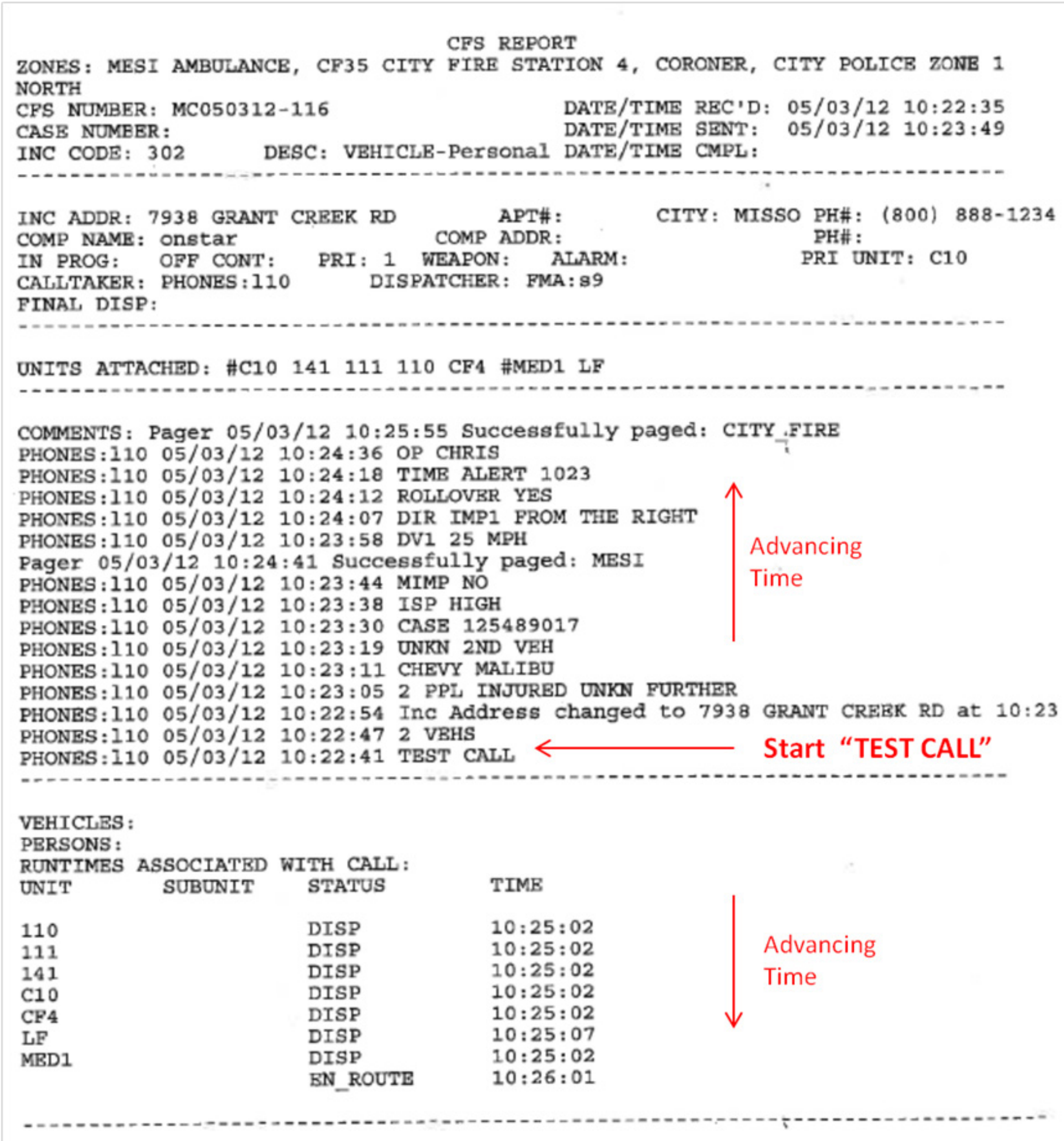
Make and model of the OnStar vehicle is one of the required parameters, which the PSAP will obtain from the OnStar Advisor, should this information not be otherwise volunteered.

### 3.4.2 Test Call Demonstration Results

***Activity at the PSAP*** - Activities at the PSAP are shown in box '1' in Figure 12. At 10:22 MDT, Chris Lounsbury, acting as the OnStar Advisor, placed the simulated call from OnStar to the Missoula 9-1-1 PSAP. Figure 14 contains the Computer Aided Dispatch (CAD) Call for Service (CFS) record. This figure shows (at top right) that at 10:22:35 the call from OnStar was received. At 10:22:41, the PSAP call taker began the call record with the notation 'TEST CALL.' She then entered the initial information on the simulated OnStar crash. This information indicated two vehicles were involved, the crash occurred at 7938 Grant Creek Road,[31] and two people were known injured.[32] At this point, the call taker announced to the room that they had an injury crash. A dispatcher (in the same room) acknowledged the call taker's statement and immediately began the dispatch process, while the call taker continued to enter information acquired from the OnStar advisor. This information included the following facts:

- That the OnStar vehicle was a Chevy Malibu
- The second vehicle type was unknown
- The case number assigned by OnStar was 125489017[33]
- The Injury Severity Prediction (ISP) was HIGH, there were no multiple impacts (MIMP No), the delta velocity (DV1) experienced in the crash was 25 mph
- The direction of impact (DIR IMP1) was from the right and a rollover occurred
- The 'time of alert' (when OnStar first received the crash message) was provided

[31] Note: Since the call was placed by Chris Lounsbury from the PSAP building, the incident address had to be 'changed' from the (auto-populated) PSAP address to the incident address on Grant Creek Rd. This is reflected in the entry at 10:22:54.
[32] Number of people injured would come from the OnStar Advisor talking with occupants in the car, NOT from crash telemetry.
[33] The OnStar Case number is important should re-connection with OnStar be necessary, or if post-event follow up is needed.



```
                              CFS REPORT
ZONES: MESI AMBULANCE, CF35 CITY FIRE STATION 4, CORONER, CITY POLICE ZONE 1
NORTH
CFS NUMBER: MC050312-116                   DATE/TIME REC'D: 05/03/12 10:22:35
CASE NUMBER:                               DATE/TIME SENT:  05/03/12 10:23:49
INC CODE: 302      DESC: VEHICLE-Personal  DATE/TIME CMPL:
-----------------------------------------------------------------------------

INC ADDR: 7938 GRANT CREEK RD        APT#:       CITY: MISSO PH#: (800) 888-1234
COMP NAME: onstar               COMP ADDR:                    PH#:
IN PROG:   OFF CONT:   PRI: 1  WEAPON:   ALARM:              PRI UNIT: C10
CALLTAKER: PHONES:110      DISPATCHER: FMA:s9
FINAL DISP:
-----------------------------------------------------------------------------

UNITS ATTACHED: #C10 141 111 110 CF4 #MED1 LF
-----------------------------------------------------------------------------

COMMENTS: Pager 05/03/12 10:25:55 Successfully paged: CITY_FIRE
PHONES:110 05/03/12 10:24:36 OP CHRIS
PHONES:110 05/03/12 10:24:18 TIME ALERT 1023
PHONES:110 05/03/12 10:24:12 ROLLOVER YES
PHONES:110 05/03/12 10:24:07 DIR IMP1 FROM THE RIGHT
PHONES:110 05/03/12 10:23:58 DV1 25 MPH
Pager 05/03/12 10:24:41 Successfully paged: MESI
PHONES:110 05/03/12 10:23:44 MIMP NO
PHONES:110 05/03/12 10:23:38 ISP HIGH
PHONES:110 05/03/12 10:23:30 CASE 125489017
PHONES:110 05/03/12 10:23:19 UNKN 2ND VEH
PHONES:110 05/03/12 10:23:11 CHEVY MALIBU
PHONES:110 05/03/12 10:23:05 2 PPL INJURED UNKN FURTHER
PHONES:110 05/03/12 10:22:54 Inc Address changed to 7938 GRANT CREEK RD at 10:23
PHONES:110 05/03/12 10:22:47 2 VEHS
PHONES:110 05/03/12 10:22:41 TEST CALL
-----------------------------------------------------------------------------

VEHICLES:
PERSONS:
RUNTIMES ASSOCIATED WITH CALL:
UNIT       SUBUNIT     STATUS        TIME

110                    DISP          10:25:02
111                    DISP          10:25:02
141                    DISP          10:25:02
C10                    DISP          10:25:02
CF4                    DISP          10:25:02
LF                     DISP          10:25:07
MED1                   DISP          10:25:02
                       EN_ROUTE      10:26:01
-----------------------------------------------------------------------------
```



*Figure 14. Call for service (CFS) report from PSAP CAD screen*

While the call taker was acquiring and entering this information, the dispatcher had already begun paging emergency services via radio/phone. This voice page began with "This is a test, this is a test, do not respond." She then conveyed information about the crash event as presented on the CAD screen, repeating 'This is a test, do not respond' midway through the incident description. The dispatcher sent (voice and text) pager messages for the 'simulated dispatch' request to MESI (MED-1 ground ambulance), first responders from City Fire (Units 141, 111, 110, CF4), Life Flight (LF) (both directly and through the Spokane air medical communication center) and Missoula City Police (Unit C10). The 'Unit' numbers for these responding agencies are listed at the bottom of the PSAP CAD screen shown in Figure 14. (Note: Agency names associated with the unit numbers are provided in a figure presented in the next section.)

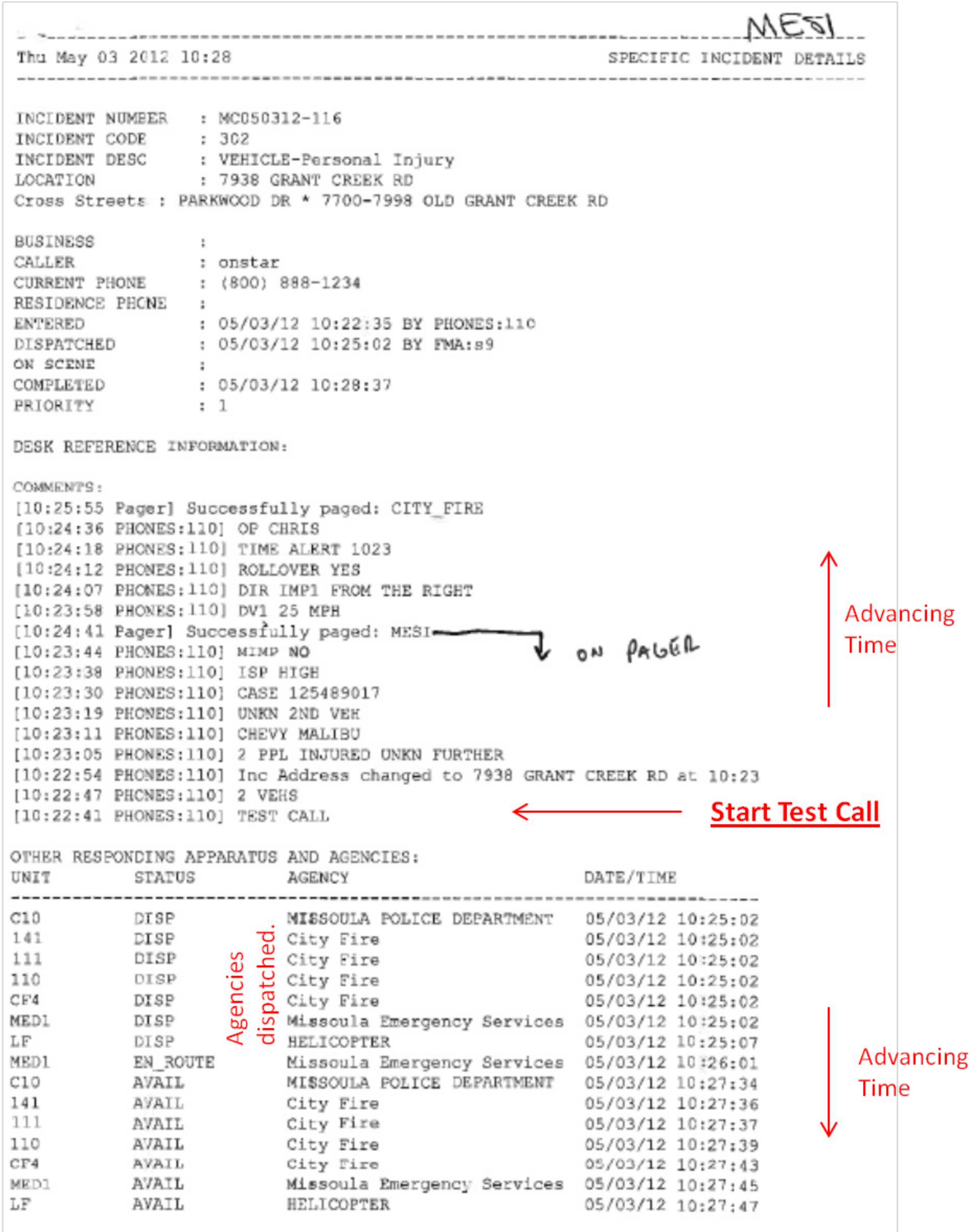
All dispatched agencies as well as the two trauma centers in Missoula were able to view the PSAP CAD screen 'live' over the internet via CAD Status software. This software automatically updates displays at the response agencies every 30 seconds.[34] CAD Status capability is important as it provides the mechanism which allows near real-time sharing of the OnStar AACN information with emergency response services and receiving hospitals.

***Activity at MESI Ground Ambulance Base.*** Missoula Emergency Services, Inc. (MESI) is the local ground ambulance provider. Test participants from MESI included Matt Bierer (paramedic) who participated from the Burlington Avenue ambulance base, and Don Whalen (MESI Regional Manager) who was at Community Medical Center. Rebecca Gao from the University of Montana, acted as the observer for the research team during the test call. Marie Flanigan (CUBRC) met briefly with MESI staff before and after the test call.

Activities at MESI are shown in box '2' on the left side of Figure 12**.** Paramedic Matt Bierer received the alert for the OnStar test call on his pager. Using his ToughBook (laptop) computer with CAD Status, he observed the AACN information as it was posted on the PSAP screen shows the information displayed (see Figure 15). The data viewed by the paramedic in the field using the Toughbook, is also viewed by MESI staff on the desktop computer at the MESI base.

After a few minutes, Paramedic Bierer placed a phone call to the charge nurse at Community Medical Center and provided a (simulated) patient en route status report. The report to the charge nurse contained the usual patient medical information (i.e., vitals, injuries, and treatments). In addition, he reported to the charge nurse the patient was in an OnStar crash and the patient was an occupant of the Chevy Malibu (determined from test call script). He also reported a rollover had occurred, impact was from the right, ISP was HIGH, (delta) velocity was 25 mph, and time of alert (to OnStar) was 10:23 am. Note: This 'time of alert' provides the best estimate of 'time of injury', which is useful information for medical providers.

[34] CAD Status can be installed on any computer that supports JAVA and has high-speed internet access. If an agency is connected to CAD Status, they have the ability to print the 'call for service' data as it is ongoing (See "Montana's Motor Vehicle Crash Data Infrastructure", MT AACN Project Task 1 Report, Amanda Golbeck, Kathy Humphries, Julie Stevens, April 30, 2010).



```
Thu May 03 2012 10:28                                  SPECIFIC INCIDENT DETAILS

INCIDENT NUMBER    : MC050312-116
INCIDENT CODE      : 302
INCIDENT DESC      : VEHICLE-Personal Injury
LOCATION           : 7938 GRANT CREEK RD
Cross Streets : PARKWOOD DR * 7700-7998 OLD GRANT CREEK RD

BUSINESS           :
CALLER             : onstar
CURRENT PHONE      : (800) 888-1234
RESIDENCE PHONE    :
ENTERED            : 05/03/12 10:22:35 BY PHONES:110
DISPATCHED         : 05/03/12 10:25:02 BY FMA:s9
ON SCENE           :
COMPLETED          : 05/03/12 10:28:37
PRIORITY           : 1

DESK REFERENCE INFORMATION:

COMMENTS:
[10:25:55 Pager] Successfully paged: CITY_FIRE
[10:24:36 PHONES:110] OP CHRIS
[10:24:18 PHONES:110] TIME ALERT 1023
[10:24:12 PHONES:110] ROLLOVER YES
[10:24:07 PHONES:110] DIR IMP1 FROM THE RIGHT
[10:23:58 PHONES:110] DV1 25 MPH
[10:24:41 Pager] Successfully paged: MESI
[10:23:44 PHONES:110] MIMP NO
[10:23:38 PHONES:110] ISP HIGH
[10:23:30 PHONES:110] CASE 125489017
[10:23:19 PHONES:110] UNKN 2ND VEH
[10:23:11 PHONES:110] CHEVY MALIBU
[10:23:05 PHONES:110] 2 PPL INJURED UNKN FURTHER
[10:22:54 PHONES:110] Inc Address changed to 7938 GRANT CREEK RD at 10:23
[10:22:47 PHONES:110] 2 VEHS
[10:22:41 PHONES:110] TEST CALL

OTHER RESPONDING APPARATUS AND AGENCIES:
```

| UNIT | STATUS | AGENCY | DATE/TIME |
|---|---|---|---|
| C10 | DISP | MISSOULA POLICE DEPARTMENT | 05/03/12 10:25:02 |
| 141 | DISP | City Fire | 05/03/12 10:25:02 |
| 111 | DISP | City Fire | 05/03/12 10:25:02 |
| 110 | DISP | City Fire | 05/03/12 10:25:02 |
| CF4 | DISP | City Fire | 05/03/12 10:25:02 |
| MED1 | DISP | Missoula Emergency Services | 05/03/12 10:25:02 |
| LF | DISP | HELICOPTER | 05/03/12 10:25:07 |
| MED1 | EN_ROUTE | Missoula Emergency Services | 05/03/12 10:26:01 |
| C10 | AVAIL | MISSOULA POLICE DEPARTMENT | 05/03/12 10:27:34 |
| 141 | AVAIL | City Fire | 05/03/12 10:27:36 |
| 111 | AVAIL | City Fire | 05/03/12 10:27:37 |
| 110 | AVAIL | City Fire | 05/03/12 10:27:39 |
| CF4 | AVAIL | City Fire | 05/03/12 10:27:43 |
| MED1 | AVAIL | Missoula Emergency Services | 05/03/12 10:27:45 |
| LF | AVAIL | HELICOPTER | 05/03/12 10:27:47 |



*Figure 15. CAD Status Data as Displayed at MESI*

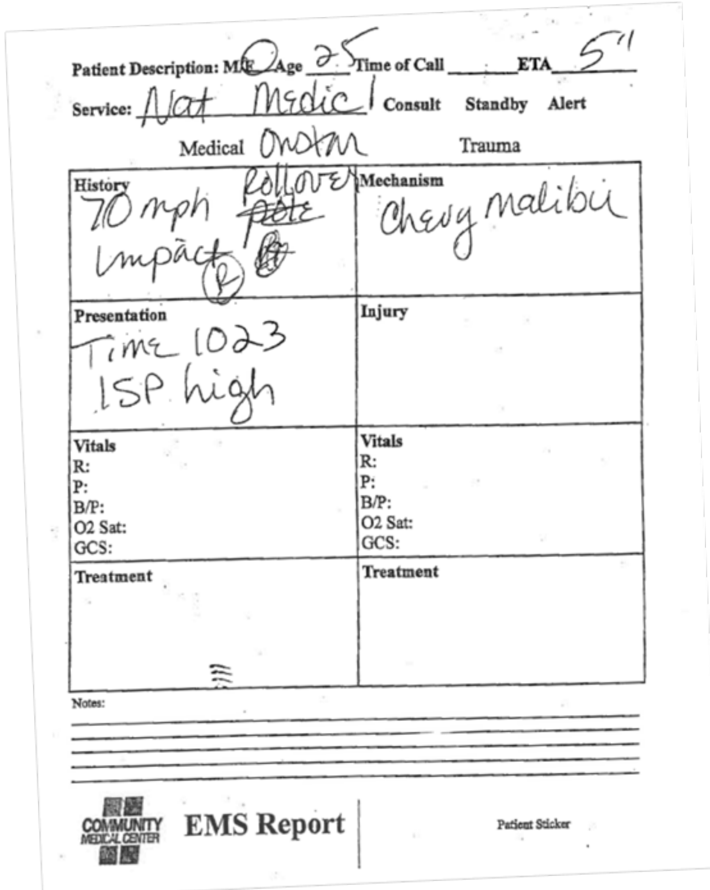
***Activity at Community Medical Center***. Community Medical Center (CMC) is a Level 3 Trauma Center in Missoula. Test call participants at Community included Jonathan Stred (Supervisor, CMC Emergency Services), Kristina MacGrady (Health Unit Coordinator), and the charge nurse on duty. Traci Jasnicki (Trauma Coordinator) briefly stopped by as did Don Whalen (MESI) and Philip Richards (Flight Paramedic, Careflight). Marie Flanigan (CUBRC) was the research team observer at CMC during the call.

The major test call activities at Community are summarized in box '3' of Figure 12. The test call activities took place at the nurse's station in the Emergency Department where the Charge Nurse and Health Unit Coordinator each had a desk. The Health Unit Coordinator typically monitors the CAD Status screen (among other duties), while the charge nurse is the usual recipient of the phone or radio call from the en route ambulance. If the charge nurse is away from her desk when a call comes in, the Health Unit Coordinator answers the call and pages the charge nurse.

Several minutes were spent providing the coordinator and the charge nurse with a summary of the test call objectives and their individual roles in the test activities. The importance of acquiring and recording the ISP and the make/model of the patient vehicle during the en route call from the ambulance was emphasized.

At 10:22 a.m., the CAD Status main screen on the Health Unit Coordinator's computer displayed a single line indicating that an incident involving a vehicle occurred on Grant Creek Rd. Note: There are no 'active' blinking or audio alerts when a new call is posted; however, the health unit coordinator periodically checks the CAD Status screen. The coordinator clicked on the new record and the details of the test 'call for service' were displayed along with the additional OnStar parameters. These parameters were noted and discussed. The data displayed on the CAD Status screen at CMC is identical to that observed at MESI and shown previously in Figure 15.

A few minutes later, a phone call from the MESI paramedic simulating the en route call from the ambulance was received at the charge nurse's station. The call was initially answered by the coordinator who paged the charge nurse. The charge nurse returned to her desk, spoke to the medic and completed the CMC 'EMS Report' form. This form has a column for medical patients where History, Presentation, Vitals and Treatment (HPVT) are listed, and a column for trauma patients where Mechanism, Injury, Vitals and Treatment (MIVT) are listed. Figure 16 shows this form along with the notes regarding the simulated OnStar crash taken by the charge nurse during the phone call from the MESI medic. In addition to the usual notations for age, gender, etc., the notes include 'OnStar', 'Rollover', '70 mph', 'Impact R' (Right), 'Time 10:23', 'ISP High' and 'Chevy Malibu'. The key information on the ISP and the make/model of the patient vehicle were successfully noted. It is also apparent that with the significant level of activity in the ED, the charge nurse experienced some difficulty hearing (e.g., 'Roll-over was first written as 'Pole' then corrected, and the delta velocity was not accurately recorded.) It is expected problems with voice communications over the radio or phones are not uncommon in this environment, due to background noise at the scene, in the ambulance or in the ED. This actually highlights an additional benefit of having the data available electronically in the ED on the CAD Status screen since this provides an alternate source to quickly verify information.



Patient Description: M/F Age 25 Time of Call ______ ETA 5"

Service: Nat Medic Consult Standby Alert

Medical Onstar Trauma

| History | Mechanism |
| --- | --- |
| 70 mph Rollover ~~pole~~ Impact | Chevy malibu |
| **Presentation** | **Injury** |
| Time 1023 ISP high | |
| **Vitals**<br>R:<br>P:<br>B/P:<br>O2 Sat:<br>GCS: | **Vitals**<br>R:<br>P:<br>B/P:<br>O2 Sat:<br>GCS: |
| **Treatment** | **Treatment** |

Notes:

COMMUNITY MEDICAL CENTER EMS Report | Patient Sticker

*Figure 16. EMS Report Completed by Hospital Charge Nurse at CMC*

### 3.4.3 Activity at Life Flight and St Patrick's Hospital Emergency Room

Life Flight is based at St. Patrick's Hospital, which is the Level 2 Trauma Center in Missoula. Test call participants from St. Patrick's and Life Flight included John Bleicher, RN (St. Patrick's Trauma Coordinator) and Larry Peterman, RN (Chief Flight Nurse, Life Flight). Observers from the research team included Alan Blatt (CUBRC) and Grace Silvia (University of Montana).

The activities at St. Patrick's Hospital, shown in box '4' on the right side of Figure 12, occurred in two locations within the hospital. The initial location was at the Life Flight office on the seventh floor of the hospital, co-located with the flight crew facilities and the helipad. Subsequent activities took place at the charge nurse's station in the Emergency Department.

***Life Flight*** - The demo began at St. Patrick's Life Flight office with the arrival of a dispatch notice on Larry Peterman's pager. This notice came from the Life Flight (MedStar) Communications Center in Spokane, Washington. Spokane dispatch does not routinely speak to Missoula 9-1-1; Spokane sends Life Flight a text page of the pertinent information they received from Missoula 9-1-1. The Life Flight crew also received a voice page from the Missoula PSAP.

Only a selected subset of the information available on the CAD Status display and/or transmitted by the Missoula PSAP to the Life Flight Communications Center was transmitted and displayed on the pager. This is because the protocol for dispatch of an air medical service dictates detailed information on the nature of the incident should not be provided until after the pilot conducts weather and flight safety checks and accepts the flight. This is to avoid undue pressure on the pilot to accept a mission if weather conditions indicate that the flight is not advisable. Information received on the pager for the test call included identification of the emergency as an OnStar car crash, the crash location, and arbitrarily selected data such as DV1. No information on the OnStar vehicle make and model or the Injury Severity Prediction (ISP) value was provided on the pager.

The CAD Status display was observed by the research team and stakeholder participants on the computer at the St. Patrick's Life Flight office. CAD Status is also displayed at the Spokane Communications Center.

The next step in the demonstration was to wait a few minutes after the dispatch was received and then have the flight nurse simulate the call that would typically be made by radio from the helicopter en route to the receiving hospital with information on the arriving patient. For the purposes of the test call, it was assumed the Life Flight crew had been able to identify their patient as having been an occupant of the OnStar equipped vehicle and they also had been advised of the other available OnStar related information (e.g. ISP). The flight nurse placed the call to the St. Pat's charge nurse and provided her with the typical information on injury mechanism (car crash, ejection, etc.), patient injuries/vital signs, treatments provided by the flight crew, and the OnStar related crash information, including the make/model of the patient vehicle.

After the call was made, the participants and observers all went from the Life Flight office to the charge nurse's station in the Emergency Department (where CAD Status can also be viewed) to see how the information had been recorded and to discuss how it could be associated with the incoming patient record.

***St. Patrick's Hospital ER*** - In the Emergency department, it was noted en route information provided by the flight nurse was simply written by the hospital charge nurse in a 'free form' format on a sheet of paper. Figure 17 shows the information recorded as part of this demonstration. This is typical of all en route information provided by ambulances and helicopters coming to St. Patrick's.

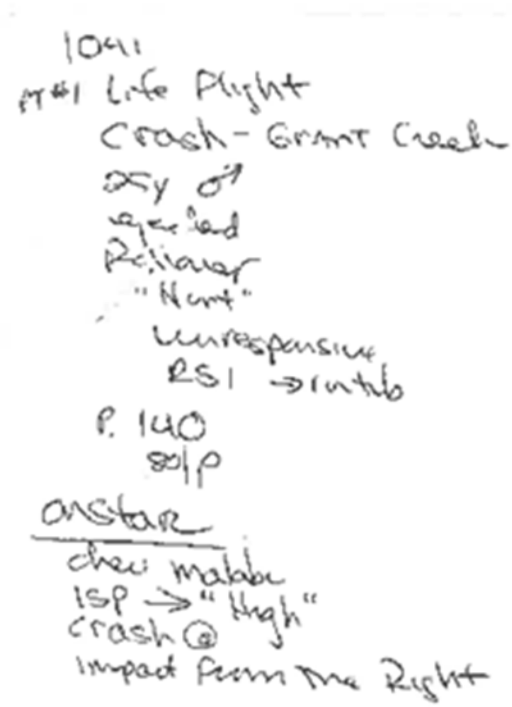



*Figure 17. St. Patrick Hospital Charge Nurse Notes*

### 3.4.4 Post Test Feedback and Actions

Feedback from participating stakeholders and observers is provided below, divided into three categories: 1) Real Time Operations, 2) Education and Training, and 3) Linkage and Documentation. More detailed discussion on these topics can be found in the full test call report (Flanigan et al., 2012).

***Feedback Related to Real Time Operations***. Both EMS and hospital providers indicated abbreviations used for a number of the AACN parameters were too cryptic. Terms must be easily read and interpreted in real time.

The paramedic indicated 'Airbag Status' (deployed, not deployed) would be useful to know at time of dispatch. This information was subsequently added to the requested AACN parameters. Note: a crash impact from the rear will not usually trigger an air bag deployment although an AACN alert can still be sent.

It is clear cooperation will be required amongst police, first responders, and EMS to ensure the make/ model of patient vehicle is communicated in a timely way to EMS personnel transporting that patient. It was suggested knowing the color of the OnStar car might help medics quickly assess if patient was in the OnStar car.

The flight nurse suggested either the Life Flight Base in Missoula or the Communications Center in Spokane could provide flight crew with AACN information from CAD Status during flight to scene. The MESI paramedic indicated strong interest in receiving (at time of dispatch) any available information on potential number of injured via CAD Status. Note: This information is available only if OnStar Advisor is able to talk with vehicle occupants.

Given that for an injury crash, EMS is simultaneously dispatched and usually gets to the scene before police, the possible use of ISP to identify crashes NOT requiring a police 'lights and sirens' response (i.e., if ISP=LOW) was raised by a police stakeholder.

Finally, given that background noise can occasionally make it difficult for the hospital charge nurse to clearly hear the EMS report over radio or phone, having access to the AACN data via CAD Status in the ED, provides an alternate source to confirm information on the crash event.

***Feedback Related to Education/Training***. There was interest expressed by emergency responders in seeing data on crash delta velocity and how it might relate to the likelihood of serious injury. There was also a request for a clear explanation of 'crash delta velocity'. Finally, a question was raised regarding differences between the AACN data provided via CAD Status and data obtained from the Event Data Recorder (EDR) by police crash investigators. Clarifications on these topics were subsequently provided to participants in a document entitled "Response to Questions on Crash Delta-V, Probability of Serious Injury, EDRs, and AACN", Memo to Montana Stakeholders Participating in MT AACN May 3, 2012 Demonstration (Blatt; Flanigan, 2012).

***Feedback Related to Data Linkage/Documentation***. The Emergency Services Supervisor at Community Medical Center requested all AACN data (including patient vehicle make/model and ISP) be documented on the current en route EMS Report form in 'Mechanism of Injury" box (see Figure 16). This form is routinely scanned into the patient hospital record, which ensures capture of information needed to appropriately link crash data and patient injury data.

The Trauma nurse coordinator at St Patrick's suggested a simple form could be developed for use by the charge nurse when recording information on OnStar crashes, including make/model of patient vehicle. The completed form could be placed in the patient folder, which will provide sufficient information to link the OnStar data to the patient record. In addition, the CAD Status screen containing the OnStar data could be printed from the ER display and placed into the patient record.

It was noted AACN parameters were presented clearly on the website. One hospital stakeholder suggested data is posted on the website within 24 hours as this makes the data available during the early days of trauma patient treatment. This request will be considered along with inputs from the PSAP regarding frequency of AACN data download from the PSAP database. The website map showing crash location was thought to be a useful addition for inclusion in the pre-hospital ground ambulance patient care report (PCR).

#### 3.4.5 Post Test Follow Up

In response to the feedback received, the research team and the PSAP together developed simplified terminology, which eliminates some of the abbreviations for AACN parameters entered into CAD Status. For any injury accident where OnStar calls the 9-1-1 PSAP, the call taker will pose the following questions (column 1) and document it in the CFS Comment field as shown in column 2:

| Question Posed to OnStar Advisor by PSAP Call Taker | Sample Answers & Format for Entry into CFS Comment Field |
|---|---|
| • What is ISP? | ISP High |
| • Vehicle Make/Model? | Chevrolet Malibu |
| • Multiple Impacts? | Multi Impact No |
| • Delta Velocity? | Delta V1 25 mph |
| • Direction of Impact? | DIR IMP1 from Left |
| • Rollover? | Rollover Yes |
| • Time of Alert? | Time Alert 1023 |
| • Airbag Deployed? | Airbag Yes |

OnStar was alerted on June 14, 2012, the Missoula PSAP was ready to 'go live' with collection of OnStar call data. OnStar had previously agreed to respond to questions from the Missoula PSAP regarding AACN data elements[35]. On the PSAP boundary map for Missoula, OnStar placed a note the Advisor sees, explaining Missoula operators may ask for ISP (High/Low) and the Advisor should provide that information along with other crash parameters (Airbag Deployment, Delta V, Direction of impact, Multiple Impacts, and Rollover).

As previously described, in order to archive AACN data, so that it is later accessible by medical providers and trauma system researchers, a process was established by Missoula PSAP IT personnel to run an automated script once a week that scans the Missoula PSAP database for any OnStar calls during the previous week. The PSAP then emails an Excel data file to CUBRC. After beta testing (July), the Missoula PSAP began sending CUBRC a regular weekly email (beginning Aug 6, 2012) which contained all calls from OnStar in the preceding week. This weekly extract is automatically processed by customized software developed at CUBRC which reads the file and uploads OnStar call records to the (password protected) MT AACN Database at https://montana-aacn.cubrc.org. If no OnStar calls are received, a NULL (empty) Excel file is still emailed to CUBRC.

Currently, all calls from OnStar are uploaded to the database. This includes 'Good Samaritan' calls (where an OnStar subscriber pushes the SOS button to get help for another party) as well as SOS calls (where an OnStar subscriber needs assistance but a crash is not involved or the crash was minor (below the AACN threshold)). Good Samaritan/SOS calls populate just a few fields in the call record ('CFS Number', possibly 'TSP Case ID', 'TSP Caller Name' (OnStar), 'PSAP Call Time' and 'Event Location'. If a call is an ACN call (from an aftermarket FMV system or an old ACN system, the 'Airbag Deployed' field will also be populated and perhaps 'Time of Alert'. Only AACN calls will populate 'Delta V', 'Direction of Impact', 'Rollover', 'Multiple

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[35] Jeff Joyner (OnStar) email message to authors, June 10, 2011.

Impacts' and 'ISP'. The only way to determine if a record in the MT AACN database is an AACN call is if these latter fields are populated.

Over a 30-week period, eight OnStar calls from Missoula County came into the Missoula PSAP. Of these, four were Good Samaritan calls (OnStar subscriber not involved) and four were SOS calls (button push). There have been no AACN calls thus far. This was a bit surprising since Missoula County was expected to receive about 10 AACN calls in a year (based on historical data from OnStar that 100 AACN calls occurred the previous year in Montana). One interpretation is the 100 AACN calls were actually 100 emergency calls that OnStar passed on to the PSAP. If the latter, this 100-call figure would include Good Samaritan and SOS calls. Regardless, CUBRC will continue to monitor the weekly extracts using the automated process described above. When sufficient AACN calls are acquired, the process will be revisited and will possibly screen out the Good Samaritan and SOS calls (assuming MT stakeholders concur). In the meantime, uploading all OnStar calls including the Good Samaritan and SOS calls provides confirmation that the automated process is working.

Two documents were prepared which describe the MT AACN website. The first is a User's Guide, which explains the functionality provided to an end user of the MT AACN web application. This application provides a mechanism for archiving telemetry data in the MT AACN Database, as well as providing a portal for registered users to view the data post-event. The website is also set up to support a registration process to provide username and password access to authorized users. The User's Guide is provided in Appendix D. The second document is a technical document (written for a System Administrator with SQL / database experience), which explains how to setup and deploy the MT AACN web application on a new system (Fusillo 2013). It is anticipated the web application will eventually be set up on a server at MT DPHHS.

## 3.5 Conclusions and Recommendations

During the test call, all required OnStar AACN data were successfully entered into the PSAP CAD system and displayed to responding agencies and hospitals within two minutes of the initial 9-1-1 call. The collection of the simulated AACN data did not delay dispatch of emergency services since a separate dispatcher began this process while the call taker continued to collect the additional AACN data.

CAD Status, which is routinely used by emergency providers in Missoula, was shown to be a viable mechanism for sharing AACN data with EMS responders and hospital providers in near real time. CAD Status is refreshed every 30 seconds.

The results of this test showed in order to support the use of the OnStar data for field triage and later research activities, only small changes to existing protocols and procedures are necessary to ensure the required data is captured and made available for use in Missoula. For example, both ground and air EMS responders demonstrated a mechanism to view or hear AACN information while en route to the scene (i.e., via Toughbook for ground EMS and via radio communication for air EMS). Thus, AACN information could be used to support field decisions as appropriate. Both ground and air medical responders successfully communicated ISP and the make/model of the patient's vehicle to the hospital charge nurse during the EMS (simulated) en route report on patient status. Charge nurses at both hospitals accurately recorded vehicle make/model and ISP using their normal documentation procedures for EMS en route information. They also had real time access to the CAD Status display. A hard copy of the EMS report and a printout of the CAD Status screen (with the AACN data) were obtained from both hospitals as test documentation. Mechanisms were identified at each hospital to ensure the AACN data in CAD Status (and the patient vehicle make/model information) were associated with the patient hospital record, thereby enabling appropriate linkage of crash event data with patient injury data.

One key finding of the project was the critical need to identify at the scene, which patient came from which vehicle and to communicate this information to the EMS provider so that OnStar crash information (especially ISP) is associated with the correct patient. This requirement is manageable with sufficient training of first responders, police, and EMS providers. For example, police routinely include make/model of the crashed vehicles in the Police Accident Report. Thus, there is no change in this data collection requirement, only that the vehicle information be noted sooner and communicated to EMS at the scene. The first page of the EMS Patient Care Report (PCR) form usually contains mechanism of injury and vehicle information fields. Make/model of the patient vehicle can be documented here by EMS and shared with the charge nurse at the hospital during the en route EMS report.

Finally, the simple and inexpensive approach described here for getting AACN information in real time to emergency medical providers (by using manual data entry into the PSAP Comment field, giving dispatched agencies access to AACN data via CAD Status and subsequent archiving of AACN data via an automated process), could be implemented in any county which has CAD Status or similar software. A number of PSAPs in Montana currently uses this software. The approach provides a viable interim solution until all crash telemetry data is transmitted electronically from OnStar (or any TSP) to the PSAP. The following the implementations are recommended:

- Operation of the system implemented in Missoula should be continued. It is quite surprising no OnStar crash calls were received by the Missoula PSAP during the project. The available historical data from OnStar indicates several crashes involving OnStar equipped vehicles resulting in calls to the Missoula PSAP should be expected. By continuing the Missoula implementation, it will be possible to demonstrate the system performance and benefits when future crash calls arrive.

- Review the OnStar call history at other Montana PSAPs. Implement the 'Missoula system' at one or more of the PSAPs that have a history of receiving OnStar crash calls. By establishing new implementations it will be possible to evaluate the performance of the system at other Montana PSAPs. The steps required to implement this system are straightforward:
    - To ensure a pathway forward, the PSAP should have VOIP capability and Wireless Enhanced 911 established to support Priority Access. Stage 1 Priority Access is currently implemented in 46 of the 57 PSAPs in Montana.
    - The PSAP must have CAD Status software installed which allows any designated hospital or agency dispatched by the PSAP to view emergency calls 'live' as the incident is unfolding. CAD Status can be installed on any computer that supports JAVA and has high-speed internet access.
    - PSAP personnel must be instructed to request AACN data from the OnStar Advisor when an AACN crash occurs. PSAP personnel must also

be trained to manually enter this data into the PSAP 'Comment' field using prescribed data element names.

- The software script to extract and forward OnStar AACN calls from the PSAP database to the MT AACN Database must be executed at pre-determined (e.g., weekly) intervals at the PSAP. This script can be obtained from the Missoula PSAP.
- Education of first responders, EMS, and hospital personnel regarding the use of AACN data and injury severity prediction must be undertaken. In particular, the need for identifying make and model of the OnStar patient vehicle *at the scene* and the reasons why this information must be immediately shared with EMS and the receiving hospital charge nurse, should be conveyed to all responding emergency personnel.
- Once sufficient AACN crashes are logged in Montana (and perhaps combined with AACN events from other western states), research should be initiated to help further validate the injury severity prediction algorithms as well as evaluate the use of other AACN data to improve real time patient triage, treatment, and transport decision-making.

Implementing this interim process to enable real time sharing of crash telemetry data with the medical response community will provide educational benefits to MT PSAP and emergency services personnel even though AACN events are infrequent. This will prepare them to fully utilize crash telemetry and injury prediction information as AACN technology becomes standard in more vehicles and as AACN data becomes available electronically in all PSAPs (i.e., via Stage 3 Priority Access or Next Generation 911 implementation).

# 4 Survey of Emergency Department Participation in MT's Resource Facilitation Service

Each year, many Montanans acquire a brain injury from a car crash, sports injury, fall, stroke, or other cause. Even mild brain injuries can lead to significant functional loss and problems of adjustment. The Brain Injury Association of Montana's (BIAMT) goal is to assist individuals who experience acquired brain injury to adjust effectively and to lead successful lives. Accordingly, BIAMT offers a Resource Facilitation Service (RFS) to everyone who experiences a brain injury in Montana. Resource Facilitation (RFS) is a service that links individuals with traumatic brain Injury (TBI) and their families to local information, resources, service providers, and natural supports. RFS is designed to benefit patients and to reduce demands on hospital staff due to repeat visits. RFS is offered free of charge to patients for as long as two and a half years.

BIAMT has sought to expand its Brain Injury Resource Facilitation Program referral network across the State. The adoption and participation of hospital emergency departments has been uneven, however. This may be due to a number of factors. Researchers sought to assess the potential for expanding it by conducting a survey of the Montana hospital emergency departments to assess their awareness of the program, the extent of their participation in the program, and certain other aspects of their operation. This survey was designed to provide a foundation for BIAMT's planning outreach to hospitals and to increase the patients served.

## 4.1 Methods

### 4.1.1 Participants

Researchers worked with staff of the Department of Public Health and Human Services to develop a contact list of hospital emergency department coordinators in Montana. They secured the email addresses for the coordinators. A staff member of BIAMT called each hospital to verify the contact information. Researchers identified 53 Montana hospitals with ED coordinators.

### 4.1.2 Procedures

BIAMT staff and members of the research team developed a survey and protocol with consultation from a Trauma Coordinator of a large hospital that participates in the RFS program. Two members of the research project technical panel who expressed specific interest in helping shape the content of this survey reviewed this survey. It was also submitted to the entire technical panel and approved by the University's Institutional Review Board.

The brain injury survey was distributed to the trauma coordinator or emergency room director of 53 Montana hospitals by e-mail. Researchers alerted potential participants to the on-line survey by sending an e-mail that described the research and indicated another e-mail would follow with a link to the survey. The e-mail with the link was sent approximately a week later. That e-mail indicated participants could provide information by using the link or by participating in a phone interview. Non-respondents and non-completers were sent a reminder e-mail.

## 4.2 Results and Findings

Sixty-one coordinators were identified to participate. Researchers were unable to e-mail 12 so contacted them by phone to obtain an e-mail address. Because of this effort, an additional four links to the survey were emailed. Finally, after another week, non-respondents were contacted by phone to remind them to complete the on-line survey. Researchers achieved a 76% response rate (40 surveys that were completed or started divided by 53 successfully delivered e-mail notifications). The following reports on the usable information provided by 32 respondents.

Table 5 lists the number of responding hospital EDs by Montana Trauma Facility Designation. Despite contacts with many EDs, only four indicated that they already participated in the RFS program.

*Table 5. Responding Hospital Emergency Departments*

| Regional Trauma Center (n=3) | Area Trauma Hospital (n=3) | Trauma Receiving Facility (n=9) | All Other (n=17) |
|---|---|---|---|
| •Billings Clinic<br>•St. Patrick Hospital and Health Sciences<br>•St. Vincent Healthcare | •Bozeman Deaconess Hospital<br>•Kalispell Regional Medical Center<br>•St. James Healthcare | •Barrett Hospital and HealthCare<br>•Beartooth Hospital and Health Center<br>•Liberty medical Center<br>•NEMHS Poplar Hospital<br>•Philips County Hospital<br>•Pondera Medical Center<br>•Powell County Hospital<br>•Roosevelt Medical Center<br>•St. Joseph Medical Center | •Blackfeet Community Hospital<br>•Broadwater Health<br>•Colstrip Medical<br>•Crow/Northern Cheyenne<br>•Dahl Memorial Healthcare Assoc.<br>•Fallon Medical Complex<br>•Fort Belknap Service<br>•Frances Mahon Deaconess Hospital<br>•Granite County Medical Center<br>•Madison Valley Medical Center<br>•McCone County Health Center<br>•Northern Rockies Medical Center<br>•Rosebud Health Care<br>•Ruby Valley Hospital<br>•Sheridan Memorial Hospital<br>•Stillwater Community Hospital<br>•St. Luke Community Hospital |

Figure 18 shows the estimate of the average number of patients with head trauma and patients with head trauma from car crashes treated annually. Respondents estimated they treated 50,593 patients emergency rooms annually. Of those who were treated in emergency rooms, approximately 3,796 (7.5%) of patients have a head trauma or brain injury due to any cause (e.g., car crash, sports injury, fall, stroke, etc.). Of those who were treated in the emergency room with a head trauma or brain injury, approximately 887 (23%) sustained the head trauma or brain injury in a car crash.

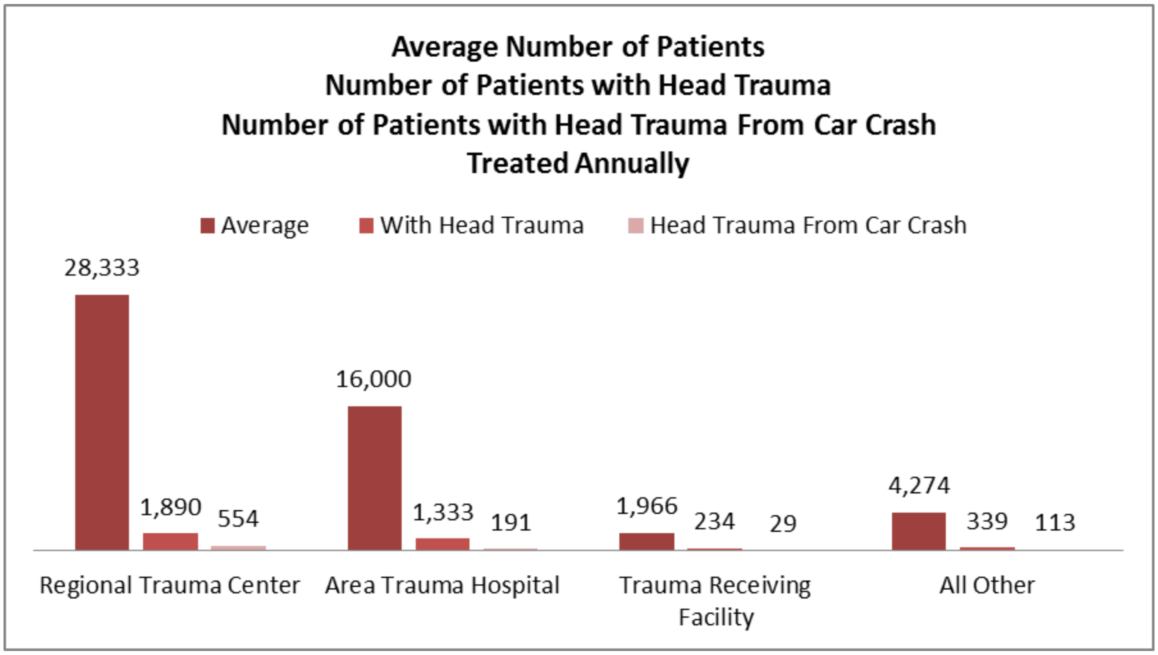


*Figure 18. Average number of patients with head trauma from car crashes*

From a systems perspective, BIAMT must judge what is understood as brain injury for each ED. This is reflected to some extend by the tools used to assess it. Table 6 presents the tools used to screen for brain injuries. While clinical assessment provides a flexible assessment, the Glasgow Coma Scale emphasizes injuries that are more serious. Few of the EDs reported using other scales that target specific causes. This suggests that BIAMT should emphasize the importance of considering any level of brain injury as suitable for referral; not just the most serious.

*Table 6. Tools Used for Brain Injury Screening*

| **Hospital Designation (n=total # survey respondents)** | **Tools Used** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Clinical Assessment** | **Hospital Check List** | **Glasgow Coma Scale** | **Acute Concussion Evaluation** | **Sport Concussion Evaluation Tool** | **Other** | **Do Not Assess** |
| Regional Trauma Center (n=3) | 3 | 1 | 3 | 0 | 0 | 1 | 0 |
| Area Trauma Hospital (n=3) | 3 | 1 | 3 | 0 | 0 | 1 | 0 |
| Trauma Receiving Facility (n=9) | 9 | 1 | 9 | 2 | 1 | 1 | 0 |
| All Other (n=17) | 17 | 3 | 17 | 3 | 1 | 0 | 0 |

Table 7 shows the circumstances in which ED staffs are likely to screen patients for brain injuries who come either by medical transport or as walk-ins. Again, the likelihood of screening increases with severity. This underscores the importance of the message BIAMT needs to convey about who should be referred to the RFS.

*Table 7. Staff likely to Screen for Brain Injury*

| | **Likely to Screen** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Minor Injuries** | **Hit Head No Complaints or Problems** | **Hit Head Complains or Has Problems** | **Unconscious < 1 Minute** | **Unconscious a Few Minutes** | **Unconscious > 5 Minutes** | **Always Screen** |
| Regional Trauma Center (n=3) | 1 | 1 | 2 | 3 | 3 | 3 | 0 |
| Area Trauma Hospital (n=3) | 1 | 2 | 3 | 3 | 3 | 3 | 0 |
| Trauma Receiving Facility (n=9) | 3 | 5 | 8 | 9 | 9 | 9 | 1 |
| All Other (n=17) | 6 | 9 | 17 | 16 | 16 | 16 | 2 |

Table 8 shows the knowledge level of emergency room staff with the signs and symptoms for identifying potential mild brain injury (1=not knowledgeable, 5=very knowledgeable). This suggests that BIAMT might offer training to bolster their outreach program.

*Table 8. Knowledge of the Signs and Symptoms*

| **Hospital Designation** (n=total # survey respondents) | **Knowledge Level** (# respondents) |
|---|---|
| Regional Trauma Center (n=3) | 2.5 (2) |
| Area Trauma Hospital (n=3) | 4.0 (3) |
| Trauma Receiving Facility (n=9) | 3.1 (9) |
| All Other (n=17) | 3.5 (17) |

Table 9 shows the likely referral pattern for each level of brain injury severity across hospital designations. This suggests BIAMT might concentrate its outreach efforts for serious injuries on the larger hospitals where more serious injuries are treated but educate the smaller hospitals about the importance of referring individuals with relatively mild injuries.

*Table 9. Likely Referral Patterns*

| **Hospital Designation** (n=total # survey respondents) | **Severe** | | | **Transfer Destination** (# Providing Destination Information) |
|---|---|---|---|---|
| | Treat | Transfer | Both | |
| Regional Trauma Center (n=3) | 2 | 0 | 0 | N/A |
| Area Trauma Hospital (n=3) | 1 | 2 | 0 | Great Falls (1) |
| Trauma Receiving Facility (n=9) | 0 | 8 | 1 | Not Provided |
| All Other (n=17) | 0 | 17 | 0 | Great Falls (1), Idaho Falls (1), Kalispell (2) |
| **Hospital Designation** (n=total # survey respondents) | **Moderate** | | | **Transfer Destination** (# Providing Destination Information) |
| | Treat | Transfer | Both | |
| Regional Trauma Center (n=3) | 2 | 0 | 0 | N/A |
| Area Trauma Hospital (n=3) | 1 | 2 | 0 | Great Falls (1) |
| Trauma Receiving Facility (n=9) | 2 | 6 | 1 | Not Provided |
| All Other (n=17) | 1 | 12 | 4 | Great Falls (1), Idaho Falls (1), Kalispell (2) |
| **Hospital Designation** ( n=total # survey respondents) | **Minor** | | | **Transfer Destination** (# Providing Destination Information) |
| | Treat | Transfer | Both | |

| | | | | |
|---|---|---|---|---|
| Regional Trauma Center (n=3) | 2 | 0 | 0 | N/A |
| Area Trauma Hospital (n=3) | 3 | 0 | 0 | N/A |
| Trauma Receiving Facility (n=9) | 8 | 0 | 1 | Not Provided |
| All Other (n=17) | 12 | 4 | 1 | Not Provided |

Table 10 shows the Regional Trauma Centers were very familiar with RFS. The Area Trauma Hospitals were significantly less familiar and the small facilities were barely familiar at all. Again, if BIAMT wants to increase its services to those with severe injuries, they should concentrate on maintaining referral relationships with the larger hospitals. If they want to increase the total number of people reached, they should provide much more education to the smaller hospitals where milder injuries are treated but not referred.

*Table 10. Familiarity with RFS*

| **Hospital Designation (n=total # survey respondents)** | **Familiarity Level (# respondents)** |
|---|---|
| Regional Trauma Center (n=3) | 4.5 (2) |
| Area Trauma Hospital (n=3) | 3.7 (3) |
| Trauma Receiving Facility (n=9) | 1.9 (9) |
| All Other (n=17) | 1.3 (17) |

Again, this underscores the willingness of hospital staff to refer patients. What seems to be missing is a clear and sustainable mechanism for them to do so. Table 11 shows that all respondents were willing to very willing to refer patients when they suspect a patient's complaints may involve a mild brain injury - whether or not the patient is not admitted to the hospital.

*Table 11. Willingness to Refer patients*

| Hospital Designation (n=total # survey respondents) | Willingness | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1=Unwilling | | 2 | | 3 | | 4 | | 5=Very Willing | |
| | Not Admit | Is Admit | Not Admit | Is Admit | Not Admit | Is Admit | Not Admit | Is Admit | Not Admit | Is Admit |
| Regional Trauma Center (n=3) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| Area Trauma Hospital (n=3) | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 1 |
| Trauma Receiving Facility (n=9) | 1 | 0 | 0 | 1 | 3 | 3 | 1 | 1 | 4 | 4 |
| All Other (n=17) | 0 | 0 | 0 | 0 | 6 | 4 | 6 | 3 | 5 | 10 |

## 4.3 Discussion

The finding that only four EDs report participating in the RFS program underscores the gap in awareness about the services. Yet, almost all EDs were willing to very willing to refer patients; even those with mild injuries who are not admitted to the hospital.

BIAMT should consider their strategic position in relation to their resources. There appear to be at least three options. First, BIAMT could emphasize services to those with severe injuries. This would involve focusing attention on the larger hospitals to which the smaller EDs refer and transfer patients with more severe injuries. This would concentrate their resources and reach those with the most need. Second, BIAMT could seek to reach those with mild injuries but this would require expanding outreach to many more of the smaller hospitals. Third, BIAMT could seek resources to support an expansion to all hospitals and provide services to many more individuals.

Researchers recommend that BIAMT focus attention on the three largest hospitals to address those most in need and to capture the largest patient population. If BIAMT can work out the procedures for sustaining consistent levels of referral and providing minimal services, they may be able to argue for resources to expand the RFS to a broader population.

# 5 Expanding the Brain Injury Referral Network

The emphasis on response to injuries from motor vehicle crashes typically focuses on immediate care from the point of the event through medical treatment at a clinic or hospital. A public health model takes a broader view; a view that spans the time from crash events through rehabilitation and community reintegration. Of course, not everyone who experiences injury from a motor vehicle crash is transported for medical treatment. Emergency responders (or occupants of a crashed vehicle) may not recognize when to refer an individual for medical care, especially when seemingly mild or occult (hidden) injuries occur. Further, even those with serious injuries who receive medical care and in-patient rehabilitation do not always make a smooth transition back into their community.

In one of the few population-based studies on the issue, Shults et al. (2004) estimated 1.2 million adults were living in the community with disabilities associated with motor vehicle crashes. Forty-one percent of those reported loss of work due to disability. Many individuals involved in crashes experience injuries that lead to long-term disability (Ameratunga et al., 2004). Surprisingly, these injuries need not appear to be severe to have significant consequences (Richmond et al., 2003; Myou et al., 1997). One of the injury groups that has been studied is the group with traumatic brain injuries (TBI). Studies have shown follow-up in the community after the injury can improve outcome (Wade, 2006).

Consistent with public health prevention goals, it is expected disabilities associated with motor vehicle crash injuries can be reduced by early detection of those crash-related injuries that might lead to disabilities and by improving the coordination, tracking, and delivery of community rehabilitation and integration services for crash victims. To accomplish this, there is a need for a mechanism to identify and track motor vehicle crash victims with the potential for disability so they can be effectively matched with rehabilitation providers in their area and follow up support provided on a continuing basis.

One model for identifying and tracking individuals who sustain injuries is the Resource Facilitation Service of the Brain Injury Association of Montana (BIAMT).[36] This developing model is based on national guidelines for services to people with brain injury. It is a low-cost, telephone- and computer-based public health service that promotes identifying brain injury early, educating survivors and families about TBI, and supporting survivors to get timely treatment and rehabilitation. Currently, only five of Montana's hospitals with EDs participate at any significant level. This project explored the procedures for expanding the RFS referral network.

## 5.1 Methods and Procedures

BIAMT staff used a standard program description approach to present their program to hospital staff. This involved describing the nature of traumatic brain injury (TBI) and the general consequences people experience. The RFS services were explained and the presenter invited referrals to the BIAMT from the hospital. This same approach was used in the first presentations to State and Regional Trauma Care Committees (STCC) through October 2009. This approach had not produced the level of referrals desired and was not well received by the STCC or RACs.

[36] The Resource Facilitation Service (now the Brain Injury Help Line) of the Brain Injury Association of Montana (BIAMT) provides information and referral, and tele-counseling to individuals with brain injury across Montana.

Further, the members expressed concerns such presentations were to review case studies as learning and improving opportunities for first responders and emergency department staff. Concerns were expressed about HIPPA compliance if non Trauma/EMS personnel participated in the meetings. Also, it was mentioned participants in the meetings focus on stabilizing patients not additional treatments and rehabilitation needs.

In response, the presentation was modified to be consistent with the "case review" approach typically used in medical settings and favored by the Trauma Advisory Committees. Ms. Morgan and Bobbi Perkins, a member of BIAMT's Board of Directors, developed a presentation in the case study format to which Trauma Committees are accustomed. The presentation reviews the initial injury data but continues reviewing the post injury care and outcomes. The goal of the presentation is to increase awareness of post injury impact and how the Resource Facilitation Service can benefit individuals living with brain injury and their families; all levels of severity. The goal of the presentation was to increase the number of referrals made by hospitals by increasing awareness of post injury needs and the free service available to help patients return. The initial presentation to the State Trauma Care Committee (STCC) was made November 3, 2009. This new presentation was positively received. Ms. Perkins reported that, overall, meeting participants were very supportive of connecting patients, especially mild traumatic brain injury (TBI) to RFS. For some STCC meeting participants, it was the first they had heard of RFS in Montana and they requested more information. Others knew about the program but did not feel they had materials they could hand out to patients in the emergency departments (ED). A few others regularly give out the RFS materials and encourage the patients to contact RFS.

The group discussed that the ED is an important location to provide the patient and family information on RFS. The group also discussed a better model is to provide the patient's name and contact information to RFS and let RFS contact the patient vs. expecting the patient to make the call to RFS on their own. The group discussed including, as part of the current hospital meetings, training on how to talk to patients/families about concussion /mild TBI (to reduce anxiety) and making a strong connection that follow-up calls to the physician's office /ED regarding minor symptoms and concerns will be reduced by getting the patient hooked into RFS early. Additional presentations to RTCS were planned. Overall, BIAMT staff made presentations to the four RTACs and STCC. These led to invitations to visit and discuss RFS from six hospitals between February and April 2010.

### 5.1.1 Data and Analysis

Researchers used the data recorded by BIAMT to track the progress in referrals and services. These included data on the date of injury, cause of injury, date of referral, referral source, and selected demographic variables. Researchers examined the overall referrals rates, those from hospitals, and those with injuries due to a motor vehicle crash.

## 5.2 Findings

From January 2007 through December 2011, BIAMT received 793 referrals that were enrolled into the RFS program; an average of 158.6 per year. Hospitals accounted for 527 (66.5%) of all referrals. Figure 19 shows the total referrals and those from hospitals enrolled by year. Overall, referrals increased over these five years increased and increased significantly (t=.05) from 2010 to 2011. However, despite the emphasis on adding hospitals to the referral process beginning in November 2009, there was no change in the overall referral rate from hospitals. A three-year forecast at the current rates suggests total enrollments might reach 250 per year; with approximately 175 of those coming from hospitals.

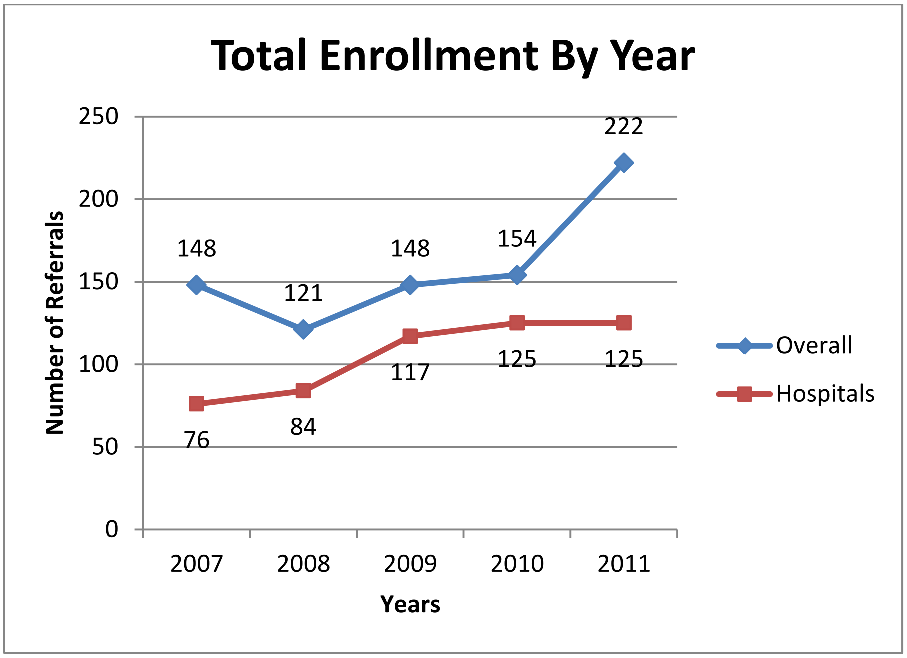


*Figure 19 . Total and hospital referrals enrolled in the RFS by year.*

Figure 20 presents the overall enrollments by month. Two points appeared to be outliers - month 38 and month 59 – and were removed. The curvilinear trend highlights referral rates declining over the first year followed by a gradual increase over the last 20 months. Hospital recruitment through the trauma system began in month 34.

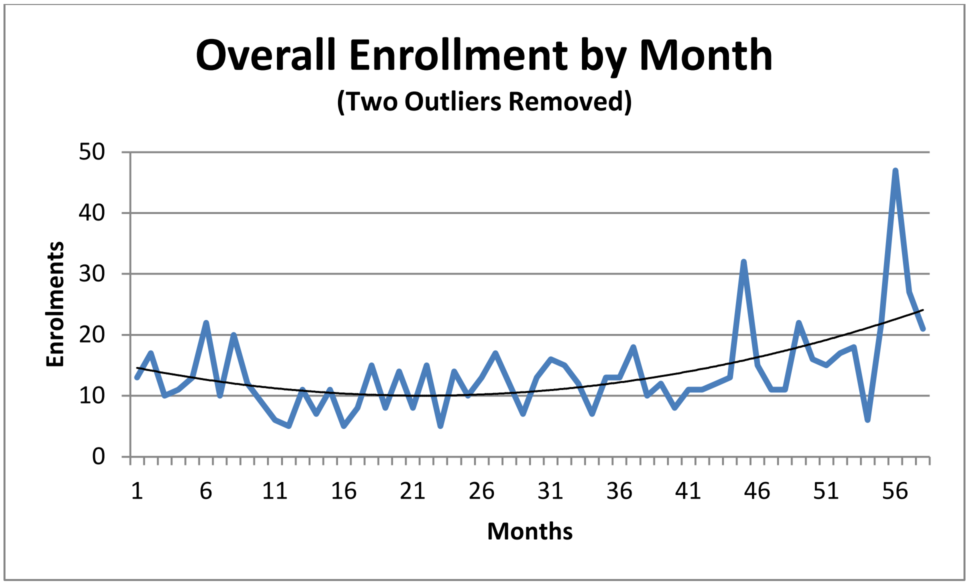


*Figure 20. Total referrals enrolled by month*

Figure 21 shows the cumulative referral pattern from hospitals to RFS. A total of 527 referrals were received from hospitals over the five year period. The cumulative graph shows a steady rate of referrals from hospitals. While there may be a trend toward growth over the last three months, there is no difference between 2009 and 2010; after participation in the trauma groups. The difference appears to be coming from another source.

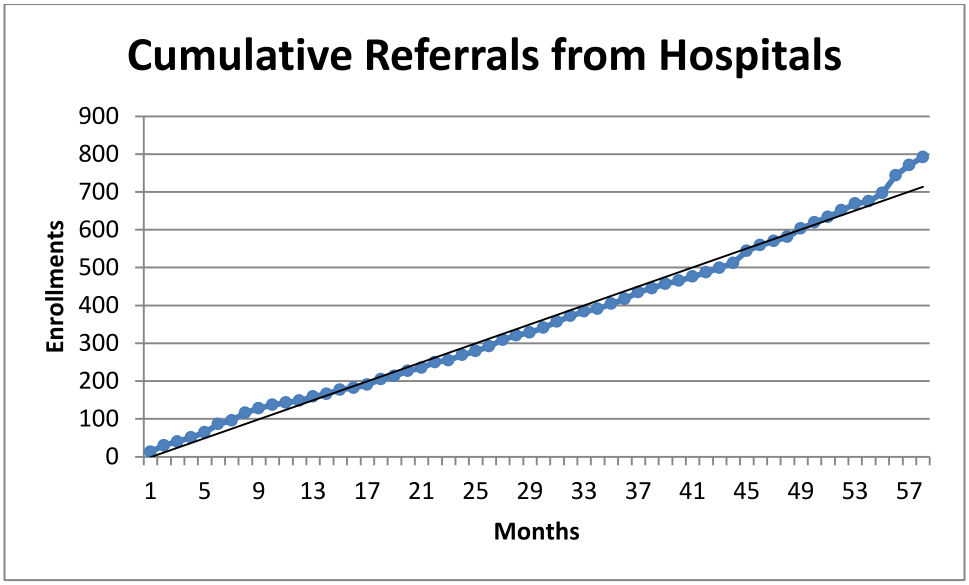


*Figure 21. Cumulative referrals from hospitals*

Figure 22 shows referrals from each hospital participating in the referral network. St. Vincent's hospital was the major contributor over the five years. Five hospitals account for the vast majority of referrals, including: St Vincent's, New Hope, Kalispell Regional, Billings Clinic, and Community Medical Center. Ten hospitals provided three or fewer referrals. Similarly, the Veterans hospital made no referrals during the period.

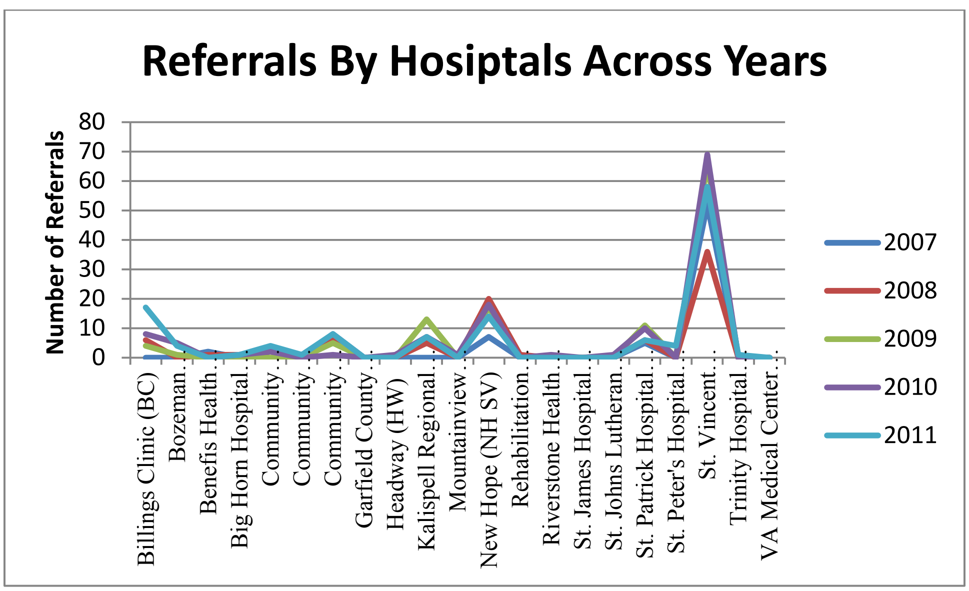


*Figure 22. RFS referrals from each hospital each year*

These efforts focused on brain injuries sustained in motor vehicle crashes. Figure 23 shows the cumulative referrals involving a brain injury due to a MVC – a total of 217 (41% of hospital referrals; 27% of all referrals). A total of 108 referrals were received over the first 34 months.

One hundred and nine referrals were received over the final 24 months. However, not all such referrals for brain injury associated with an MVC came from a hospital.

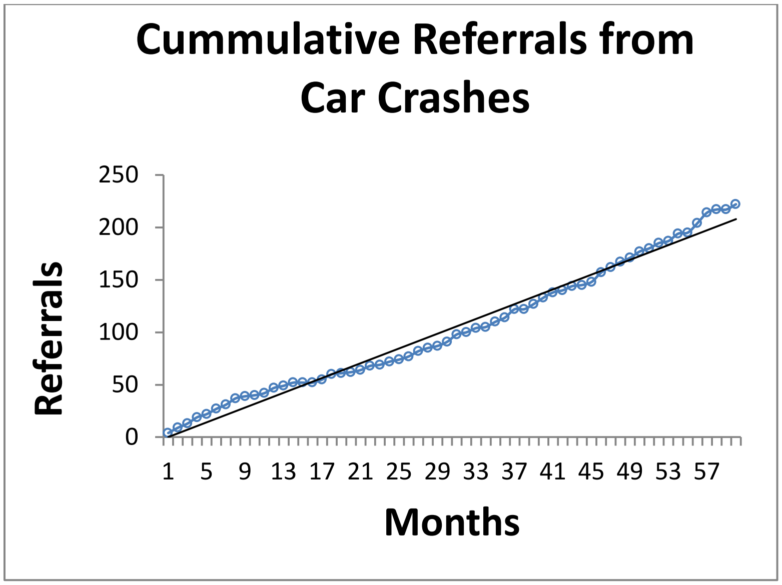


*Figure 23. Cumulative referrals for brain injuries associated with MVC*

Figure 24 shows referrals from hospitals for injuries sustained in MVCs across the five years. The BIAMT received 161 referrals from hospitals. The effort to market the RFS through the Trauma Committees began in November 2009. While it appears this may have had an effect when viewed on an annual basis, a closer examination suggests that it did not. A three-year forecast suggests , at this rate, hospital referrals for car crashes will reach only about 52 per year.

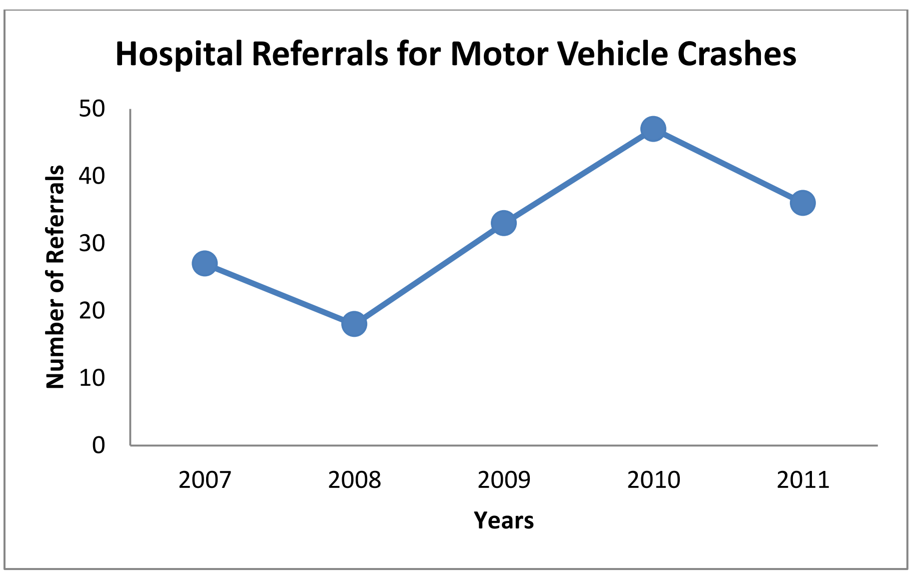


*Figure 24. Annual referrals from hospitals for MVC*

Figure 25 shows the cumulative referrals from hospitals across months. When examined against a linear trend line, the rate of hospital referrals varies but does not suggest a deviation from the relative rate.

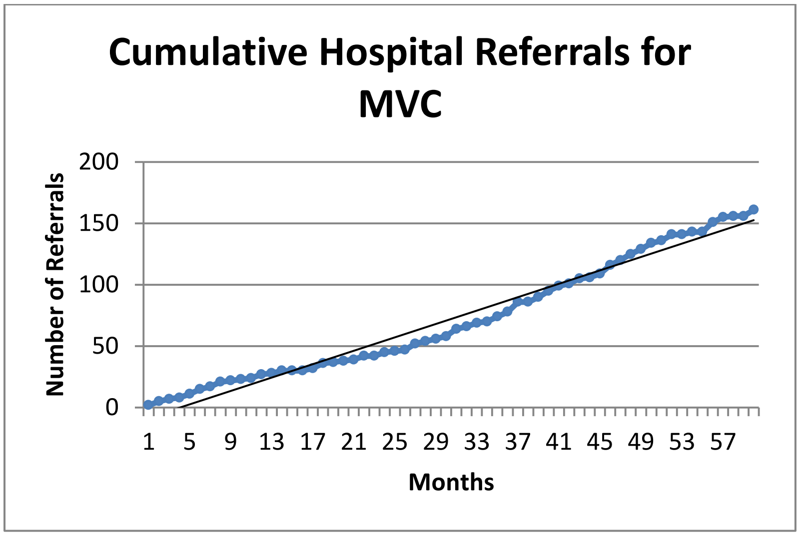


*Figure 25. Cumulative hospital referrals for TBI from MVC's*

Figure 26 shows that the hospital referral sources for individuals injured in motor vehicles crashes parallels that for all injuries. That is, the top five referral sources accounted for the majority of referrals (St. Vincent's, New Hope, St. Patrick's, Kalispell Regional, and Community Medical Center). Little variation appears.

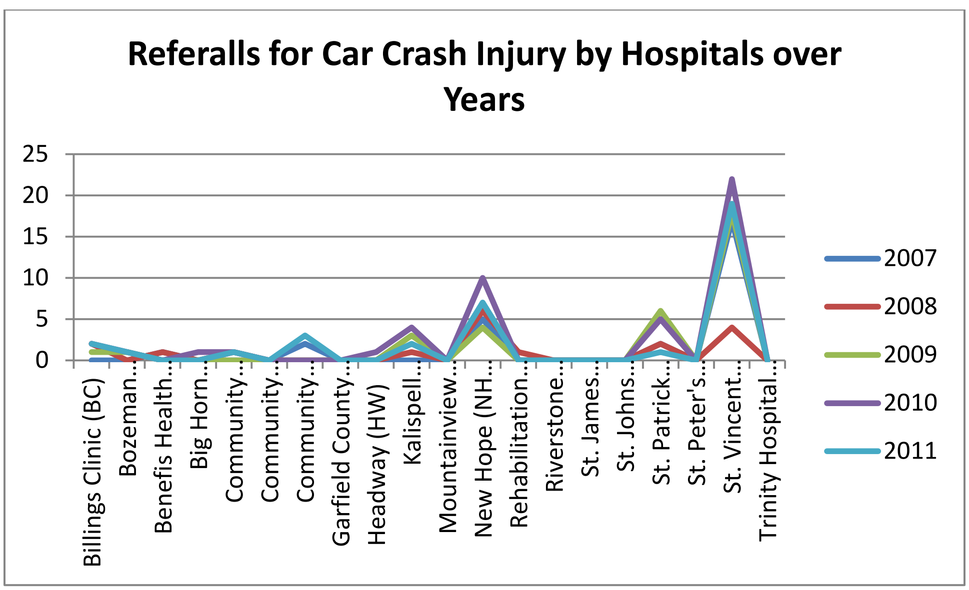


*Figure 26. Referrals from hospitals over each of the five years*

While being referred for assistance at all is a critical step, the time between an injury and enrollment for services can influence outcome. Figure 27 shows the relationship between time to referral and the sequence or order in which individuals injured in motor vehicle crashes were referred. The time to referral for those injured in motor vehicle crashes declined rapidly over the first 50 referrals, stabilized across the next 175 cases, and then began to rise again. Still, while the time to referral for MVC s averaged 32.5 days, the median is 70 day. The longest delay from the time of reported injury to referral exceeded 30 years.

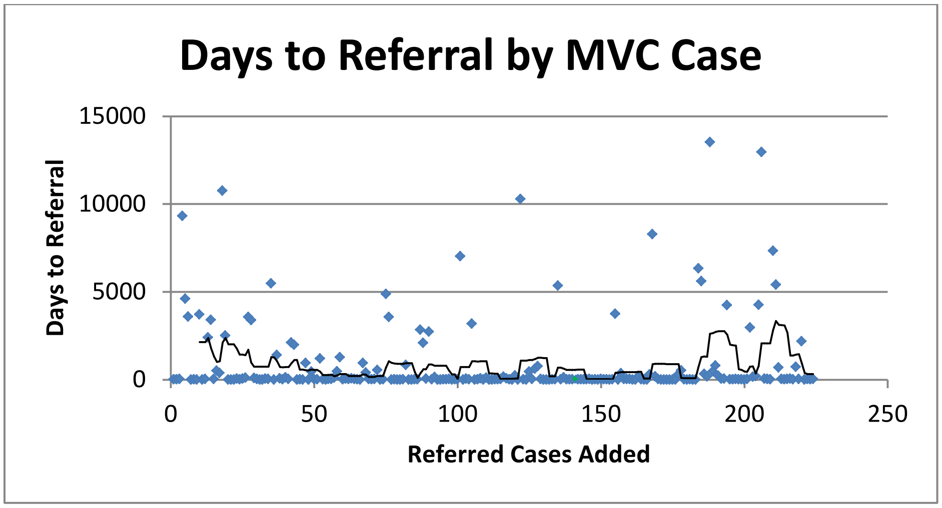


*Figure 27. Time from injury to referral for successive enrollees*

Figure 28 shows the sources of referrals that exceed the median. By far the greatest source (33%) is from an "other" than usual source. The Veterans Administration is the second highest source of delayed referrals (18%).

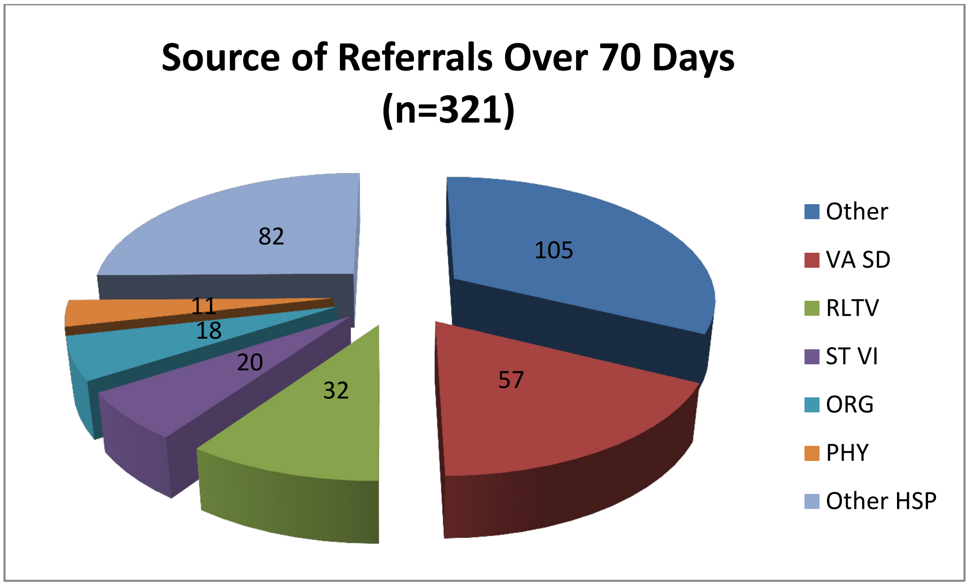


*Figure 28. Source of referrals exceeding the median*

Figure 29 projects the delay in referral for the next 100 cases at the current pace. This analysis suggests that referrals will continue to come from people who were injured several years ago.

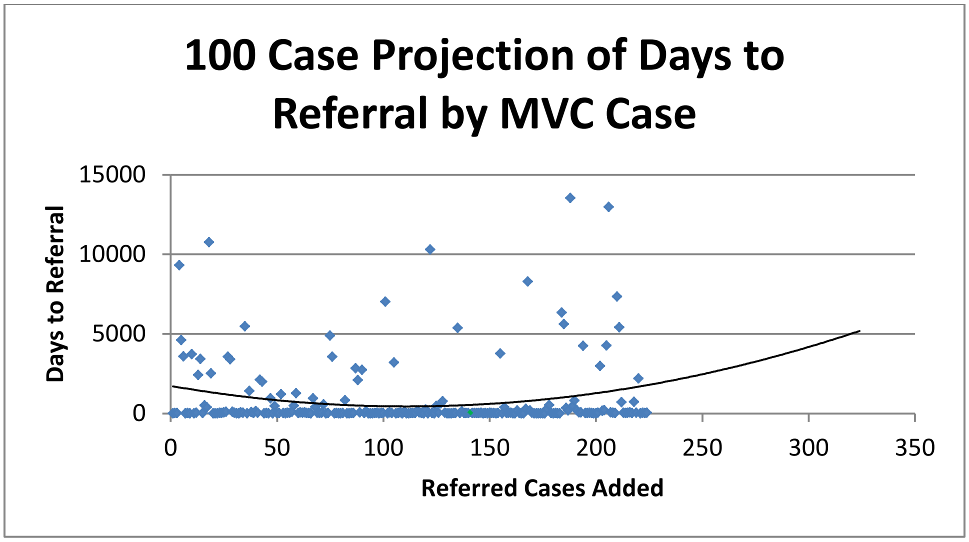


*Figure 29. Projection of increase in delayed referrals*

## 5.3 Discussion

Over the five years beginning in 2007, BIAMT received 793 referrals that were enrolled into the RFS program; an average of 158.6 per year. Hospitals accounted for 527 (66.5%) of all referrals. Of all hospital referrals, 161 were for brain injuries due to a MVC.

An increase in referrals over time and an increase in referrals from hospitals for brain injuries related to MVCs were found. However, those do not seem to have been related to the outreach conducted through the STCC and RTCCs. This growth in referrals between 2010 and 2011 may be explained in part by an increase in public education about concussions from sports activities, self-referrals by veterans, and referrals by community agencies.

While the outreach to the STCC and RTCCs led to hospital presentations of revised materials, BIAMT did not develop or implement procedures to establish formal mechanisms of referral and follow-up with those hospitals. BIAMT may still want to consider doing so.

In the emerging era of bundled and outcome reimbursement for medical treatment and hospital care, such an arrangement could lead to reimbursement for services under contract from a hospital. If BIAMT can demonstrate their RFS services reduce unnecessary re-hospitalization, for example, it becomes a valuable service for cost containment.

The time to referral after injury varied considerably and may be increasing. Overall, the time to referral for MVC s averaged 32.5 days, the median was 70 days. A total of 321 cases exceeded the median. The major source of those "delayed" referrals was other than not a standard source. However, the VA accounted for 18%. BIAMT might consider an outreach campaign that used themes such as:

1. It's Never Too Late
2. When You're Ready, We Can Help
3. The Sooner the Better
4. How Long Has It Been?
5. Don't Hesitate to Ask - Don't Hesitate to Tell

In any case, BIAMT might want to reconsider their approach to establishing and maintaining referrals from hospitals. The same five hospitals appear to be responsible for the majority of hospital referrals. St. Vincent’s and New Hope contribute the most by far. One possible new strategy, reflecting the practice of St. Vincent’s, would be to negotiate the inclusion of a standard referral prompt as hospitals adopt and implement electronic medical record systems.

# 6 Estimating the Costs of a Brain Injury

## 6.1 Referral Network

The Resource Facilitation Service (now the Brain Injury Help Line) of the Brain Injury Association of Montana (BIAMT) provides information and referral, and tele counseling to individuals with brain injury across Montana. The BIAMT receives referrals from many sources but hospitals are the place that those with a significant injury go for help. BIAMT currently provides the only statewide system for follow-up information and referral for individuals experiencing brain injury. While this system is in an early phase of development and is limited to brain injury, it provides a model upon which a more comprehensive system of patient follow-up could be designed. One question is how much might it cost to expand this model? This study attempted to estimate the costs of providing this service more broadly.

## 6.2 Method

Two researcher team members interviewed the director of the BIAMT and reviewed budget records. They identified the tasks required to sustain the Help Line, amount of time each task required, salary levels of each staff involved, and the current level of activity and service. These data were placed in a spreadsheet and the calculations confirmed by testing against actual figures. Then, based on the data from the study reported above, a series of scenarios were conducted to estimate the budget required to support services at different levels. Table 11 present the results compared to the current budget; which received about 222 referrals in the last full year.

*Table 12. Projected Budgets*

| | **Current Budget (N= 222)** | **Projected Referrals (N=200)** | **Projected Referrals (N=222)** | **Projected Referrals (N=300)** | **Projected Referrals (N=444)** |
|---|---|---|---|---|---|
| Budget at Levels of Referral | $113,000 | $139,385 | $140,325 | $143,659 | $149,814 |
| Difference from Current | $0 | ($26,385) | ($27,325) | ($30,659) | ($36,814) |

The estimated range of cost for doubling referrals and serving 444 referrals annually ranges from $149,418 to $160,510. Specific budget line time totals for the lower estimate of serving 444 individuals each year included: $44,354 for referral services, $42,006 in labor costs, $53,204 in supplies and facility overhead, and $10,250 in travel.

## 6.3 Discussion

This analysis suggests the Brain Injury Help Line may be underfunded by as much as $27,235 annually at this point in its development. If the service doubled by expanding recruitment for referrals or expanded to include individuals with serious injuries from car crashes, it could be operated for the modest $150,000 to $160,000 annually.

Alternatively, rather than seeking to expand referrals, BIAMT may reduce their scope to match their budget. One option would be to reduce their effort to include all hospitals and focus on those that are the source of referrals already.

One question that remains to be addressed is the cost benefit of the Help Line. BIAMT might consider conducting a study of the outcomes of referral services to build a case for funding.

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# Appendix A - Technical Panel Test Call Participants and Stakeholders

**Research Project Technical Panel**

| Name | Position | Organization |
|---|---|---|
| Jim DeTienne | EMS & Trauma Systems Section Supervisor | DPHHS |
| Tom Hamilton | Captain | MT Highway Patrol |
| Pierre Jomini | Traffic Safety Engineer | MDT |
| Ryan Olson | Former Montana State 9-1-1 Program Assistant Manager | MT Dept. of Admin |
| Steve Albert | | WTI |
| Phil Balsley | Traffic and Safety Bureau | MDT |
| Jake Boltz | | Montana Highway Patrol |
| Calvin Schock | | Montana Highway Patrol |
| Steve Keller | Communications Bureau | MDT |
| Nels Sanddal | | Critical Illness & Trauma Foundation |
| Marcee Allen | | FHWA |
| Max Severeid | | NHTSA |

**Key Informants**

| Name | Position | Organization |
|---|---|---|
| Jim DeTienne | EMS & Trauma Systems Section Supervisor | DPHHS |
| Tom Hamilton | Captain | MT Highway Patrol |
| Pierre Jomini | Safety Management Engineer | MT DOT |
| Ryan Olson | Former Montana State 9-1-1 Program Assistant Manager | MT Dept. of Admin |

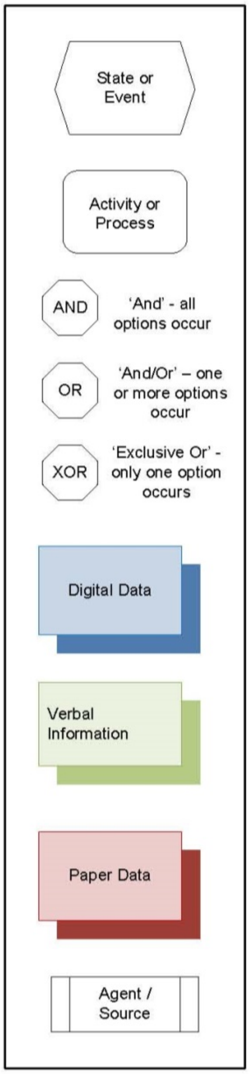
## Test Call Participants and Stakeholders

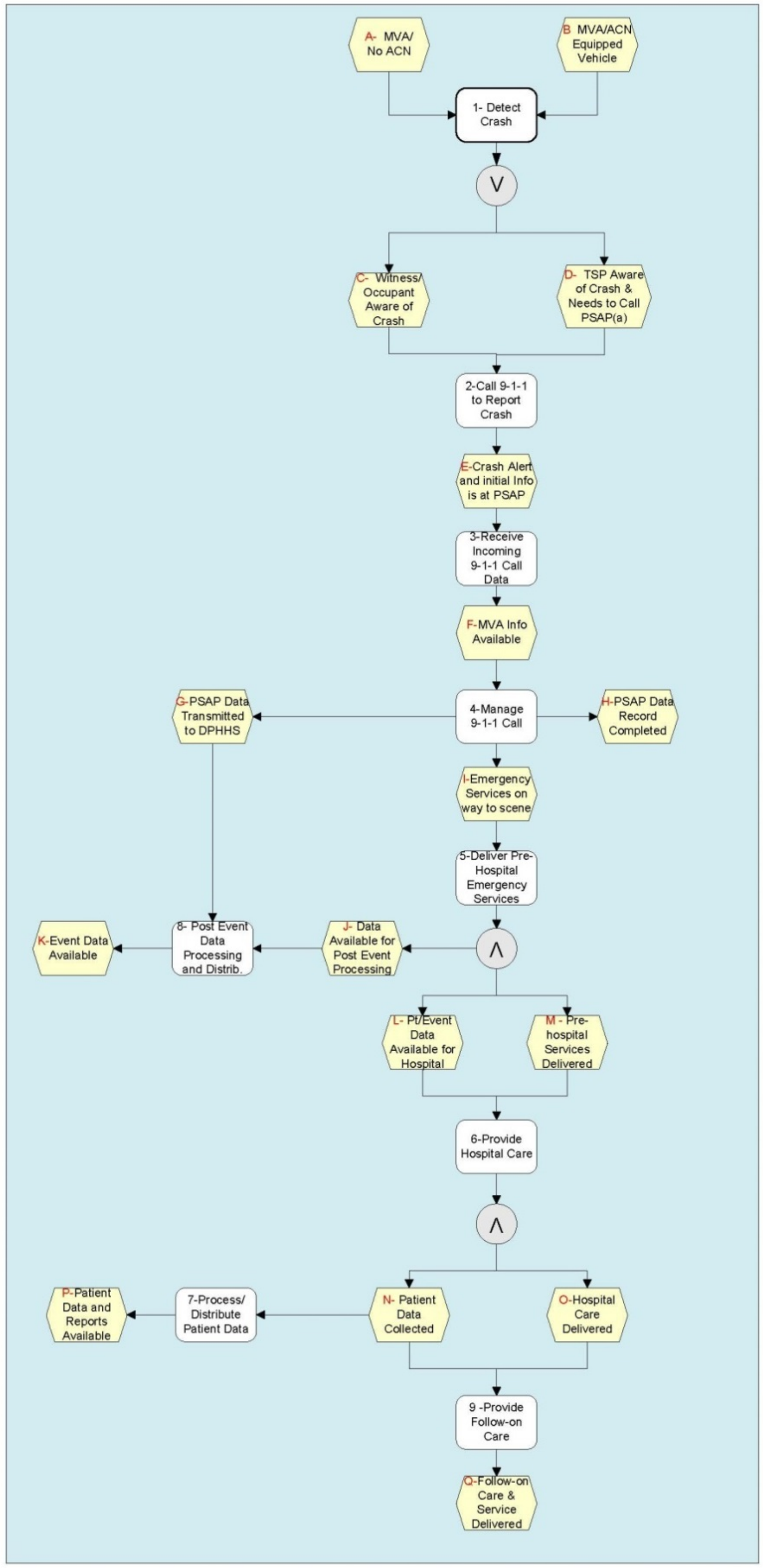
| Name | Affiliation | Email | Test Call Station | Station Location |
|---|---|---|---|---|
| Blatt, Alan | CUBRC | blatt@cubrc.org | St Patrick's ED or Flight Room | 500 W Broadway |
| Bierer, Matt | MESI | emtibierer@msn.com | MESI Dispatch | 1200 Burlington |
| Bleicher, John | St Pat's Hospital | jbleicher@saintpatrick.org | St Patrick's ED or Flight Room | 500 W Broadway |
| Christensen, Kris | MDT | krchristensen@mt.gov | MDT | Helena |
| Costilla, Valerie | Univ of MT | vcostilla@ruralinstitute.umt.edu | PSAP | 200 W Broadway |
| DeTienne, Jim | MT DPHHS | jdetienne@mt.gov | MT DPHHS | Helena |
| Flanigan, Marie | CUBRC | flanigan@cubrc.org | Community ED | 2827 Fort Missoula Road |
| Fusillo, Tom | CUBRC | fusillo@cubrc.org | CUBRC | Buffalo, NY |
| Goe, Rebecca | Univ of MT | rgoe@ruralinstitute.umt.edu | MESI Dispatch | 1200 Burlington |
| Grimes, Shane | Montana Highway Patrol | sgrimes@mt.gov | PSAP | 200 W Broadway |
| Jeff Joyner | OnStar | Jeffrey.Joyner@ONSTAR.com | OnStar | Detroit |
| Lounsbury, Chris | Missoula PSAP | clounsbury@co.missoula.mt.us | PSAP | 200 W Broadway |
| Peterman, Larry | LifeFlight (St Pat's) | PETERMAN@saintpatrick.org | Life Flight<br>Flight Room | 500 W. Broadway |
| Seekins, Tom | Univ of MT | ruraldoc@ruralinstitute.umt.edu | PSAP | 200 W Broadway |
| Silvia, Grace | Univ of MT | Grace.silvia@umontana.edu | Life Flight<br>Flight Room | 500 W Broadway |
| Stred, Jon | Community Medical Center | jstred@communitymed.org | Community ED | 2827 Fort Missoula Road |
| Weber, John | Missoula City Police | jweber@ci.missoula.mt.us | PSAP | 200 W Broadway |
| Whalen, Don | MESI | don@missoulaparamedics.com | MESI Dispatch | 1200 Burlington |

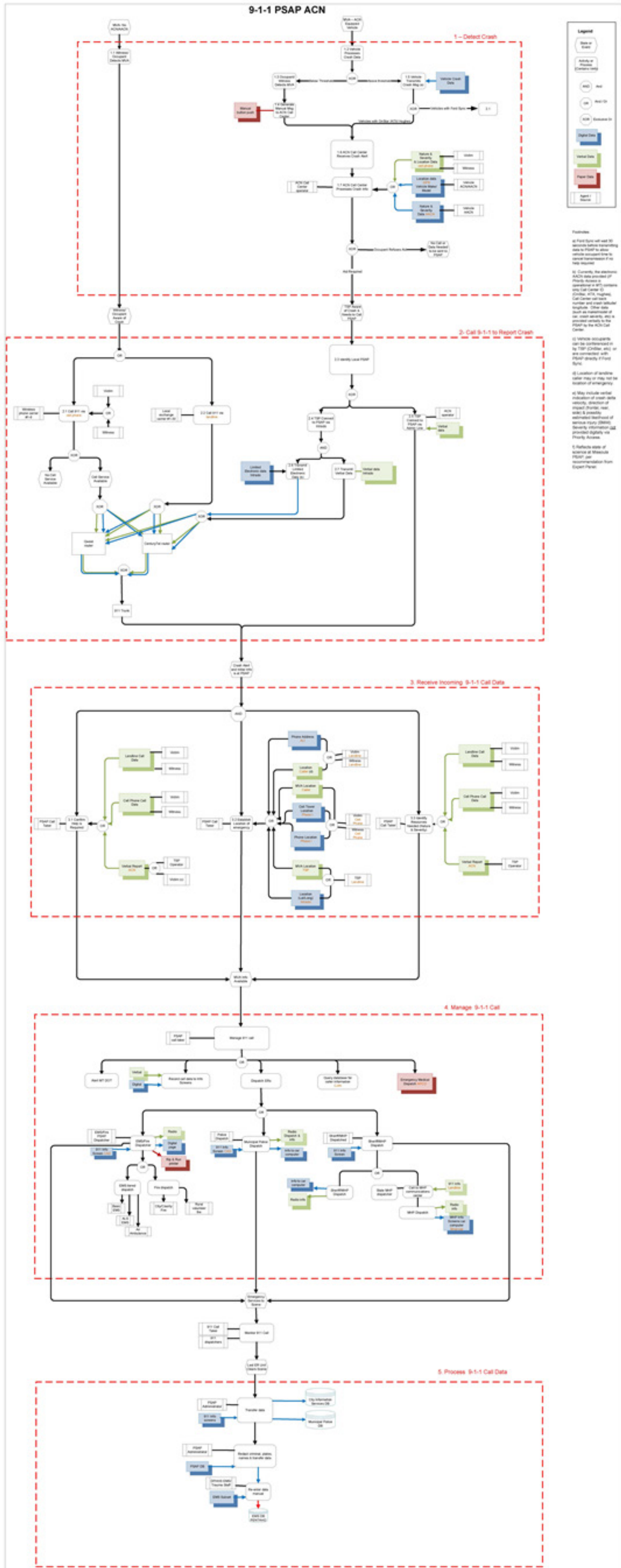
## Appendix B - Seven Agencies' Data Flow Diagrams

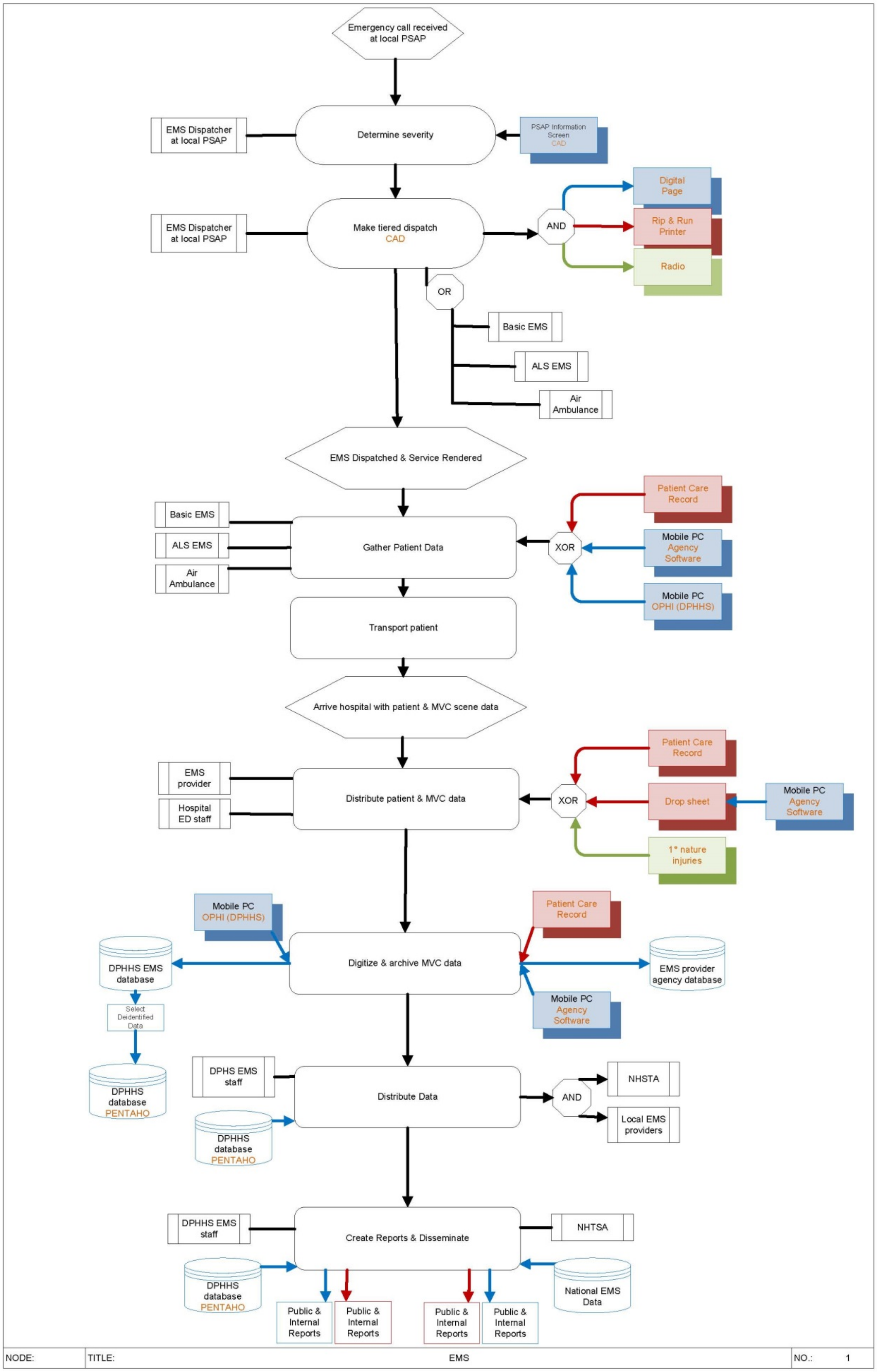
Level 0 – MVA Crash Response Overview

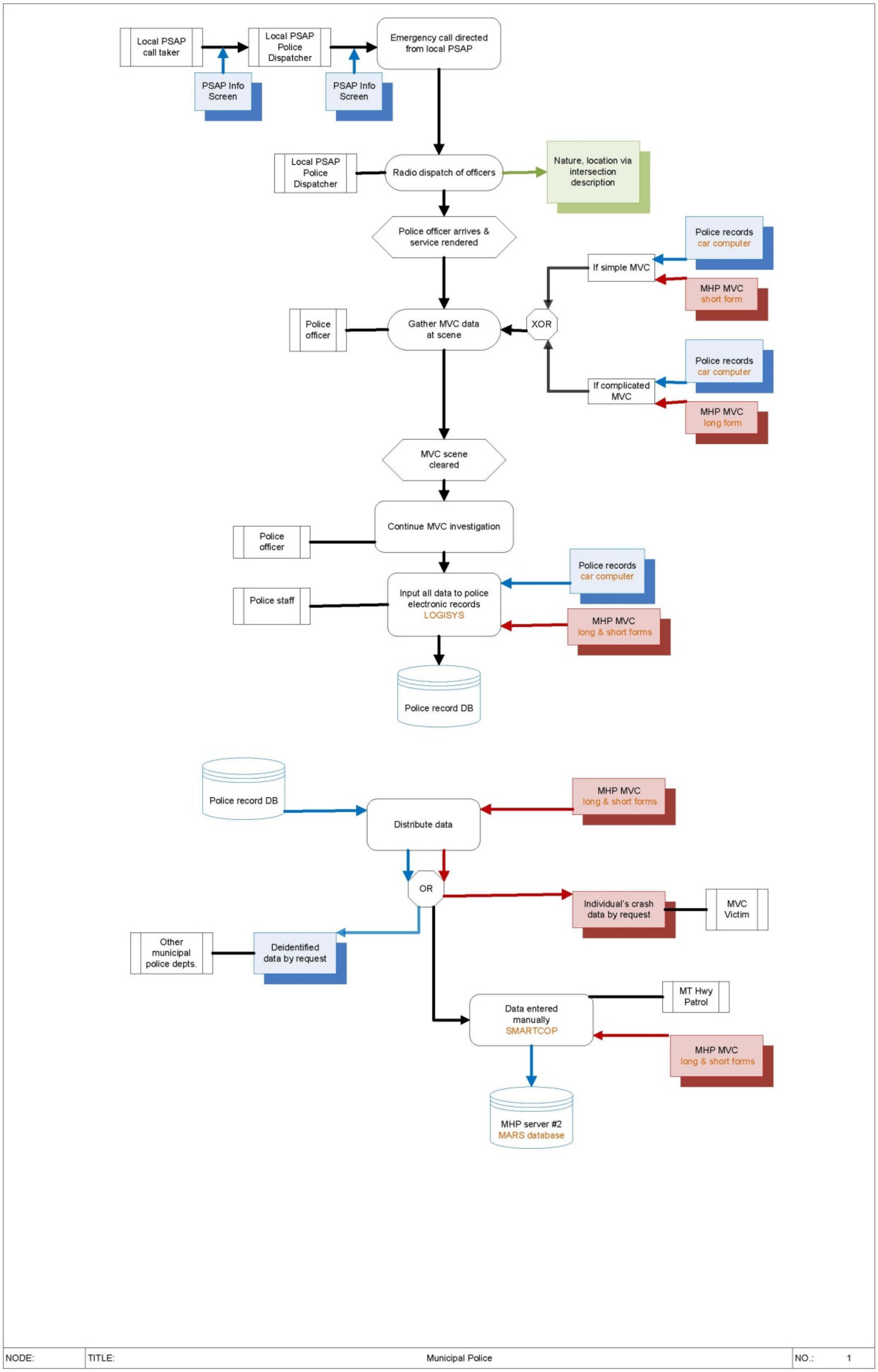
### Legend

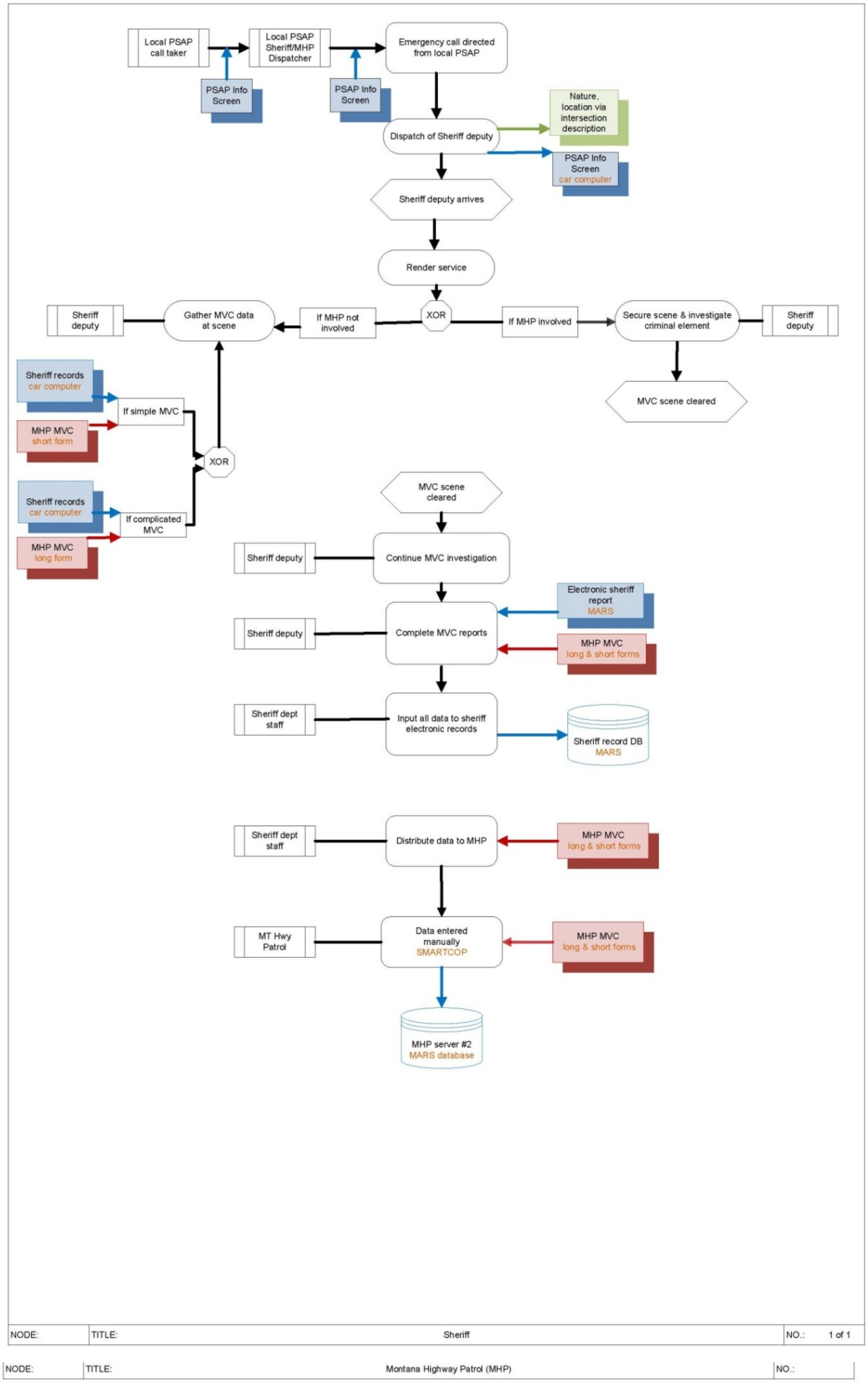


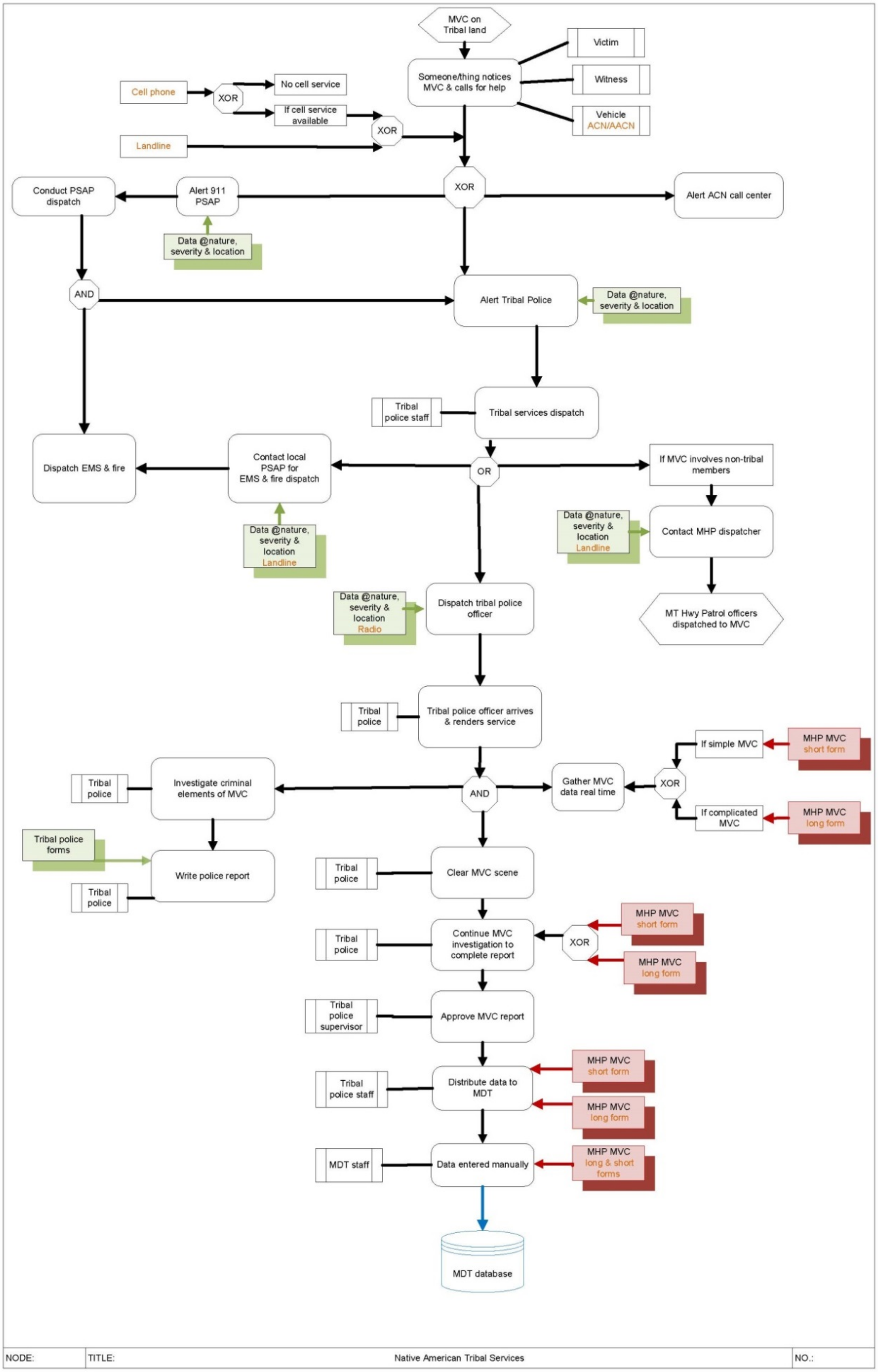



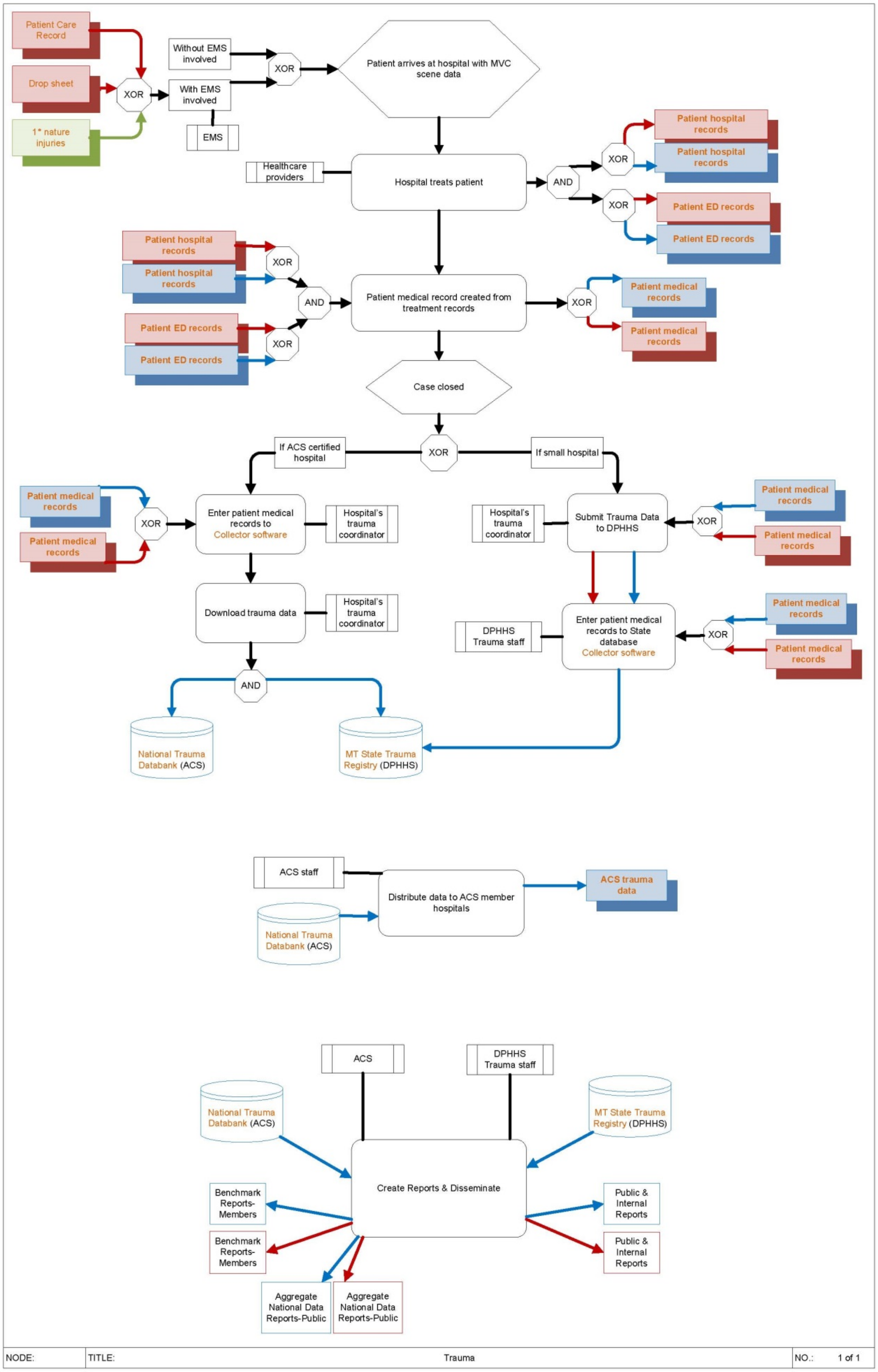

9-1-1 PSAP ACN
1 – Detect Crash
2- Call 9-1-1 to Report Crash
3 Receive Incoming 9-1-1 Call Data
4 Manage 9-1-1 Call
5. Process 9-1-1 Call Data


Emergency call received at local PSAP
EMS Dispatcher at local PSAP
Determine severity
PSAP Information Screen
CAD
EMS Dispatcher at local PSAP
Make tiered dispatch
CAD
AND
Digital Page
Rip & Run Printer
Radio
OR
Basic EMS
ALS EMS
Air Ambulance
EMS Dispatched & Service Rendered
Basic EMS
ALS EMS
Air Ambulance
Gather Patient Data
XOR
Patient Care Record
Mobile PC Agency Software
Mobile PC OPHI (DPHHS)
Transport patient
Arrive hospital with patient & MVC scene data
EMS provider
Hospital ED staff
Distribute patient & MVC data
XOR
Patient Care Record
Drop sheet
Mobile PC Agency Software
1* nature injuries
Mobile PC OPHI (DPHHS)
Patient Care Record
DPHHS EMS database
Digitize & archive MVC data
EMS provider agency database
Select Deidentified Data
Mobile PC Agency Software
DPHHS database PENTAHO
DPHS EMS staff
Distribute Data
AND
NHSTA
Local EMS providers
DPHHS database PENTAHO
DPHHS EMS staff
Create Reports & Disseminate
NHTSA
DPHHS database PENTAHO
National EMS Data
Public & Internal Reports
Public & Internal Reports
Public & Internal Reports
Public & Internal Reports
NODE:
TITLE:
EMS
NO.: 1


Local PSAP call taker
Local PSAP Police Dispatcher
Emergency call directed from local PSAP
PSAP Info Screen
PSAP Info Screen
Local PSAP Police Dispatcher
Radio dispatch of officers
Nature, location via intersection description
Police officer arrives & service rendered
Police records car computer
If simple MVC
MHP MVC short form
Police officer
Gather MVC data at scene
XOR
Police records car computer
If complicated MVC
MHP MVC long form
MVC scene cleared
Continue MVC investigation
Police officer
Police records car computer
Police staff
Input all data to police electronic records LOGISYS
MHP MVC long & short forms
Police record DB
Police record DB
Distribute data
MHP MVC long & short forms
OR
Individual's crash data by request
MVC Victim
Other municipal police depts.
Deidentified data by request
MT Hwy Patrol
Data entered manually SMARTCOP
MHP MVC long & short forms
MHP server #2 MARS database
NODE:
TITLE:
Municipal Police
NO.: 1


Local PSAP call taker
Local PSAP Sheriff/MHP Dispatcher
Emergency call directed from local PSAP
PSAP Info Screen
PSAP Info Screen
Dispatch of Sheriff deputy
Nature, location via intersection description
PSAP Info Screen car computer
Sheriff deputy arrives
Render service
XOR
If MHP not involved
If MHP involved
Sheriff deputy
Gather MVC data at scene
Secure scene & investigate criminal element
Sheriff deputy
MVC scene cleared
Sheriff records car computer
If simple MVC
MHP MVC short form
XOR
Sheriff records car computer
If complicated MVC
MHP MVC long form
MVC scene cleared
Sheriff deputy
Continue MVC investigation
Sheriff deputy
Complete MVC reports
Electronic sheriff report MARS
MHP MVC long & short forms
Sheriff dept staff
Input all data to sheriff electronic records
Sheriff record DB MARS
Sheriff dept staff
Distribute data to MHP
MHP MVC long & short forms
MT Hwy Patrol
Data entered manually SMARTCOP
MHP MVC long & short forms
MHP server #2 MARS database
NODE: TITLE: Sheriff NO.: 1 of 1
NODE: TITLE: Montana Highway Patrol (MHP) NO.:


MVC on Tribal land
Someone/thing notices MVC & calls for help
Victim
Witness
Vehicle
ACN/AACN
Cell phone
XOR
No cell service
If cell service available
XOR
Landline
XOR
Conduct PSAP dispatch
Alert 911 PSAP
Data @nature, severity & location
Alert ACN call center
AND
Alert Tribal Police
Data @nature, severity & location
Tribal police staff
Tribal services dispatch
Dispatch EMS & fire
Contact local PSAP for EMS & fire dispatch
OR
If MVC involves non-tribal members
Data @nature, severity & location
Landline
Data @nature, severity & location
Landline
Contact MHP dispatcher
MT Hwy Patrol officers dispatched to MVC
Data @nature, severity & location
Radio
Dispatch tribal police officer
Tribal police
Tribal police officer arrives & renders service
Tribal police
Investigate criminal elements of MVC
AND
Gather MVC data real time
XOR
If simple MVC
MHP MVC
short form
If complicated MVC
MHP MVC
long form
Tribal police forms
Write police report
Tribal police
Tribal police
Clear MVC scene
Tribal police
Continue MVC investigation to complete report
XOR
MHP MVC
short form
MHP MVC
long form
Tribal police supervisor
Approve MVC report
Tribal police staff
Distribute data to MDT
MHP MVC
short form
MHP MVC
long form
MDT staff
Data entered manually
MHP MVC
long & short forms
MDT database
NODE:
TITLE:
Native American Tribal Services
NO.:


Patient Care Record
Drop sheet
1* nature injuries
XOR
Without EMS involved
With EMS involved
EMS
XOR
Patient arrives at hospital with MVC scene data
Healthcare providers
Hospital treats patient
AND
XOR
XOR
Patient hospital records
Patient hospital records
Patient ED records
Patient ED records
Patient hospital records
Patient hospital records
Patient ED records
Patient ED records
XOR
XOR
AND
Patient medical record created from treatment records
XOR
Patient medical records
Patient medical records
Case closed
XOR
If ACS certified hospital
If small hospital
Patient medical records
Patient medical records
XOR
Enter patient medical records to Collector software
Hospital's trauma coordinator
Download trauma data
Hospital's trauma coordinator
AND
National Trauma Databank (ACS)
MT State Trauma Registry (DPHHS)
Hospital's trauma coordinator
Submit Trauma Data to DPHHS
XOR
Patient medical records
Patient medical records
DPHHS Trauma staff
Enter patient medical records to State database Collector software
XOR
Patient medical records
Patient medical records
ACS staff
Distribute data to ACS member hospitals
ACS trauma data
National Trauma Databank (ACS)
ACS
DPHHS Trauma staff
National Trauma Databank (ACS)
MT State Trauma Registry (DPHHS)
Create Reports & Disseminate
Benchmark Reports-Members
Benchmark Reports-Members
Public & Internal Reports
Public & Internal Reports
Aggregate National Data Reports-Public
Aggregate National Data Reports-Public
NODE:
TITLE:
Trauma
NO.:
1 of 1

## Appendix C - Data Book

| VEDS | | OnStar | | MSO 9-1-1 | | EMS OPHI-PCR | | Police and Sheriff | | Hwy Patrol SmartCop CAD Call Hx | | Hwy Patrol SmartCop Crash | | Trauma | | Hospital Discharge & ED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref | Name | Ref | Comment | Ref | Comment | Ref | Comment | Ref | Comment | Ref | Comment | Ref | Comment | Ref | Comment | Ref | Comment |
| ***Data Source 1.1*** | | | | | | | | | | | | | | | | | |
| | Type | 3 | | | | | | | | | | | | | | | |
| | Incident Originator | 4 | | | | | | | | | | | | | | | |
| | Provider Name | 5 | | 43 | | 3 | | | | 109, 112, 201 | | | | | | | |
| | Incident ID Number | 6 | | 433 | | 115 | | 3 | | 3 | | 2 | Crash Report # | 2, 7 | | 2 | |
| | Call Back Number | 7 | | 44 | | 30 | | | | 110 | | | | | | | |
| ***Incident Data 1.2*** | | | | | | | | | | | | | | | | | |
| | Event Verified | | | 40 | | | | | | | | | | | | | |
| | Incident Date and Time | | | 433 | | | | | | | | | | 63 | | | |
| | Received Date/Time of Incident | 10, 11 | | | | 143 | | 5 | | 116, 117 | | | | | | 3 | Admission date |
| | Event Time | | | 55 | | 140 | | | | | | 4 | | | | | |
| | Location | | | 23 | | 215-223 | | 6-7 | | 91,92 | | 17-19 | | 62 | | | |
| | Latitude | 12 | | 23 | | 218 | | 81, 83 | | 91 | | 17 | | | | | |
| | Longitude | 13 | | 23 | | 218 | | 82, 83 | | 92 | | 18 | | | | | |
| | Location Description | 15 | | 23 | | 215-223 | | 6, 7, 10 | | 51-65, 67-92, 216-217 | | 19 | | 58, 134-139 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Datum | 14 | | | | 51 | | | |
| LDT Confidence | | 433 | | | | | | |
| LDT Confidence Percentage | | | | | | | | |
| Location Time | | | | | | | | |

| ***VEDS*** | ***OnStar*** | ***MSO 9-1-1*** | ***EMS OPHI-PCR*** | ***Police and Sheriff*** | ***Hwy Patrol SmartCop CAD Call Hx*** | ***Hwy Patrol SmartCop Crash*** | ***Trauma*** | ***Hospital Discharge & ED*** |
|---|---|---|---|---|---|---|---|---|
| Device Event Type | 16 | 433 | | | | | | |
| ***Agency Notified by Voice 1.3*** | | | | | | | | |
| Name | | | | | | | | |
| Reference Number | | | | | | | | |
| Agency Telephone Number | | | | | | | | |
| Agency Contact Address | | | | | | | | |
| Agency Contact Time | | | | | | | | |
| ***Automated Incident Data 1.4*** | | | | | | | | |
| *Data from the Vehicle 1.4a* | | | | | | | | |
| *Vehicle Data* | | | | | | | | |
| Body Type | | 270 | | 98 | | 174 | | |
| USDOT # | | | | | | 290 | | |
| Manufacturer | 18 | | | | | | | |
| Make | 19 | 263 | | 97 | | 181 | | |
| Model | 20 | 264 | | | | 182 | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year | 21 | | 260 | | | | 96 | | | | 180 | | | | | |
| | Weight | | | | | | | 139 | | | | 304 | categorical | | | | |
| | Color | 22 | | 265 | | | | | | | | 184 | | | | | |
| | Power Source | | | | | | | | | | | | | | | | |
| | License Plate | | | 261 | | | | | | | | 179 | | | | | |
| | VIN | 23 | | 266 | | | | | | | | 173 | | | | | |
| *Owner Data* | | | | | | | | | | | | | | | | | |
| | Owner's Name | | | 150 | | | | | | | | 218-221 | | | | | |
| | Owner's Age | | | 157 | | | | | | | | | | | | | |
| | Owner's Gender | | | 152 | | | | | | | | | | | | | |
| | Owner's Language | | | | | | | | | | | | | | | | |
| | Owner Hearing Impaired | | | | | | | | | | | | | | | | |
| | Owner Mobility Impaired | | | | | | | | | | | | | | | | |
| | Owner Speech Impaired | | | | | | | | | | | | | | | | |
| | Owner Other Condition | | | | | | | | | | | | | | | | |
| *Primary Driver Data* | | | | | | | | | | | | | | | | | |
| | Primary Driver's Age | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Driver's Gender | | | | | | | | | | | | | | | | |
| Primary Driver's Language | | | | | | | | | | | | | | | | |
| Primary Driver Hearing Impaired | | | | | | | | | | | | | | | | |
| Primary Driver Mobility Impaired | | | | | | | | | | | | | | | | |
| Primary Driver Speech Impaired | | | | | | | | | | | | | | | | |
| Primary Driver Other Condition | | | | | | | | | | | | | | | | |
| *Other Data from the Vehicle* | | | | | | | | | | | | | | | | |
| Owner's State and Province | | | 262 | | | | 94 | | | | 176 | | | | | |
| Garaged State and Province | 24 | | | | | | | | | | | | | | | |
| Hazardous Materials | | | | | | | 68,133 | | | | 307 | | | | | |
| *Contents of Vehicle* | | | | | | | | | | | | | | | | |
| Contents Quantity | | | | | | | | | | | | | | | | |
| *Crash Data 1.4b* | | | | | | | | | | | | | | | | |
| *General Crash Data* | | | | | | | | | | | | | | | | |
| Ignition State | | | 433 | | | | | | | | | | | | | |
| Heading | 28 | | 433 | | | | 100 | | 66 | | 216 | | | | | |
| Orientation | | | | | | | 30 | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fire | | | 4<br>3<br>3 | | 243 | | | | | | | | | | | |
| Multiple Impacts | 30 | | 4<br>3<br>3 | | 244 | | | | | | 241-255 | descriptives | | | | |
| *Impacts* | | | | | | | | | | | | | | | | |
| Delta Velocity | 26 | Up to 2 impacts | | | | | | | | | | | | | | |
| Crash Pulse Duration | | | | | | | | | | | | | | | | |
| Crash Pulse Location | | | | | | | | | | | | | | | | |
| Principle Direction of Force | 27 | Up to 2 impacts | | | | | | | | | | | | | | |
| Rollover | 29 | ? | | | 244 | | | | | | | | | | | |
| Digital image location | | | | | | | | | | | | | | | | |
| *Seat Data* | | | | | | | | | | | | | | | | |
| Seat | | | | | | | | | | | | | | | | |
| *Airbag Deployed* | | | | | | | | | | | | | | | | |
| Deployed | 33 | Each airbag | 4<br>3<br>3 | | 248 | | 152 | | | | 88 | | 105 | | | |
| Location | 34 | | | | | | | | | | | | 111-114 | | | |
| *Other* Seat *Data* | | | | | | | | | | | | | | | | |
| Belt Monitored | | | | | | | | | | | | | | | | |
| Belt Fastened | | | | | 247 | | 151 | | | | 86 | | 103 | | | |
| Tensioner Triggered | | | | | | | | | | | | | | | | |
| Occupied | | | | | | | | | | | | | | | | |
| ***Post Crash On Scene Data 1.5*** | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *General Post Crash Data* | | | | | | | | | | | | | | | | |
| Number of Occupants | | | 433 | | 213 | | | | | | | | | | | |
| *Occupant* | | | | | | | | | | | | | | | | |
| Occupant's Name | | | 150 | | 153-155 | | 155, 156, 157 | | | | 96-99 | | 13, 23-25 | | | |
| Occupant's Age | | | 157 | | 166, 167 | | 159 | | | | 108 | | 50 | | 7 | |
| Occupant's Gender | | | 152 | | 163 | | 158 | | | | 109 | | 48 | | | |
| Conscious | | | 433 | | 296-300, 303 | | | | | | | | 196-199 | | | |
| Breathing | | | 433 | | 252, 292-293, 307 | | | | | | | | 192-193 | | | |
| Speaking | | | 433 | | 303 | | | | | | | | | | | |
| Moving Arm | | | 433 | | 317, 337, 339 | | | | | | | | | | | |
| Moving Leg | | | 433 | | 319, 338, 340 | | | | | | | | | | | |
| External Bleeding | | | 433 | | 323-342 | | | | | | | | | | | |
| Entrapped | | | 433 | | 261 | | 154 | | | | 151 | | 208 | | | |
| Ejected | | | 433 | | 243 | | 153 | | | | 89 | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seat Position | 32 | | 433 | | 245 | | 147 | | | | 82-85 | | | | | |
| *Child Seat* | | | | | | | | | | | | | | | | |
| Restraint Type | | | 433 | | | | | | | | | | 104 | | | |
| Child Weight | | | | | | | | | | | | | | | | |
| Injury Patterns | | | 433 | | | | | | | | | | | | | |
| Seat Type | | | | | | | | | | | | | | | | |
| Latch Used | | | | | 247 | | | | | | | | 103 | | | |
| ***Historical (Personal) Medical Data 1.6*** | | | | | | | | | | | | | | | | |
| *Provider* | | | | | | | | | | | | | | | | |
| Provider Retrieval Method | | | | | | | | | | | | | | | | |
| Provider Telephone Number | | | | | | | | | | | | | | | | |
| Provider Fax | | | | | | | | | | | | | | | | |
| Provider URL | | | | | | | | | | | | | | | | |
| Record Update Date | | | | | | | | | | | | | | | | |
| *Subscriber Information* | | | | | | | | | | | | | | | | |
| Name | | | | | | | | | | | | | | | | |
| Age | | | | | | | | | | | | | | | | |
| Gender | | | | | | | | | | | | | | | | |
| Language | | | | | | | | | | | | | | | | |
| Hearing Impaired | | | | | | | | | | | | | | | | |
| Mobility Impaired | | | | | | | | | | | | | | | | |
| Speech Impaired | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Other Condition | | | | | | | | | | | | | | | | |
| *Primary Care Physician* | | | | | | | | | | | | | | | | | |
| | Name | | | | | 264-266 | | | | | | | | | | | |
| | Telephone Number | | | | | | | | | | | | | | | | |
| *Emergency Contact* | | | | | | | | | | | | | | | | | |
| | Name | | | | | 278 | Presence of form | | | | | | | | | | |
| | Telephone Number | | | | | | | | | | | | | | | | |
| | Alternate TN | | | | | | | | | | | | | | | | |
| *Other Subscriber Information* | | | | | | | | | | | | | | | | | |
| | Medical History | | | | | 270 | Injured Person's | | | | | | | | | | |
| | Allergies | | | | | 268, 269 | Injured Person's | | | | | | | | | | |
| | Medications | | | | | 274-277 | Injured Person's | | | | | | | | | | |
| | Blood Type | | | | | | | | | | | | | | | | |
| | Pregnant | | | | | 280 | Injured Person | | | | | | | | | | |
| | Organ Donor | | | | | | | | | | | | | | | | |
| | Preferred Hospital | | | | | | | | | | | | | | | | |
| | Living Will | | | | | 267 | Injured Person's | | | | | | | | | | |
| *Subscriber Government IDs* | | | | | | | | | | | | | | | | | |
| | Driver's License Number | | | | | 171 | Injured Person's | | | | | | | | | | |
| | Driver's License State Province | | | | | 170 | Injured Person's | | | | | | | | | | |
| | Social Security Number | | | | | 162 | Injured Person's | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Subscriber Primary Insurance Provider* | | | | | | | | | | | | | | | | |
| Insurance Provider Name | | | | | 174 | Injured Person's | | | | | | | | | | |
| Policy Number | | | | | 181 | Injured Person's | | | | | | | | | | |
| Telephone Number | | | | | | | | | | | | | | | | |
| *Frequent Drivers/ Occupants (FDO)* | | | | | | | | | | | | | | | | |
| FDO Age | | | | | | | | | | | | | | | | |
| FDO Gender | | | | | | | | | | | | | | | | |
| FDO Language | | | | | | | | | | | | | | | | |
| FDO Hearing Impaired | | | | | | | | | | | | | | | | |
| FDO Mobility Impaired | | | | | | | | | | | | | | | | |
| FDO Speech Impaired | | | | | | | | | | | | | | | | |
| FDO Other Condition | | | | | | | | | | | | | | | | |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| 2 | 1.1 | Data Source | Data Source | Data Source | Type |
| 3 | 1.1 | Data Source | Data Source | Data Source | Incident Originator |
| 4 | 1.1 | Data Source | Data Source | Data Source | Provider Name |
| 5 | 1.1 | Data Source | Data Source | Data Source | Incident ID Number |
| 6 | 1.1 | Data Source | Data Source | Data Source | Call Back Number |
| 7 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Event Verified |
| 8 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Incident Date and Time |
| 9 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Received Date/Time of Incident |
| 10 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Event Time |
| 11 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Location |
| 12 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Latitude |
| 13 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Longitude |
| 14 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Location Description |
| 15 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Datum |
| 16 | 1.2 | Incident Data | Incident Date, Time, | Incident Date, Time, | LDT Confidence |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | | Location | Location | |
| 17 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | LDT Confidence Percentage |
| 18 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Location Time |
| 19 | 1.2 | Incident Data | Incident Date, Time, Location | Incident Date, Time, Location | Device Event Type |
| 20 | 1.3 | Agency Notified by Voice | Agency Notified by Voice | Agency Notified by Voice | Name |
| 21 | 1.3 | Agency Notified by Voice | Agency Notified by Voice | Agency Notified by Voice | Reference Number |
| 22 | 1.3 | Agency Notified by Voice | Agency Notified by Voice | Agency Notified by Voice | Agency Telephone Number |
| 23 | 1.3 | Agency Notified by Voice | Agency Notified by Voice | Agency Notified by Voice | Agency Contact Address |
| 24 | 1.3 | Agency Notified by Voice | Agency Notified by Voice | Agency Notified by Voice | Agency Contact Time |
| 25 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | Body Type |
| 26 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | USDOT # |
| 27 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | Manufacturer |
| 28 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | Make |
| 29 | 1.4a | Automated Incident | Data from the Vehicle | Vehicle Data | Model |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Data | | | |
| 30 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | Year |
| 31 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | Weight |
| 32 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | Color |
| 33 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | Power Source |
| 34 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | License Plate |
| 35 | 1.4a | Automated Incident Data | Data from the Vehicle | Vehicle Data | VIN |
| 36 | 1.4a | Automated Incident Data | Data from the Vehicle | Owner Data | Owner's Name |
| 37 | 1.4a | Automated Incident Data | Data from the Vehicle | Owner Data | Owner's Age |
| 38 | 1.4a | Automated Incident Data | Data from the Vehicle | Owner Data | Owner's Gender |
| 39 | 1.4a | Automated Incident Data | Data from the Vehicle | Owner Data | Owner's Language |
| 40 | 1.4a | Automated Incident Data | Data from the Vehicle | Owner Data | Owner Hearing Impaired |
| 41 | 1.4a | Automated Incident Data | Data from the Vehicle | Owner Data | Owner Mobility Impaired |
| 42 | 1.4a | Automated Incident | Data from the Vehicle | Owner Data | Owner Speech Impaired |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Data | | | |
| 43 | 1.4a | Automated Incident Data | Data from the Vehicle | Owner Data | Owner Other Condition |
| 44 | 1.4a | Automated Incident Data | Data from the Vehicle | Primary Driver Data | Primary Driver's Age |
| 45 | 1.4a | Automated Incident Data | Data from the Vehicle | Primary Driver Data | Primary Driver's Gender |
| 46 | 1.4a | Automated Incident Data | Data from the Vehicle | Primary Driver Data | Primary Driver's Language |
| 47 | 1.4a | Automated Incident Data | Data from the Vehicle | Primary Driver Data | Primary Driver Hearing Impaired |
| 48 | 1.4a | Automated Incident Data | Data from the Vehicle | Primary Driver Data | Primary Driver Mobility Impaired |
| 49 | 1.4a | Automated Incident Data | Data from the Vehicle | Primary Driver Data | Primary Driver Speech Impaired |
| 50 | 1.4a | Automated Incident Data | Data from the Vehicle | Primary Driver Data | Primary Driver Other Condition |
| 51 | 1.4a | Automated Incident Data | Data from the Vehicle | Other Data from the Vehicle | Owner's State and Province |
| 52 | 1.4a | Automated Incident Data | Data from the Vehicle | Other Data from the Vehicle | Garaged State and Province |
| 53 | 1.4a | Automated Incident Data | Data from the Vehicle | Other Data from the Vehicle | Hazardous Materials |
| 54 | 1.4a | Automated Incident Data | Data from the Vehicle | Contents of Vehicle | Contents Quantity |
| 55 | 1.4b | Automated Incident | Crash Data | General Crash Data | Ignition State |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Data | | | |
| 56 | 1.4b | Automated Incident Data | Crash Data | General Crash Data | Heading |
| 57 | 1.4b | Automated Incident Data | Crash Data | General Crash Data | Orientation |
| 58 | 1.4b | Automated Incident Data | Crash Data | General Crash Data | Fire |
| 59 | 1.4b | Automated Incident Data | Crash Data | General Crash Data | Multiple Impacts |
| 60 | 1.4b | Automated Incident Data | Crash Data | Impacts | Delta Velocity |
| 61 | 1.4b | Automated Incident Data | Crash Data | Impacts | Crash Pulse Duration |
| 62 | 1.4b | Automated Incident Data | Crash Data | Impacts | Crash Pulse Location |
| 63 | 1.4b | Automated Incident Data | Crash Data | Impacts | Principle Direction of Force |
| 64 | 1.4b | Automated Incident Data | Crash Data | Impacts | Rollover |
| 65 | 1.4b | Automated Incident Data | Crash Data | Impacts | Digital image location |
| 66 | 1.4b | Automated Incident Data | Crash Data | Seat Data | Seat |
| 67 | 1.4b | Automated Incident Data | Crash Data | Airbag Deployed | Deployed |
| 68 | 1.4b | Automated Incident | Crash Data | Airbag Deployed | Location |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Data | | | |
| 69 | 1.4b | Automated Incident Data | Crash Data | Other Seat Data | Belt Monitored |
| 70 | 1.4b | Automated Incident Data | Crash Data | Other Seat Data | Belt Fastened |
| 71 | 1.4b | Automated Incident Data | Crash Data | Other Seat Data | Tensioner Triggered |
| 72 | 1.4b | Automated Incident Data | Crash Data | Other Seat Data | Occupied |
| 73 | 1.5 | Post Crash On Scene Data | General Post Crash Data | General Post Crash Data | Number of Occupants |
| 74 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Occupant's Name |
| 75 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Occupant's Age |
| 76 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Occupant's Gender |
| 77 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Conscious |
| 78 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Breathing |
| 79 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Speaking |
| 80 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Moving Arm |
| 81 | 1.5 | Post-Crash On Scene | Occupant | Occupant | Moving Leg |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Data | | | |
| 82 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | External Bleeding |
| 83 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Entrapped |
| 84 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Ejected |
| 85 | 1.5 | Post-Crash On Scene Data | Occupant | Occupant | Seat Position |
| 86 | 1.5 | Post-Crash On Scene Data | Child Seat | Child Seat | Restraint Type |
| 87 | 1.5 | Post-Crash On Scene Data | Child Seat | Child Seat | Child Weight |
| 88 | 1.5 | Post-Crash On Scene Data | Child Seat | Child Seat | Injury Patterns |
| 89 | 1.5 | Post-Crash On Scene Data | Child Seat | Child Seat | Seat Type |
| 90 | 1.5 | Post-Crash On Scene Data | Child Seat | Child Seat | Latch Used |
| 91 | 1.6 | Historical (Personal) Medical Data | Provider | Provider | Provider Retrieval Method |
| 92 | 1.6 | Historical (Personal) Medical Data | Provider | Provider | Provider Telephone Number |
| 93 | 1.6 | Historical (Personal) Medical Data | Provider | Provider | Provider Fax |
| 94 | 1.6 | Historical (Personal) | Provider | Provider | Provider URL |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Medical Data | | | |
| 95 | 1.6 | Historical (Personal) Medical Data | Provider | Provider | Record Update Date |
| 96 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Name |
| 97 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Age |
| 98 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Gender |
| 99 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Language |
| 100 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Hearing Impaired |
| 101 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Mobility Impaired |
| 102 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Speech Impaired |
| 103 | 1.6 | Historical (Personal) Medical Data | Subscriber Information | Subscriber Information | Other Condition |
| 104 | 1.6 | Historical (Personal) Medical Data | Primary Care Physician | Primary Care Physician | Name |
| 105 | 1.6 | Historical (Personal) Medical Data | Primary Care Physician | Primary Care Physician | Telephone Number |
| 106 | 1.6 | Historical (Personal) Medical Data | Emergency Contact | Emergency Contact | Name |
| 107 | 1.6 | Historical (Personal) | Emergency Contact | Emergency Contact | Telephone Number |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Medical Data | | | |
| 108 | 1.6 | Historical (Personal) Medical Data | Emergency Contact | Emergency Contact | Alternate TN |
| 109 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Medical History |
| 110 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Allergies |
| 111 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Medications |
| 112 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Blood Type |
| 113 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Pregnant |
| 114 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Organ Donor |
| 115 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Preferred Hospital |
| 116 | 1.6 | Historical (Personal) Medical Data | Other Subscriber Information | Other Subscriber Information | Living Will |
| 117 | 1.6 | Historical (Personal) Medical Data | Subscriber Government IDs | Subscriber Government IDs | Driver's License Number |
| 118 | 1.6 | Historical (Personal) Medical Data | Subscriber Government IDs | Subscriber Government IDs | Driver's License State Province |
| 119 | 1.6 | Historical (Personal) Medical Data | Subscriber Government IDs | Subscriber Government IDs | Social Security Number |
| 120 | 1.6 | Historical (Personal) | Subscriber Primary | Subscriber Primary | Insurance Provider Name |

| Line # | Category # | Group | Category | Sub-Category | Element |
|---|---|---|---|---|---|
| | | Medical Data | Insurance Provider | Insurance Provider | |
| 121 | 1.6 | Historical (Personal) Medical Data | Subscriber Primary Insurance Provider | Subscriber Primary Insurance Provider | Policy Number |
| 122 | 1.6 | Historical (Personal) Medical Data | Subscriber Primary Insurance Provider | Subscriber Primary Insurance Provider | Telephone Number |
| 123 | 1.6 | Historical (Personal) Medical Data | Frequent Drivers/ Occupants (FDO) | Frequent Drivers/ Occupants (FDO) | FDO Age |
| 124 | 1.6 | Historical (Personal) Medical Data | Frequent Drivers/ Occupants (FDO) | Frequent Drivers/ Occupants (FDO) | FDO Gender |
| 125 | 1.6 | Historical (Personal) Medical Data | Frequent Drivers/ Occupants (FDO) | Frequent Drivers/ Occupants (FDO) | FDO Language |
| 126 | 1.6 | Historical (Personal) Medical Data | Frequent Drivers/ Occupants (FDO) | Frequent Drivers/ Occupants (FDO) | FDO Hearing Impaired |
| 127 | 1.6 | Historical (Personal) Medical Data | Frequent Drivers/ Occupants (FDO) | Frequent Drivers/ Occupants (FDO) | FDO Mobility Impaired |
| 128 | 1.6 | Historical (Personal) Medical Data | Frequent Drivers/ Occupants (FDO) | Frequent Drivers/ Occupants (FDO) | FDO Speech Impaired |
| 129 | 1.6 | Historical (Personal) Medical Data | Frequent Drivers/ Occupants (FDO) | Frequent Drivers/ Occupants (FDO) | FDO Other Condition |

| Line # | OnStar Data Element | OnStar Data Set | Value | Included in VEDS | VEDS Element |
|---|---|---|---|---|---|
| | | | | | 1.1 Data Source |
| 3 | Data Source Type | B | Telematics Service Provider | x | Type |
| 4 | Incident Originator | B | TRUE | x | Incident Originator |
| 5 | Provider Name | B | OnStar | x | Provider Name |
| 6 | Incident ID | B | OnStar Case ID | x | Incident ID |
| 7 | Call Back Number | B | OnStar Call Center 800 # | x | Call Back Number |
| | | | | | 1.2 Incident Data |
| 9 | | | | x | Event Verified |
| 10 | Received Date | A | Date at which data is received into OCC | x | Date Stamp |
| 11 | Received Time | A | Time at which data is received into OCC | x | Received Time |
| 12 | Latitude | A | Latitude of incident | x | Latitude |
| 13 | Longitude | A | Longitude of incident | x | Longitude |
| 14 | Datum | A | GIS map projection scheme | x | Datum |
| 15 | Location Description | B | (Used to send incident state to help CARS route to the appropriate state webserver) | x | Location Description |
| 16 | Device Event Type | A | ACN, AACN, or SOS | x | Device Event Type |
| | | | | | 1.4a Vehicle Data |
| 18 | Manufacturer | B | General Motors | x | Manufacturer |
| 19 | Make | B | Chevrolet, Pontiac, etc. | x | Make |
| 20 | Model | B | Lumina, Cavalier, etc. | x | Model |
| 21 | Year | B | | x | Year |

| Line # | OnStar Data Element | OnStar Data Set | Value | Included in VEDS | VEDS Element |
|---|---|---|---|---|---|
| 22 | Color | B | | x | Colors |
| 23 | VIN | B | | x | VIN |
| 24 | Garaged State | B | State where car is garaged | x | Garaged State |
| | | | | | 1.4b Crash Data |
| 26 | Delta Velocity | B | Delta-v for each impact (up to 2) | x | Delta velocity |
| 27 | PDOF | B | PDOF for each impact (up to 2) | x | Principal direction of force (PDOF) |
| 28 | Pre-crash Heading | A | Heading prior to event | x | Pre-crash heading |
| 29 | Rollover | A | Rollover for each impact - yes or know if any impact experienced a rollover - (value ascribed to the first impact) | x | Rollover |
| 30 | Multiple Impacts | B | True / false | x | Multiple impacts |
| | | | | | 1.5 Seat Data |
| 32 | Seat Position | B | (Needed to support airbag deployed) | x | Seat Position |
| 33 | Airbag Deployed | B | True for each distinct airbag reported to be deployed | x | Airbag deployed |
| 34 | Location | B | (Needed to support airbag deployed) | x | Location (of deployed airbag) |
| | | | | | |
| | Note: OnStar provided a data dictionary limited to VEDS elements. | | | | |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 2 | | CadAddressTable | cadaddrdb2 | cadaddrdb2 | cfs_numbr | The CFS Number |
| 3 | | | cadaddrdb2 | cadaddrdb2 | addr_pre | Prefix of the Incident Address (NWSE…) |
| 4 | | | cadaddrdb2 | cadaddrdb2 | addr_street | Street Name of the Incident Address (Main, Elm, 42nd, …) |
| 5 | | | cadaddrdb2 | cadaddrdb2 | addr_suf | Suffix of the Incident Address (NWSE…) |
| 6 | | | cadaddrdb2 | cadaddrdb2 | addr_stype | Type of street (Ave., Blvd., Rd., …) |
| 7 | | | cadaddrdb2 | cadaddrdb2 | addr_fullstreet | Full name of Incident Address (Number Prefix, Street Name, Suffix, Street Type) |
| 8 | | | cadaddrdb2 | cadaddrdb2 | addr_number | Number associated with the Incident Address |
| 9 | | | cadaddrdb2 | cadaddrdb2 | landmark | Any landmark name associated with the Incident Address |
| 10 | | | | | | |
| 11 | | CadBoundaryTable | cadbnddb2 | cadbnddb2 | bnd_nmbr | The CFS Number - Foreign Key into the cadcfsdb2 table |
| 12 | | | cadbnddb2 | cadbnddb2 | bind_id | The boundary description |
| 13 | | | cadbnddb2 | cadbnddb2 | resp_level | The response level of the boundary |
| 14 | | | cadbnddb2 | cadbnddb2 | resp_code | The Response code of |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | | | | | | the boundary |
| 15 | | | cadbnddb2 | cadbnddb2 | cfs_numbr | The CFS Number |
| 16 | | | cadbnddb2 | cadbnddb2 | bound_id | The logical ID associated with the response level and response code of the boundary definition |
| 17 | | | cadbnddb2 | cadbnddb2 | agency | The Agency related to the boundary definition |
| 18 | | | | | | |
| 19 | | CadCallForServiceTable | cadcfsdb2 | cadcfsdb2 | cfs_arch | Always "0001" |
| 20 | | | cadcfsdb2 | cadcfsdb2 | cfs_numbr | Call for Service (CFS) Number - Primary key |
| 21 | | | cadcfsdb2 | cadcfsdb2 | priority | Priority of the Incident Code |
| 22 | | | cadcfsdb2 | cadcfsdb2 | inc_code | Incident Code |
| 23 | 1.2 Location, Latitude, Longitude, Location Descriptio n | | cadcfsdb2 | cadcfsdb2 | address | Incident Address |
| 24 | | | cadcfsdb2 | cadcfsdb2 | landmark | Landmark |
| 25 | | | cadcfsdb2 | cadcfsdb2 | apt_number | Any apartment number associated with the Incident Address |
| 26 | | | cadcfsdb2 | cadcfsdb2 | city | City of the Incident Address |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 27 | | | cadcfsdb2 | cadcfsdb2 | address_x | X-coordinate of the Address |
| 28 | | | cadcfsdb2 | cadcfsdb2 | address_y | Y-coordinate of the Address |
| 29 | | | cadcfsdb2 | cadcfsdb2 | zone1 | Not filled |
| 30 | | | cadcfsdb2 | cadcfsdb2 | zone2 | Not filled |
| 31 | | | cadcfsdb2 | cadcfsdb2 | addrtype | Agency of the First matching boundary |
| 32 | | | cadcfsdb2 | cadcfsdb2 | onbound | Not filled |
| 33 | | | cadcfsdb2 | cadcfsdb2 | bound1 | Not filled |
| 34 | | | cadcfsdb2 | cadcfsdb2 | bound2 | Not filled |
| 35 | | | cadcfsdb2 | cadcfsdb2 | bound3 | Not filled |
| 36 | | | cadcfsdb2 | cadcfsdb2 | bound4 | Not filled |
| 37 | | | cadcfsdb2 | cadcfsdb2 | alarm_no | Any alarm associated with the Incident Address |
| 38 | | | cadcfsdb2 | cadcfsdb2 | offr_cntct | Officer contract? Yes or No |
| 39 | | | cadcfsdb2 | cadcfsdb2 | line_number | Phone Line; alt "Dispatch Cntr." for SCFC burn notification |
| 40 | 1.2 Event Verified | | cadcfsdb2 | cadcfsdb2 | how_recd | How the CFS was received |
| 41 | | | cadcfsdb2 | cadcfsdb2 | in_progres | Is the CFS in progress? Yes or No |
| 42 | | | cadcfsdb2 | cadcfsdb2 | call_taker | Call taker who answered the CFS |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 43 | 1.1 Provider Name | | cadcfsdb2 | cadcfsdb2 | complainan | Complainant's name |
| 44 | 1.1 Call back # | | cadcfsdb2 | cadcfsdb2 | curr_phone | Complainant's phone |
| 45 | | | cadcfsdb2 | cadcfsdb2 | comp_addre | Reporting Person's Address |
| 46 | | | cadcfsdb2 | cadcfsdb2 | res_phone | Complainant's residence phone |
| 47 | | | cadcfsdb2 | cadcfsdb2 | weapon | Weapon associated with this CFS? |
| 48 | | | cadcfsdb2 | cadcfsdb2 | dispatcher | Dispatcher who processed this CFS |
| 49 | | | cadcfsdb2 | cadcfsdb2 | priunit | Primary unit attached to the CFS |
| 50 | | | cadcfsdb2 | cadcfsdb2 | finaldisp | Any Final Disposition attached to the CFS |
| 51 | | | cadcfsdb2 | cadcfsdb2 | building | Any building names associated with the incident location |
| 52 | | | cadcfsdb2 | cadcfsdb2 | busname | Any business names associated with the incident location |
| 53 | | | cadcfsdb2 | cadcfsdb2 | stmp_rcvd | Date and time the CFS was received |
| 54 | | | cadcfsdb2 | cadcfsdb2 | time_rcvd | Time the CFS was received |
| 55 | 1.2 Event | | cadcfsdb2 | cadcfsdb2 | TimeReceived | Time the CFS was |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | Time | | | | | received |
| 56 | | | cadcfsdb2 | cadcfsdb2 | dow_rcvd | Day of the week the CFS was received |
| 57 | | | cadcfsdb2 | cadcfsdb2 | stmp_sent | Date and time the CFS was sent to a dispatcher |
| 58 | | | cadcfsdb2 | cadcfsdb2 | time_sent | Time the CFS was sent to a dispatcher |
| 59 | | | cadcfsdb2 | cadcfsdb2 | TimeSent | Time the CFS was sent to a dispatcher |
| 60 | | | cadcfsdb2 | cadcfsdb2 | dow_sent | Day of the week the CFS was sent to a dispatcher |
| 61 | | | cadcfsdb2 | cadcfsdb2 | stmp_disp | Date and time a unit attached to a CFS first changed status to DISPATCHED |
| 62 | | | cadcfsdb2 | cadcfsdb2 | time_disp | Time a unit attached to a CFS first changed status to DISPATCHED |
| 63 | | | cadcfsdb2 | cadcfsdb2 | DispatchTime | Time a unit attached to a CFS changed status to DISPATCHED |
| 64 | | | cadcfsdb2 | cadcfsdb2 | dow_disp | Day of the week a unit attached to a CFS first changed status to DISPATCHED |
| 65 | | | cadcfsdb2 | cadcfsdb2 | stmp_cenrt | Date and time a unit attached to a CFS first changed status to EN ROUTE |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 66 | | | cadcfsdb2 | cadcfsdb2 | time_cenrt | Time a unit attached to a CFS first changed status to EN ROUTE |
| 67 | | | cadcfsdb2 | cadcfsdb2 | cenrtTime | Time a unit attached to a CFS first changed status to EN ROUTE |
| 68 | | | cadcfsdb2 | cadcfsdb2 | dow_cenrt | Day of the week a unit attached to a CFS first changed status to EN ROUTE |
| 69 | | | cadcfsdb2 | cadcfsdb2 | stmp_consc | Date and time a unit attached to a CFS first changed status to ON SCENE |
| 70 | | | cadcfsdb2 | cadcfsdb2 | time_consc | Time a unit attached to a CFS first changed status to ON SCENE |
| 71 | | | cadcfsdb2 | cadcfsdb2 | conscTime | Time a unit attached to a CFS first changed status to ON SCENE |
| 72 | | | cadcfsdb2 | cadcfsdb2 | dow_consc | Day of the week a unit attached to a CFS first changed status to ON SCENE |
| 73 | | | cadcfsdb2 | cadcfsdb2 | stmp_cmpl | Date and time the CFS was COMPLETED |
| 74 | | | cadcfsdb2 | cadcfsdb2 | time_cmpl | Time the CFS was COMPLETED |
| 75 | | | cadcfsdb2 | cadcfsdb2 | CompletionTime | Time the CFS was COMPLETED |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 76 | | | cadcfsdb2 | cadcfsdb2 | dow_cmpl | Day of the week the CFS was COMPLETED |
| 77 | | | cadcfsdb2 | cadcfsdb2 | stamp_att_any | Always '9999-12-31-24.00.00.000000' |
| 78 | | | cadcfsdb2 | cadcfsdb2 | tim_att_any | Always '24.00.00' |
| 79 | | | cadcfsdb2 | cadcfsdb2 | TimeAttAny | Not filled |
| 80 | | | cadcfsdb2 | cadcfsdb2 | dow_att_any | Always '' (blank) |
| 81 | | | cadcfsdb2 | cadcfsdb2 | duration | The difference between the time completed and the time received (in seconds) |
| 82 | | | cadcfsdb2 | cadcfsdb2 | routetime | The difference between the time sent and the time received (in seconds) |
| 83 | | | cadcfsdb2 | cadcfsdb2 | disptime | The difference between the time dispatched and the time sent (in seconds) |
| 84 | | | cadcfsdb2 | cadcfsdb2 | Agency | Agency of the unit attached to the CFS |
| 85 | | | cadcfsdb2 | cadcfsdb2 | station | The boundary description |
| 86 | | | cadcfsdb2 | cadcfsdb2 | district | The boundary description |
| 87 | | | cadcfsdb2 | cadcfsdb2 | zone | The boundary description |
| 88 | | | cadcfsdb2 | cadcfsdb2 | map_page | Map Page |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 89 | | | cadcfsdb2 | cadcfsdb2 | platoon | Not filled |
| 90 | | | cadcfsdb2 | cadcfsdb2 | cancelled | Does the How Recd field contain the letter C? |
| 91 | | | cadcfsdb2 | cadcfsdb2 | missing_times | Complete with +1 for each of STMP_RCVD |
| 92 | | | cadcfsdb2 | cadcfsdb2 | LinkIndex | Index into the Links Table for RMS |
| 93 | | | cadcfsdb2 | cadcfsdb2 | Floor | Floor of the building |
| 94 | | | cadcfsdb2 | cadcfsdb2 | XField1 | Intoxicated |
| 95 | | | cadcfsdb2 | cadcfsdb2 | XField2 | Emergency Medical Description |
| 96 | | | cadcfsdb2 | cadcfsdb2 | XField3 | Varies by site; default label is "XField3:" but configurable in FieldNames.dat |
| 97 | | | cadcfsdb2 | cadcfsdb2 | XField4 | Varies by site; default label is "XField4:" but configurable in FieldNames.dat |
| 98 | | | cadcfsdb2 | cadcfsdb2 | stmp_arch | DateTime Archived |
| 99 | | | cadcfsdb2 | cadcfsdb2 | time_arch | Time Archived |
| 100 | | | cadcfsdb2 | cadcfsdb2 | dow_arch | DOW Archived |
| 101 | | | cadcfsdb2 | cadcfsdb2 | inc_descript | Incident Code Description |
| 102 | | | cadcfsdb2 | cadcfsdb2 | Comp_x | Complainant Address X coordinate |
| 103 | | | cadcfsdb2 | cadcfsdb2 | Comp_y | Complainant Address Y |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | | | | | | coordinate |
| 104 | | | cadcfsdb2 | cadcfsdb2 | IncLatitude | Incident Address Latitude |
| 105 | | | cadcfsdb2 | cadcfsdb2 | IncLongitude | Incident Address Longitude |
| 106 | | | cadcfsdb2 | cadcfsdb2 | CompLatitude | Complainant Address Latitude |
| 107 | | | cadcfsdb2 | cadcfsdb2 | CompLongitude | Complainant Address Longitude |
| 108 | | | cadcfsdb2 | cadcfsdb2 | XField5 | Extra fields - Not Filled |
| 109 | | | cadcfsdb2 | cadcfsdb2 | XField6 | Extra fields - Not Filled |
| 110 | | | cadcfsdb2 | cadcfsdb2 | XField7 | Extra fields - Not Filled |
| 111 | | | cadcfsdb2 | cadcfsdb2 | BoundaryId | Logical Boundary Id of the CFS Address; displayed in unlabeled boundary list |
| 112 | | | cadcfsdb2 | cadcfsdb2 | Stmp_Strt | SCFC Burn start time |
| 113 | | | cadcfsdb2 | cadcfsdb2 | Time_Strt | SCFC Burn start time |
| 114 | | | cadcfsdb2 | cadcfsdb2 | Dow_Strt | SCFC Burn start day of the week |
| 115 | | | cadcfsdb2 | cadcfsdb2 | XField10 | Extra fields - Not Filled |
| 116 | | | cadcfsdb2 | cadcfsdb2 | XField11 | Extra fields - Not Filled |
| 117 | | | cadcfsdb2 | cadcfsdb2 | XField12 | Extra fields - Not Filled |
| 118 | | | cadcfsdb2 | cadcfsdb2 | XField8 | Extra fields - Not Filled |
| 119 | | | cadcfsdb2 | cadcfsdb2 | XField13 | Extra fields - Not Filled |
| 120 | | | cadcfsdb2 | cadcfsdb2 | XField9 | Extra fields - Not Filled |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 121 | | | | | | |
| 122 | | CadCommandLineTable | cadcomdb2 | cadcomdb2 | com_arch | Always "0002" |
| 123 | | | cadcomdb2 | cadcomdb2 | com_numbr | The CFS Number - Foreign Key into the cadcfsdb2 table |
| 124 | | | cadcomdb2 | cadcomdb2 | sequence | Not filled |
| 125 | | | cadcomdb2 | cadcomdb2 | stmp_creat | Date and time the comment was attached to a CFS |
| 126 | | | cadcomdb2 | cadcomdb2 | time_creat | Time the comment was created |
| 127 | | | cadcomdb2 | cadcomdb2 | dow_creat | Day of the week the comment was created |
| 128 | | | cadcomdb2 | cadcomdb2 | com_name | Name of the user who attached the comment to the CFS |
| 129 | | | cadcomdb2 | cadcomdb2 | com_ment | Comment attached to a CFS |
| 130 | | | cadcomdb2 | cadcomdb2 | cfs_numbr | The CFS Number |
| 131 | | | | | | |
| 132 | | CadDRNumberTable | caddrndb2 | caddrndb2 | drn_arch | Always "0004" |
| 133 | | | caddrndb2 | caddrndb2 | drn_nmbr | The CFS Number - Foreign Key into the cadcfsdb2 table |
| 134 | | | caddrndb2 | caddrndb2 | d_agency | The Agency associated with the DR Number |
| 135 | | | caddrndb2 | caddrndb2 | dr_nmbr | Desk Reference Number |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | | | | | | associated with a CFS |
| 136 | | | caddrndb2 | caddrndb2 | stmp_att_drn | Always '9999-12-31-24.00.00.000000' |
| 137 | | | caddrndb2 | caddrndb2 | stmp_onsc_drn | Always '9999-12-31-24.00.00.000000' |
| 138 | | | caddrndb2 | caddrndb2 | stmp_ofsc_drn | Always '9999-12-31-24.00.00.000000' |
| 139 | | | caddrndb2 | caddrndb2 | resptime | Always "-999" |
| 140 | | | caddrndb2 | caddrndb2 | dr_duration | Always "-999" |
| 141 | | | caddrndb2 | caddrndb2 | cfs_numbr | The CFS Number |
| 142 | | | caddrndb2 | caddrndb2 | Unit | Unit Associated with DR number |
| 143 | | | | | | |
| 144 | | CadPersonTable | cadperdb2 | cadperdb2 | per_arch | Always "0006" |
| 145 | | | cadperdb2 | cadperdb2 | per_nmbr | The CFS Number - Foreign Key into the cadcfsdb2 table |
| 146 | | | cadperdb2 | cadperdb2 | stamp_cre | Date and time the person info was attached to a CFS |
| 147 | | | cadperdb2 | cadperdb2 | tim_cre | Time the person information was attached to a CFS |
| 148 | | | cadperdb2 | cadperdb2 | dow_cre | Day of the week the person information was attached to a CFS |
| 149 | | | cadperdb2 | cadperdb2 | arm_dan | Person armed and |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | | | | | | dangerous? |
| 150 | 1.4a Owner's Name, 1.5 Occupant's Name | | cadperdb2 | cadperdb2 | name | Name of person (Last, First, Middle) |
| 151 | | | cadperdb2 | cadperdb2 | ssn | Person's Social Security Number |
| 152 | 1.4a Owner's Gender, 1.5 Occupant's Gender | | cadperdb2 | cadperdb2 | sex | Person's sex |
| 153 | | | cadperdb2 | cadperdb2 | dob_str | Person's Date of Birth - String Format |
| 154 | | | cadperdb2 | cadperdb2 | dob | Person's Date of Birth - Date Format |
| 155 | | | cadperdb2 | cadperdb2 | race | Person's Race |
| 156 | | | cadperdb2 | cadperdb2 | age_str | Person's Age |
| 157 | 1.4a Owner's Age, 1.5 Occupant's Age | | cadperdb2 | cadperdb2 | age | Person's Age Integer |
| 158 | | | cadperdb2 | cadperdb2 | ageunit | Not filled |
| 159 | | | cadperdb2 | cadperdb2 | ageyear | Not filled |
| 160 | | | cadperdb2 | cadperdb2 | height_str | Person's Height - String Format |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 161 | | | cadperdb2 | cadperdb2 | height | Person's Height - Integer |
| 162 | | | cadperdb2 | cadperdb2 | weight_str | Person's Weight - String Format |
| 163 | | | cadperdb2 | cadperdb2 | weight | Person's Weight - Integer |
| 164 | | | cadperdb2 | cadperdb2 | hair | Person's hair color |
| 165 | | | cadperdb2 | cadperdb2 | eyes | Person's eye color |
| 166 | | | cadperdb2 | cadperdb2 | complx | Person's complexion |
| 167 | | | cadperdb2 | cadperdb2 | drlic | Operator License Number |
| 168 | | | cadperdb2 | cadperdb2 | per_state | Person's state |
| 169 | | | cadperdb2 | cadperdb2 | per_address | Person's address |
| 170 | | | cadperdb2 | cadperdb2 | per_phone | Person's phone number |
| 171 | | | cadperdb2 | cadperdb2 | per_stored | Indicates if the person record was stored in the GenInfo database |
| 172 | | | cadperdb2 | cadperdb2 | per_gid_type | General Information database Type (BOLO, Missing Person, Suspect |
| 173 | | | cadperdb2 | cadperdb2 | lsw | What the person was last seen wearing |
| 174 | | | cadperdb2 | cadperdb2 | per_misc | Miscellaneous information about the person |
| 175 | | | cadperdb2 | cadperdb2 | per_reqby | Person Who Requested the Query |
| 176 | | | cadperdb2 | cadperdb2 | cfs_numbr | The CFS Number |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 177 | | | cadperdb2 | cadperdb2 | pxfield1 | Extra fields - Not Filled |
| 178 | | | cadperdb2 | cadperdb2 | pxfield2 | Extra fields - Not Filled |
| 179 | | | cadperdb2 | cadperdb2 | pxfield3 | Extra fields - Not Filled |
| 180 | | | cadperdb2 | cadperdb2 | pxfield4 | Extra fields - Not Filled |
| 181 | | | | | | |
| 182 | | CadReadinessTable | CadReadinessLevel | CadReadinessLevel | SectorID | |
| 183 | | | CadReadinessLevel | CadReadinessLevel | EnteredDate | |
| 184 | | | CadReadinessLevel | CadReadinessLevel | ReadinessLevel | |
| 185 | | | CadReadinessLevel | CadReadinessLevel | UserName | |
| 186 | | | | | | |
| 187 | | CadRosterTable | cadrosdb2 | cadrosdb2 | ros_arch | |
| 188 | | | cadrosdb2 | cadrosdb2 | ros_number | |
| 189 | | | cadrosdb2 | cadrosdb2 | ros_beg_stmp | |
| 190 | | | cadrosdb2 | cadrosdb2 | ros_end_stmp | |
| 191 | | | cadrosdb2 | cadrosdb2 | ros_user | |
| 192 | | | cadrosdb2 | cadrosdb2 | ros_host | |
| 193 | | | cadrosdb2 | cadrosdb2 | ros_type | |
| 194 | | | | | | |
| 195 | | CadSectorsTable | CadSectors | CadSectors | SectorID | |
| 196 | | | CadSectors | CadSectors | SectorName | |
| 197 | | | CadSectors | CadSectors | RegionID | |
| 198 | | | | | | |
| 199 | | CadSubUnitTable | cadsubdb2 | cadsubdb2 | sub_arch | |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 200 | | | cadsubdb2 | cadsubdb2 | sub_num | |
| 201 | | | cadsubdb2 | cadsubdb2 | unt_number | Unit identifier |
| 202 | | | cadsubdb2 | cadsubdb2 | sub_unit_id | Subunit name or identifier |
| 203 | | | cadsubdb2 | cadsubdb2 | sub_unit_desc | Subunit description or attributes |
| 204 | | | cadsubdb2 | cadsubdb2 | cfs_numbr | |
| 205 | | | | | | |
| 206 | | CadUnitTrakTable | cadtrkdb2 | cadtrkdb2 | trk_arch | Always "0015" |
| 207 | | | cadtrkdb2 | cadtrkdb2 | trk_number | A sequence number generated by cad2rms(d) |
| 208 | | | cadtrkdb2 | cadtrkdb2 | unt_stmp_chg | Date and time the unit changed status |
| 209 | | | cadtrkdb2 | cadtrkdb2 | unt_trk_stat | Status of the unit |
| 210 | | | cadtrkdb2 | cadtrkdb2 | unt_number | Unit Identifier |
| 211 | | | cadtrkdb2 | cadtrkdb2 | lnkunt | Linked Unit Number |
| 212 | | | cadtrkdb2 | cadtrkdb2 | dbl_number | Unit identifier and Linked Unit Number separated by "/" (slash) |
| 213 | | | cadtrkdb2 | cadtrkdb2 | untcfsNumber | CFS Number to which the unit was attached |
| 214 | | | cadtrkdb2 | cadtrkdb2 | zone | Zone to which the unit was attached |
| 215 | | | cadtrkdb2 | cadtrkdb2 | incCode | Incident Code of the CFS to which the unit was attached |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 216 | | | cadtrkdb2 | cadtrkdb2 | location | Incident Location of the CFS to which the unit was attached |
| 217 | | | cadtrkdb2 | cadtrkdb2 | message | Any messages attached to the unit |
| 218 | | | cadtrkdb2 | cadtrkdb2 | trk_type | Unit = 5; SubUnit = 23 |
| 219 | | | cadtrkdb2 | cadtrkdb2 | UserName | Unit identified if change made via switcher else User making unit change |
| 220 | | | cadtrkdb2 | cadtrkdb2 | Location_x | Unit's geocode location when Address changes |
| 221 | | | cadtrkdb2 | cadtrkdb2 | Location_y | Unit's geocode location when Address changes |
| 222 | | | cadtrkdb2 | cadtrkdb2 | Latitude | Unit's location when Address changes |
| 223 | | | cadtrkdb2 | cadtrkdb2 | Longitude | Unit's location when Address changes |
| 224 | | | cadtrkdb2 | cadtrkdb2 | Mileage | Not filled |
| 225 | | | cadtrkdb2 | cadtrkdb2 | bndxfield | County as translated by ZoneCounty.dat; enabled with "(cad2rmsd) fill county in cadtrkdb2 table = True" |
| 226 | | | cadtrkdb2 | cadtrkdb2 | Boundary | Not filled |
| 227 | | | cadtrkdb2 | cadtrkdb2 | EventType | The reason for updating an AVL enabled unit |
| 228 | | | cadtrkdb2 | cadtrkdb2 | UXField1 | Extra fields - Not Filled |
| 229 | | | cadtrkdb2 | cadtrkdb2 | UXField2 | Extra fields - Not Filled |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 230 | | | | | | |
| 231 | | CadUnitTable | caduntdb2 | caduntdb2 | unt_arch | Always "0017" |
| 232 | | | caduntdb2 | caduntdb2 | unt_nmbr | The CFS Number - Foreign Key into the cadcfsdb2 table |
| 233 | | | caduntdb2 | caduntdb2 | un_nmbr | Unit identifier |
| 234 | | | caduntdb2 | caduntdb2 | u_agency | Agency of unit |
| 235 | | | caduntdb2 | caduntdb2 | new_stat | Status of a unit |
| 236 | | | caduntdb2 | caduntdb2 | stamp_change | Date and time the unit changed status |
| 237 | | | caduntdb2 | caduntdb2 | tim_change | Time a unit changed status |
| 238 | | | caduntdb2 | caduntdb2 | dow_change | Day of the week a unit changed status |
| 239 | | | caduntdb2 | caduntdb2 | zone | Zone |
| 240 | | | caduntdb2 | caduntdb2 | cfs_numbr | The CFS Number |
| 241 | | | caduntdb2 | caduntdb2 | Uxfield | Extra fields - Not Filled |
| 242 | | | | | | |
| 243 | | CadUnitTimeTable | CadUntTime | cadunttime | u_tm_nmbr | |
| 244 | | | CadUntTime | cadunttime | u_rcvd2enrt | |
| 245 | | | CadUntTime | cadunttime | u_sent2enrt | |
| 246 | | | CadUntTime | cadunttime | u_disp2enrt | |
| 247 | | | CadUntTime | cadunttime | u_rcvd2onsc | |
| 248 | | | CadUntTime | cadunttime | u_sent2onsc | |
| 249 | | | CadUntTime | cadunttime | u_disp2onsc | |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 250 | | | CadUntTime | cadunttime | u_enrt2onsc | |
| 251 | | | | | | |
| 252 | | CadVehicleTable | cadvehdb2 | cadvehdb2 | veh_arch | Always "0005" |
| 253 | | | cadvehdb2 | cadvehdb2 | veh_nmbr | The CFS Number - Foreign Key into the cadcfsdb2 table |
| 254 | | | cadvehdb2 | cadvehdb2 | status | Vehicle's status |
| 255 | | | cadvehdb2 | cadvehdb2 | stmp_cre | Date and time the vehicle information was attached to a CFS |
| 256 | | | cadvehdb2 | cadvehdb2 | time_cre | Time the vehicle information was attached to a CFS |
| 257 | | | cadvehdb2 | cadvehdb2 | dow_time | Day of the week the vehicle was attached to a CFS |
| 258 | | | cadvehdb2 | cadvehdb2 | arm_dang | Is the person operating the vehicle armed and dangerous? |
| 259 | | | cadvehdb2 | cadvehdb2 | year_str | Vehicle's year |
| 260 | 1.4a Year | | cadvehdb2 | cadvehdb2 | year | |
| 261 | 1.4a License Plate | | cadvehdb2 | cadvehdb2 | license | Vehicle's license |
| 262 | 1.4a Owner's State and Province | | cadvehdb2 | cadvehdb2 | state | Vehicle's license state |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 263 | 1.4a Make | | cadvehdb2 | cadvehdb2 | make | Vehicle's make |
| 264 | 1.4a Model | | cadvehdb2 | cadvehdb2 | model | Vehicle's model |
| 265 | 1.4a Color | | cadvehdb2 | cadvehdb2 | color | Vehicle's color |
| 266 | 1.4a VIN | | cadvehdb2 | cadvehdb2 | vin | Vehicle's Identification Number |
| 267 | | | cadvehdb2 | cadvehdb2 | type | License Type |
| 268 | | | cadvehdb2 | cadvehdb2 | veh_stored | Vehicle Stored |
| 269 | | | cadvehdb2 | cadvehdb2 | veh_gid_type | General Info Database record type; configurable in GIDBTypes.dat (e.g. BOLO, Suspect) |
| 270 | 1.4a Body Type | | cadvehdb2 | cadvehdb2 | VehType | Vehicle Type |
| 271 | | | cadvehdb2 | cadvehdb2 | veh_reqby | Person Who Requested Query |
| 272 | | | cadvehdb2 | cadvehdb2 | veh_licyr | Vehicle License Year |
| 273 | | | cadvehdb2 | cadvehdb2 | cfs_numbr | The CFS Number |
| 274 | | | cadvehdb2 | cadvehdb2 | vxfield1 | Extra fields - Not Filled |
| 275 | | | cadvehdb2 | cadvehdb2 | veh_misc | Miscellaneous information associated with the vehicle |
| 276 | | | cadvehdb2 | cadvehdb2 | TextInfo | Large miscellaneous text field |
| 277 | | | | | | |
| 278 | | CadWeatherTable | CadWeatherManagement | CadWeatherManagement | WeatherZoneID | |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 279 | | | CadWeatherManagement | CadWeatherManagement | CategoryDay | |
| 280 | | | CadWeatherManagement | CadWeatherManagement | TransportDirection | |
| 281 | | | CadWeatherManagement | CadWeatherManagement | TransportSpeed | |
| 282 | | | CadWeatherManagement | CadWeatherManagement | SurfaceDirection | |
| 283 | | | CadWeatherManagement | CadWeatherManagement | SurfaceSpeed | |
| 284 | | | CadWeatherManagement | CadWeatherManagement | NightDispersion | |
| 285 | | | CadWeatherManagement | CadWeatherManagement | UserName | |
| 286 | | | CadWeatherManagement | CadWeatherManagement | EnteredDate | |
| 287 | | | | | | |
| 288 | | CadWeatherZonesTable | CadWeatherZones | CadWeatherZones | WeatherZoneID | |
| 289 | | | CadWeatherZones | CadWeatherZones | WeatherZoneName | |
| 290 | | | CadWeatherZones | CadWeatherZones | RegionID | |
| 291 | | | | | | |
| 292 | | CadCrossReferenceTable | cadxrefdb2 | cadxrefdb2 | cfs_numbr | The CFS Number - Foreign Key into the cadcfsdb2 table |
| 293 | | | cadxrefdb2 | cadxrefdb2 | xref_cfs | CFS Number of cross-refed cfs |
| 294 | | | cadxrefdb2 | cadxrefdb2 | origin | Not filled |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 295 | | | cadxrefdb2 | cadxrefdb2 | typeofxref | Type of Cross Reference |
| 296 | | | | | | |
| 297 | | CadCFSTableForTimeDifference | CFS | cadcfsdb2 | cfs_arch | Always '0001' |
| 298 | | | CFS | cadcfsdb2 | cfs_numbr | The call for service number of the incident. Part 1 of 1 part primary key. |
| 299 | | | CFS | cadcfsdb2 | priority | The priority of the CFS. |
| 300 | | | CFS | cadcfsdb2 | inc_code | The code for the incident. |
| 301 | | | CFS | cadcfsdb2 | address | The location of the incident. |
| 302 | | | CFS | cadcfsdb2 | landmark | The landmark name associated with the address. |
| 303 | | | CFS | cadcfsdb2 | apt_number | The apartment associated with the incident address. |
| 304 | | | CFS | cadcfsdb2 | city | The city associated with the incident address. |
| 305 | | | CFS | cadcfsdb2 | address_x | the X coordinate of the Person's address |
| 306 | | | CFS | cadcfsdb2 | address_y | the Y coordinate of the Person's address |
| 307 | | | CFS | cadcfsdb2 | zone1 | The zones in which the incident occurred. |
| 308 | | | CFS | cadcfsdb2 | zone2 | The zones in which the incident occurred. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 309 | | | CFS | cadcfsdb2 | addrtype | The address type. |
| 310 | | | CFS | cadcfsdb2 | onbound | Boundary Information |
| 311 | | | CFS | cadcfsdb2 | bound1 | Not Filled |
| 312 | | | CFS | cadcfsdb2 | bound2 | Not Filled |
| 313 | | | CFS | cadcfsdb2 | bound3 | Not Filled |
| 314 | | | CFS | cadcfsdb2 | bound4 | Not Filled |
| 315 | | | CFS | cadcfsdb2 | alarm_no | Indicates whether the person had a security alarm. |
| 316 | | | CFS | cadcfsdb2 | offr_cntct | Indicates whether the complainant requested to speak with an officer. |
| 317 | | | CFS | cadcfsdb2 | line_number | The phone line on which the call was received. |
| 318 | | | CFS | cadcfsdb2 | how_recd | The description of the source of the dispatch initiating the CFS. |
| 319 | | | CFS | cadcfsdb2 | in_progres | Indicates whether the incident was in progress at the time of the CFS. |
| 320 | | | CFS | cadcfsdb2 | call_taker | The login name of the call taker who entered the CFS. |
| 321 | | | CFS | cadcfsdb2 | complainan | The name of the person placing the CFS. |
| 322 | | | CFS | cadcfsdb2 | curr_phone | The phone number from which the complainant called. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 323 | | | CFS | cadcfsdb2 | comp_addre | The complainant's home address. |
| 324 | | | CFS | cadcfsdb2 | res_phone | The complainant's home telephone number. |
| 325 | | | CFS | cadcfsdb2 | weapon | Indicates if a weapon was involved in the CFS. |
| 326 | | | CFS | cadcfsdb2 | dispatcher | The name of the dispatcher. |
| 327 | | | CFS | cadcfsdb2 | priunit | The reporting officer for a generated Records report. |
| 328 | | | CFS | cadcfsdb2 | finaldisp | The Final Disposition of the CFS. |
| 329 | | | CFS | cadcfsdb2 | building | The building number associated with the address. |
| 330 | | | CFS | cadcfsdb2 | busname | The business name associated with the address. |
| 331 | | | CFS | cadcfsdb2 | stmp_rcvd | The date and time that the call occurred. |
| 332 | | | CFS | cadcfsdb2 | time_rcvd | The time the call occurred. |
| 333 | | | CFS | cadcfsdb2 | dow_rcvd | The day of the week on which the incident occurred. |
| 334 | | | CFS | cadcfsdb2 | stmp_sent | The date and time that the units were sent to respond. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 335 | | | CFS | cadcfsdb2 | time_sent | The time the units were sent to the CFS. |
| 336 | | | CFS | cadcfsdb2 | dow_sent | The day of the week of the time_sent |
| 337 | | | CFS | cadcfsdb2 | stmp_disp | The date and time the CFS was dispatched. |
| 338 | | | CFS | cadcfsdb2 | time_disp | The time the CFS was dispatched. |
| 339 | | | CFS | cadcfsdb2 | dow_disp | The day of the week of the time_disp. |
| 340 | | | CFS | cadcfsdb2 | stmp_cenrt | The date and time the CFS went EnRoute. |
| 341 | | | CFS | cadcfsdb2 | time_cenrt | The time the CFS went EnRoute. |
| 342 | | | CFS | cadcfsdb2 | dow_cenrt | The day of the week the CFS went EnRoute. |
| 343 | | | CFS | cadcfsdb2 | stmp_consc | The date and time the CFS went OnScene. |
| 344 | | | CFS | cadcfsdb2 | time_consc | The time the CFS went Onscene. |
| 345 | | | CFS | cadcfsdb2 | dow_consc | The day of the week the CFS wend OnScene. |
| 346 | | | CFS | cadcfsdb2 | stmp_cmpl | The date the CFS was completed. |
| 347 | | | CFS | cadcfsdb2 | time_cmpl | The time the CFS was completed. |
| 348 | | | CFS | cadcfsdb2 | dow_cmpl | The day of the week the CFS was completed. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 349 | | | CFS | cadcfsdb2 | stamp_att_any | Always '9999-12-31-24.00.00.000000' |
| 350 | | | CFS | cadcfsdb2 | tim_att_any | Always '24.00.00' |
| 351 | | | CFS | cadcfsdb2 | dow_att_any | Always '' (blank) |
| 352 | | | CFS | cadcfsdb2 | duration | The difference between the time completed and the time received (in seconds) |
| 353 | | | CFS | cadcfsdb2 | routetime | The difference between the time sent and the time received (in seconds) |
| 354 | | | CFS | cadcfsdb2 | disptime | The time units were dispatched. |
| 355 | | | CFS | cadcfsdb2 | LinkIndex | The link index number. |
| 356 | | | CFS | cadcfsdb2 | agency | Description of the agency the event occurred in (not filled by default) |
| 357 | | | CFS | cadcfsdb2 | ZONE | Used for Print Report |
| 358 | | | CFS | cadcfsdb2 | INC_DESCRIPT | Used for Print Report |
| 359 | | | CFS | cadcfsdb2 | XFIELD4 | Used for Print Report |
| 360 | | | CFS | cadcfsdb2 | cancelled | Used for Print Report |
| 361 | | | CFS | cadcfsdb2 | CENRTTIME | Used for Print Report |
| 362 | | | CFS | cadcfsdb2 | COMPLETIONTIME | Used for Print Report |
| 363 | | | CFS | cadcfsdb2 | CONSCTIME | Used for Print Report |
| 364 | | | CFS | cadcfsdb2 | DISTRICT | Used for Print Report |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 365 | | | CFS | cadcfsdb2 | DOW_ARCH | Used for Print Report |
| 366 | | | CFS | cadcfsdb2 | FLOOR | Used for Print Report |
| 367 | | | CFS | cadcfsdb2 | TimeReceived | Used for Print Report |
| 368 | | | CFS | cadcfsdb2 | MAP_PAGE | Used for Print Report |
| 369 | | | CFS | cadcfsdb2 | MISSING_TIMES | Used for Print Report |
| 370 | | | CFS | cadcfsdb2 | STATION | Used for Print Report |
| 371 | | | CFS | cadcfsdb2 | STMP_ARCH | Used for Print Report |
| 372 | | | CFS | cadcfsdb2 | TIME_ARCH | Used for Print Report |
| 373 | | | CFS | cadcfsdb2 | XFIELD1 | Used for Print Report |
| 374 | | | CFS | cadcfsdb2 | DispatchTime | Used for Print Report |
| 375 | | | CFS | cadcfsdb2 | TimeSent | Used for Print Report |
| 376 | | | CFS | cadcfsdb2 | XFIELD3 | Used for Print Report |
| 377 | | | CFS | cadcfsdb2 | XFIELD2 | Used for Print Report |
| 378 | | | CFS | cadcfsdb2 | IncLatitude | |
| 379 | | | CFS | cadcfsdb2 | IncLongitude | |
| 380 | | | CFS | cadcfsdb2 | BoundaryID | |
| 381 | | | CFS | cadcfsdb2 | RcvdDate | The date and time that the call occurred. |
| 382 | | | CFS | cadcfsdb2 | Time_Strt | |
| 383 | | | CFS | cadcfsdb2 | Comp_x | Complainant Address X coordinate |
| 384 | | | CFS | cadcfsdb2 | Comp_y | Complainant Address Y coordinate |
| 385 | | | CFS | cadcfsdb2 | CompLongitude | Complainant Address |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | | | | | | Longitude |
| 386 | | | CFS | cadcfsdb2 | Dow_Strt | SCFC Burn start day of the week |
| 387 | | | CFS | cadcfsdb2 | platoon | Not filled |
| 388 | | | CFS | cadcfsdb2 | Stmp_Strt | SCFC Burn start time |
| 389 | | | CFS | cadcfsdb2 | TimeAttAny | Not filled |
| 390 | | | CFS | cadcfsdb2 | XField5 | Used for Print Report |
| 391 | | | CFS | cadcfsdb2 | XField6 | Used for Print Report |
| 392 | | | CFS | cadcfsdb2 | XField7 | Used for Print Report |
| 393 | | | CFS | cadcfsdb2 | XField10 | Used for Print Report |
| 394 | | | CFS | cadcfsdb2 | XField11 | Used for Print Report |
| 395 | | | CFS | cadcfsdb2 | XField12 | Used for Print Report |
| 396 | | | CFS | cadcfsdb2 | XField8 | Used for Print Report |
| 397 | | | CFS | cadcfsdb2 | XField13 | Used for Print Report |
| 398 | | | CFS | cadcfsdb2 | XField9 | Used for Print Report |
| 399 | | | | | | |
| 400 | | | CFSBoundary | cadbnddb2 | bnd_nmbr | The CFS number this boundary record is associated with. |
| 401 | | | CFSBoundary | cadbnddb2 | bind_id | The boundary description. |
| 402 | | | CFSBoundary | cadbnddb2 | resp_level | The response level. |
| 403 | | | CFSBoundary | cadbnddb2 | resp_code | The response code. |
| 404 | | | CFSBoundary | cadbnddb2 | agency | Agency associated with this boundary |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 405 | | | | | | |
| 406 | | | CFSCadTrk | cadtrkdb2 | trk_arch | |
| 407 | | | CFSCadTrk | cadtrkdb2 | trk_number | |
| 408 | | | CFSCadTrk | cadtrkdb2 | unt_stmp_chg | |
| 409 | | | CFSCadTrk | cadtrkdb2 | unt_trk_stat | |
| 410 | | | CFSCadTrk | cadtrkdb2 | unt_number | |
| 411 | | | CFSCadTrk | cadtrkdb2 | lnkunt | |
| 412 | | | CFSCadTrk | cadtrkdb2 | dbl_number | |
| 413 | | | CFSCadTrk | cadtrkdb2 | untcfsNumber | |
| 414 | | | CFSCadTrk | cadtrkdb2 | zone | |
| 415 | | | CFSCadTrk | cadtrkdb2 | incCode | |
| 416 | | | CFSCadTrk | cadtrkdb2 | location | |
| 417 | | | CFSCadTrk | cadtrkdb2 | message | |
| 418 | | | CFSCadTrk | cadtrkdb2 | trk_type | |
| 419 | | | CFSCadTrk | cadtrkdb2 | UserName | |
| 420 | | | CFSCadTrk | cadtrkdb2 | Location_x | |
| 421 | | | CFSCadTrk | cadtrkdb2 | Location_y | |
| 422 | | | CFSCadTrk | cadtrkdb2 | Latitude | |
| 423 | | | CFSCadTrk | cadtrkdb2 | Longitude | |
| 424 | | | CFSCadTrk | cadtrkdb2 | Mileage | |
| 425 | | | | | | |
| 426 | | CadCFSCommentsTable | CFSComments | cadcomdb2 | com_arch | Always '0002' |
| 427 | | | CFSComments | cadcomdb2 | com_numbr | The CFS number. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 428 | | | CFSComments | cadcomdb2 | sequence | Not filled |
| 429 | | | CFSComments | cadcomdb2 | stmp_creat | The date and time the comment was created. |
| 430 | | | CFSComments | cadcomdb2 | time_creat | The time the comment was created. |
| 431 | | | CFSComments | cadcomdb2 | dow_creat | The day of the week the comment was created. |
| 432 | | | CFSComments | cadcomdb2 | com_name | The name of the user who created this comment. |
| 433 | 1.1 Incident ID #, 1.2 Incident Date/Time, LTD Confidence, Device Event Type, 1.4b Ignition State, Heading, Orientation, Fire, Multiple Impacts, Deployed, 1.5 # of occupants, conscious, breathing, speaking, | | CFSComments | cadcomdb2 | com_ment | The text of the comment. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | moving arm, moving leg, external bleeding, entrapped, ejected, seat position, restraint type, injury patterns | | | | | |
| 434 | | | | | | |
| 435 | | CadCFSDispatchTable | CFSDispatch | caduntdb2 | unt_arch | Always '0017'. |
| 436 | | | CFSDispatch | caduntdb2 | unt_nmbr | The CFS number of this unit record. |
| 437 | | | CFSDispatch | caduntdb2 | un_nmbr | The unit number sent. |
| 438 | | | CFSDispatch | caduntdb2 | u_agency | The ID number of the agency referenced. |
| 439 | | | CFSDispatch | caduntdb2 | new_stat | The status of the unit. |
| 440 | | | CFSDispatch | caduntdb2 | stamp_change | The date and time the unit changed status. |
| 441 | | | CFSDispatch | caduntdb2 | tim_change | The time the unit changed status |
| 442 | | | CFSDispatch | caduntdb2 | dow_change | The day of the week the unit changed status. |
| 443 | | | | | | |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 444 | | CadCFSIncidentTable | CFSIncident | caddrndb2 | drn_arch | Always '0004' |
| 445 | | | CFSIncident | caddrndb2 | drn_nmbr | The CFS number. |
| 446 | | | CFSIncident | caddrndb2 | d_agency | The ID number of the agency referenced. |
| 447 | | | CFSIncident | caddrndb2 | dr_nmbr | The DR number. |
| 448 | | | CFSIncident | caddrndb2 | stmp_att_drn | Always '9999-12-31-24.00.00.000000' |
| 449 | | | CFSIncident | caddrndb2 | stmp_onsc_drn | Always '9999-12-31-24.00.00.000000' |
| 450 | | | CFSIncident | caddrndb2 | stmp_ofsc_drn | Always '9999-12-31-24.00.00.000000' |
| 451 | | | CFSIncident | caddrndb2 | resptime | Always -999 |
| 452 | | | CFSIncident | caddrndb2 | dr_duration | Always -999 |
| 453 | | | CFSIncident | caddrndb2 | unit | |
| 454 | | | | | | |
| 455 | | CadCfsPersonTable | CFSPerson | cadperdb2 | pxfield3 | |
| 456 | | | CFSPerson | cadperdb2 | per_reqby | |
| 457 | | | CFSPerson | cadperdb2 | per_arch | Always '0006' |
| 458 | | | CFSPerson | cadperdb2 | per_nmbr | The CFS number. |
| 459 | | | CFSPerson | cadperdb2 | stamp_cre | The date and time the person record was created. |
| 460 | | | CFSPerson | cadperdb2 | tim_cre | The time the person record was created. |
| 461 | | | CFSPerson | cadperdb2 | dow_cre | The day of the week the person record was |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| | | | | | | created. |
| 462 | | | CFSPerson | cadperdb2 | arm_dan | Indicates whether the individual was armed and dangerous. |
| 463 | | | CFSPerson | cadperdb2 | name | The name of the individual. |
| 464 | | | CFSPerson | cadperdb2 | ssn | The civilian's social security number. |
| 465 | | | CFSPerson | cadperdb2 | sex | The gender of the civilian. |
| 466 | | | CFSPerson | cadperdb2 | dob | The civilian's date of birth. |
| 467 | | | CFSPerson | cadperdb2 | race | The race of the civilian. |
| 468 | | | CFSPerson | cadperdb2 | age | The officer's age at the incident event. |
| 469 | | | CFSPerson | cadperdb2 | ageunit | Not filled. |
| 470 | | | CFSPerson | cadperdb2 | ageyear | Not filled. |
| 471 | | | CFSPerson | cadperdb2 | height | The individual's height. |
| 472 | | | CFSPerson | cadperdb2 | weight | The individual's weight. |
| 473 | | | CFSPerson | cadperdb2 | hair | The individual's hair color. |
| 474 | | | CFSPerson | cadperdb2 | eyes | The individual's eye color. |
| 475 | | | CFSPerson | cadperdb2 | complx | The individual's skin complexion condition. |
| 476 | | | CFSPerson | cadperdb2 | drlic | The civilian's driver license number. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 477 | | | CFSPerson | cadperdb2 | per_state | The state the individual is from. |
| 478 | | | CFSPerson | cadperdb2 | per_address | The individual's address. |
| 479 | | | CFSPerson | cadperdb2 | per_phone | The individual's phone number. |
| 480 | | | CFSPerson | cadperdb2 | per_stored | Indicates if the person record was stored to the GenInfo database. |
| 481 | | | CFSPerson | cadperdb2 | per_gid_type | The type of record in the GenInfo database (if stored). |
| 482 | | | CFSPerson | cadperdb2 | lsw | The description of what the individual was last seen wearing. |
| 483 | | | CFSPerson | cadperdb2 | per_misc | Any misc. comments concerning the individual. |
| 484 | | | | | | |
| 485 | | CadCFSSubUnitTable | CFSSubUnit | cadsubdb2 | sub_arch | |
| 486 | | | CFSSubUnit | cadsubdb2 | sub_num | |
| 487 | | | CFSSubUnit | cadsubdb2 | unt_number | |
| 488 | | | CFSSubUnit | cadsubdb2 | sub_unit_id | |
| 489 | | | CFSSubUnit | cadsubdb2 | sub_unit_desc | |
| 490 | | | CFSSubUnit | cadsubdb2 | cfs_numbr | |
| 491 | | | | | | |
| 492 | | CadCFSVehicleTable | CFSVehicle | cadvehdb2 | veh_arch | Always '0005' |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 493 | | | CFSVehicle | cadvehdb2 | veh_nmbr | The CFS number. |
| 494 | | | CFSVehicle | cadvehdb2 | status | |
| 495 | | | CFSVehicle | cadvehdb2 | stmp_cre | The date and time this vehicle record was created. |
| 496 | | | CFSVehicle | cadvehdb2 | time_cre | The time this vehicle record was created. |
| 497 | | | CFSVehicle | cadvehdb2 | dow_time | The day of the week this vehicle record was created. |
| 498 | | | CFSVehicle | cadvehdb2 | arm_dang | The armed and dangerous value for this vehicle. |
| 499 | | | CFSVehicle | cadvehdb2 | year | The year of the vehicle. |
| 500 | | | CFSVehicle | cadvehdb2 | license | The license number of the equipment. |
| 501 | | | CFSVehicle | cadvehdb2 | state | The state, which the vehicle is licensed under. |
| 502 | | | CFSVehicle | cadvehdb2 | make | The make of the equipment. |
| 503 | | | CFSVehicle | cadvehdb2 | model | The model of the equipment. |
| 504 | | | CFSVehicle | cadvehdb2 | color | The color of the vehicle. |
| 505 | | | CFSVehicle | cadvehdb2 | vin | The VIN number of the vehicle. |
| 506 | | | CFSVehicle | cadvehdb2 | type | The vehicle's involvement in the CFS. |

| Line # | VEDS element | Cad Table Name | Table | DBTableName | DBFieldName | Description |
|---|---|---|---|---|---|---|
| 507 | | | CFSVehicle | cadvehdb2 | veh_stored | Indicates if the vehicle record was stored in the GenInfo database. |
| 508 | | | CFSVehicle | cadvehdb2 | veh_gid_type | The type of record in the GenInfo database (if stored). |
| 509 | | | CFSVehicle | cadvehdb2 | veh_misc | A description of the diagram. |
| 510 | | | CFSVehicle | cadvehdb2 | veh_licyr | The year that the vehicle's license expires. |

| Line # | VEDS element | **Element Code** (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | **X = Data Elements to be Tested for Compliance** (Red = Required National Data Elements) |
|---|---|---|---|---|
| 2 | | D01_01 | EMS Agency Number | X |
| 3 | 1.1 Provider Name | D01_02 | EMS Agency Name | |
| 4 | | D01_03 | EMS Agency State | X |
| 5 | | D01_04 | EMS Agency County | X |
| 6 | | D01_05 | Primary Type of Service | |
| 7 | | D01_06 | Other Types of Service | |
| 8 | | D01_07 | Level of Service | X |
| 9 | | D01_08 | Organizational Type | X |
| 10 | | D01_09 | Organization Status | X |
| 11 | | D01_10 | Statistical Year | X |
| 12 | | D01_11 | Other Agencies In Area | |
| 13 | | D01_12 | Total Service Size Area | X |
| 14 | | D01_13 | Total Service Area Population | X |
| 15 | | D01_14 | 911 Call Volume per Year | X |
| 16 | | D01_15 | EMS Dispatch Volume per Year | X |
| 17 | | D01_16 | EMS Transport Volume per Year | X |
| 18 | | D01_17 | EMS Patient Contact Volume per Year | X |
| 19 | | D01_18 | EMS Billable Calls per Year | |
| 20 | | D01_19 | EMS Agency Time Zone | X |
| 21 | | D01_20 | EMS Agency Daylight Savings Time Use | |
| 22 | | D01_21 | National Provider Identifier | X |
| 23 | | D02_01 | Agency Contact Last Name | |
| 24 | | D02_02 | Agency Contact Middle Name/Initial | |
| 25 | | D02_03 | Agency Contact First Name | |
| 26 | | D02_04 | Agency Contact Address | |
| 27 | | D02_05 | Agency Contact City | |
| 28 | | D02_06 | Agency Contact State | |
| 29 | | D02_07 | Agency Contact Zip Code | X |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 30 | 1.1 Call Back # | D02_08 | Agency Contact Telephone Number | |
| 31 | | D02_09 | Agency Contact Fax Number | |
| 32 | | D02_10 | Agency Contact Email Address | |
| 33 | | D02_11 | Agency Contact Web Address | |
| 34 | | D03_01 | Agency Medical Director Last Name | |
| 35 | | D03_02 | Agency Medical Director Middle Name/Initial | |
| 36 | | D03_03 | Agency Medical Director First Name | |
| 37 | | D03_04 | Agency Medical Director Address | |
| 38 | | D03_05 | Agency Medical Director City | |
| 39 | | D03_06 | Agency Medical Director State | |
| 40 | | D03_07 | Agency Medical Director Zip Code | |
| 41 | | D03_08 | Agency Medical Director Telephone Number | |
| 42 | | D03_09 | Agency Medical Director Fax Number | |
| 43 | | D03_10 | Agency Medical Director's Medical Specialty | |
| 44 | | D03_11 | Agency Medical Director Email Address | |
| 45 | | D04_01 | State Certification Licensure Levels | |
| 46 | | D04_02 | EMS Unit Call Sign | |
| 47 | | D04_03 | Zones | |
| 48 | | D04_05 | Personnel Level Permitted to Use the Procedure | |
| 49 | | D04_06 | Medications Given | |
| 50 | | D04_07 | Personnel Level Permitted to Use the Medication | |
| 51 | | D04_08 | Protocol | |
| 52 | | D04_09 | Personnel Level Permitted to Use the Protocol | |
| 53 | | D04_10 | Billing Status | |
| 54 | | D04_11 | Hospitals Served | |
| 55 | | D04_12 | Hospital Facility Number | |
| 56 | | D04_13 | Other Destinations | |
| 57 | | D04_14 | Destination Facility Number | |
| 58 | | D04_15 | Destination Type | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 59 | | D04_16 | Insurance Companies Used | |
| 60 | | D04_17 | EMD Vendor | |
| 61 | | D05_01 | Station Name | |
| 62 | | D05_02 | Station Number | |
| 63 | | D05_03 | Station Zone | |
| 64 | | D05_04 | Station GPS | |
| 65 | | D05_05 | Station Address | |
| 66 | | D05_06 | Station City | |
| 67 | | D05_07 | Station State | |
| 68 | | D05_08 | Station Zip | |
| 69 | | D05_09 | Station Telephone Number | |
| 70 | | D06_01 | Unit/Vehicle Number | |
| 71 | | D06_03 | Vehicle Type | |
| 72 | | D06_04 | State Certification/Licensure Levels | |
| 73 | | D06_05 | Number Of Each Personnel Level on the Vehicle Crew | |
| 74 | | D06_06 | Vehicle Initial Cost | |
| 75 | | D06_07 | Vehicle Model Year | |
| 76 | | D06_08 | Year Miles/Hours Accrued | |
| 77 | | D06_09 | Annual Vehicle Hours | |
| 78 | | D06_10 | Annual Vehicle Miles | |
| 79 | | D07_01 | Personnel's Agency ID Number | |
| 80 | | D07_02 | State/Licensure ID Number | |
| 81 | | D07_03 | Personnel's Employment Status | |
| 82 | | D07_04 | Employment Status Date | |
| 83 | | D07_05 | Personnel's Level of Certification/Licensure for Agency | |
| 84 | | D07_06 | Date of Personnel's Certification or Licensure for Agency | |
| 85 | | D08_01 | EMS Personnel's Last Name | |
| 86 | | D08_02 | EMS Personnel's Middle Name/Initial | |
| 87 | | D08_03 | EMS Personnel's First Name | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 88 | | D08_04 | EMS Personnel's Mailing Address | |
| 89 | | D08_05 | EMS Personnel's City of Residence | |
| 90 | | D08_06 | EMS Personnel's State | |
| 91 | | D08_07 | EMS Personnel's Zip Code | |
| 92 | | D08_08 | EMS Personnel's Work Telephone | |
| 93 | | D08_09 | EMS Personnel's Home Telephone | |
| 94 | | D08_10 | EMS Personnel's Email Address | |
| 95 | | D08_11 | EMS Personnel's Date Of Birth | |
| 96 | | D08_12 | EMS Personnel's Gender | |
| 97 | | D08_13 | EMS Personnel's Race | |
| 98 | | D08_14 | EMS Personnel's Ethnicity | |
| 99 | | D08_15 | State EMS Certification Licensure Level | |
| 100 | | D08_16 | National Registry Credentialed | |
| 101 | | D08_17 | State EMS Current Certification Date | |
| 102 | | D08_18 | Initial State Certification Date | |
| 103 | | D08_19 | Total Length of Service | |
| 104 | | D08_20 | Date Length of Service Documented | |
| 105 | | D09_01 | Device Serial Number | |
| 106 | | D09_02 | Device Name or ID | |
| 107 | | D09_03 | Device Manufacturer | |
| 108 | | D09_04 | Model Number | |
| 109 | | D09_05 | Device Purchase Date | |
| 110 | | E01_01 | Patient Care Report Number | X |
| 111 | | E01_02 | Software Creator | X |
| 112 | | E01_03 | Software Name | X |
| 113 | | E01_04 | Software Version | X |
| 114 | | E02_01 | EMS Agency Number | X |
| 115 | 1.1 Incident # | E02_02 | Incident Number | |
| 116 | | E02_03 | EMS Unit (Vehicle) Response Number | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 117 | | E02_04 | Type of Service Requested | X |
| 118 | | E02_05 | Primary Role of the Unit | X |
| 119 | | E02_06 | Type of Dispatch Delay | X |
| 120 | | E02_07 | Type of Response Delay | X |
| 121 | | E02_08 | Type of Scene Delay | X |
| 122 | | E02_09 | Type of Transport Delay | X |
| 123 | | E02_10 | Type of Turn-Around Delay | X |
| 124 | | E02_11 | EMS Unit/Vehicle Number | |
| 125 | | E02_12 | EMS Unit Call Sign (Radio Number) | X |
| 126 | | E02_13 | Vehicle Dispatch Location | |
| 127 | | E02_14 | Vehicle Dispatch Zone | |
| 128 | | E02_15 | Vehicle Dispatch GPS Location | |
| 129 | | E02_16 | Beginning Odometer Reading of Responding Vehicle | |
| 130 | | E02_17 | On-Scene Odometer Reading of Responding Vehicle | |
| 131 | | E02_18 | Patient Destination Odometer Reading of Responding Vehicle | |
| 132 | | E02_19 | Ending Odometer Reading of Responding Vehicle | |
| 133 | | E02_20 | Response Mode to Scene | X |
| 134 | | E03_01 | Complaint Reported by Dispatch | X |
| 135 | | E03_02 | EMD Performed | X |
| 136 | | E03_03 | EMD Card Number | |
| 137 | | E04_01 | Crew Member ID | |
| 138 | | E04_02 | Crew Member Role | |
| 139 | | E04_03 | Crew Member Level | |
| 140 | 1.2 Event Time | E05_01 | Incident or Onset Date/Time | |
| 141 | | E05_02 | PSAP Call Date/Time | X |
| 142 | | E05_03 | Dispatch Notified Date/Time | |
| 143 | 1.2 Received Date/Time of Incident | E05_04 | Unit Notified by Dispatch Date/Time | X |
| 144 | | E05_05 | Unit En Route Date/Time | X |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 145 | | E05_06 | Unit Arrived on Scene Date/Time | X |
| 146 | | E05_07 | Arrived at Patient Date/Time | X |
| 147 | | E05_08 | Transfer of Patient Care Date/Time | |
| 148 | | E05_09 | Unit Left Scene Date/Time | X |
| 149 | | E05_10 | Patient Arrived at Destination Date/Time | X |
| 150 | | E05_11 | Unit Back in Service Date/Time | X |
| 151 | | E05_12 | Unit Cancelled Date/Time | |
| 152 | | E05_13 | Unit Back at Home Location Date/Time | X |
| 153 | 1.5 Occupant's Name | E06_01 | Last Name | |
| 154 | 1.5 Occupant's Name | E06_02 | First Name | |
| 155 | 1.5 Occupant's Name | E06_03 | Middle Initial/Name | |
| 156 | | E06_04 | Patient's Home Address | |
| 157 | | E06_05 | Patient's Home City | |
| 158 | | E06_06 | Patient's Home County | |
| 159 | | E06_07 | Patient's Home State | |
| 160 | | E06_08 | Patient's Home Zip Code | X |
| 161 | | E06_09 | Patient’s Home Country | |
| 162 | 1.6 Subscriber Government IDs | E06_10 | Social Security Number | |
| 163 | 1.5 Occupant's Gender | E06_11 | Gender | X |
| 164 | | E06_12 | Race | X |
| 165 | | E06_13 | Ethnicity | X |
| 166 | 1.5 Occupant's Age | E06_14 | Age | X |
| 167 | 1.5 Occupant's Age | E06_15 | Age Units | X |
| 168 | | E06_16 | Date of Birth | |
| 169 | | E06_17 | Primary or Home Telephone Number | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 170 | 1.6 Driver License State | E06_18 | State Issuing Driver's License | |
| 171 | 1.6 Driver License # | E06_19 | Driver's License Number | |
| 172 | | E07_01 | Primary Method of Payment | X |
| 173 | | E07_02 | Certificate of Medical Necessity | |
| 174 | 1.6 Insurance Provider Name | E07_03 | Insurance Company ID/Name | |
| 175 | | E07_04 | Insurance Company Billing Priority | |
| 176 | | E07_05 | Insurance Company Address | |
| 177 | | E07_06 | Insurance Company City | |
| 178 | | E07_07 | Insurance Company State | |
| 179 | | E07_08 | Insurance Company Zip Code | |
| 180 | | E07_09 | Insurance Group ID/Name | |
| 181 | 1.6 Policy # | E07_10 | Insurance Policy ID Number | |
| 182 | | E07_11 | Last Name of the Insured | |
| 183 | | E07_12 | First Name of the Insured | |
| 184 | | E07_13 | Middle Initial/Name of the Insured | |
| 185 | | E07_14 | Relationship to the Insured | |
| 186 | | E07_15 | Work-Related | |
| 187 | | E07_16 | Patient's Occupational Industry | |
| 188 | | E07_17 | Patient's Occupation | |
| 189 | | E07_18 | Closest Relative/Guardian Last Name | |
| 190 | | E07_19 | First Name of the Closest Relative/ Guardian | |
| 191 | | E07_20 | Middle Initial/Name of the Closest Relative/ Guardian | |
| 192 | | E07_21 | Closest Relative/ Guardian Street Address | |
| 193 | | E07_22 | Closest Relative/ Guardian City | |
| 194 | | E07_23 | Closest Relative/ Guardian State | |
| 195 | | E07_24 | Closest Relative/ Guardian Zip Code | |
| 196 | | E07_25 | Closest Relative/ Guardian Phone Number | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 197 | | E07_26 | Closest Relative/ Guardian Relationship | |
| 198 | | E07_27 | Patient's Employer | |
| 199 | | E07_28 | Patient's Employer's Address | |
| 200 | | E07_29 | Patient’s Employer’s City | |
| 201 | | E07_30 | Patient’s Employer’s State | |
| 202 | | E07_31 | Patient’s Employer’s Zip Code | |
| 203 | | E07_32 | Patient's Work Telephone Number | |
| 204 | | E07_33 | Response Urgency | |
| 205 | | E07_34 | CMS Service Level | X |
| 206 | | E07_35 | Condition Code Number | X |
| 207 | | E07_36 | ICD-9 Code for the Condition Code Number | |
| 208 | | E07_37 | Condition Code Modifier | |
| 209 | | E08_01 | Other EMS Agencies at Scene | |
| 210 | | E08_02 | Other Services at Scene | |
| 211 | | E08_03 | Estimated Date/Time Initial Responder Arrived on Scene | |
| 212 | | E08_04 | Date/Time Initial Responder Arrived on Scene | |
| 213 | 1.5 # of Occupants | E08_05 | Number of Patients at Scene | X |
| 214 | | E08_06 | Mass Casualty Incident | X |
| 215 | 1.2 Location, Location description | E08_07 | Incident Location Type | X |
| 216 | 1.2 Location, Location description | E08_08 | Incident Facility Code | |
| 217 | 1.2 Location, Location description | E08_09 | Scene Zone Number | |
| 218 | 1.2 Location, Location description, Latitude, Longitude | E08_10 | Scene GPS Location | |

| Line # | VEDS element | **Element Code** (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | **X = Data Elements to be Tested for Compliance** (Red = Required National Data Elements) |
|---|---|---|---|---|
| 219 | 1.2 Location, Location description | E08_11 | Incident Address | |
| 220 | 1.2 Location, Location description | E08_12 | Incident City | |
| 221 | 1.2 Location, Location description | E08_13 | Incident County | |
| 222 | 1.2 Location, Location description | E08_14 | Incident State | |
| 223 | 1.2 Location, Location description | E08_15 | Incident ZIP Code | X |
| 224 | | E09_01 | Prior Aid | X |
| 225 | | E09_02 | Prior Aid Performed by | X |
| 226 | | E09_03 | Outcome of the Prior Aid | X |
| 227 | | E09_04 | Possible Injury | X |
| 228 | | E09_05 | Chief Complaint | |
| 229 | | E09_06 | Duration of Chief Complaint | |
| 230 | | E09_07 | Time Units of Duration of Chief Complaint | |
| 231 | | E09_08 | Secondary Complaint Narrative | |
| 232 | | E09_09 | Duration of Secondary Complaint | |
| 233 | | E09_10 | Time Units of Duration of Secondary Complaint | |
| 234 | | E09_11 | Chief Complaint Anatomic Location | X |
| 235 | | E09_12 | Chief Complaint Organ System | X |
| 236 | | E09_13 | Primary Symptom | X |
| 237 | | E09_14 | Other Associated Symptoms | X |
| 238 | | E09_15 | Providers Primary Impression | X |
| 239 | | E09_16 | Provider's Secondary Impression | X |
| 240 | | E10_01 | Cause of Injury | X |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 241 | | E10_02 | Intent of the Injury | |
| 242 | | E10_03 | Mechanism of Injury | |
| 243 | 1.4b Fire, 1.5 Ejected | E10_04 | Vehicular Injury Indicators | |
| 244 | 1.4b Multiple Impacts, Rollover | E10_05 | Area of the Vehicle impacted by the collision | |
| 245 | 1.5 Seat Position | E10_06 | Seat Row Location of Patient in Vehicle | |
| 246 | | E10_07 | Position of Patient in the Seat of the Vehicle | |
| 247 | 1.4b Belt Fastened, 1.5 Latch Used | E10_08 | Use of Occupant Safety Equipment | |
| 248 | 1.4b Deployed | E10_09 | Airbag Deployment | |
| 249 | | E10_10 | Height of Fall | |
| 250 | | E11_01 | Cardiac Arrest | X |
| 251 | | E11_02 | Cardiac Arrest Etiology | X |
| 252 | 1.5 Breathing | E11_03 | Resuscitation Attempted | X |
| 253 | | E11_04 | Arrest Witnessed by | |
| 254 | | E11_05 | First Monitored Rhythm of the Patient | |
| 255 | | E11_06 | Any Return of Spontaneous Circulation | |
| 256 | | E11_07 | Neurological Outcome at Hospital Discharge | |
| 257 | | E11_08 | Estimated Time of Arrest Prior to EMS Arrival | |
| 258 | | E11_09 | Date/Time Resuscitation Discontinued | |
| 259 | | E11_10 | Reason CPR Discontinued | |
| 260 | | E11_11 | Cardiac Rhythm on Arrival at Destination | |
| 261 | 1.5 Entrapped | E12_01 | Barriers to Patient Care | X |
| 262 | | E12_02 | Sending Facility Medical Record Number | |
| 263 | | E12_03 | Destination Medical Record Number | |
| 264 | 1.6 Primary Care Physician Name | E12_04 | First Name of Patient's Primary Practitioner | |
| 265 | 1.6 Primary Care Physician Name | E12_05 | Middle Name of Patient's Primary Practitioner | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 266 | 1.6 Primary Care Physician Name | E12_06 | Last Name of Patient's Primary Practitioner | |
| 267 | 1.6 Living Will | E12_07 | Advanced Directives | |
| 268 | 1.6 Allergies | E12_08 | Medication Allergies | |
| 269 | 1.6 Allergies | E12_09 | Environmental/Food Allergies | |
| 270 | 1.6 Medical History | E12_10 | Medical/Surgical History | |
| 271 | | E12_11 | Medical History Obtained From | |
| 272 | | E12_12 | Immunization History | |
| 273 | | E12_13 | Immunization Date | |
| 274 | 1.6 Medications | E12_14 | Current Medications | |
| 275 | 1.6 Medications | E12_15 | Current Medication Dose | |
| 276 | 1.6 Medications | E12_16 | Current Medication Dosage Unit | |
| 277 | 1.6 Medications | E12_17 | Current Medication Administration Route | |
| 278 | 1.6 Emergency Contact | E12_18 | Presence of Emergency Information Form | |
| 279 | | E12_19 | Alcohol/Drug Use Indicators | X |
| 280 | 1.6 Pregnant | E12_20 | Pregnancy | |
| 281 | | E13_01 | Run Report Narrative | |
| 282 | | E14_01 | Date/Time Vital Signs Taken | |
| 283 | | E14_02 | Obtained Prior to this Units EMS Care | |
| 284 | | E14_03 | Cardiac Rhythm | |
| 285 | | E14_04 | SBP (Systolic Blood Pressure) | |
| 286 | | E14_05 | DBP (Diastolic Blood Pressure) | |
| 287 | | E14_06 | Method of Blood Pressure Measurement | |
| 288 | | E14_07 | Pulse Rate | |
| 289 | | E14_08 | Electronic Monitor Rate | |
| 290 | | E14_09 | Pulse Oximetry | |
| 291 | | E14_10 | Pulse Rhythm | |
| 292 | 1.5 Breathing | E14_11 | Respiratory Rate | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 293 | 1.5 Breathing | E14_12 | Respiratory Effort | |
| 294 | | E14_13 | Carbon Dioxide | |
| 295 | | E14_14 | Blood Glucose Level | |
| 296 | 1.5 Conscious | E14_15 | Glasgow Coma Score-Eye | |
| 297 | 1.5 Conscious | E14_16 | Glasgow Coma Score-Verbal | |
| 298 | 1.5 Conscious | E14_17 | Glasgow Coma Score-Motor | |
| 299 | 1.5 Conscious | E14_18 | Glasgow Coma Score-Qualifier | |
| 300 | 1.5 Conscious | E14_19 | Total Glasgow Coma Score | |
| 301 | | E14_20 | Temperature | |
| 302 | | E14_21 | Temperature Method | |
| 303 | 1.5 Conscious, Speaking | E14_22 | Level of Responsiveness | |
| 304 | | E14_23 | Pain Scale | |
| 305 | | E14_24 | Stroke Scale | |
| 306 | | E14_25 | Thrombolytic Screen | |
| 307 | 1.5 Breathing | E14_26 | APGAR | |
| 308 | | E14_27 | Revised Trauma Score | |
| 309 | | E14_28 | Pediatric Trauma Score | |
| 310 | | E15_01 | NHTSA Injury Matrix External/Skin | |
| 311 | | E15_02 | NHTSA Injury Matrix Head | |
| 312 | | E15_03 | NHTSA Injury Matrix Face | |
| 313 | | E15_04 | NHTSA Injury Matrix Neck | |
| 314 | | E15_05 | NHTSA Injury Matrix Thorax | |
| 315 | | E15_06 | NHTSA Injury Matrix Abdomen | |
| 316 | | E15_07 | NHTSA Injury Matrix Spine | |
| 317 | 1.5 Moving Arm | E15_08 | NHTSA Injury Matrix Upper Extremities | |
| 318 | | E15_09 | NHTSA Injury Matrix Pelvis | |
| 319 | 1.5 Moving Leg | E15_10 | NHTSA Injury Matrix Lower Extremities | |
| 320 | | E15_11 | NHTSA Injury Matrix Unspecified | |
| 321 | | E16_01 | Estimated Body Weight | |

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|---|---|---|---|---|
| 322 | | E16_02 | Broselow/Luten Color | |
| 323 | | E16_03 | Date/Time of Assessment | |
| 324 | 1.5 External Bleeding | E16_04 | Skin Assessment | |
| 325 | 1.5 External Bleeding | E16_05 | Head/Face Assessment | |
| 326 | 1.5 External Bleeding | E16_06 | Neck Assessment | |
| 327 | 1.5 External Bleeding | E16_07 | Chest/Lungs Assessment | |
| 328 | 1.5 External Bleeding | E16_08 | Heart Assessment | |
| 329 | 1.5 External Bleeding | E16_09 | Abdomen Left Upper Assessment | |
| 330 | 1.5 External Bleeding | E16_10 | Abdomen Left Lower Assessment | |
| 331 | 1.5 External Bleeding | E16_11 | Abdomen Right Upper Assessment | |
| 332 | 1.5 External Bleeding | E16_12 | Abdomen Right Lower Assessment | |
| 333 | 1.5 External Bleeding | E16_13 | GU Assessment | |
| 334 | 1.5 External Bleeding | E16_14 | Back Cervical Assessment | |
| 335 | 1.5 External Bleeding | E16_15 | Back Thoracic Assessment | |
| 336 | 1.5 External Bleeding | E16_16 | Back Lumbar/Sacral Assessment | |
| 337 | 1.5 External Bleeding, Moving Arm | E16_17 | Extremities-Right Upper Assessment | |
| 338 | 1.5 External Bleeding, Moving Leg | E16_18 | Extremities-Right Lower Assessment | |

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|---|---|---|---|---|
| 339 | 1.5 External Bleeding, Moving Arm | E16_19 | Extremities-Left Upper Assessment | |
| 340 | 1.5 External Bleeding, Moving Leg | E16_20 | Extremities-Left Lower Assessment | |
| 341 | 1.5 External Bleeding | E16_21 | Eyes-Left Assessment | |
| 342 | 1.5 External Bleeding | E16_22 | Eyes-Right Assessment | |
| 343 | | E16_23 | Mental Status Assessment | |
| 344 | | E16_24 | Neurological Assessment | |
| 345 | | E17_01 | Protocols Used | |
| 346 | | E18_01 | Date/Time Medication Administered | |
| 347 | | E18_02 | Medication Administered Prior to this Units EMS Care | |
| 348 | | E18_03 | Medication Given | X |
| 349 | | E18_04 | Medication Administered Route | |
| 350 | | E18_05 | Medication Dosage | |
| 351 | | E18_06 | Medication Dosage Units | |
| 352 | | E18_07 | Response to Medication | |
| 353 | | E18_08 | Medication Complication | X |
| 354 | | E18_09 | Medication Crew Member ID | |
| 355 | | E18_10 | Medication Authorization | |
| 356 | | E18_11 | Medication Authorizing Physician | |
| 357 | | E19_01 | Date/Time Procedure Performed Successfully | |
| 358 | | E19_02 | Procedure Performed Prior to this Units EMS Care | |
| 359 | | E19_03 | Procedure | X |
| 360 | | E19_04 | Size of Procedure Equipment | |
| 361 | | E19_05 | Number of Procedure Attempts | X |
| 362 | | E19_06 | Procedure Successful | X |
| 363 | | E19_07 | Procedure Complication | X |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 364 | | E19_08 | Response to Procedure | |
| 365 | | E19_09 | Procedure Crew Members ID | |
| 366 | | E19_10 | Procedure Authorization | |
| 367 | | E19_11 | Procedure Authorizing Physician | |
| 368 | | E19_12 | Successful IV Site | |
| 369 | | E19_13 | Tube Confirmation | |
| 370 | | E19_14 | Destination Confirmation of Tube Placement | |
| 371 | | E20_01 | Destination/Transferred To, Name | |
| 372 | | E20_02 | Destination/Transferred To, Code | |
| 373 | | E20_03 | Destination Street Address | |
| 374 | | E20_04 | Destination City | |
| 375 | | E20_05 | Destination State | |
| 376 | | E20_06 | Destination County | |
| 377 | | E20_07 | Destination Zip Code | X |
| 378 | | E20_08 | Destination GPS Location | |
| 379 | | E20_09 | Destination Zone Number | |
| 380 | | E20_10 | Incident/Patient Disposition | X |
| 381 | | E20_11 | How Patient Was Moved to Ambulance | |
| 382 | | E20_12 | Position of Patient During Transport | |
| 383 | | E20_13 | How Patient Was Transported From Ambulance | |
| 384 | | E20_14 | Transport Mode from Scene | X |
| 385 | | E20_15 | Condition of Patient at Destination | |
| 386 | | E20_16 | Reason for Choosing Destination | X |
| 387 | | E20_17 | Type of Destination | X |
| 388 | | E21_01 | Event Date/Time | |
| 389 | | E21_02 | Medical Device Event Name | |
| 390 | | E21_03 | Waveform Graphic Type | |
| 391 | | E21_04 | Waveform Graphic | |
| 392 | | E21_05 | AED, Pacing, or CO2 Mode | |

| Line # | VEDS element | Element Code (Red and Yellow are NEMSIS elements collected by the state) | OPHI-PCR Data Element | X = Data Elements to be Tested for Compliance (Red = Required National Data Elements) |
|---|---|---|---|---|
| 393 | | E21_06 | ECG Lead | |
| 394 | | E21_07 | ECG Interpretation | |
| 395 | | E21_08 | Type of Shock | |
| 396 | | E21_09 | Shock or Pacing Energy | |
| 397 | | E21_10 | Total Number of Shocks Delivered | |
| 398 | | E21_11 | Pacing Rate | |
| 399 | | E21_12 | Device Heart Rate | |
| 400 | | E21_13 | Device Pulse Rate | |
| 401 | | E21_14 | Device Systolic Blood Pressure | |
| 402 | | E21_15 | Device Diastolic Blood Pressure | |
| 403 | | E21_16 | Device Respiratory Rate | |
| 404 | | E21_17 | Device Pulse Oximetry | |
| 405 | | E21_18 | Device CO2 or etCO2 | |
| 406 | | E21_19 | Device CO2, etCO2, or Invasive Pressure Monitor Units | |
| 407 | | E21_20 | Device Invasive Pressure Mean | |
| 408 | | E22_01 | Emergency Department Disposition | X |
| 409 | | E22_02 | Hospital Disposition | X |
| 410 | | E22_03 | Law Enforcement/Crash Report Number | |
| 411 | | E22_04 | Trauma Registry ID | |
| 412 | | E22_05 | Fire Incident Report Number | |
| 413 | | E22_06 | Patient ID Band/Tag Number | |
| 414 | | E23_01 | Review Requested | |
| 415 | | E23_02 | Potential Registry Candidate | |
| 416 | | E23_03 | Personal Protective Equipment Used | |
| 417 | | E23_04 | Suspected Intentional, or Unintentional Disaster | |
| 418 | | E23_05 | Suspected Contact with Blood/Body Fluids of EMS Injury or Death | |
| 419 | | E23_06 | Type of Suspected Blood/Body Fluid Exposure, Injury, or Death | |
| 420 | | E23_07 | Personnel Exposed | |
| 421 | | E23_08 | Required Reportable Conditions | |

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|---|---|---|---|---|
| 422 | | E23_09 | Research Survey Field | |
| 423 | | E23_10 | Who Generated this Report? | |
| 424 | | E23_11 | Research Survey Field Title | |

| Line # | VEDS element | SHEET # | SHEET NAME | FIELD NAME | FIELD TYPE | NULLABLE | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 2 | | 1 | ACCIDENT | AC_ACCID_NO | NUMBER(9) | | UNIQUE NUMBER ASSIGNED BY THE DATABASE (I.E. PRIMARY KEY) |
| 3 | 1.1 Incident # | 1 | ACCIDENT | AC_ACCID_ID | CHAR(13) | | ACCIDENT NUMBER ASSIGNED BY THE REPORTING OFFICER. |
| 4 | | 1 | ACCIDENT | AC_REPORT_FLAG | CHAR(1) | Y | REPORT FLAG. (UNUSED) |
| 5 | 1.2 Incident Date/Time | 1 | ACCIDENT | AC_DATE | DATE | | ACCIDENT DATE. |
| 6 | 1.2 Location Description | 1 | ACCIDENT | AC_CITY_CODE | CHAR(3) | Y | CITY CODE. |
| 7 | 1.2 Location Description | 1 | ACCIDENT | AC_COUNTY_CODE | CHAR(2) | Y | COUNTY CODE. |
| 8 | | 1 | ACCIDENT | AC_GPS | CHAR(16) | Y | GLOBAL POSITIONING INFORMATION.(UNUSED) |
| 9 | | 1 | ACCIDENT | AC_LOCATION_TYPE | CHAR(1) | Y | LOCATION TYPE. |
| 10 | 1.2 Location Description | 1 | ACCIDENT | AC_LOCATION | CHAR(16) | Y | ACCIDENT LOCATION. |
| 11 | | 1 | ACCIDENT | AC_DIST_FROM | CHAR(5) | Y | ACCIDENT LOCATION DISTANCE FROM THE NEAREST MILEPOST. |
| 12 | | 1 | ACCIDENT | AC_CITY_COORD | CHAR(12) | Y | CITY GRID COORDINATES. |
| 13 | | 1 | ACCIDENT | AC_RANGE_CODE | CHAR(4) | Y | RANGE CODE. |
| 14 | | 1 | ACCIDENT | AC_TOWNSHIP_CODE | CHAR(3) | Y | TOWNSHIP CODE. |
| 15 | | 1 | ACCIDENT | AC_SECTION_CODE | CHAR(2) | Y | SECTION CODE. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 16 | | 1 | ACCIDENT | AC_ROUTE_ID | CHAR(6) | Y | ROUTE ID. |
| 17 | | 1 | ACCIDENT | AC_MILEPOST | CHAR(4) | Y | MILEPOST. |
| 18 | | 1 | ACCIDENT | AC_MILEPOST_DIR_CODE | CHAR(1) | Y | MILEPOST DIRECTION CODE.(UNUSED) |
| 19 | | 1 | ACCIDENT | AC_SPEED_LIMIT | NUMBER(5) | Y | MAXIMUM SPEED LIMIT AT THE PLACE OF ACCIDENT. |
| 20 | | 1 | ACCIDENT | AC_SPEED_UNIT_CODE | CHAR(1) | Y | SPEED UNIT CODE (MI/KM). |
| 21 | | 1 | ACCIDENT | AC_TYPE_COLL_CODE | CHAR(1) | Y | TYPE OF COLLISION. |
| 22 | | 1 | ACCIDENT | AC_HIT_RUN_CODE | CHAR(1) | Y | HIT AND RUN CODE. |
| 23 | | 1 | ACCIDENT | AC_INJ_NUMB | NUMBER(5) | Y | NUMER OF INJURIES. |
| 24 | | 1 | ACCIDENT | AC_FATAL_NUMB | NUMBER(5) | Y | NUMBER OF FATALITIES. |
| 25 | | 1 | ACCIDENT | AC_VEH_NUMB | NUMBER(5) | Y | NUMBER OF VEHICLES INVOLVED. |
| 26 | | 1 | ACCIDENT | AC_PEDEST_NUMB | NUMBER(5) | Y | NUMBER OF PEDESTRIANS INVOLVED. |
| 27 | | 1 | ACCIDENT | AC_CLASS_TRFWAY_CODE | CHAR(1) | Y | TRAFFICWAY CLASS CODE. |
| 28 | | 1 | ACCIDENT | AC_ACCID_SEV_CODE | CHAR(1) | Y | ACCIDENT SEVERITY CODE. |
| 29 | | 1 | ACCIDENT | AC_DAMAGE_SEV_CODE | CHAR(1) | Y | DAMAGE SEVERITY CODE.(UNUSED) |
| 30 | 1.4b Orientation | 1 | ACCIDENT | AC_REL_RDWAY_CODE | CHAR(1) | Y | RELATION TO ROADWAY. |
| 31 | | 1 | ACCIDENT | AC_REL_JUNC_CODE | CHAR(1) | Y | JUNCTION RELATED CODE. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 32 | | 1 | ACCIDENT | AC_WEATH_COND_CODE | CHAR(2) | Y | WEATHER CONDITION AT THE TIME OF ACCIDENT. |
| 33 | | 1 | ACCIDENT | AC_LIGHT_COND_CODE | CHAR(1) | Y | LIGHT CONDITION AT THE TIME OF ACCIDENT. |
| 34 | | 1 | ACCIDENT | AC_ROAD_COND_CODE | CHAR(1) | Y | CONDITIONS OF THE ROAD. |
| 35 | | 1 | ACCIDENT | AC_TRAF_CONTLS_CODE | CHAR(2) | Y | TRAFFIC CONTROLS. |
| 36 | | 1 | ACCIDENT | AC_GRADE_CODE | CHAR(1) | Y | GRADE. |
| 37 | | 1 | ACCIDENT | AC_CONSTR_ZONE_CODE | CHAR(1) | Y | CONSTRUCTION ZONE CODE (IF IT WAS A CONSTRUCTION ZONE). |
| 38 | | 1 | ACCIDENT | AC_SITE_STUDY | CHAR(1) | Y | SITE STUDY. |
| 39 | | 1 | ACCIDENT | AC_BIKEWAY_CODE | CHAR(1) | Y | BIKEWAY TYPE. |
| 40 | | 1 | ACCIDENT | AC_RESERVATION_CODE | CHAR(1) | Y | RESERVATION AREA CODE. |
| 41 | | 1 | ACCIDENT | AC_OTHR_DAMAG_CODE | CHAR(2) | Y | OTHER DAMAGE TYPE. |
| 42 | | 1 | ACCIDENT | AC_OTHR_DAMAG_SEVER_CODE | CHAR(1) | Y | OTHER DAMAGE SEVERITY. |
| 43 | | 1 | ACCIDENT | AC_OTHR_DAMAG_OWNR_CODE | CHAR(1) | Y | OTHER DAMAGE OWNER. |
| 44 | | 1 | ACCIDENT | AC_CC1_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE ONE.(UNUSED) |
| 45 | | 1 | ACCIDENT | AC_CC2_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE TWO.(UNUSED) |
| 46 | | 1 | ACCIDENT | AC_CC3_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE THREE.(UNUSED) |
| 47 | | 1 | ACCIDENT | AC_CC4_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE FOUR.(UNUSED) |

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|---|---|---|---|---|---|---|---|
| 48 | | 1 | ACCIDEN T | AC_CC5_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE FIVE.(UNUSED) |
| 49 | | 1 | ACCIDEN T | AC_FIRST_HARM_COD E | CHAR(2) | Y | FIRST HARMFUL EVENT.(UNUSED) |
| 50 | | 1 | ACCIDEN T | AC_MOST_HARM_COD E | CHAR(2) | Y | MOST HARMFUL EVENT.(UNUSED) |
| 51 | | 1 | ACCIDEN T | AC_ALCOHOL | CHAR(1) | Y | ALCOHOL INVOLVED.(UNUSED) |
| 52 | | 1 | ACCIDEN T | AC_BADGE_NO | CHAR(4) | Y | BADGE_NO.(UNUSED) |
| 53 | | 1 | ACCIDEN T | AC_DETACH_CODE | CHAR(3) | Y | DETACH_CODE.(UNUSED) |
| 54 | | 1 | ACCIDEN T | AC_FUNCT_CLASS | CHAR(1) | Y | FUNCTIONAL CODE.(UNUSED) |
| 55 | | 1 | ACCIDEN T | AC_NOTIF_DATE | DATE | Y | NOTIFICATION DATE. |
| 56 | | 1 | ACCIDEN T | AC_ARRIV_DATE | DATE | Y | ARRIVAL DATE. |
| 57 | | 1 | ACCIDEN T | AC_ADHOC_PROJ1 | CHAR(12) | Y | ADHOC PROJECT 1.(UNUSED) |
| 58 | | 1 | ACCIDEN T | AC_ADHOC_DATA1 | CHAR(12) | Y | ADHOC DATA 1.(UNUSED) |
| 59 | | 1 | ACCIDEN T | AC_ADHOC_PROJ2 | CHAR(12) | Y | ADHOC PROJECT 2.(UNUSED) |
| 60 | | 1 | ACCIDEN T | AC_ADHOC_DATA2 | CHAR(12) | Y | ADHOC DATA 2.(UNUSED) |
| 61 | | 1 | ACCIDEN T | AC_CRE_DATE_TIME | DATE | | CREATION DATE AND TIME. |
| 62 | | 1 | ACCIDEN T | AC_CRE_USER | CHAR(8) | | CREATED BY USER. |
| 63 | | 1 | ACCIDEN T | AC_UPD_DATE_TIME | DATE | | UPDATED DATE AND TIME. |

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|---|---|---|---|---|---|---|---|
| 64 | | 1 | ACCIDEN T | AC_UPD_USER | VARCHAR2 (10) | | UPDATED BY USER. |
| 65 | | 1 | ACCIDEN T | AC_SENT_DOJ | DATE | Y | DATE SENT TO DEPARTMENT OF JUSTICE.(UNUSED) |
| 66 | | 1 | ACCIDEN T | AC_SENT_MDT | DATE | Y | DATE SENT TO DEPARTMENT OF TRANSPORTATION. |
| 67 | | 1 | ACCIDEN T | AC_COMMERCIAL_NU MB | NUMBER(2 ) | Y | COMMERCIAL NUMBER. |
| 68 | 1.4a Hazardous Materials | 1 | ACCIDEN T | AC_HAZMAT_NUMB | NUMBER(2 ) | Y | WHAT HAZARDIOUS MATERIAL INVOLVED IN ACCIDENT. |
| 69 | | 1 | ACCIDEN T | AC_SHORT_FORM | VARCHAR2 (1) | Y | SHORT FORM ACCIDENT REPORT. |
| 70 | | 1 | ACCIDEN T | AC_X_COORD | NUMBER(1 3,5) | Y | X COORDINATE OF ACCIDENT. |
| 71 | | 1 | ACCIDEN T | AC_Y_COORD | NUMBER(1 3,5) | Y | Y COORDINATE OF ACCIDENT. |
| 72 | | 1 | ACCIDEN T | AC_Z_COORD | NUMBER(9 ,4) | Y | Z COORDINATE OF ACCIDENT. |
| 73 | | 1 | ACCIDEN T | AC_DC_ID | VARCHAR2 (15) | Y | CORRIDOR IDENTIFICATION OF ACCIDENT LOCATION |
| 74 | | 1 | ACCIDEN T | AC_DC_ROADBED | VARCHAR2 (1) | Y | CORRIDOR ROADBED OF ACCIDENT LOCATION. |
| 75 | | 1 | ACCIDEN T | AC_DC_MP | NUMBER(4 ) | Y | CORRIDOR MILEPOST OF ACCIDENT LOCATION. |
| 76 | | 1 | ACCIDEN T | AC_DC_MP_OFFSET | NUMBER(4 ,3) | Y | CORRIDOR MILEPOST OFFSET OF ACCIDENT LOCATION. |
| 77 | | 1 | ACCIDEN T | AC_SYS_CLASS | VARCHAR2 (30) | Y | SYSTEM CLASSIFICATION OF ACCIDENT LOCATION. |
| 78 | | 1 | ACCIDEN T | AC_DR_ID | VARCHAR2 (15) | Y | DEPARTMENTAL ROUTE IDENTIFICATION OF ACCIDENT LOCATION. |
| 79 | | 1 | ACCIDEN T | AC_DR_ROADBED | VARCHAR2 (1) | Y | DEPARMTMENTAL ROUTE ROADBED OF ACCIDENT LOCATION. |

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|---|---|---|---|---|---|---|---|
| 80 | | 1 | ACCIDEN T | AC_FIN_DISTRICT_ID | VARCHAR2 (20) | Y | FINANCIAL DISTRICT |
| 81 | 1.2 Latitude | 1 | ACCIDEN T | AC_LAT | FLOAT | Y | LATITUDE |
| 82 | 1.2 Longitude | 1 | ACCIDEN T | AC_LON | FLOAT | Y | LONGITUDE |
| 83 | 1.2 Latitude, Longitude | 1 | ACCIDEN T | AC_INPUT_DATA_TYPE | VARCHAR2 (20) | Y | Field to indicate the format of data. XY COORDINATES or LAT LON |
| 84 | | 1 | ACCIDEN T | AC_MHP_UNIQUE_KEY | VARCHAR2 (22) | Y | This is the unique key field to tie records to the new MHP system. |
| 85 | | 1 | ACCIDEN T | AC_SUPPLEMENT_NO | VARCHAR2 (3) | Y | This field identifies if the record has been duplicated and the number of times. 01 is the original. |
| 86 | | 1 | ACCIDEN T | AC_OFFICER_DESC | VARCHAR2 (40) | Y | Officer Description of the location |
| 87 | | 1 | ACCIDEN T | AC_OFFICER_AGENCY | VARCHAR2 (50) | Y | Officer Agency |
| 88 | | 1 | ACCIDEN T | AC_OFFICER_ID | VARCHAR2 (10) | Y | Officer Badge ID |
| 89 | | 1 | ACCIDEN T | AC_VIOLATION_COUNT | NUMBER(2 ) | Y | The number of violations given on this crash. |
| 90 | | 1 | ACCIDEN T | AC_ACCESS_CONTROL | VARCHAR2 (2) | Y | How Access to the roadway is controlled |
| 91 | | 2 | VEHICLE | VE_VEH_NO | NUMBER(9 ) | | PRIMARY KEY OF VEHICLE TABLE. |
| 92 | | 2 | VEHICLE | VE_ACCID_NO | NUMBER(9 ) | | SYSTEM ASSIGNED ACCIDENT PRIMARY KEY. |
| 93 | | 2 | VEHICLE | VE_VEH_SEQ_NO | NUMBER(5 ) | | THE VEHICLE NUMBER INVOLVED IN THE ACCIDENT. |
| 94 | 1.4a Owner's State and Province | 2 | VEHICLE | VE_PLATE_STATE_COD E | CHAR(2) | Y | VEHICLE STATE. |

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|---|---|---|---|---|---|---|---|
| 95 | | 2 | VEHICLE | VE_PLATE_EXP_YEAR | NUMBER(5) | Y | PLATE EXPERATION YEAR.(UNUSED) |
| 96 | 1.4a Year | 2 | VEHICLE | VE_VEH_YEAR | NUMBER(5) | Y | VEHICLE YEAR OF MANUFACTURE. |
| 97 | 1.4a Body Type | 2 | VEHICLE | VE_VEH_MAKE | CHAR(10) | Y | VEHICLE MAKE. |
| 98 | 1.4a Make | 2 | VEHICLE | VE_BODY_STYLE_CODE | CHAR(2) | Y | VEHICLE BODY STYLE CODE. |
| 99 | | 2 | VEHICLE | VE_TRAILER_STYLE_CODE | CHAR(2) | Y | TRAILER STYLE. |
| 100 | 1.4b Heading | 2 | VEHICLE | VE_HEADING | CHAR(1) | Y | DIRECTION OF TRAVEL. |
| 101 | | 2 | VEHICLE | VE_VEH_INTENT_CODE | CHAR(2) | Y | VEHICLE INTENT. |
| 102 | | 2 | VEHICLE | VE_DAMAG_SEVER_CODE | CHAR(1) | Y | DAMAGE SEVERITY. |
| 103 | | 2 | VEHICLE | VE_DAMAG_AREA_CODE | CHAR(2) | Y | (UNUSED) |
| 104 | | 2 | VEHICLE | VE_DEFORM_EXT_CODE | CHAR(1) | Y | (UNUSED) |
| 105 | | 2 | VEHICLE | VE_TOW_CODE | CHAR(1) | Y | TOWED DUE TO DAMAGE. |
| 106 | | 2 | VEHICLE | VE_VIOL1_CODE | VARCHAR2(30) | Y | VIOLATION NUMBER ONE. |
| 107 | | 2 | VEHICLE | VE_VIOL2_CODE | VARCHAR2(30) | Y | VIOLATION NUMBER TWO. |
| 108 | | 2 | VEHICLE | VE_DL_STATE_CODE | CHAR(2) | Y | DRIVERS LICENSE STATE. |
| 109 | | 2 | VEHICLE | VE_DL_STATUS_CODE | CHAR(1) | Y | DRIVERS LICENSE STATUS. |
| 110 | | 2 | VEHICLE | VE_DL_CLASS_CODE | CHAR(1) | Y | DRIVERS LICENSE CLASS CODE. |
| 111 | | 2 | VEHICLE | VE_DL_COMPL_CODE | CHAR(1) | Y | DRIVERS LICENSE RESTRICTION COMPLIANCE. |
| 112 | | 2 | VEHICLE | VE_DL_OTHR_DATA | CHAR(10) | Y | (UNUSED) |
| 113 | | 2 | VEHICLE | VE_CC1_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE ONE. |
| 114 | | 2 | VEHICLE | VE_CC2_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE TWO. |

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| 115 | | 2 | VEHICLE | VE_CC3_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE THREE. |
| 116 | | 2 | VEHICLE | VE_CC4_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE FOUR. |
| 117 | | 2 | VEHICLE | VE_CC5_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE FIVE |
| 118 | | 2 | VEHICLE | VE_FIRST_HARMFUL | CHAR(2) | Y | FIRST HARMFUL EVENT. |
| 119 | | 2 | VEHICLE | VE_MOST_HARMFUL | CHAR(2) | Y | MOST HARMFUL EVENT. |
| 120 | | 2 | VEHICLE | VE_ALCOHOL_DRUGS | CHAR(1) | Y | USE OF ALCOHOL OR DRUGS.(UNUSED) |
| 121 | | 2 | VEHICLE | VE_ALCOHOL | CHAR(2) | Y | USE OF ALCOHOL.(UNUSED) |
| 122 | | 2 | VEHICLE | VE_DRUGS | CHAR(1) | Y | USE OF DRUGS.(UNUSED) |
| 123 | | 2 | VEHICLE | VE_ADHOC_PROJ1 | CHAR(12) | Y | ADHOC PROJECT 1.(UNUSED) |
| 124 | | 2 | VEHICLE | VE_ADHOC_DATA1 | CHAR(12) | Y | ADHOC DATA 1.(UNUSED) |
| 125 | | 2 | VEHICLE | VE_ADHOC_PROJ2 | CHAR(12) | Y | ADHOC PROJECT 2.(UNUSED) |
| 126 | | 2 | VEHICLE | VE_ADHOC_DATA2 | CHAR(12) | Y | ADHOC DATA 2.(UNUSED) |
| 127 | | 2 | VEHICLE | VE_VEH_PED_FLAG | CHAR(1) | Y | VEHICLE / PEDIESTRIAN FLAG "V". |
| 128 | | 2 | VEHICLE | VE_CRE_DATE_TIME | DATE | | CREATED DATE AND TIME. |
| 129 | | 2 | VEHICLE | VE_CRE_USER | CHAR(8) | | CREATED BY USER. |
| 130 | | 2 | VEHICLE | VE_UPD_DATE_TIME | DATE | | UPDATED DATE AND TIME. |
| 131 | | 2 | VEHICLE | VE_UPD_USER | CHAR(8) | | UPDATED BY USER. |
| 132 | | 2 | VEHICLE | VE_COMMERCIAL_FLA G | CHAR(1) | Y | COMMERCIAL FLAG. |
| 133 | 1.4a Hazardous Materials | 2 | VEHICLE | VE_HAZMAT_FLAG | CHAR(1) | Y | HAZARDOUS MATERIAL INVOLVED IN ACCIDENT. |
| 134 | | 2 | VEHICLE | VE_MHP_UNIQUE_KEY | VARCHAR2 (22) | Y | THIS IS THE UNIQUE KEY TO TIE THE VECHICLE RECORDS TO THE MHP SYSTEM. |
| 135 | | 2 | VEHICLE | VE_MHP_UNIQUE_FKE Y | VARCHAR2 (22) | Y | THIS IS THE FOREIGN KEY TO TIE THE VEHICLE RECORDS TO THE TRAFFIC CRASH RECORDS. |
| 136 | | 2 | VEHICLE | VE_VIOL1_DESC | VARCHAR2 (180) | Y | VIOLATION 1 DESCRIPTION |

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| 137 | | 2 | VEHICLE | VE_VIOL2_DESC | VARCHAR2 (180) | Y | VIOLATION 2 DESCRIPTION |
| 138 | | 2 | VEHICLE | VE_CMV_CONFIG | VARCHAR2 (2) | Y | COMMERCIAL MOTOR VECHICLE CONFIG |
| 139 | 1.4a Weight | 2 | VEHICLE | VE_GVW_RATING | VARCHAR2 (2) | Y | GROSS VEHICLE WEIGHT RATING |
| 140 | | 2 | VEHICLE | VE_HAZ_MAT_NO | VARCHAR2 (4) | Y | HAZARDOUS MATERIALS MATERIAL NO |
| 141 | | 2 | VEHICLE | VE_TRAFFICWAY_DESC | VARCHAR2 (2) | Y | TRAFFICWAY DESCRIPTION |
| 142 | | 3 | OCCUPA NT | OC_OCCUP_NO | NUMBER(9 ) | | OCCUPANT NUMBER PRIMARY KEY OF THE TABLE. |
| 143 | | 3 | OCCUPA NT | OC_ACCID_NO | NUMBER(9 ) | | KEY FROM ACCIDENT TABLE AC_ACCID_NO KEY. |
| 144 | | 3 | OCCUPA NT | OC_VEH_NO | NUMBER(9 ) | Y | KEY FROM VEHICLE TABLE VE_ACCID_NO. |
| 145 | | 3 | OCCUPA NT | OC_NAME_NO | NUMBER(9 ) | Y | KEY FROM NAME TABLE NM_NAME_NO. |
| 146 | | 3 | OCCUPA NT | OC_PEDEST_NO | NUMBER(9 ) | Y | KEY FROM PEDESTRIAN TABLE PE_PEDEST_NO. |
| 147 | 1.5 Seat Position | 3 | OCCUPA NT | OC_SEAT_POS_CODE | CHAR(2) | Y | SEATING POSITION. |
| 148 | | 3 | OCCUPA NT | OC_INJ_TRANS_CODE | CHAR(1) | Y | INJURED TRANSPORTATION. |
| 149 | | 3 | OCCUPA NT | OC_INJ_CLASSIF_CODE | CHAR(1) | Y | INJURY CLASSIFICATION. |
| 150 | | 3 | OCCUPA NT | OC_ALCOHOL_DRUGS_ CODE | CHAR(1) | Y | ALCOHOL OR DRUG USE. |
| 151 | 1.4b Belt Fastened | 3 | OCCUPA NT | OC_BELTS_CODE | CHAR(2) | Y | BELT CODE. |
| 152 | 1.4b Deployed | 3 | OCCUPA NT | OC_AIR_BAG_CODE | CHAR(1) | Y | AIR BAG DEPLOYED. |

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| 153 | 1.5 Ejected | 3 | OCCUPANT | OC_EJECT_CODE | CHAR(1) | Y | EJECTION. |
| 154 | 1.5 Entrapped | 3 | OCCUPANT | OC_TRAP_EXTRAC_CODE | CHAR(1) | Y | TRAPPED / EXTRACTION. |
| 155 | 1.5 Occupant's Name | 3 | OCCUPANT | OC_LAST_NAME | CHAR(16) | Y | LAST NAME.(UNUSED) |
| 156 | 1.5 Occupant's Name | 3 | OCCUPANT | OC_FIRST_NAME | CHAR(10) | Y | FIRST NAME.(UNUSED) |
| 157 | 1.5 Occupant's Name | 3 | OCCUPANT | OC_MIDDLE_INITIAL | CHAR(1) | Y | MIDDLE INITIAL.(UNUSED) |
| 158 | 1.5 Occupant's Gender | 3 | OCCUPANT | OC_SEX_CODE | CHAR(1) | Y | SEX CODE. |
| 159 | 1.5 Occupant's Age | 3 | OCCUPANT | OC_AGE | NUMBER(5) | Y | AGE. |
| 160 | | 3 | OCCUPANT | OC_CC1_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCES ONE.(UNUSED) |
| 161 | | 3 | OCCUPANT | OC_CC2_CODE | CHAR(2) | Y | CONTRIUBTING CIRCUMSTANCES TWO.(UNUSED) |
| 162 | | 3 | OCCUPANT | OC_ADHOC_PROJ1 | CHAR(12) | Y | ADHOC PROJECT 1.(UNUSED) |
| 163 | | 3 | OCCUPANT | OC_ADHOC_DATA1 | CHAR(12) | Y | ADHOC DATA 1.(UNUSED) |
| 164 | | 3 | OCCUPANT | OC_ADHOC_PROJ2 | CHAR(12) | Y | ADHOC PROJECT 2.(UNUSED) |
| 165 | | 3 | OCCUPANT | OC_ADHOC_DATA2 | CHAR(12) | Y | ADHOC DATA 2.(UNUSED) |
| 166 | | 3 | OCCUPANT | OC_VEH_PED_FLAG | CHAR(1) | Y | VEHICLE OR PEDESTRIAN FLAG V OR P. |

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| 167 | | 3 | OCCUPANT | OC_CRE_DATE_TIME | DATE | | CREATED TIME AND DATE. |
| 168 | | 3 | OCCUPANT | OC_CRE_USER | CHAR(8) | | CREATED BY USER. |
| 169 | | 3 | OCCUPANT | OC_UPD_DATE_TIME | DATE | | UPDATE TIME AND DATE. |
| 170 | | 3 | OCCUPANT | OC_UPD_USER | CHAR(8) | | UPDATED BY USER. |
| 171 | | 3 | OCCUPANT | OC_MHP_UNIQUE_KEY | VARCHAR2(22) | Y | THIS IS THE UNIQUE KEY TO TIE OCCUPANT RECORDS TO THE PERSON BUSINESS RECORDS IN THE NEW MHP SYSTEM |
| 172 | | 3 | OCCUPANT | OC_MHP_UNIQUE_TKEY | VARCHAR2(22) | Y | THIS IS A FOREIGN KEY TO THE TRAFFIC CRASH TABLE IN THE NEW MHP SYSTEM. |
| 173 | | 3 | OCCUPANT | OC_MHP_UNIQUE_VKEY | VARCHAR2(22) | Y | THIS IS A FOREIGN KEY TO THE VEHICLE TABLE IN THE NEW MHP SYSTEM. |
| 174 | | 4 | PEDESTRIAN | PE_PEDEST_NO | NUMBER(9) | | PEDESTRIAN NUMBER PRIMARY KEY OF THE TABLE. |
| 175 | | 4 | PEDESTRIAN | PE_ACCID_NO | NUMBER(9) | | SYSTEM ASSIGNED ACCIDENT PRIMARY KEY. |
| 176 | | 4 | PEDESTRIAN | PE_PEDEST_SEQ_NO | NUMBER(5) | | PEDESTRIAN SEQUENCE NUMBER. |
| 177 | | 4 | PEDESTRIAN | PE_VIOL1_CODE | CHAR(30) | Y | VIOLATION CODE ONE. |
| 178 | | 4 | PEDESTRIAN | PE_VIOL2_CODE | CHAR(30) | Y | VIOLATION CODE TWO. |
| 179 | | 4 | PEDESTRIAN | PE_ACTIONS | CHAR(2) | Y | ACTIONS OF THE PEDESTRIAN. |
| 180 | | 4 | PEDESTRIAN | PE_HEADING | CHAR(1) | Y | DIRECTION OF TRAVEL. |
| 181 | | 4 | PEDESTRIAN | PE_CC1_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE ONE.(UNUSED) |
| 182 | | 4 | PEDESTRIAN | PE_CC2_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE TWO.(UNUSED) |

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| 183 | | 4 | PEDESTR IAN | PE_CC3_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE THREE.(UNUSED) |
| 184 | | 4 | PEDESTR IAN | PE_CC4_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE FOUR.(UNUSED) |
| 185 | | 4 | PEDESTR IAN | PE_CC5_CODE | CHAR(2) | Y | CONTRIBUTING CIRCUMSTANCE FIVE.(UNUSED) |
| 186 | | 4 | PEDESTR IAN | PE_ALCOHOL_DRUGS | CHAR(1) | Y | USE OF ALCOHOL OR DRUGS.(UNUSED) |
| 187 | | 4 | PEDESTR IAN | PE_ALCOHOL | CHAR(2) | Y | ALCOHOL USE.(UNUSED) |
| 188 | | 4 | PEDESTR IAN | PE_DRUGS | CHAR(1) | Y | DRUG USE.(UNUSED) |
| 189 | | 4 | PEDESTR IAN | PE_ADHOC_PROJ1 | CHAR(12) | Y | ADHOC PROJECT 1.(UNUSED) |
| 190 | | 4 | PEDESTR IAN | PE_ADHOC_DATA1 | CHAR(12) | Y | ADHOC DATA 1.(UNUSED) |
| 191 | | 4 | PEDESTR IAN | PE_ADHOC_PROJ2 | CHAR(12) | Y | ADHOC PROJECT 2.(UNUSED) |
| 192 | | 4 | PEDESTR IAN | PE_ADHOC_DATA2 | CHAR(12) | Y | ADHOC DATA 2.(UNUSED) |
| 193 | | 4 | PEDESTR IAN | PE_VEH_PED_FLAG | CHAR(1) | Y | VEHICLE / PEDESTRIAN FLAG "P". |
| 194 | | 4 | PEDESTR IAN | PE_CRE_DATE_TIME | DATE | | CREATED TIME AND DATE. |
| 195 | | 4 | PEDESTR IAN | PE_CRE_USER | CHAR(8) | | CREATED BY USER. |
| 196 | | 4 | PEDESTR IAN | PE_UPD_DATE_TIME | DATE | | UPDATED TIME AND DATE. |
| 197 | | 4 | PEDESTR IAN | PE_UPD_USER | CHAR(8) | | UPDATED BY USER. |
| 198 | | 4 | PEDESTR IAN | PE_MHP_UNIQUE_KEY | VARCHAR2 (22) | Y | THIS IS THE UNIQUE KEY TO THE PERSON BUSINESS TABLE IN THE NEW MHP SYSTEM. |

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| 199 | | 4 | PEDESTRIAN | PE_MHP_UNIQUE_TKEY | VARCHAR2 (22) | Y | THIS IS THE FOREIGN KEY TO THE TRAFFIC CRASH TABLE IN THE NEW MHP SYSTEM. |
| 200 | | 4 | PEDESTRIAN | PE_VIOL1_DESC | VARCHAR2 (180) | Y | VIOLATION 1 DESCRIPTION |
| 201 | | 4 | PEDESTRIAN | PE_VIOL2_DESC | VARCHAR2 (180) | Y | VIOLATION 2 DESCRIPTION |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 2 | | | MCTSEND | BIT | Y | True if the call was sent to MCT |
| 3 | 1.1 Incident # | | INCIDENTNO | VARCHAR(15) | Y | Incident number for the call |
| 4 | | | OFFENSENO | VARCHAR(15) | Y | Offense number for the call |
| 5 | | | CTYPE | VARCHAR(1) | Y | Dispatch call type |
| 6 | | | CMAP_OBJECT_NO | INT | Y | Dispatch map object number |
| 7 | | | CSTREETNO | VARCHAR(8) | Y | Dispatch street number |
| 8 | | | CSTREETDIR | VARCHAR(2) | Y | Dispatch street direction |
| 9 | | | CSTREET | VARCHAR(30) | Y | Dispatch street name |
| 10 | | | CAPTLOT | VARCHAR(5) | Y | Dispatch apartment or suite |
| 11 | | | CXSTREETDIR1 | VARCHAR(2) | Y | Dispatch cross street direction |
| 12 | | | CXSTREET1 | VARCHAR(30) | Y | Dispatch cross street name |
| 13 | | | CXSTREETDIR2 | VARCHAR(2) | Y | Dispatch cross street direction |
| 14 | | | CXSTREET2 | VARCHAR(30) | Y | Dispatch cross street name |
| 15 | | | CPLACE | VARCHAR(55) | Y | Dispatch place |
| 16 | | | CIDIR1 | VARCHAR(2) | Y | Dispatch location intersection direction |
| 17 | | | CISTREET1 | VARCHAR(30) | Y | Dispatch location intersection street |
| 18 | | | CIDIR2 | VARCHAR(2) | Y | Dispatch location intersection direction |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 19 | | | CISTREET2 | VARCHAR(30) | Y | Dispatch location intersection street |
| 20 | | | CINTERSTATE | VARCHAR(4) | Y | Dispatch interstate location |
| 21 | | | CBOUND | VARCHAR(1) | Y | Dispatch bound in what direction |
| 22 | | | CMM | VARCHAR(4) | Y | Dispatch mile marker |
| 23 | | | CEXIT | VARCHAR(10) | Y | Dispatch interstate exit |
| 24 | | | CENTRANCE | VARCHAR(10) | Y | Dispatch interstate entrance |
| 25 | | | COVERPASS | VARCHAR(10) | Y | Dispatch overpass location |
| 26 | | | CUNDERPASS | VARCHAR(10) | Y | Dispatch underpass location |
| 27 | | | CXINTERSTATE | VARCHAR(4) | Y | Dispatch cross interstate |
| 28 | | | CHIGHWAY | VARCHAR(30) | Y | Dispatch highway location |
| 29 | | | CMILES | VARCHAR(4) | Y | Dispatch highway miles to |
| 30 | | | CFROM | VARCHAR(30) | Y | Dispatch from location |
| 31 | | | CTOWARDS | VARCHAR(30) | Y | Dispatch on highway, towards location |
| 32 | | | COTHER_LOCATION | VARCHAR(55) | Y | Dispatch other location |
| 33 | | | CCITY | VARCHAR(18) | Y | Dispatch City |
| 34 | | | CSTATE | VARCHAR(2) | Y | Dispatch state |
| 35 | | | CZIP | VARCHAR(5) | Y | Dispatch zip code |
| 36 | | | CGEO_PRIMARY_AREA | VARCHAR(4) | Y | Dispatch primary geo area |
| 37 | | | CGEO_WRECKER_AREA | VARCHAR(4) | Y | Dispatch wrecker are |
| 38 | | | CGEO_LAW_SUB1 | VARCHAR(4) | Y | Dispatch law geo sub area |
| 39 | | | CGEO_LAW_SUB2 | VARCHAR(4) | Y | Dispatch law geo sub area |
| 40 | | | CGEO_LAW_SUB3 | VARCHAR(4) | Y | Dispatch law geo sub area |
| 41 | | | CGEO_FIRE_SUB1 | VARCHAR(4) | Y | Dispatch fire geo sub area |
| 42 | | | CGEO_FIRE_SUB2 | VARCHAR(4) | Y | Dispatch fire geo sub area |
| 43 | | | CGEO_FIRE_SUB3 | VARCHAR(4) | Y | Dispatch fire geo sub area |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 44 | | | CGEO_EMS_SUB1 | VARCHAR(4) | Y | Dispatch EMS geo sub area |
| 45 | | | CGEO_EMS_SUB2 | VARCHAR(4) | Y | Dispatch EMS geo sub area |
| 46 | | | CGEO_EMS_SUB3 | VARCHAR(4) | Y | Dispatch EMS geo sub area |
| 47 | | | CMAP_X | FLOAT | Y | Dispatch latitude |
| 48 | | | CMAP_Y | FLOAT | Y | Dispatch longitude |
| 49 | | | CDIR | TEXT | Y | Dispatch directions |
| 50 | | | DTYPE | VARCHAR(1) | Y | Occurrence call type |
| 51 | 1.2 Location Description, Datum | | DMAP_OBJECT_NO | INT | Y | Occurrence map object number |
| 52 | 1.2 Location Description | | DSTREETNO | VARCHAR(8) | Y | Occurrence street number |
| 53 | 1.2 Location Description | | DSTREETDIR | VARCHAR(2) | Y | Occurrence street direction |
| 54 | 1.2 Location Description | | DSTREET | VARCHAR(30) | Y | Occurrence street name |
| 55 | 1.2 Location Description | | DAPTLOT | VARCHAR(5) | Y | Occurrence street apartment or suite |
| 56 | 1.2 Location Description | | DXSTREETDIR1 | VARCHAR(2) | Y | Occurrence cross street direction |
| 57 | 1.2 Location Description | | DXSTREET1 | VARCHAR(30) | Y | Occurrence cross street name |
| 58 | 1.2 Location Description | | DXSTREETDIR2 | VARCHAR(2) | Y | Occurrence cross street direction |
| 59 | 1.2 Location Description | | DXSTREET2 | VARCHAR(30) | Y | Occurrence cross street name |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 60 | 1.2 Location Description | | DPLACE | VARCHAR(55) | Y | Occurrence place name |
| 61 | 1.2 Location Description | | DIDIR1 | VARCHAR(2) | Y | Occurrence location intersection direction |
| 62 | 1.2 Location Description | | DISTREET1 | VARCHAR(30) | Y | Occurrence location intersection street |
| 63 | 1.2 Location Description | | DIDIR2 | VARCHAR(2) | Y | Occurrence location intersection direction |
| 64 | 1.2 Location Description | | DISTREET2 | VARCHAR(30) | Y | Occurrence location intersection street |
| 65 | 1.2 Location Description | | DINTERSTATE | VARCHAR(4) | Y | Occurrence interstate location |
| 66 | 1.2 Heading | | DBOUND | VARCHAR(1) | Y | Occurrence direction bound |
| 67 | 1.2 Location Description | | DMM | VARCHAR(4) | Y | Occurrence mile marker |
| 68 | 1.2 Location Description | | DEXIT | VARCHAR(10) | Y | Occurrence interstate exit location |
| 69 | 1.2 Location Description | | DENTRANCE | VARCHAR(10) | Y | Occurrence interstate entrance location |
| 70 | 1.2 Location Description | | DOVERPASS | VARCHAR(10) | Y | Occurrence overpass location |
| 71 | 1.2 Location Description | | DUNDERPASS | VARCHAR(10) | Y | Occurrence underpass location |
| 72 | 1.2 Location Description | | DXINTERSTATE | VARCHAR(4) | Y | Occurrence cross interstate |
| 73 | 1.2 Location Description | | DHIGHWAY | VARCHAR(30) | Y | Occurrence highway |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 74 | 1.2 Location Description | | DMILES | VARCHAR(4) | Y | Occurrence miles distance |
| 75 | 1.2 Location Description | | DFROM | VARCHAR(30) | Y | Occurrence Highway from location |
| 76 | 1.2 Location Description | | DTOWARDS | VARCHAR(30) | Y | Occurrence highway towards location |
| 77 | 1.2 Location Description | | DOTHER_LOCATION | VARCHAR(55) | Y | Occurrence other location |
| 78 | 1.2 Location Description | | DCITY | VARCHAR(18) | Y | Occurrence city |
| 79 | 1.2 Location Description | | DSTATE | VARCHAR(2) | Y | Occurrence state |
| 80 | 1.2 Location Description | | DZIP | VARCHAR(5) | Y | Occurrence zip code |
| 81 | 1.2 Location Description | | DGEO_PRIMARY_AREA | VARCHAR(4) | Y | Occurrence geo primary area |
| 82 | 1.2 Location Description | | DGEO_LAW_SUB1 | VARCHAR(4) | Y | Occurrence geo law sub area |
| 83 | 1.2 Location Description | | DGEO_LAW_SUB2 | VARCHAR(4) | Y | Occurrence geo law sub area |
| 84 | 1.2 Location Description | | DGEO_LAW_SUB3 | VARCHAR(4) | Y | Occurrence geo law sub area |
| 85 | 1.2 Location Description | | DGEO_FIRE_SUB1 | VARCHAR(4) | Y | Occurrence geo fire sub area |
| 86 | 1.2 Location Description | | DGEO_FIRE_SUB2 | VARCHAR(4) | Y | Occurrence geo fire sub area |
| 87 | 1.2 Location Description | | DGEO_FIRE_SUB3 | VARCHAR(4) | Y | Occurrence geo fire sub area |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 88 | 1.2 Location Description | | DGEO_EMS_SUB1 | VARCHAR(4) | Y | Occurrence geo EMS sub area |
| 89 | 1.2 Location Description | | DGEO_EMS_SUB2 | VARCHAR(4) | Y | Occurrence geo EMS sub area |
| 90 | 1.2 Location Description | | DGEO_EMS_SUB3 | VARCHAR(4) | Y | Occurrence geo EMS sub area |
| 91 | 1.2 Location Description, Latitude | | DMAP_X | FLOAT | Y | Occurrence latitude |
| 92 | 1.2 Location Description, Longitude | | DMAP_Y | FLOAT | Y | Occurrence longitude |
| 93 | | | DDIR | TEXT | Y | Occurrence location direction |
| 94 | | | DOCCUR_IS_DISPATCH | BIT | Y | True if the occurrence is the same as the dispatch area |
| 95 | | | COMPLAINT | VARCHAR(20) | Y | Complaint |
| 96 | | | COMPLAINT_ADDINFO | VARCHAR(15) | Y | Complaint additional info |
| 97 | | | COMPLAINT_STATUS | VARCHAR(20) | Y | Complaint status |
| 98 | | | COMPLAINT_LAW | BIT | Y | True if this is a law complaint |
| 99 | | | COMPLAINT_FIRE | BIT | Y | True if this is a fire complaint |
| 100 | | | COMPLAINT_EMS | BIT | Y | True if this is a EMS complaint |
| 101 | | | COMPLAINT_PUBLIC | BIT | Y | True if this call is for public view |
| 102 | | | COMPLAINT_TSDR | BIT | Y | True if this is a TSDR complaint |
| 103 | | | COMPLAINT_CRASH | BIT | Y | True if this is a crash complaint |
| 104 | | | COMPLAINT_OTHER | BIT | Y | True if this is other complaint |
| 105 | | | COMPLAINT_DUPLICATES | BIT | Y | True if there is a duplicate compliant |
| 106 | | | PRIORITY | VARCHAR(1) | Y | Priority of the call |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 107 | | | ALARM | BIT | Y | True if this an alarm call |
| 108 | | | WEAPON | VARCHAR(10) | Y | Weapon used in the complaint |
| 109 | 1.1 Provider Name | | CNAME | VARCHAR(30) | Y | Complainant name |
| 110 | 1.1 Call back # | | CPHONE | VARCHAR(13) | Y | Complainant phone number |
| 111 | | | CCONTACT | VARCHAR(1) | Y | Complainant contact - Y or N |
| 112 | 1.1 Provider Name | | C911 | VARCHAR(1) | Y | Complainant 911 call - Y or N |
| 113 | | | PUNIT | VARCHAR(5) | Y | Primary unit |
| 114 | | | PUNITA | VARCHAR(4) | Y | Primary unit agency |
| 115 | | | PUNITPERNO | VARCHAR(15) | Y | Primary unit personnel number |
| 116 | 1.2 Receive Date/Time of Incident | | DRECV | DATETIME | Y | Date call received |
| 117 | 1.2 Receive Date/Time of Incident | | TRECV | DATETIME | Y | Time call received |
| 118 | | | DRECV_C | VARCHAR(10) | Y | String value of the DRECV Field |
| 119 | | | TRECV_C | VARCHAR(8) | Y | String value of the TRECV Field |
| 120 | | | DSHIP | DATETIME | Y | Date call was shipped to unit |
| 121 | | | TSHIP | DATETIME | Y | Time call was shipped to unit |
| 122 | | | DDISP | DATETIME | Y | Date call was disposed |
| 123 | | | TDISP | DATETIME | Y | Time call was disposed |
| 124 | | | D1051 | DATETIME | Y | Date unit was enroute |
| 125 | | | T1051 | DATETIME | Y | Time unit was put on enroute |
| 126 | | | D1097 | DATETIME | Y | Date unit was placed on scene |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 127 | | | T1097 | DATETIME | Y | Time unit was placed on scene |
| 128 | | | D1098 | DATETIME | Y | Date call was closed |
| 129 | | | T1098 | DATETIME | Y | Time call was closed |
| 130 | | | CLOSED | VARCHAR(1) | Y | Closed code |
| 131 | | | CODE_DATE | DATETIME | Y | Date call was coded closed |
| 132 | | | CODE_TIME | DATETIME | Y | Time call was coded closed |
| 133 | | | CODE1 | VARCHAR(4) | Y | Code 1 for call disposition |
| 134 | | | CODE1_REASON | VARCHAR(50) | Y | Reason the call was closed |
| 135 | | | CODE1_LAW | BIT | Y | True if call was closed as law call |
| 136 | | | CODE1_FIRE | BIT | Y | True if call was closed as fire call |
| 137 | | | CODE1_EMS | BIT | Y | True if call was closed as EMS call |
| 138 | | | CODE1_OTHER | BIT | Y | True if call was closed as other call |
| 139 | | | CODE1_TSDR | BIT | Y | True if call was closed as a TSDR call |
| 140 | | | CODE2 | VARCHAR(4) | Y | Code 2 for call disposition |
| 141 | | | CODE2_REASON | VARCHAR(50) | Y | Reason the call was closed |
| 142 | | | CODE3 | VARCHAR(4) | Y | Code 3 for call disposition |
| 143 | | | CODE3_REASON | VARCHAR(50) | Y | Reason the call was closed |
| 144 | | | CODE4 | VARCHAR(4) | Y | Code 4 for call disposition |
| 145 | | | CODE4_REASON | VARCHAR(50) | Y | Reason the call was closed |
| 146 | | | CODE5 | VARCHAR(4) | Y | Code 5 for call disposition |
| 147 | | | CODE5_REASON | VARCHAR(50) | Y | Reason the call was closed |
| 148 | | | CODE6 | VARCHAR(4) | Y | Code 6 for call disposition |
| 149 | | | CODE6_REASON | VARCHAR(50) | Y | Reason the call was closed |
| 150 | | | CALLTAKER | VARCHAR(10) | Y | Call taker for the call |
| 151 | | | DISPATCHER | VARCHAR(10) | Y | Dispatcher of the call |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 152 | | | SUSPEND | BIT | Y | True if the call was suspended |
| 153 | | | SUSPEND_DATE | DATETIME | Y | Date call was suspended |
| 154 | | | SUSPEND_TIME | DATETIME | Y | Time call was suspended |
| 155 | | | FLAG_CWO | BIT | Y | True if there was dispatch watch order |
| 156 | | | FLAG_CPC | BIT | Y | True if there was a dispatch prior call |
| 157 | | | FLAG_CPX | BIT | Y | True if there are prior calls for the dispatch location |
| 158 | | | FLAG_CCN | BIT | Y | True if there are caution notes on the dispatch location |
| 159 | | | FLAG_CTW | BIT | Y | True if there are trespass warnings for dispatch location |
| 160 | | | FLAG_CDIR | BIT | Y | True if there are directions to the dispatch location |
| 161 | | | FLAG_CDUP | BIT | Y | True if there are duplicate calls for this dispatch location |
| 162 | | | FLAG_DWO | BIT | Y | True if there is watch order on the occurrence address |
| 163 | | | FLAG_DPC | BIT | Y | True if there are prior calls for the occurrence location |
| 164 | | | FLAG_DPX | BIT | Y | True if there are prior calls for the occurrence location |
| 165 | | | FLAG_DCN | BIT | Y | True if there are caution notes on the occurrence location |
| 166 | | | FLAG_DTW | BIT | Y | True if there are trespass warnings for occurrence location |
| 167 | | | FLAG_DDIR | BIT | Y | True if there are directions to the occurrence location |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 168 | | | FLAG_DDUP | BIT | Y | True if there are duplicate calls for this occurrence location |
| 169 | | | FLAG_TPC | BIT | Y | True if there are Vehicle Priors |
| 170 | | | FLAG_TCN | BIT | Y | True if there are Vehicle Caution Note |
| 171 | | | FLAG_TTL | BIT | Y | True if there are Vehicle Tow |
| 172 | | | FLAG_TBO | BIT | Y | True if there are Vehicle BOLO (Be on the lookout) |
| 173 | | | FLAG_AN | BIT | Y | True if there is a call note |
| 174 | | | FLAG_ERUN | BIT | Y | True if there is a EMS Run Card for call (not used) |
| 175 | | | FLAG_FRUN | BIT | Y | True if there is a Fire Run Card for call (not used) |
| 176 | | | FLAG_LRUN | BIT | Y | True if there is a Law Run Card for call (not used) |
| 177 | | | FLAG_DUP | BIT | Y | True if there is a Duplicate call |
| 178 | | | FLAG_SOP | BIT | Y | rue if there is a SOP record exists for call's complaint |
| 179 | | | FLAG_MED | BIT | Y | True if there is a Medical record exists for call's complaint |
| 180 | | | LOCATION_DISPLAY | VARCHAR(80) | Y | The main screen displays this field, it is a combination of the main street with the cross streets |
| 181 | | | LAST_REFRESH_DATE | DATETIME | Y | Last refresh date |
| 182 | | | LAST_REFRESH_TIME | DATETIME | Y | Last refresh time |
| 183 | | | RMS_EXPORT_LAW | BIT | Y | This field is not used |
| 184 | | | RMS_EXPORT_FIRE | BIT | Y | This field is not used |
| 185 | | | RMS_EXPORT_EMS | BIT | Y | This field is not used |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 186 | | | RMS_EXPORT_OTHER | BIT | Y | This field is not used |
| 187 | | 🔑 | UNIQUEKEY | VARCHAR(22) | N | Primary key for the record |
| 188 | | | UCR_CODE1 | VARCHAR(4) | Y | UCR Code1 |
| 189 | | | UCR_CODE2 | VARCHAR(4) | Y | UCR Code2 |
| 190 | | | UCR_CODE3 | VARCHAR(4) | Y | UCR Code3 |
| 191 | | | UCR_CODE4 | VARCHAR(4) | Y | UCR Code4 |
| 192 | | | UCR_CODE5 | VARCHAR(4) | Y | UCR Code5 |
| 193 | | | UCR_CODE6 | VARCHAR(4) | Y | UCR Code6 |
| 194 | | | UCR_DESCRIPT1 | VARCHAR(100) | Y | UCR description for the code |
| 195 | | | UCR_DESCRIPT2 | VARCHAR(100) | Y | UCR description for the code |
| 196 | | | UCR_DESCRIPT3 | VARCHAR(100) | Y | UCR description for the code |
| 197 | | | UCR_DESCRIPT4 | VARCHAR(100) | Y | UCR description for the code |
| 198 | | | UCR_DESCRIPT5 | VARCHAR(100) | Y | UCR description for the code |
| 199 | | | UCR_DESCRIPT6 | VARCHAR(100) | Y | UCR description for the code |
| 200 | | | GMT_OFFSET | INT | Y | Greenwich mean time offset |
| 201 | 1.1 Provider Name | | AGENCY | VARCHAR(4) | Y | Agency for the call |
| 202 | | | RUNIT | VARCHAR(5) | Y | Reporting unit |
| 203 | | | RUNITA | VARCHAR(4) | Y | Reporting unit agency |
| 204 | | | RUNITPERNO | VARCHAR(15) | Y | Reporting unit personnel number |
| 205 | | | FLAG_VALIDATED | BIT | Y | True if the main address has been validated |
| 206 | | | FLAG_MCT_INITIATED | BIT | Y | True if an MCT sent this call in |
| 207 | | | C911_TYPE | INT | Y | 911 call type |
| 208 | | | CICITY | BIT | Y | True if the Dispatch occurred inside an incorporated city |

| Line # | VEDS element | PK | Name | Data Type | Nullable | Description |
|---|---|---|---|---|---|---|
| 209 | | | DICITY | BIT | Y | True if the occurrence occurred inside an incorporated city |
| 210 | | | CCOUNTY | VARCHAR(35) | Y | Dispatch county |
| 211 | | | DCOUNTY | VARCHAR(35) | Y | Occurrence county |
| 212 | | | CVALIDATED | BIT | Y | Dispatch location validated |
| 213 | | | DVALIDATED | BIT | Y | Occurrence location validated |
| 214 | | | CADDRESS1 | VARCHAR(55) | Y | Dispatch address |
| 215 | | | CADDRESS2 | VARCHAR(55) | Y | Dispatch address |
| 216 | 1.2 Location Description | | DADDRESS1 | VARCHAR(55) | Y | Occurrence address |
| 217 | 1.2 Location Description | | DADDRESS2 | VARCHAR(55) | Y | Occurrence address |
| 218 | | | CGEOKEY | VARCHAR(22) | Y | Dispatch geo key |
| 219 | | | DGEOKEY | VARCHAR(22) | Y | Occurrence geo key |
| 220 | | | COMPLAINT_NONCAD | BIT | Y | Non CAD complaint |
| 221 | | | PUNITR | VARCHAR(15) | Y | Primary unit agency |
| 222 | | | RUNITR | VARCHAR(15) | Y | Backup unit perno |
| 223 | | | CALL_ORIGIN | VARCHAR(25) | Y | Call Orgin |
| 224 | | | QUNIT | VARCHAR(5) | Y | Q Unit |
| 225 | | | CEXT | VARCHAR(10) | Y | Dispatch location extension |
| 226 | | | ALARM_LEVEL | INT | Y | Alarm Level |
| 227 | | | FLAG_NOTIFICATION_LIST | BIT | Y | Flag notification list |
| 228 | | | LAST_CHANGE_BY | VARCHAR(10) | Y | User who last changed record |
| 229 | | | FLAG_APCO | BIT | N | True if APCO |
| 230 | | | APCO_IN_PROGRESS | BIT | N | APCO is in progress |

## Appendix D - Test Script

**AACN Data Script for Simulated OnStar 'Test Call'**

**May 3, 2012**

Test Scenario: A (simulated) crash involving two vehicles occurs in a rural part of Missoula County, Montana. One of the two vehicles is equipped with OnStar AACN. The other vehicle is not. The OnStar Advisor, in talking with the driver of the OnStar vehicle, determines that there are at least two people in the OnStar vehicle, both of whom are injured. No information on the other vehicle is available.

Test Call Data from OnStar Surrogate (Chris L) ***Standard Data*** *Currently Captured by PSAP Call Taker during OnStar Call*

**Table C1**

| 4. Standard Data - Currently received or acquired by PSAP Call Taker from OnStar Caller | | |
|---|---|---|
| Item | Sample input | Notes |
| Caller Name | OnStar TEST | CAD data field automatically populated (Priority Access Phase 1) |
| Call Back Number | 800-xxx-yyyy | CAD data field automatically populated (Priority Access Phase 1) |
| Vehicle Make | Chevrolet | Verbally acquired; entered into CAD / Comment Field |
| Vehicle Model | Malibu | Verbally acquired; entered into CAD / Comment Field |
| OnStar Case Number | 125489017 | Verbally acquired; entered into Comment Field |
| PSAP Call Date | mo/day/year | CAD data field automatically populated |
| PSAP Call Time | hr:min | CAD data field automatically populated |
| Incident Street | 7938 Grant Creek Rd | Verbally acquired; entered into CAD |
| Incident City | Missoula | Verbally acquired; entered into CAD |
| Number Injured | 2 | Verbally acquired (if TSP contact with vehicle occupants); entered in CAD |
| 5. Additional AACN Parameters - Verbally requested from OnStar and entered in PSAP 'Comment Field' using pre-defined notation (2nd column) below: | | |
| Item | Sample input | Notes |
| Injury Severity Prediction | ISP HIGH | Reported (by OnStar) as HIGH or LOW (but computed as percentage). |
| Multiple Impacts? | MIMP No | |
| Crash Delta Velocity (mph) | DV1 25 | Units are miles/hour. (Can be a DV2 if Multiple Impacts (i.e. if MIMP Yes) |
| Direction of Impact | DIR IMP1 from Right | Choices are Front, Right, Left, or Rear. (Can be a DIR IMP2 if MIMP=Y; Here only first (or max) impact delta V and direction recorded) |
| Rollover? | Rollover Yes | See Note** |
| Time of Alert | (hrs:min) | Time alert received at TSP (OnStar). |
| 6. Other Test Data 'Acquired' by EMS (simulated at scene) | | |

## Activities at Missoula 9-1-1 PSAP during MT AACN Test Call
**May 3, 2012**

| OnStar Surrogate | PSAP Call Taker | MT AACN Team Member |
|---|---|---|
| | | • Arrive at PSAP at 9:45 am. Meet Chris Lounsbury & John Weber (Police). |
| | | • Review planned test call activities. |
| | | • Wait for cell phone notification from all stations indicating players are in place. Inform Chris when ready. |
| • Call 9-1-1 | | |
| • Identify call as an 'OnStar Test Call' | | |
| • Provide standard OnStar call information (see Table C1 'Standard Data') | | |
| | • Record standard call information in CAD including Make/Model of OnStar Vehicle | |
| | • Send Dispatch request to MESI and Life Flight, noting that this is a TEST. | |
| | • Return to OnStar Advisor. Request rest of AACN information (see Table C1 'Additional Data'). | |
| • Provide PSAP call taker with additional AACN information (Attach A 'Additional) | | |
| | • Record additional AACN parameters in Comment Field in prescribed format. | |
| | • Monitor call until word received that test is over. | • Request copy of CAD Status screen (& audio) for test documentation. |
| | Post Event – PSAP Staff | |
| | • Go to MT-AACN website https://montana-aacn.cubrc.org. View simulated crash records. | • Ask posttest survey questions. |
| | • Run software script to extract OnStar crash data from PSAP database.<br>• Emails crash record to CUBRC. | |

## Activities at MESI Ground Ambulance during MT AACN Test Call
**May 3, 2012**

| MESI Comm | MESI Medic | MT AACN Team Member |
|---|---|---|
| | | • Arrive at MESI at 9:45 am. Meet Don Whalen. |
| | | • Review planned test call activities. When all players ready, call team member (via cell phone) at PSAP. |
| | • Receive dispatch message (via Pager, Radio) from Missoula 9-1-1 requesting (simulated) MESI response to an OnStar crash involving multiple vehicles. | |
| • Monitor CAD Status for appearance of additional AACN info. | • During (simulated) response to scene, monitor CAD Status on ToughBook. Note ISP (Injury Severity Prediction) and other OnStar AACN info. Also note make/model of OnStar-equipped vehicle | |
| | • Upon (simulated) arrival at scene, determine that patient to be transported by MESI was in Chevy Malibu (OnStar vehicle)*. This confirms ISP (& other AACN info) applies to MESI patient. | |
| | • Call Community Medical Center Charge Nurse with simulated en route patient info. (Make up age, gender, injuries/vitals). Tell nurse this was OnStar crash, patient was in Chevy Malibu, ISP=HIGH | |
| | • After (simulated) patient delivery to ER staff at St Pats, describe how patient AACN info and vehicle make/model might be documented in patient pre-hospital report. | |
| | Post Event | |
| | • Go to MT-AACN website https://montana-aacn.cubrc.org. View simulated crash records including one similar to test call** | • Request copy of CAD Status screen & pre-hospital report form for test documentation. |
| | | • Ask follow up survey questions. |

*In actual event, police or first responder at scene can identify make/model of patient vehicle and verbally communicate this to medic.

**Data from OnStar AACN crash records will be extracted from Missoula 9 1-1 database by PSAP staff at regular (TBD) intervals and posted to website.

**Test Call Activities at LifeFlight during MT AACN Test Call**
**May 3, 2012**

| Life Flight Comm (Spokane) | Life Flight Medical Crew (Missoula) | MT AACN Team Member |
|---|---|---|
| | | • Arrive at St Pat's ED at 9:45 am. Call Larry Peterman |
| | | • Review planned test call activities. Go to CAD Status location (Flight Room). When all players ready, inform team member (via cell phone) at PSAP. |
| • Receive message from Missoula 9-1-1 PSAP requesting (simulated) Life Flight response to an OnStar crash. Monitor CAD Status (if available). | • Assume weather is good & flight is accepted; view CAD Status in Flight Room while (simulated) preflight is underway. Note ISP, other OnStar AACN info and make/model of OnStar vehicle. | |
| | • Upon (simulated) arrival at scene, determine that patient to be transported was occupant in Chevy Malibu (OnStar vehicle)*. Therefore ISP (& other AACN info) applies to Life Flight patient. | |
| | • Call St Pat's Charge Nurse with simulated en route patient info. (Make up age, gender, injuries). Tell charge nurse that patient was in OnStar crash, in Chevy Malibu & ISP is HIGH. (May also convey info upon arrival at hospital.) | |
| | • After (simulated) patient delivery to ER staff at St Pats, describe how patient AACN info and vehicle make/model might be documented in patient pre-hospital report. | |
| | • Post Event | |
| | • Access MT-AACN website https://montana-aacn.cubrc.org. View simulated crash record from test call**. | • Request copy of CAD Status screen and pre-hospital report form for test documentation. |
| | | • Ask follow up survey questions. |

*In actual event, police or first responder at scene can identify make/model of patient vehicle and verbally communicate this to medic.

**Data from OnStar AACN crash records will be extracted from Missoula 9-1-1 center database at regular (TBD) intervals and posted to website.

## Test Call Activities at St. Patrick's Hospital during MT AACN Test Call
## May 3, 2012

| Trauma Nurse Coordinator | Hospital Charge Nurse | MT AACN Team Member |
|---|---|---|
| | | • Meet John Bleicher at ED at 9:45 am |
| | | • Go to CAD Status location. Review planned test call activities. When all players are ready, inform team member (via cell phone) at PSAP. |
| | • Monitor CAD Status display for first appearance of simulated OnStar crash event. Note make/model of OnStar vehicle, ISP and other AACN info. | |
| | • Receive an en route call from Life Flight medic simulating transport of crash victim. Medic will provide usual patient status info. During this call (or upon hospital arrival), medic will indicate this was an OnStar crash, patient was in the Chevy Malibu and ISP is HIGH. | |
| | • Since patient vehicle matches make/model of OnStar vehicle on CAD Status, now confirmed that AACN info (and ISP) applies to incoming patient. | |
| | • Is there a mechanism for including patient vehicle make/model in patient trauma record? | |
| | • Put copy of CAD Status screen in patient trauma record. | • Request copy of CAD Status screen for test documentation. A copy of patient trauma record form is also desirable. |
| | -Event | |
| • https://montana-aacn.cubrc.org<br>View AACN data** during patient record review at discharge. (CFSNo on CAD Status screen IDs crash record) | | • Ask posttest survey questions. |

**Data from OnStar AACN crash records will be extracted from Missoula 9-1-1 database by PSAP staff at regular (TBD) intervals and posted to website.

## Activities at Community Medical Center during MT AACN Test Call
**May 3, 2012**

| Trauma Nurse Coordinator | Hospital Charge Nurse | MT AACN Team Member |
|---|---|---|
| | | • Meet Jon Stred at ED at 9:45 am. |
| | | • Go to CAD Status location. Review planned test call activities. When all players are ready, inform team member (via cell phone) at PSAP. |
| | • Monitor CAD Status display for first appearance of simulated OnStar crash event. Note make/model of OnStar vehicle, ISP and other AACN info. | |
| | • Receive an en route call from MESI medic simulating transport of crash victim. Medic will provide usual patient info and indicate this was OnStar crash, patient was in Chevy Malibu, and ISP = HIGH | |
| | • Since patient vehicle matches make/ model of OnStar vehicle on CAD Status, now confirmed that AACN info applies to incoming patient. | |
| | • Document patient vehicle make/model on ambulance call report with other usual info (mechanism of injury, vitals, treatment). | |
| | • As per protocol, scan ambulance call report (simulated) and put in patient record. Include copy of CAD Status screen in patient record. | • Request copy of CAD Status screen & ambulance call report for test documentation. |
| | Post-Event | |
| • https://montana-aacn.cubrc.org<br>View simulated crash record ** | | • Ask posttest survey questions.<br>• (Clarity of CAD Status Screen) |

*In actual event, police or first responder at scene can identify make/model of patient vehicle and verbally communicate this to medic.
**Data from OnStar AACN crash records will be extracted from Missoula 9-1-1 database by PSAP staff at regular (TBD) intervals and posted to website.

# Appendix E - MT AACN Crash Telemetry Reports

**Website User Guide**

# Montana Advanced Automatic Crash Notification (MT AACN)

# Crash Telemetry Reports

# Website User Guide

http://montana-aacn.cubrc.org

Prepared by

Tom Fusillo & Marie Flanigan
CUBRC
4455 Genesee St
Buffalo, NY 14225

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## 1. Introduction

This manual explains the functionality provided to an end user using the Montana Advanced Automatic Crash Notification (AACN) Crash Telemetry Reports web application. This application provides a mechanism for archiving telemetry data in the MT AACN Database, as well as providing a portal for registered users to view the data post-event.

### 1.1 Objectives

The application was created to automatically receive and display crash telemetry data obtained from Missoula County's 9-1-1 call records, which now document crash data obtained from motor vehicles in Missoula County that are equipped with AACN technology and experience a significant crash event. With the creation of this application, it is hoped Montana's medical community can gain familiarity with AACN crash telemetry data and the use of such data to predict the likelihood of a serious injury. Understanding the utility of this data is important because:

- Injury prediction will help support future medical direction, triage, and transport decision-making in real time.
- AACN data can be linked with pre-hospital and hospital patient care records, providing supplemental data for future use in assessing effectiveness of various treatments and overall trauma system response.

## 2. Getting Started

### 2.1 Terminology and Definitions

The event records displayed are initially acquired from a Telematics Service Provider (TSP), such as OnStar, who notifies the Missoula County 9-1-1 Public Safety Answering Point (PSAP) upon receipt of an AACN telematics call from their county. The PSAP call taker will initiate the dispatch of emergency vehicles, if necessary, and then collect the AACN data from the TSP. Information includes make and model of the vehicle, time and location of the event, crash delta velocity, direction from which the impact occurred, if the airbags deployed, whether the vehicle rolled over, and if there were multiple impacts.

### 2.2 Opening the Application

To access the application, a user must open a web browser, such as Internet Explorer, Firefox, Google Chrome, or Safari. In the address bar enter the address of the application: https://montana-aacn.cubrc.org. If a security certificate error appears, please continue to the webpage. This just means the site is using a secure protocol to send and receive the data, but does not have a trusted issuer of the certificate yet. Once on the home page, the user can review introductory material and navigate to other web pages, which include a description of how the AACN data is acquired, the stakeholders involved, links to additional background material, and where to 'contact us' to request a username and password. In the upper right hand corner of the home page, there is a button labeled 'Data'. This will take you to a login screen. Enter the username and password provided and then click 'Submit'.

## 3. Web Application

### 3.1 Data Table

The data table in the web application provides a summary of the event records present in the database. Underneath the data table, there is information pertaining to the number of records in the database and the page you are currently viewing.

#### 3.1.1 Select a Record

To select a record from the data table, use your mouse to scroll over the desired row and left-click. Once a record is selected, it will be highlighted in the data table. If you hover your mouse over the 'event record' link directly below the table, a text box will appear which describes the types of calls currently included in the table. This text states:

> "An OnStar call to the 9-1-1 PSAP is made for three types of events: 1) an AACN crash which will provide crash location, TSP Case ID and AACN data (Delta V, Direction of Impact, Injury Severity Prediction, etc.), 2) an ACN crash which will provide crash location only, and 3) an emergency call initiated by pushing the SOS button in OnStar vehicle, which will provide OnStar vehicle location only. Currently, all three types of calls are listed. "

#### 3.1.2 Paging

If there are more records in the database than what can currently be shown on the page, the data will be paged. To change pages, click either 'First', 'Last', 'Next', or 'Previous', and the data in the table will change.

#### 3.1.3 Sorting the Data

The data table provides multiple fields upon which the data can be sorted. To sort on a given field, go to the header of the table and left-click on the given field. The data table will update and the direction of the sort will be given by the direction of the arrow. An up pointing arrow indicates ascending and down pointing indicates descending. To change the direction of the sort, click on the header of the same field.

#### 3.1.4 Number of Records Displayed

To change the number of rows displayed in the data table, above the data table there is a drop down box, left-click on this and select the desired number of rows to be shown. The data table will update displaying the new number of rows and the information associated with the selection.

### 3.2 AACN Crash Data

When an event record is selected from the data table, the AACN Crash Data will automatically expand and populate the fields associated crash records data. To expand the collapsed view or to collapse an expanded view, go the text 'AACN Crash Data' with the arrow and left-click.

To print the data displayed, underneath the 'AACN Crash Data' with the arrow, left-click on the 'Print Summary' button. This will open a new page with the data in a printer-friendly format and at the top left of the screen will be a link 'Click to Print This Page' to bring up your print options.

### 3.3 Map

When an event record is selected from the data table, the approximate location of where the event happened will be pinned. The view will not automatically expand. To expand the collapsed view or to collapse an expanded view, go the text 'Map' with the arrow and left-click. If a pin icon showing the crash location does not show on the map, click on highlighted record in the table to initiate. This is typically only required the first time the map is opened.

To print the map displayed, underneath the 'Map' with the arrow, left-click on the 'Print Map' button. This will open a new page with the map in a printer-friendly format.

### 3.4 Search

To the right of the data table, a form provides the ability to search for specific records in the database. There are three values that need to be set: Field, Operation, and Value. First select the field, or column, upon which you would like to search. Depending on the data type of the field, the operation and value may update. For instance, if the data type contains numeric values, the operation drop down box will contain: 'Equals', 'Greater than', 'Greater than or equal to', 'Less than', and 'Less than or equal to'. Finally, enter the desired value to search for and at the bottom of the search form, left-click the 'Submit' button. Once a search is conducted, the data table will update and the current search value will be displayed below the search form. To remove the current search value, at the bottom of the search form, left-click the 'Clear' button. (Note: Functionality for some search parameters will not be apparent until sufficient AACN event records are contained in the database. For example, Good Samaritan SOS calls are not crashes involving the OnStar vehicle and therefore produce no crash data.)

3.5 Logout

To logout and end your session, go the upper right hand corner of the page and click on the 'Logout' button.

**4. Administration**

4.1 Change Password

To change your password, go the upper right hand corner of the page and click on the 'Change Password' button. This will redirect to another page containing a form with three fields, current password, new password, and retype password, which need to be filled out. Once all three fields are completed, at the bottom of the form, left-click the 'Change' button. If the process was successful, a pop box will appear that says 'Password change successful!', if not an error message will appear above the form.

4.2 Admin Users

An admin user is a user deemed responsible for multiple users with an organization. They have the ability to add users, remove users, and change a user's password in the system. To access the Admin page, go the upper right hand corner and left-click the 'Admin' button. The 'Admin' button will only appear if user has Admin privileges.

4.2.1 Adding Users

To add a user to the system, expand the 'Add User' view by going to the text 'Add User' with the arrow and left-clicking. This displays a form with four fields: Username, Password, Verify Password, and Email. Once all four fields are filled out, go to the bottom of the form and left-click the 'Submit' button. If the process was successful, a pop box will appear that says 'User created successfully' and the form will be cleared, if not an error message will appear above the form.

4.2.2 Deleting Users

To delete a user from the system, expand the 'Delete User' view by going to the text 'Delete User' with the arrow and left-clicking. Select the desired user to remove from the system by left-clicking on them and then left-clicking the 'Delete' button beneath the selection box. If the process was successful, a pop box will appear that says 'User deleted successfully'.

4.2.3 Change a User's Password

To change a user's password, expand the 'Change User's Password' view by going to the text 'Change User's Password' with the arrow and left-clicking. Select the desired user's password to change by left-clicking on them and filling out two fields: Password and Verify Password. Once complete, go to the bottom of the form and left-click the 'Change' button. If the process was successful, a pop box will appear that says 'Password change successfully', if not an error message will appear above the form.

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