STREAMLINING THE CRASH REPORTING PROCESS IN THE PACIFIC NORTHWEST

FINAL PROJECT REPORT

by

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16. Abstract

Over five million traffic crashes are reported annually in the United States, and the documentation process for every single crash begins at the scene of the incident with information gathered by a member of the law enforcement community or by a private citizen (NHTSA). This information is subsequently transmitted to a local and state agency for data entry, processing, and aggregation. Given the volume of incidents and the multiple handoffs between different parties, the likelihood of transmission error and interpretation deviation necessitates a cradle-to-grave examination of this reporting process. Furthermore, each state has developed its own independent tracking system, rendering data comparisons across state boundaries inconsistent. These collective issues justify the need to examine crash reporting and to identify a process in which data entry can be streamlined to best meet the needs of all system users, which include, but are not limited to law enforcement, local and state agency data analysts, national and state agency safety offices, and researchers and academicians who must rely on good data to draw conclusions and recommend purposeful safety improvements.

This project determined where the introduction of potential errors occurs in each state's reporting process and the respective causes. Semi-structured interviews were conducted in-person and by phone with law enforcement professionals familiar with crash report data collection and processing procedures in their respective states. The interviews were followed with a regional survey distributed to a larger population of officers. It is apparent that there are significant opportunities to improve crash report forms and officer training practices. Officers within the same agency apply different classifications for identical crash scenarios, as do different agencies within the same state. Adjacent states are using very different data collection methods, and forms are not meeting the national standard laid out in the Model Minimum Uniform Crash Criteria, a document published by NHTSA. Opportunities exist to standardize the crash report form and strengthen training programs so that crash data that are comprehensively compiled and analyzed will accurately represent real-world conditions and benefit all end users.

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Acronyms and Abbreviations

ACN	Automatic Collision Nonfiction
ADOT&PF	Alaska Department of Transportation & Public Facilities
AK	Alaska
ANSI	American National Standards Institute
CAC	Collision Analysis Corridor
CAL	Collision Analysis Location
CAR	Crash Analysis Reporting
CARE	Critical Analysis Reporting Environment
CDR	Crash Data Repository
CDS	Crashworthiness Data System
CIRCA	Crash Information Retrieval Collection and Analysis
CLAS	Crash Location and Analysis System
DMV	Department of Motor Vehicles
DOT	Department of Transportation
EDR	Event Data Records
eIMPACT	electronic Idaho Mobile Program for Accident Collection
EMS	Emergency Medical Services
EndDD	End Distracted Driving
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
HAS	Highway Analysis System
HSM	Highway Safety Manual
IAL	Intersection Analysis Locator
ID	Idaho
ITD	Idaho Transportation Department
MMUCC	Model Minimum Uniform Crash Criteria
MUTCD	Manual on Uniform Traffic Control Devices
NHTSA	National Highway Traffic Safety Administration
ODOT	Oregon Department of Transportation

OR	Oregon
OTTCH	Oregon Temporary Traffic Control Handbook
PDO	Property damage only
SECTOR	Statewide Electronic Collision and Ticketing Online Records
SHRP2	Strategic Highway Research Program 2
SQL	Structured Query Language
TraCS	Traffic and Criminal Software
URL	Uniform Resource Locator
USDOT	United States Department of Transportation
USPS	United States Postal Service
VIN	Vehicle Identification Number
WA	Washington
WSDOT	Washington State Department of Transportation
WSP	Washington State Police

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Executive Summary

In 2015, 6.3 million crash reports were submitted by police and compiled to create crash statistics (NHTSA). During 2015, fatal traffic accidents increased by 7.2 percent to over 35,000 and injuries increased by roughly 4 percent to over 2.4 million (NHTSA, 2016), with each of those crashes resulting in a formal report. Each report requires multiple handoffs and input from numerous parties, which greatly increases the potential for error. The number of hand-offs required for a report varies among states and law enforcement agencies. This can depend on the number of staff at each agency, the size of the dispatch jurisdiction, and the population size of the jurisdiction. This review process is different for each state and agency, although some basic elements are regulated by federal law.

Crash data are used extensively in the United States to enact laws, make safety improvements, and much more. However, if even adjacent states are using completely different crash report forms and definitions, then the crash data from those states should be compared with caution. The scope of this research was to examine the documentation process for these events and identify how crash data entries can be streamlined from the scene of the incident, where the data are collected, to final data transmission in a secured database. This study examined the crash reporting processes currently in place in the states of Alaska, Idaho, Oregon, and Washington.

Semi-structured interviews were conducted in-person and by phone with law enforcement professionals familiar with the crash report data collection and processing procedures in their respective states. The purpose of these interviews was to determine how law enforcement officers complete a crash report form and whether they had any specific insights about particular sections of the form. The responses from the interview participants were then used to develop questions for a subsequent online survey to law enforcement agencies throughout Washington,

Idaho, and Oregon. The combination of interview (qualitative) and survey (quantitative) techniques provided a means of triangulating answers to the research questions of interest.

After the interviews had been conducted, it was apparent that there are significant opportunities to improve crash report forms and officer training practices. Officers within the same agency are using differing definitions of terms to describe crashes, as are different agencies within the same state. Adjacent states are using very different data collection methods, and forms that do not meet the national standard as described in the Model Minimum Uniform Crash Criteria (MMUCC), a document published by the National Highway Traffic Safety Administration (NHTSA). Despite the MMUCC containing voluntary guidelines, states should make an effort to create crash report forms that follow its recommendations. It is assumed that if all states used the same interface and fields for data collection the available data would be more consistent for all end users.

A logical next step would be to assess additional states and to determine whether trends are similar in other regions of the United States. A comparison among officer narratives could confirm whether electronic platforms should be implemented in every state, whether citizen reporting is necessary for good data, and whether additional state or federal funding should be dedicated to train officers on the importance and methods of data collection. Another avenue of research would examine each state's usage of specific MMUCC sections and document the process of restructuring the crash report form. A restructure of a single electronic platform could be administered throughout the United States and used to compare data collection efforts, thereby aiding in improvements to software applications and streamlining future efforts.

Chapter 1: Introduction

Since 2015, the United States has seen an increase in traffic accidents resulting in injuries and fatalities. During 2015, fatal traffic accidents increased by 7.2 percent to over 35,000 and injuries increased by roughly 4 percent to over 2.4 million (NHTSA, 2016). A collective analysis of state crash reports conducted by the National Highway Traffic Safety Administration (NHTSA) showed that nearly 6.3 million crash report forms were submitted by police and processed in 2015. Each report requires multiple handoffs and interpretation by numerous people, and the potential for error greatly increases with each step.

The numbers of hand-offs and handlers required depend upon the number of staff at each agency, the size of the dispatch jurisdiction, and the population size of the jurisdiction. For instance, smaller agencies may not have the resources to perform complete crash investigations and may enlist a larger agency to perform the task. Larger agencies may be staffed with specific traffic departments or units whose primary tasks are crash investigations. All crash investigation documentation is reviewed by some form of approval process prior to transmission. In some agencies only one person is needed to approve a crash report, whereas in others multiple people may review it. This process has not been adequately described for each individual agency, although some foundational information is regulated by federal law.

The scope of this research was to examine the documentation process for these events and identify how crash data entries can be streamlined from the scene of the incident, where the data are collected, to final data transmission in a secured database. This study examined the crash reporting processes currently in place in the states of Alaska, Idaho, Oregon, and Washington.

Chapter 2: Literature Review

Every time a crash occurs on a non-private road that results in injury or death, a crash report form is created that includes information on the people and vehicle(s) involved, contributing factors to the incident, and location. Depending on where the crash occurs, each state and agency determines its own means of filling out and processing the form. If there is no injury as a result of the crash, a crash report form is required only if the cost of damage is above a certain threshold. According to state department of transportation (DOT) and department of motor vehicle (DMV) records, crash damages must exceed $2,000 in Alaska (AS § 28.35.080), $1,500 for Idaho and Oregon (ID § 49-1306, and ORS § 811.745), and $1,000 for Washington (RCW § 46.52.030). Data are typically collected and entered by the incident responder, but if no responder is present, citizens are typically responsible for filing their own crash report. The crash report form is then reviewed and confirmed by the local or state agency responsible for the responding officer or citizen, and it is then submitted into a secured query database. Recent research by Bennett and Perkins (2016) mapped the data collection and processing for several states in the western region of the United States. Their findings showed that all states had different ways of collecting data, processes for data review and confirmation, crash report form formats, storage methods, and databases. Table 2.1 summarizes their findings with regard to four Pacific Northwest states.

Table 2.1 Data collection and process

State	Initial	Initial Storage	Database	Query Database
AK	Tufbook, equipped with forms 200 and 209	DMV, Crash Data Repository (CDR)	Traffic Records Program Traffic and Criminal Software (TraCS), Oracle	***Old:*** Highway Analysis System (HAS) ***New:*** Critical Analysis Reporting Environment (CARE)
ID	Electronic Idaho Mobil Program for Accident Collection (eIMPACT)	DOT district level	Downloaded daily to Crash Information Retrieval Collection and Analysis (CIRCA)	WebCARS, access
OR	Paper forms sent to DMV	Crash Analysis Reporting (CAR) unit within DOT gets reports from DMV and inputs (by hand) into Fatality Analysis Reporting System (FARS) and DOT	IBM software Structured Query Language (SQL)	N/A
WA	Statewide Electronic Collision and Ticketing Online Records (SECTOR), supplied by DOT	DOT	Crash Location and Analysis System (CLAS)	SafetyAnalyst (which replaces Collision Analysis Location (CAL) and Collision Analysis Corridor (CAC) methodology, as well as Intersection Analysis Locator (IAL))

The process of handling a crash report form is similar among the states. Initially the crash report is created by the responding officer. The report is then reviewed by a person of authority in the department to confirm that the responding officer's report is consistent and complete. Finally, it is submitted to the state for final review and filing.

However, the platforms used to process crash report forms differ among the states. Idaho and Washington use electronic platforms to create and transmit the initial crash report form, whereas it is typical that Alaska and Oregon use paper submissions, although the option to create a portable document format to print is available. Each local agency processes the initial report within its own office and provides it to their reviewing authority, which then submits the documentation to the state. In Oregon, the paper crash report forms are input into an electronic interface at the state level.

Once the crash report reaches the state level, the crash data elements are matched with input requirements. This work is performed by the DOTs for Idaho, Oregon, and Washington, and by the DMV for Alaska. Alaska records its state's crash elements in the Traffic Records Program Traffic and Criminal Software (TraCE); Idaho performs daily downloads into the Crash Information Retrieval Collection and Analysis (CIRCA) program; Oregon uses the Structured Query Language (SQL), which is an International Business Machines (IBM) software; and Washington uses the Crash Location and Analysis System (CLAS). These databases are used to confirm that the input crash data information matches the actual location of the crash and other definable elements. Access to these processed crash data by public and research agencies varies by state (see far-right column of table 2.1).

Bailey and Huft (2008) discovered further discrepancies when they studied reporting practices at several Indian Reservations throughout the United States. The purpose of their work was to improve on the collaborative processes for crash report forms conducted by tribal officers and how that information would be submitted to the state. Although tribal agencies do not always conform to the same rules and regulations as state, county, and local agencies, there were similar

explanations for why collaboration was difficult and how these factors were attributed to "consistency and flow" factors among agencies.

For these reasons, there are three major opportunities for collaboration by internal and external agencies on the crash reporting process: training, software applications, and standardization of the crash report form and its respective questions.

2.1 Training

Training law enforcement officers can help achieve increased crash report accuracy, understanding, and proper processing. Training should include instructions on any software applications available to help automate and improve crash data collection. Training can be performed a number of different ways, but a universal approach to training could help reduce differences in collection procedures. An understanding as to what data the forms lack and what data are not often used, as well as identification of current best practices for transmitting the information will determine what training should be performed within each agency.

The Transportation Research Board's *NCHRP Synthesis 350: Crash Records Systems* previously examined data collection training. Accuracy of data comes from an understanding of the data collection process and continued efforts to make changes to it. The synthesis (NCHRP, 2005) pinpointed that no single crash records system can be identified as a best practice for reporting, management, and analysis; rather, linking data from different organizations needs to be standardized to improve the accuracy and reliability of results.

Training is not limited to first responders and law enforcement agencies. The general public also plays a vital role in crash data collection. In most states citizens can submit their own crash report forms in addition to the law enforcement submission for the same incident. In Oregon, it is a law that every incident be reported by the citizen(s) involved (ORS, 2015). If no

report is submitted within 72 hours of the incident, the citizen involved could have his/her license suspended. The DMV warns: “A police report does not count as filing an accident report with DMV. [The citizen] must also file an accident report with the DMV” (ODOT, 2015).

Citizen crash report forms are submitted either on paper or via a web-based platform. The data collected from citizens are similar to those from police reports but are usually less detailed; however, they can be very valuable with regard to information processing. While agencies have established tutorials explaining their filing process for both citizens and police officers, many states have identified an improvement opportunity because of the observed differences in the question structure and transmission process. One example of agency training for the public is a presentation created by the Washington State Patrol (WSP) that explains the revised 2013 citizen form (WSP, 2013). The presentation instructs the reporting citizen on how to correctly complete the crash report form. All material needed for completion of a report is illustrated in the beginning of the presentation, followed by a detailed example to aid the citizen. Similar tutorials provided by Alaska and Oregon are attached to the front of their state’s crash report forms. State DOTs facilitate yearly training, and various instructions are offered on the basis of agency size and whether the training is designed for current officers and/or incoming officers.

2.2 Software Applications

Improvements to data collection and communication are related to technological advancements. Pfefer (1999) studied advancements in computers and networks and made projections on how they would streamline data collection in the future. With advancements in the past decade exceeding Pfefer’s projections in web technologies, high-speed wireless connections, and radio transmitting, electronic crash data collection has become increasingly feasible. There have been multiple attempts to implement software in the patrol car for data collection and

processing. An online search conducted in March 2017 revealed that there were over 40 different purchasable software packages that aid in police dispatching, report writing, and data collection. The issue with making a selection is that software interfaces vary greatly. Some products perform only data collection, whereas others perform dispatching, writing, and data collection as a complete package; however, little research has been conducted to compare all the package platforms. Two popular platforms include Traffic and Criminal Software (TraCS) and SmartCOP (SmartCOP, 2008 and Bejleri, 2010). Both platforms are standalone packages that are downloaded onto a portable computer that is stationed in the patrol car to aid the officer completing the crash report form. The benefit of these platforms is that an internet connection is not needed; however, if there is a software error, a paper version of the crash report form must be filed by the officer until troubleshooting has been completed. This introduces the possibility of incomplete data collection from an outdated paper version in comparison with an updated electronic version.

Bejleri (2010) examined simplifying platform-based software and using only a web-based model for data collection. The proposed model is an improvement over the paper submission, yielding potential cost benefits, and can streamline the update process if there are only periodic changes to the crash forms. However, relying solely on an internet connection is not feasible at all locations because of connectivity constraints, and the officer has to complete paper forms for those situations. Nevertheless, electronic data collection is promising to be more beneficial than paper crash report forms in the long run.

Additional software such as Event Data Records (EDRs) is now being installed in some new manufactured vehicles. These are commonly referred to as “vehicle black boxes” that record vehicle and occupant information for a brief period of time (typically in seconds) before, during,

and after a crash (NHTSA, 2016). This information can be downloaded directly from a car and yield an opportunity to understand details about contributing factors leading up to the incident, such as pre-crash vehicle dynamics and system status, driver inputs, vehicle crash signature, and restraint usage/deployment status, as well as post-crash data such as the activation of an automatic collision notification (ACN) system. This method is not intended to replace officer or citizen reports, but it could link the findings of the EDRs to the filing process as a data collection check and balance.

2.3 Form Standardization

Form standardization does not imply that every agency should use the same form; rather it is about the format, type of questions, and respective verbiage being consistent. For example, research efforts on understanding distracted driving, work zone hazards, and school zones (NCHRP, 2005; Ullman, 2004) are recent hot topics. Most research has determined that there is need for more data to be collected about these topics, and standardizing crash forms could help increase data collection. Some agencies still use crash report forms that were last revised in the early 2000s (NHTSA, 2017) and lack the necessary information to capture data on these new topics.

Overseas advancements in crash reporting could encourage collaborative relationships in data management between countries. Elvik and Mysen (1999) studied the reporting differences between police and hospitals in 13 different countries. The studies showed that there is a considerable number of hospital-treated injury accidents that are not directly reported by the police. The information that is taken at the incident is similar to the information taken at the hospital, but it may not be revised on the field crash report forms if updates become available.

This discovery has led to cooperation between police and hospitals to capture similar information on their reports and in a transferable format.

This research effort examined the standardization of crash report forms and developed an understanding of where potential gaps exist in the documentation process from the moment a crash occurs to final processing in a crash system database. An opportunity exists to improve data collection and to learn more from these system reports, and enhanced crash report forms would improve agency and public understanding of safety risk.

In the next chapter, data collection on crashes due to driver distraction or in work zones is discussed. These two conditions represented spotlight areas for this study and are followed by a description of the research methodology in Chapter 4.

Chapter 3: Spotlight Areas - Distracted Driving and Work Zones

This chapter explores different elements of driver distraction (including types, sources and locations of distraction) and work zone characteristics.

3.1 Driver Distraction

3.1.1 Distraction Types

The National Highway Traffic Safety Administration (NHTSA) defines distracted driving as "any non-driving activity a person engages in while operating a motor vehicle. Such activities have the potential to distract the person from the primary task of driving and increase the risk of crashing" (NHTSA, 6/5/2017). The Highway Safety Manual (HSM) states that the driving task comprises three main components: control, guidance and navigation (2010). These components included maintaining appropriate speed and position, interacting with other road users safely, and following the desired path while using road markers or other navigation methods. Any additional secondary task beyond these three can be considered a distraction.

EndDD (End Distracted Driving) is an organization committed to raising awareness and working to prevent distracted driving incidents. EndDD provides the following definitions (and examples) of the three types of distractions (EndDD, 2017):

- *Manual distractions* are those that cause drivers to move their hands away from the task of controlling the vehicle. Reaching for a soda in the drink carrier is an example of a manual distraction.
- *Visual distractions* are those that cause drivers to focus their eyes away from the road. As an example, dropping a soda, and when it spills all over the floor of the car, looking down at one's ruined shoes and stained slacks.

- A *cognitive distraction* occurs when a driver's mind wanders away from the task of driving. For example, the driver starts to consider whether s/he can afford to replace the clothing that was just ruined and which stores have bargains this week. The driver is no longer paying attention to the essential job of driving.

Figure 3.1 visually represents each of the three types of distraction.

Figure 3.1 Three types of driver distraction (EndDD, 2017)

The problem with distracted driving is not necessarily the distraction itself, but the accidents caused as a result of the distraction. NHTSA produced a 2013 report that looked at distracted driving statistics from 2011. These statistics noted the safety issues that occur as a result of distracted driving. Ten percent of fatal crashes and 17 percent of injury crashes in 2011 were distraction-affected. A distraction-affected crash is any crash in which the driver was identified as distracted at the time of the crash. This means that more than 3,000 people were killed and more than 380,000 people were injured in distraction-affected vehicle crashes (NHTSA, 2013).

3.1.2 Sources of Distraction

There are many sources of visual, cognitive, and manual distractions. Regan et al. (2009) identified six major sources of distraction while driving. Five of the sources (i.e., things brought into vehicle, vehicle systems, vehicle occupants, moving object or animal in vehicle, and

internalized activity) are considered to be internal distractions. That is, the source of the distraction comes from inside the vehicle. Internal distractors can result in all three types of distraction – visual, cognitive, and manual.

3.1.2.1 Internal Distractors

Internal distractions are consistently present during the driving task, whether it is adjusting the temperature or radio controls or using a cell phone. Some driver distractions are more easily avoided than others. Often, drivers do not correctly perceive that secondary tasks can constitute a distraction, such as adjusting in-vehicle controls or interacting with passengers (Jashami et al., 2017). The most dangerous type of internal distractor is one that causes the driver's eyes look away from the roadway. A Strategic Highway Research Program (SHRP2) report stated that texting on a smart phone has a much higher risk of a crash than talking on a smart phone (2014).

Regan et. al. (2009) documented the following as internal distractors:

- Portable music or video players
- Navigation systems
- Mobile phones
- In-vehicle entertainment system
- Eating and drinking
- Smoking
- Reading and writing
- Reaching for objects
- Grooming
- Passengers
- Fatigue
- Emotional extremes

This list is not exhaustive, and many of these categories can be subdivided into additional sub-tasks. For example talking on a smart phone may be considered its own distractor, independent of the distraction associated with reaching for or dialing the smart phone. Stress and

emotional extremes have been identified as contributing factors in crashes but have not been widely examined as a source of distraction (SHRP2, 2014).

Regan et al. (2009) also suggested that introducing potentially distracting items into the vehicle may reduce the occurrence of crashes if they are used appropriately. For example, a navigation device may reduce the mental workload on the driver and allow her to focus more on driving tasks. Internal distractors are often easy to identify and observe, and therefore they are the focus of discussions of potential sources of distraction. However, external distractors are constantly present during the driving task as well and should also be considered.

3.1.2.2 External Distractors

External distractions are the other categorical source of distraction, originating outside the vehicle. Regan et al. (2009) listed the following events and objects that constitute external distractions:

- Animal
- Architecture
- Advertising billboards
- Construction zone/equipment
- Crash scene
- Incident
- Insect
- Landmark
- Road signs
- Road users
- Scenery
- Vehicle
- Weather

External distractors commonly result in only visual and cognitive distraction. Because the source of the distraction is outside of the vehicle, it is therefore out of the physical reach of the driver.

Stutts et al. (2001) and (2005) determined that between 23 percent and 29 percent of distraction-related crashes originate from external distractions. This makes them the largest single category of distraction-related crashes. Milloy and Caird (2011) noted that despite the large percentage of crashes from external distractions, most of previous studies had explored distractions due to internal distractors such as cell phones and navigation systems. Comparatively few studies have been conducted that examine external distractors.

3.1.3 Performance Degradation

Driving a vehicle requires a person to focus on a multitude of competing tasks and sensory inputs. Humans have a limited ability to attend to multiple tasks simultaneously, and when they try to do too much, the performance of some of the tasks will suffer (Regan et al., 2009). Each distraction type results in varying degrees of driving performance degradation. Additionally, many types of internal and external distractors fall within all three types (manual, visual, and cognitive) of distraction.

3.1.3.1 Implications of Internal Distractions on Driving Performance

Chisholm et al. (2007) conducted a simulator experiment to determine how iPod use impacted driver performance. The experiment asked 19 young drivers to perform both easy and difficult tasks with an iPod while responding to hazardous events in the driving simulator. Possible events included late yellow traffic light changes and a pedestrian unexpectedly entering the roadway. The difficult task increased perception-reaction time to the event by 16 percent, while the driver spent 37 percent more time looking inside the vehicle instead of at the roadway.

Naturalistic studies on driver distraction are more difficult to conduct because variables cannot be controlled as they can in a simulated environment. However, they provide data that may be more accurately mapped to real-world conditions. One of the most well-known

naturalistic studies on driver distraction was the 100-car study conducted by Virginia Tech. In 2002 researchers instrumented 100 vehicles with cameras that monitored vehicle position as well as the driver to record events preceding and following any rear-end collision. This study found that by far the most common distraction preceding a rear-end collision was the use of a wireless device. In particular, dialing and talking on a cell phone were the most common interactions. Researchers also determined that glances away from the forward roadway for more than 2 seconds increased the crash risk by more than two times that of normal driving (NHTSA, 2005).

Most current research has focused on cell phone or technology use as the main source of in-vehicle distraction, but many other interactions can degrade driver performance. Eating, smoking, reading, reaching for objects, grooming, and other passengers all can result in a decrease in driving performance (Hurwitz et al., 2013). This is mostly a result of drivers removing their hands from the wheel or taking their eyes off the road (Regan et al., 2009).

3.1.3.2 Implications of External Distractions on Driving Performance

Several previous studies evaluated external distractions in a simulator environment. The primary subject of external distraction in simulators related to billboards near the roadside. Bendak and Al-Saleh (2010) and Edquist et al. (2011) studied the effects of billboards in a simulator environment and found, on the basis of measures such as response time, headway, and lateral position, that the signs altered drivers' visual attention and negatively affected their driving performance. Milloy and Caird (2011) took the topic further and compared the distraction effects of standard roadside billboards to video billboards.

Antonson et al. (2014) evaluated various roadside objects and determined that the presence of objects had a slight speed-reducing effect. When the objects were close to the road edge, the lateral position of the driver was also affected (Antonson et al., 2014). The Milloy and

Caird (2011) article on external distractors examined the effects of video billboards and wind farms on driver distraction. This study found that a roadside wind farm did result in drivers looking at the turbines, which caused them to reduce speed, although their lateral position was not affected. Ultimately, these studies suggest that a variety of external distractions have been explored through the use of a high-fidelity simulation environment.

As drivers age they may become more susceptible to external distractors affecting their driving performance. Using data obtained from the Crashworthiness Data System (CDS) maintained by NHTSA, Stutts et al. (2001) found that for drivers over 65 years old involved in a crash caused by distraction, 43 percent of the crashes were caused by an external distractor, whereas to the frequency was about 30 percent for all other age groups. This could be because older drivers have a more difficult time shifting attention than younger drivers. However, Lam (2002) found that younger, more inexperienced drivers under the age of 19 were more likely to be involved in a crash caused by external distractors than other age groups.

3.1.4 Manual on Model Uniform Crash Criteria

The manual on Model Minimum Uniform Crash Criteria (MMUCC) contains some language dedicated to identifying whether a driver was distracted at the time of a crash and what, if any, distraction was present. Section P16 of the Fourth edition of the MMUCC includes attributes to describe whether the driver was either “not distracted” or “unknown if distracted” in the crash report (USDOT, 2012). These are important to separate so that if an officer is unsure or suspects that the driver was distracted but has no proof s/he does not have to definitively select “not distracted.”

The MMUCC includes a variety of options to record whether an electronic communication device caused a distraction, including whether it was being used hands-free.

There are also options to record whether there was something besides a smart phone distracting the driver, such as another passenger or some kind of external distractor.

3.2 Work Zones

3.2.1 Importance of Work Zone Safety

Work zone safety is of particular concern because of the increased risk to workers and motorists. The presence of equipment and personnel, or geometry and traffic control device changes can introduce additional risk beyond that inherent in the driving task. Furthermore, work zones are extremely common on the national highway system. Drivers encounter a highway work zone approximately every 100 miles driven (Ozturk et. al, 2013) and must deal with unfamiliar lane patterns, slowdowns, or distractions in the form of workers or equipment.

3.2.1.1 Crash Statistics for Work Zones

In 2013, an estimated 67,523 crashes occurred in work zones throughout the United States. Of those crashes, 0.4 percent resulted in a fatality. Almost 73 percent of crashes were property damage only and did not result in an injury or fatality. In addition, the total number of crashes that occurred in work zones represented 1.2 percent of the total number of crashes that occurred in the United States in 2013 (FHWA, 2016).

Many of the statistics about work zone crashes come from the crash report forms filled out by officers at the scene of the crash. However, not all states include sections on their form to mark whether the crash occurred in a work zone, and if they do, the section is often lacking in auxiliary information needed to help determine how to improve work zone safety.

3.2.1.2 Model Minimum Uniform Crash Criteria

The MMUCC guidelines were developed in 1998 by a panel of members from the US Department of Transportation, Federal Highway Administration (FHWA), NHTSA, law

enforcement agencies, and various public health and safety departments. This manual provides a minimum set of standardized data elements that should be included on a crash report form, including those needed to describe a work zone accident (FHWA, 2017). However, the MMUCC provides only recommendations and is not required by federal law (USDOT, 2012). The most recent version of the MMUCC, the Fourth edition, was published in 2012, with the Fifth edition planned for release in the summer of 2017.

3.2.2 Work Zone Definition and Identification

3.2.2.1 Model Minimum Uniform Crash Criteria Definition

The MMUCC defines a work zone related crash as follows:

> "A crash that occurs in or related to a construction, maintenance, or utility work zone, whether or not workers were actually present at the time of the crash. 'Work zone related' crashes may also include those involving motor vehicles slowed or stopped because of the work zone, even if the first harmful event occurred before the first warning sign." (USDOT, 2012).

It is important to note that the MMUCC includes the word "related" in its definition. This serves to include all crashes that occur as a result of the work being performed on the roadway, even if the crash is outside the work area or the signage. The MMUCC also states that it is important to collect these data "at the scene because work zones are temporary or moving operations that are not recorded in permanent road inventory files" (USDOT, 2012).

3.2.2.2 Federal Definition

There is no single accepted definition of a work zone in the United States. Instead, individual states adopt their own definitions of a work zone (Turner, 1999). This is because a work zone can encompass a large variety of jobs, including construction, repair, maintenance,

and inspection, among others. However, various federally sponsored organizations have adopted definitions that try to encompass all aspects of a work zone, particularly when trying to define whether an accident occurred in a work zone.

3.2.2.3 US Department of Transportation

USDOT sponsors NHTSA, which maintains the Fatality Analysis Reporting System (FARS). This system compiles information from fatal accidents across the United States to help determine possible influences and trends in fatal vehicle accidents. FARS also provides a free database containing all the records of fatal crashes since 1975 (NHTSA, 2017). FARS uses the following definition from the American National Standard (ANSI) to define a work zone when determining whether a crash occurred within the zone:

> "A work zone is an area of a trafficway where construction, maintenance or utility work activities are identified by warning signs/signals/indicators, including those on transport devices (e.g., signs, flashing lights, channelizing devices, barriers, pavement markings, flagmen, warning signs and arrow boards mounted on the vehicles in a mobile maintenance activity) that mark the beginning and end of a construction, maintenance or utility work activity. It extends from the first warning sign, signal or flashing lights to the END ROAD WORK sign or the last traffic control device pertinent for that work activity. Work zones also include roadway sections where there is ongoing, moving (mobile) work activity such as lane line painting or roadside mowing" (ANSI, 2007).

The Manual on Uniform Traffic Control Devices (MUTCD) outlines the type of temporary warning signs that can be used to indicate a work zone, as identified in this definition.

3.2.2.4 Manual on Uniform Traffic Control Devices

A driver is informed of a work zone through the use of temporary traffic control devices. Part 6: Temporary Traffic Control of the MUTCD describes the design specifications for temporary traffic control zones. The MUTCD states that there are four main areas in a work zone: the advance warning, transition, activity, and termination areas. The Oregon Temporary Traffic Control Handbook (OTTCH) incorporates the temporary traffic control described in the MUTCD (figure 3.2).

The advance warning area may vary in format from a series of signs up to a mile or more in advance of the work space to a single sign or flashing lights on a work vehicle. In the advanced warning area, information regarding the upcoming temporary traffic control measures is relayed to road users. The layout of the area should give road users ample time to respond to downstream modifications occurring within the transition area (ODOT, 2011; MUTCD, 2009).

The transition area diverts traffic from its normal path and into a temporary path through the work zone when there are lane closures or traffic pattern changes. The transition area contains tapers arranged with approved channelizing devices used to shift or close one or more travel lanes or a shoulder (ODOT, 2011; MUTCD, 2009).

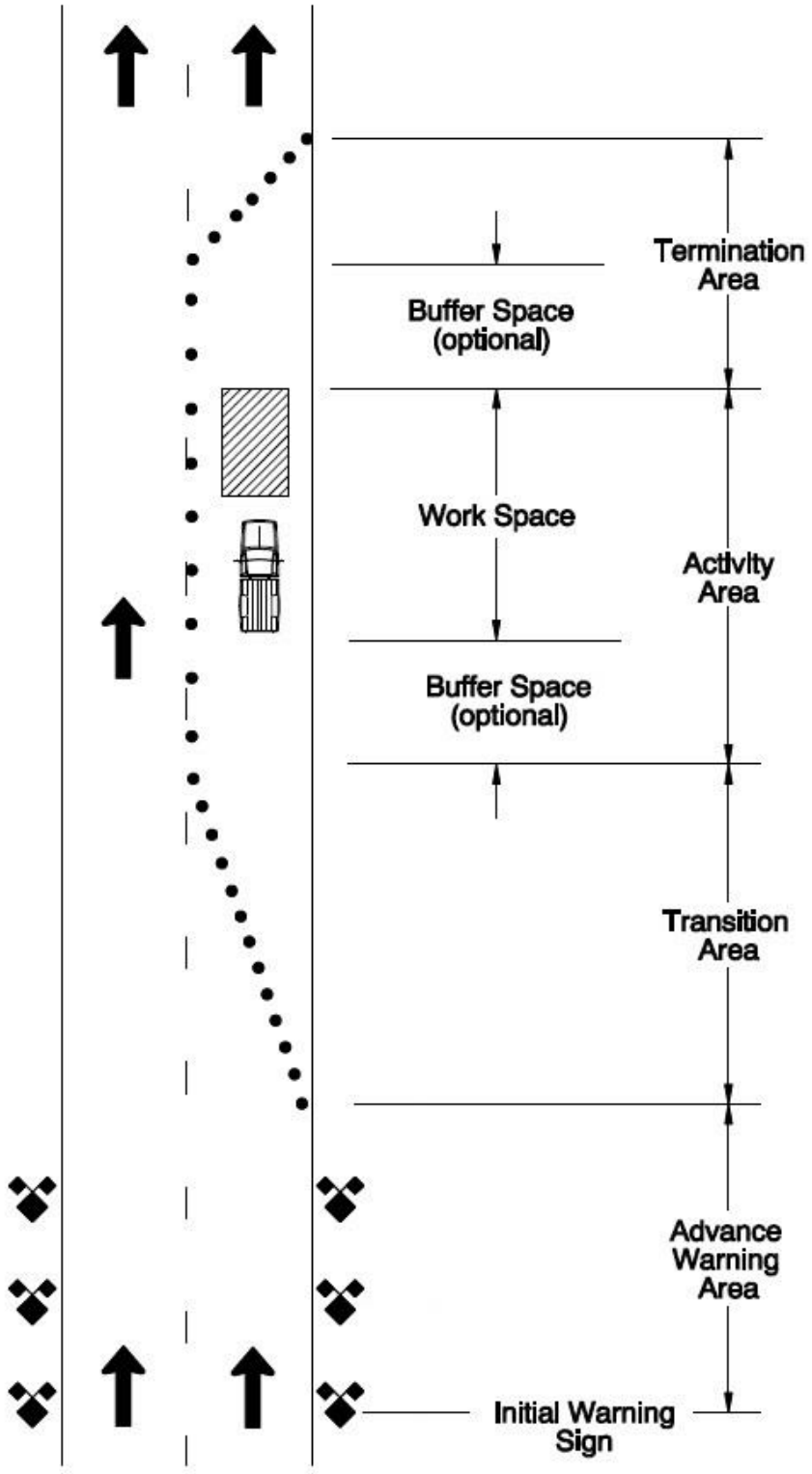

Figure 3.2 Example work zone layout for single right lane drop (OTTCH, 2011)

The area immediately following the transition area is called the activity area. It comprises two sections and is typically designated with longitudinal channelizing devices or barriers. The first section of the activity area is the work space, or "the portion of the roadway containing the work activity and includes workers, materials, and equipment" (MUTCD, 2009). It is recommended that this area be appropriately delineated and protected. Longitudinal or lateral buffer space(s) make up the second section of the activity area. Buffer space is a closed section of road upstream and adjacent to the work space. It acts to "provide an extra margin of safety for both traffic and workers, and a clear recovery area for errant vehicles" (ODOT, 2011, MUTCD, 2009). The decisions to use buffer spaces and their dimensions are left to engineering judgment, but they should be provided when space is available.

The last work zone section is the termination area. It provides a short, optional buffer space after the workspace and before the tapered distance for traffic to clear the work space and return to its usual path and speed.

3.2.3 Definitions in the Pacific Northwest

Because there is no national regulatory definition for work zones, individual states are left to determine on their own what constitutes a work zone. This can vary greatly among states, even those adjoining. The following are the state-level definitions found in the Pacific Northwest.

3.2.3.1 Alaska

Alaska statute 28.90.990 defines a highway work zone as "an area identified by advance signing where road construction, repair, or maintenance work is being done on or adjacent to a highway, whether or not work is actually being done at that time." Alaska does not have a separate definition for a work zone outside of the work performed on a highway.

3.2.3.2 Washington

Washington state defines a work zone as “an area of roadway with construction, maintenance, or utility work activities. A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign or rotating/strobe lights on a vehicle to the END ROAD WORK SIGN or the last temporary traffic control device” (WSDOT, 2017). This definition includes utility work activities, which can encompass a wide variety of situations and signage.

3.2.3.3 Oregon

The state of Oregon defines a highway work zone as “an area identified by advance warning where road construction, repair or maintenance work is being done by highway workers on or adjacent to a highway, regardless of whether or not highway workers are actually present. As used in this paragraph, "road construction, repair or maintenance work" includes, but is not limited to, the setting up and dismantling of advance warning systems (OR § 811.230). Like Alaska, Oregon does not have a definition for a non-highway work site, such as a utility vehicle stopped on the side of a road.

3.2.3.4 Idaho

Like Oregon and Alaska, Idaho only specifically defines a highway work zone. In Idaho, “‘highway work zone’ means an area identified by advance signing where road construction, repair, or maintenance work is being done on or adjacent to a highway, whether or not work is actually being done at that time” (Idaho State Statute, 2005).

3.3 Summary

The states in the Pacific Northwest all maintain different crash report forms using different definitions of distracted driving and work zones. This adds another layer of difficulty

when researchers and law makers try to determine how to reduce crashes and improve safety because they cannot accurately or confidently compare crash statistics among neighboring states.

Chapter 4: State-Level State-of-the-Practice

This chapter explains the process of data collection at the scene of the crash, the process of handling the form during the review, possible revision of each crash report form, and transmission of the data into a state-level database. In each state the process begins when an officer conducts an investigation of the crash. The information collected comes from driver and witness narratives and observations of the surrounding environment. All of the collected data are subsequently recorded on a crash report form.

The information is then reviewed to check for accuracy of all personal, insurance, and identifying information. Once the crash report form has been reviewed by all necessary handlers, then it is transmitted to an electronic database. The following description explains this process accompanied by a process flow diagram, for each state.

4.1 Alaska

Both citizen and law enforcement crash reports are recorded in the state of Alaska. If damages exceed $2000, if someone is hurt, or if someone dies, a law enforcement officer is responsible for creating the report (AS § 28.35.080). Depending on the remoteness of the crash response, either a paper form #12-200 is filled out by hand, or it is created and filed electronically if the officer has a compact computer in his or her patrol vehicle with the mobile software Tufbooks installed. When no officer is present to file a report, the citizen is responsible for printing and filing the Accident Participant Form #209 provided by the DMV. This is most common for property damage only (PDO) incidents; however, the DMV recommends documenting all minor injury crashes. Because insurance companies limit damages via citizen reports to approximately $500, an officer can be contacted to provide a report shortly after the occurrence of the crash. A crash data manager from ADOT&PF estimated that approximately 60

percent of the state's crashes are recorded by law enforcement and the remaining 40 percent by citizens.

Once a citizen has completed the crash report, the form is mailed to the DMV; once an officer has completed the crash report, it is submitted to a superior officer. The crash report form is held for review until the superior officer approves the form or requests a revision. The superior officer primarily reviews the narrative for corrections with regard to the location and whether the events resulting in the crash make reasonable sense. If a revision is required, the superior officer gives the crash report back to the reporting officer for correction. If the superior officer approves the details in the report, then it is transmitted to the DMV.

The DMV neither makes corrections to the data submitted on the forms nor contacts the agency that submitted the report if there is an error. Instead, the agency records general information that would be used for issues relating to licensing of drivers and the vehicles involved. When the DMV has completed its process, the forms are mailed to the ADOT&PF. ADOT&PF is the last handler of the crash report form. The crash report is thoroughly reviewed before it is entered into the state database. If multiple crash report forms are submitted for the same crash, then those forms are consolidated into one report. On occasion, an outside agency may be contacted to confirm details, but ADOT&PF typically is able to adjust or edit the report itself to properly reflect narrative details. The process flow diagram is shown in figure 4.1.

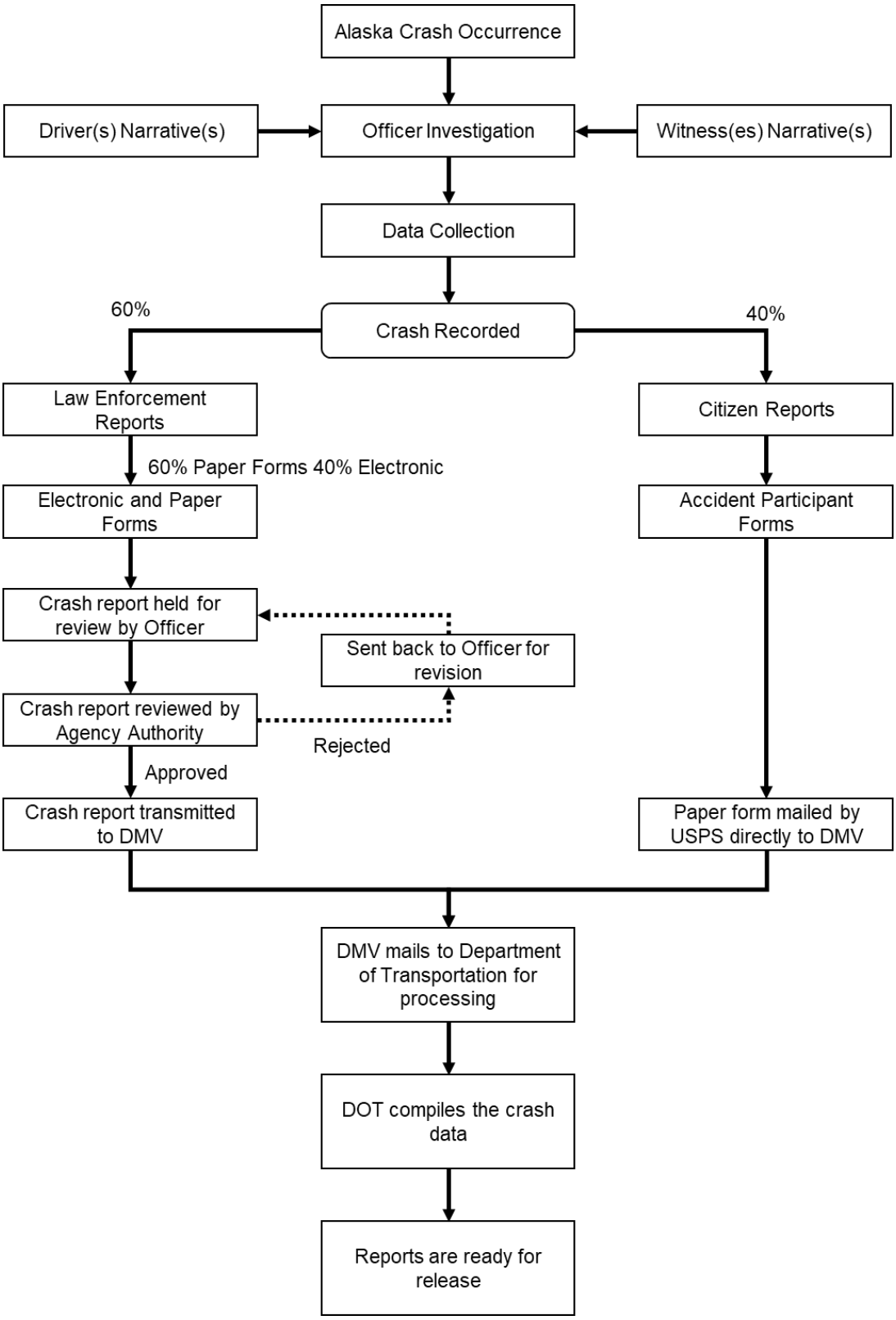

Figure 4.1 Alaska process flow diagram

4.2 Idaho

Crash reports are only completed by law enforcement in the state of Idaho. Idaho Code 49-1306 states that if damages exceed $1500, or if someone is hurt or dies, a law enforcement officer is responsible for creating the crash report form with the Electronic Idaho Mobile Program for Accident Collection (eIMPACT). When a crash does not meet the mandates for a recordable crash, a Collision Information Exchange is completed by the responding officer. This paper form is exchanged between the involved parties for insurance purposes, and records are held at the police station. None of the information on the Information Exchange is transmitted to the Idaho Transportation Department (ITD).

Every responding officer accesses eIMPACT either from her patrol car or at the station. All crashes must be reported in eIMPACT; no paper report is accepted in Idaho. As in Alaska, when the officer completes the crash report form, the file is transmitted through eIMPACT to the superior officer. The report is flagged for review and held within the program until the superior officer approves the form or requests a revision. Because eIMPACT will not allow the officer to proceed with transmission if information is missing, the most predominant details reviewed by the superior officer include the crash location and involved person(s) information. If the superior notes a revision, the report is flagged and transmitted back. Once the revisions have been completed, the process repeats and the crash report is transmitted back to the superior officer and flagged for review. If approved, the report is added to the daily transmission of the Crash Information Retrieval Collection and Analysis (CIRCA) database and held for further review by ITD. Some agencies have reporting officers submit the report though the eIMPACT software on their respective computers if the information does not require a thorough review by the superior officer (i.e., for spelling, edits, or grammar).

ITD's reviewing technicians comb through each crash report individually. Each report receives at least four reviews, and larger reports receive up to seven different reviews. The information that is reviewed with the greatest detail includes the following:

- Event factors and narrative,
- Crash diagram and actual location,
- Contributing factors with narrative, and
- Vehicle identification number (VIN) of each involved vehicle with the vehicle registry details through the DMV.

ITD is responsible for making corrections to the reports, and no crash report that is transmitted to ITD is sent back for review. In most cases, common errors are fixed by the technicians. If a solution cannot be identified by the technicians, then the responding officer will be contacted for clarification.

At this point, the crash data are available for use. There are three primary locations to which the data are sent: WebCARS, monthly Highway Technical Advisory Board meetings, and direct researcher requests through online request procedures. The process flow diagram is shown in figure 4.2.

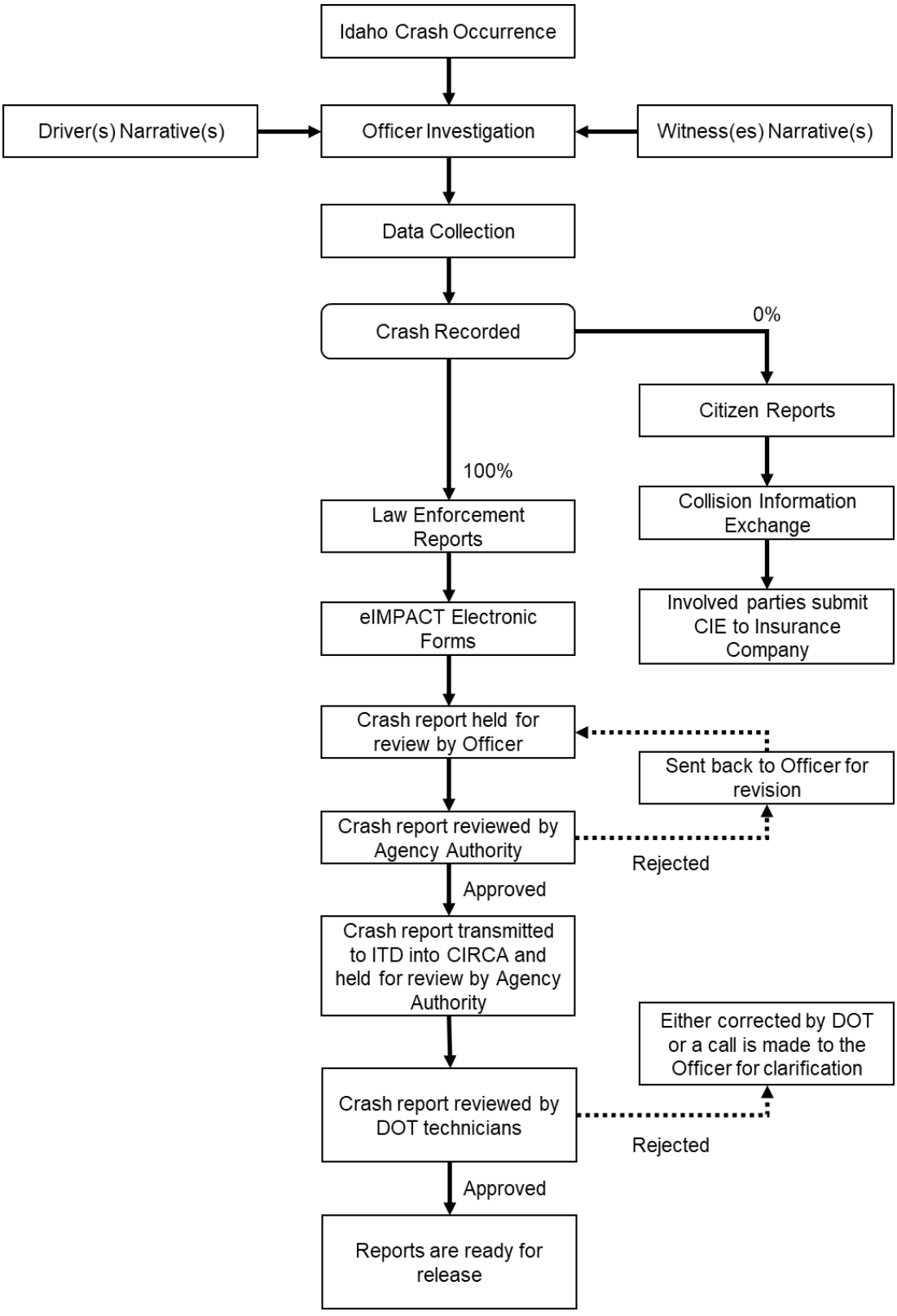

Figure 4.2 Idaho process flow diagram

4.3 Oregon

Oregon Code 810.470 states that for every accident, no matter the severity, or whether an officer arrived and created a crash report form, all citizens must submit their own crash reports. If the citizen involved in the crash fails to report the accident to the DMV, then the lack of a report may result in a suspension of driving privileges. This requires citizens to obtain the Oregon Citizen Traffic Accident and Insurance Report Form 735-32 from the DMV office or downloaded from the DMV website. Almost all the information required from a citizen is also included on the officer's Oregon Police Traffic Crash Report Form 735-46A; however, the citizen report requires fewer details and is only from the point of the individual driver. The manager of Oregon Department of Transportation (ODOT) CARS estimated that roughly 50 percent of the crash reports in the state of Oregon are filed by law enforcement officials because the incidents meet the criteria outlined in Oregon statute 811.745 (ORS § 811.745) that either damages exceed $1500, someone is hurt, or there is a fatality. Furthermore, the manger estimated that approximately 75 percent of the officer filed report forms are completed on paper only and not with the assistance of an electronic platform.

The responding officer is either equipped with paper forms in the patrol vehicle or with electronic forms available for printing once back in the office. This creates more opportunity for error as data are transcribed. Like other states, when the responding officer completes the crash report form, it is submitted to the superior officer for review. If revisions are needed, then the form is returned to the responding officer or another form is created. Once the revisions have been completed or the superior does not see any issues with the crash report form, the agency packages and mails the reports daily via USPS to the DMV. Citizen reports are also required to be sent to the DMV.

The DMV processes all of the reports and confirms that the information regarding vehicle(s) and driver(s) matches with its records. The crashes that require an officer report are processed only after both the officer and citizen reports have been received. Oregon statute 811.720 requires that citizens report a crash within 72 hours of the accident. If the citizen does not comply with that deadline, then driving privileges may be suspended. Officers are required to submit their crash report within 24 hours of the accident, although there are cases in which the investigation of the crash requires more time. If this is the case, the citizen report is held at the DMV awaiting the officer's report.

After the DMV has processed the crash report the forms are packaged and shipped by a secured state shuttle to the Crash Analysis Reporting (CAR) unit within ODOT. The reports are again processed by hand and input into three different programs: the Statewide Crash Program, the FARS, and the state motor carrier's Federal Motor Carrier's Safety Administration (FMCSA) SafetyNet Program.

The Statewide Crash Program thoroughly reviews each element of every crash report. The coding for analysis and evaluation takes place there, as well as the upload of the database entries. Locations that have common crash types or severities are flagged. Any report with errors is also fixed at this stage and confirmed with other reports. The task of Oregon FARS is to ensure consistency and completeness of data elements in all crash data programs and to update fatal crash information to USDOT. The task of the State Motor Carrier's FMCSA SafetyNet Program is to support crash data elements used for improving motor carrier compliance throughout the state of Oregon. The process flow diagram is shown in figure 4.3.

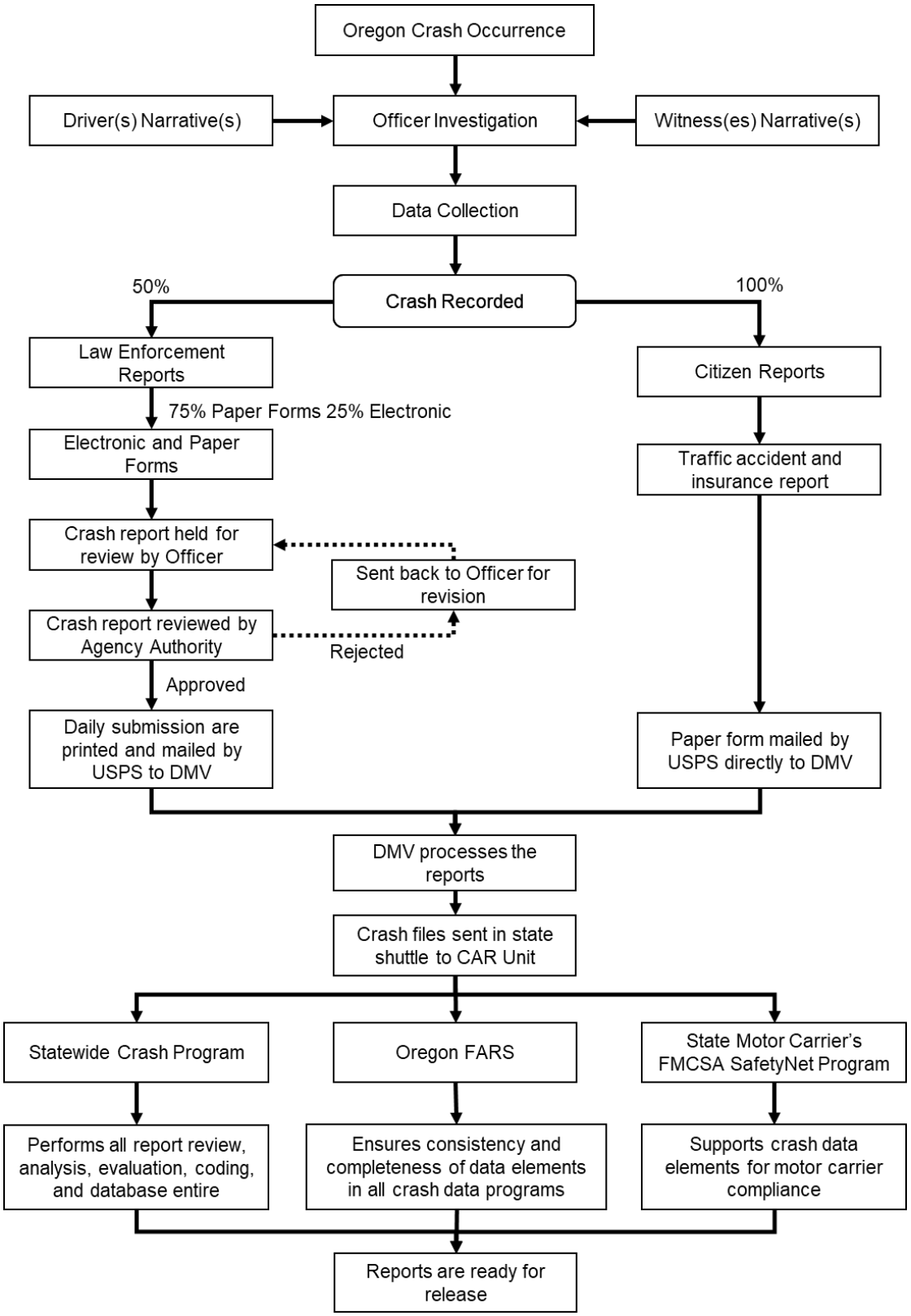

Figure 4.3 Oregon process flow diagram

4.4 Washington

As in Idaho, the state of Washington does not process any citizen crash report forms through its crash database. The Washington State Department of Transportation (WSDOT) receives citizen reports but does not use the data for the state's database. If a citizen report has been submitted that includes an injury or excessive damages, then an officer simply follows up. The officer will create a new crash report for the incident and process that with the state. If damages exceed $1000, or if someone is hurt or dies, a crash report form must be completed by law enforcement (RCW § 46.52.030). PDO incidents are not registered in the Washington state database. Most law enforcement in Washington is equipped with the fully electronic Statewide Electronic Collision and Ticketing Online Records (SECTOR) software. WSDOT crash data and reporting analysts estimate that 90 percent of all daily reports submitted by law enforcement are electronically submitted through SECTOR, while the remaining 10 percent are created and submitted on paper.

The paper crash report forms are received by the Washington State Patrol (WSP) team that is embedded within the WSDOT. Remote jurisdictions or agencies that do not have the necessary resources account for the paper forms. WSP staff perform initial quality control measures on the paper reports. If the form is rejected, then the responding officer is contacted for clarification on the appropriate edit(s). If it is a simple error, WSP will perform the fix. Once the form has been approved, WSP scans and indexes the raw data from the reports into WSDOT's CLAS system.

The revision process through SECTOR is similar to Idaho's eIMPACT software. There are administrator protections within SECTOR that do not allow the reporting officer to transmit an incomplete crash report to the superior officer. When the reporting officer has completed the

crash report, the report is held internally in the background of the program awaiting the review of the superior officer. If there are any issues with the crash report, then the SECTOR file is flagged for revision, and the reporting officer must make the appropriate changes. Interviews with officers revealed that the review process is different at each agency. When a report is flagged for revision by the superior officer the report can only be sent back to the IP address where the report was created. This creates time constraints, since the report should be revised within 24 hours of crash occurrence; an officer may have the day off when the revision is issued or the officer could be using a different vehicle that day. Some larger agencies issue their officers his or her own patrol vehicle to either take home or leave at the station. This reduces the time constraint caused by the officer needing to have access to the same computer. When the report has been completed and confirmed, the superior imports the report directly to WSDOT's CLAS system through SECTOR.

The last two stages of confirming the crash reports are in the hands of WSP staff. Each crash location is assigned X and Y coordinates on the basis of the location information submitted by the reporting officer for the Law Enforcement Database. WSDOT data analysts review and refine (i.e., update and filter) each data element in the crash report to fix the "Data Analysis Workflow." This process redefines up to 121 data elements submitted by the law enforcement officer. WSDOT analysts also use internal tools to geocode the location of the crash and derive an additional 21 engineering- or safety-related data elements and add them to the crash record. The process flow diagram is shown in figure 4.4.

Once the refining process has been completed, WSDOT compiles the reports into formats that are appropriate for release. The information exchange, based on documentation provided by WSDOT, is shown in figure 4.5.

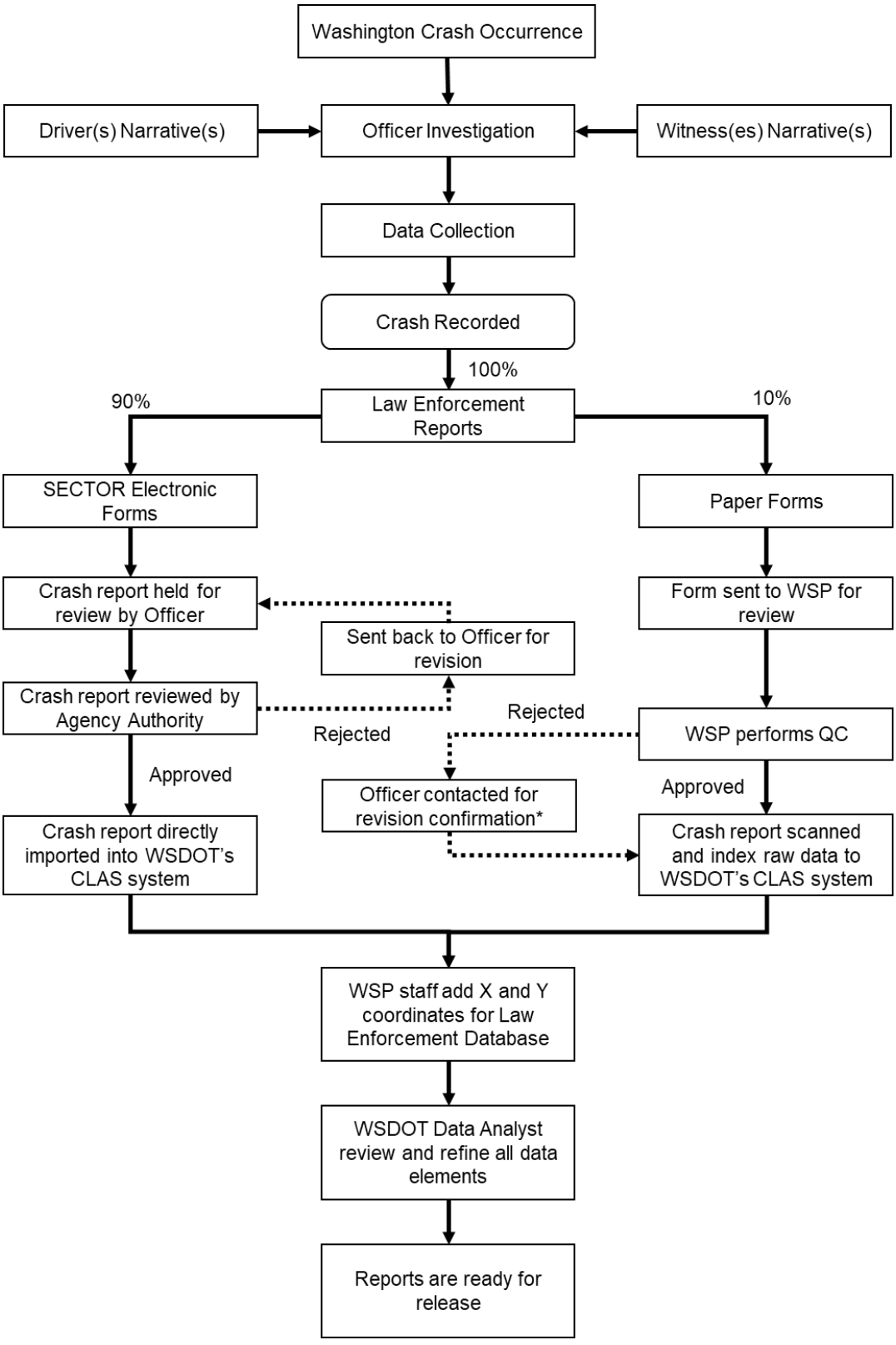

Figure 4.4 Washington process diagram

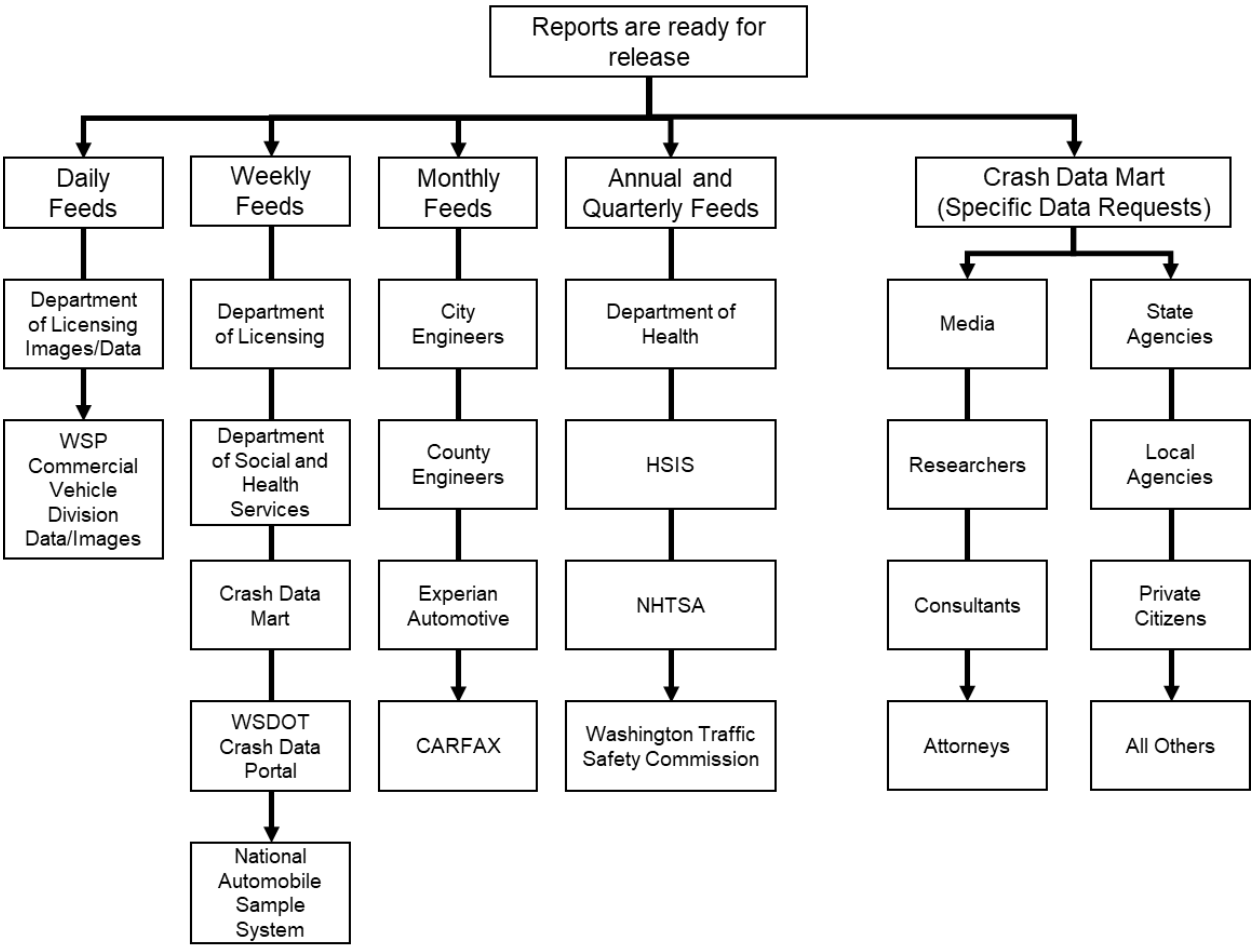

Figure 4.5 Washington state data release flow diagram

The following chapter explains the methodology used to confirm these processes and to gain further narrative from officers who represented different agency levels throughout the Pacific Northwest.

Chapter 5: Methodology

This chapter describes the motivation, structure, and process that this project used to conduct officer interviews prior to conducting a regional online survey.

5.1 Officer Interviews

5.1.1 Motivation and Background Information

Semi-structured interviews were conducted in-person and by phone with law enforcement professionals familiar with the crash report data collection and processing procedures in their respective states. The purpose of these interviews was to determine how law enforcement officers complete a crash report form and any specific insights they might have about particular sections of the form. The semi-structured interview format allowed for a more interactive conversation to take place (Diccio-Bloom et al. 2006).

The primary and secondary questions asked during the interview sought to determine where errors could occur in the crash reporting process and the potential causes of those errors. The responses from the interview participants were then used to develop questions for a subsequent online survey to law enforcement agencies throughout Washington, Idaho, and Oregon. The combination of interview (qualitative) and survey (quantitative) techniques provided a means of triangulating answers to the research questions of interest.

5.1.2 Methodology

The interviews sought to maintain a consistent, direct, and personable format between the interviewer and interviewee. The interview protocol included 20 primary questions. By design, the interviews did not exceed 30 minutes and included additional questions to explore any new ideas.

An interview framework was created to aid in the direction and pace of the interview. The structure of the questions emulated a conversation that could be held in person or over the phone (see Appendix A for the interview protocol). Careful consideration of word choice was reviewed before conducting the interviews to ensure objectivity and alignment with the research questions. Before the interview was begun, the project objectives and purpose of the survey were explained, and the officers were informed that their answers would be confidential.

The interview started by determining how and when an officer created a crash report form during a crash investigation, followed by capturing the officer's opinion of the data collection process. The interview also specifically considered how an officer completed subsections of the crash report regarding distracted driving, crashes in work zones, and crashes involving a bicycle and/or pedestrian.

An attempt was made to contact all levels of law enforcement who regularly use crash report forms. Responses from state, county, and local police officers were necessary to achieve saturation; for this project, saturation was defined as a state in which no additional new information would be acquired by the next interview. Agencies were initially contacted on the basis of their geographical proximity to the project team. To ensure that the responding population accurately represented the collective opinion of each state, additional interviews were conducted in Idaho and Washington by contacting agencies that were located much farther from the initial contact, and ensuring that department sizes greatly varied. This method allowed the research team to record responses from agencies that differed in officer population and size. Six to eight officers were interviewed in each of the three states (Washington, Oregon, and Idaho), along with crash record professionals from two state-level departments of transportation.

(Results from Alaska were not included because of an inability to contact officers, despite multiple good faith attempts.)

Agencies were primarily contacted via e-mail or phone call and asked whether they would be interested in participating in the interview. Officer participation in the interviews was entirely voluntary. In one case, an officer asked to be interviewed after hearing about the research efforts outside of his agency. Interviews in Oregon were conducted either with a single officer or multiple officers in a group setting. Group interviews were held to minimize the time commitment required by officers. The interviews in Idaho and Washington were conducted individually. Probing, follow-up questions were occasionally asked in addition to the primary protocol questions to both clarify the officer's response and delve more deeply into their reasoning. Interviews were recorded with a voice recorder and transcribed to text by members of the research team. Notes were also taken by the interviewers to support the transcribed data.

By the fourth or fifth interview in each state, the responses were consistent with what had already been gathered, and very little new information (saturation) was obtained from the primary or probing interview questions. The follow-up questions yielded the most material at this point of the interviews. Further interviews were conducted to increase the level of saturation and to broaden the range of law enforcement agencies, to ensure that there were no discernable differences in how they completed the crash report forms in each state. The results from the interviews were invaluable in constructing the regional survey questions.

5.2 Regional Survey

5.2.1 Motivation and Background Information

The responses received from the officer interviews were used to develop questions for the regional survey. While the officer interviews were conducted, several additional concepts were

introduced that needed to be confirmed by a larger sample of officer responses (e.g., officer opinion of needed and received crash report training and officer preference for electronic or paper reporting). The purpose of the survey was to confirm specific information received during the officer interviews and to explore officer opinions of additional information necessary to properly capture crashes associated with distracted driving or work zones.

5.2.2 Methodology

The survey used to collect law enforcement feedback was developed with the Qualtrics platform. In order to obtain a comprehensive statewide assessment within each agency level, a list of all state, county, and local law enforcement agencies from each state was obtained from online searches. After the contact information had been obtained, a random sample representing 50 percent of each agency level in each state was contacted by phone or e-mail. The script for this e-mail is included in Appendix B.

The final survey consisted of 41 questions with display logic that reduced the survey to approximately 30 questions for each officer, depending on the responses. The survey was divided into five sections: performing crash reports, opinions of [respective] crash report forms, driver distraction and work zone sections, training, and basic demographics. Officers were also allowed to provide comments regarding crash reporting or the training process on the last question of the survey.

The "performing crash reports" section captured general information similar to the officer interviews, such as how frequently the officer completed crash report forms, how crash report forms were submitted (electronic or paper), who received the crash report after submission by the officer, how long the report took to complete, and the revision process.

The next section asked for the officer's opinions of the crash report forms. This section consisted of five-point Likert scale questions pertaining to the officer's opinion of the structure of the crash report form, whether there was a need for revisions to any sections of the form, and whether crashes were adequately captured by the form.

The distraction- and work zone-related sections focused on obtaining the officer's opinion as to whether the form collected enough information about a crash caused by or influenced by distraction or within a work zone. These questions were accompanied by images taken from each state's crash report form to aid with comprehension.

The training section asked questions pertaining to the adequacy of the officer's training, the length of time since his or her last training, who conducted the training, the frequency of training, and general opinion questions about the need for training. The purpose of these questions was to help determine whether increased training correlated with the officers' knowledge of the data elements on the crash report form.

The survey did not collect any personal information that could be traced back to the individual responding to the survey. The last section asked basic demographic information to distinguish officer responses from different agency levels, states, and years of service. This information was used to compare states to determine possible response trends.

A draft version of the survey was developed and sent out to the participating officers from the officer survey. Their review ensured that the questions did not offend or make a responding officer uneasy. After their feedback was recorded, minor adjustments were made to the survey. The survey and process were reviewed and approved by the University of Idaho's Institutional Review Board (IRB # 17-152). A URL link to the survey was subsequently sent to

55 different agencies in Alaska, 141 in Oregon, 61 in Idaho, and 88 in Washington beginning in August 2017 and ending in December 2017.

Chapter 6: Results and Discussion

On the basis of the activities described in the previous chapter, the results of the interviews and then the survey are separately presented and discussed. A discussion of the correlation between the flow charts and survey responses is also provided. (Note: Because of an insufficient number of responses from law enforcement officers representing Alaska, only Oregon, Idaho, and Washington survey results are provided as part of this study.)

6.1 Officer Interviews

The following discussion represents a comprehensive summary of the interviews conducted in each state. Some subsections of the crash report forms, including those related to distraction and work zones, are highlighted on the basis of the uniqueness of the interview responses.

6.1.1 Oregon

The responses to the interview questions were relatively consistent across different agencies. Officers seemed satisfied with the usability of the Oregon crash report form and did not feel that significant changes needed to be made on the basis of their experience with using the form in real-world situations. The most compelling responses resulted from questions about distracted driving and work zone-related crashes. The Oregon crash report form has very limited options for recording driver factors or special zones (e.g., work zones, school zones, etc.), and these are inconsistent with the MMUCC recommended fields, especially in comparison to other states in the Pacific Northwest (2017); these limitations require officers to use more individual judgment when filling out the report.

6.1.1.1 Work Zones

Officers were asked four questions related to reporting work zone and work zone-related crashes. All of the officers interviewed in Oregon had little to no experience with work zone crashes and did not have an immediate response to the question, "What is the most common contributing factor to a work zone-related crash?" The most interesting responses resulted from asking the officers how they would determine whether a crash was work zone-related.

A common response was "signage," meaning that if the work zone was identified with the temporary traffic control devices specified in the MUTCD, then the officer would consider it a work zone. A follow-up question was asked to determine whether they would consider very short-term work conditions as a work zone. The question was often phrased as, "What if utility workers were present on the side of the road and set up cones while they did work, and there was a crash. Would you consider this a work zone?" Officers in Oregon had differing responses to this question.

Two officers from the same department who had the same training were interviewed on the same day. When asked whether they would consider temporary workers or equipment near the roadway a work zone they had different responses. One officer responded, "I would probably consider that a work zone, yeah" while the other officer responded, "Personally, if I had to give you a gut answer I would say no."

These responses highlighted one issue with the Oregon crash report form: inconsistency of data entry among officers. This inconsistency makes detailed analysis of crash statistics less reliable and less informative, and it stems from the lack of a consistent work zone definition, along with states not adhering to MMUCC recommendations. An officer remarked that he "think[s] 'yes' or 'no' [to record a work zone] doesn't fully articulate it because there's a ton of

work zones. And if you get specific concepts like if you put cones out and it makes them go three inches to the right that's a work zone. If there is a specific guideline saying cones are out or flaggers are used, whatever it is, articulate 'this is a work zone'." The officer continued by stating that a "more in-depth analysis of the specific type of construction zone would be helpful and might make it so that at least [there would be] data [about] what's more safe and what's less safe." If a more consistent crash report were used across the Pacific Northwest with specific instructions on the definition of a work zone, consistency of data entry by officers could improve, increasing confidence in the data set for researchers and decision makers alike.

6.1.1.2 Distracted Driving

Responses to the distracted driving questions were not as varied as those for the work zone questions. Officers were fairly consistent in their responses when asked, "Do you feel that the crash report form appropriately captures a crash caused by distracted driving?"

Officers remarked that they would need to know with certainty before acknowledging a distracted driver at the time of a crash. Unless the applicable driver admitted to being distracted or the officer personally witnessed the driver looking away from the roadway they would not record the crash as being caused by a distraction. An officer from a county sheriff's department commented that, "For us we show up after the fact and often times we're trying to rebuild this and we don't know if the person was on their phone unless they tell us." Even if a witness reports that they saw someone using a smart phone before a crash, an officer often won't record this on the crash report "because even a minor crash is a traumatic event and so sometimes you can't rely on witnesses [because what they] think they saw is not necessarily what they saw."

It is rare for a driver to admit that they were distracted at the time of a crash, which presents another challenge for officers accurately documenting what happened. A senior trooper

from a state police agency commented that “I can’t put what I think happened; I can only put what the evidence says and what the people say.” For this reason, even if officers suspect that a motorist was distracted at the time of the crash, they typically will not record this on the crash report unless it is confirmed.

This factor presents convincing evidence for including the MMUCC recommended field of “unknown” into the distracted driving section of the crash report (2017). This addition would allow the officer filling out the report to indicate that distracted driving could have been a contributing factor in the crash without knowing for sure; currently an officer suspecting that a driver was distracted will select “no” in the distraction field.

6.1.2 Idaho

The responses to the interview questions varied significantly among different agencies. Some officers were very vocal with their frustrations, whereas other officers were content with the current reporting process. These differences of opinion could be explained by the wide range of experience of the officers interviewed; years of service ranged between seven and 27 years. Responses were consistent when asked about the overall layout and procedure of crash reporting. The response did differ with regard to opinion and definitions of some crash report form subsections, including how a crash in a work zone is reported and other contributing factors (i.e., driver speeding, inattentive, or too aggressive) that likely caused the crash. The majority of the officers felt that there were opportunities for further data collection and improved usability by updating the crash report form with better definitions and more selections to capture what happened before and during the crash. Officers also stated that a better established relationship is needed between citizens and officers to discourage the reporting and recording of false information, and there needs to be improved training so that officers understand why each

element of data is important on the crash report forms and how each data entry field is defined. While the majority of the officers suggested changes to the crash report forms, others communicated that they were comfortable with the structure and number of questions on the crash report form and felt that data were adequately captured by the current form.

The most compelling responses resulted from questions about contributing factors, distracted driving, and work zone-related crashes. In particular, officers noted occasionally being unable to confidently identify an event that led to a crash because the parties involved were not honest about what actually happened prior to the crash. Each officer defined this inability in a similar manner: "garbage in equals garbage out." There were also differences in the definitions of work zones, even at the same agency, such as: a location that had construction present, a location with "construction zone" posting, or a location with "work" being performed. Each officer felt that the crash report form should take no longer than an hour to complete. With the amount of detail that the form currently requires, each officer agreed that some degree of change to the crash form was needed to improve how details were captured.

6.1.2.1 Events

Officers were asked to identify any parts of the current crash report form that either needed elaboration, consolidation, or additional explanation. Each officer answered these questions differently, but one of the most consistent responses was that the graphical user interface needs improvement with regard to coding the details preceding the crash; this section of the crash report is titled "Events." In Idaho, officers are able to input only three leading causes for each crash, and these causes must be in the selectable "pull-down" tab on eIMPACT. Because of such restrictions, one officer said, "The events section does not capture the true event. It is too short to be able to explain that a car lost control in the northbound lane, due to ice,

then tried correcting, struck a car upon reenter, and then rolled off the embankment. The officers usually only capture the last event to happen in this section, [such as the vehicle] left the road and rolled off the embankment."

The officer can record a detailed description of the crash in the narrative section, although it is often difficult to link this description to the categorical sections in the crash report form. Because the link between the categorical element(s) selected in the crash report form and the officer's narrative is often missing, the crash report form could be rejected, requiring the officer to resubmit it. Two officers remarked that this rejection is often due to their narrative having too much detail and the reviewing officer rejects it for simplification. The officers expressed that detailed investigations that result in a rejected crash report form is frustrating and time consuming. There is a need for a more detailed categorical data system that would provide help in reducing the need for narratives and subsequently result in fewer rejected reports. In most cases, when a crash report form is rejected in review and sent back to the officer, significant time has elapsed, and therefore the revision of the narrative matches only selectable data elements, eliminating a more nuanced description. The key details should be the location and participants involved in the crash. The balance between capturing relevant crash data and having too much data is viewed differently by each officer and serves as a reason to revise the crash reporting form.

6.1.2.2 Distracted Driving

Although officers in Idaho agreed that driver inattention is the leading cause of vehicular crashes, there was agreement that current procedures make this difficult to document on the crash report form. The crash report form does not have a section for distractions other than cell phones, so officers can only write a citation for using a cell phone while operating a vehicle.

Each officer interviewed had witnessed a driver distracted by other things, and one of the officers interviewed also taught classes on driver inattention and how to determine whether it caused the crash. He remarked that capturing what the person was truly doing would be valuable in creating new laws. “The need to add verbiage is a must. They need to beef up the details on what they were using and why. Policy will not change without knowledge. [Was the person] using a phone, were they talking, texting, using GPS, or eating or putting on makeup. We need to be able to rate which is worse, and then make laws that change what people can and cannot do.”

Other officers added that the potential lack of honesty from drivers was one of the most frustrating details of a crash investigation. Without a warrant they were unable to confirm whether the driver was telling the truth about using a cell phone. One officer explained that he knows when a driver must have been inattentive, although if the driver does not admit it, then it is nearly impossible to ensure it is correctly captured in the report. “Most officers don’t even put anything [in the distraction section] because they feel it is just not true,” the officer explained.

6.1.2.3 Work Zones

Officers were asked several questions relating to the reporting procedure for work zone and work zone-related crashes. Each officer determined a work zone-related crash as occurring between the entering and exiting signage of a construction area. Only one officer believed that a utility crew or tree service crew working on the side of the road should also be considered a work zone. The same officer felt that if a crash occurred “within” a working space, such as farm equipment harvesting or a side road being regraded on an adjacent street, then that situation should also be considered a work zone-related crash because the driver was potentially affected by those operations. The officers debated whether or not the description of a work zone is a

location of distance or space, so a single work crew on the roadside did not always meet the requirement of a work zone-related crash in the eyes of all officers.

One officer interviewed worked as a reconstruction specialist and expressed his frustrations with the lack of detail on the crash report forms pertaining to work zones. His response to, “In your opinion, is there any information related to work zone crashes that is currently not recorded on the crash report form?” was direct and illustrates why officers maintain that work zones are defined by established signage. “Almost everything is missing of value. We must observe the zone as a point of interest. It is dependent where and what [the] work is. Is the work in the road, along the road, or on a hillside? Are trucks entering and exiting? Are there flaggers?”

The officer expressed that the crash report does not capture details that could reconstruct the crash, therefore there is little to no relevant information other than knowing that it was in a construction zone. He felt that providing officers with the opportunity to explain the crash in more detail would provide the data needed to aid improved enforcement or policy decisions.

6.1.3 Washington

The responses to the interview questions by Washington officers were very different than those from Idaho with regard to acceptance of the crash report form and data collection and processing. All officers expressed comfort and ease working with SECTOR and explained how they hoped every state was doing something similar. Officers were also content with the current form, and when asked, “What part(s) of the crash report form do you think could be consolidated?” every officer responded with some variation of “nothing.”

The electronic crash report form used in Washington is much more efficient than the previously used paper version; officers can scan the driver’s license and insurance card

information, and the crash form is auto-populated, which reduces the completion time by approximately one hour. Other sections throughout the crash form are auto-populated or ignored, depending on the information being submitted. For example, if the officer says that no emergency medical services (EMS) were dispatched to the scene of the crash, approximately eight proceeding questions are skipped. Officers seemed satisfied with the usability of SECTOR and the flexibility that it allows each user.

However, officers believed that there are still opportunities for improvement with the data collection process. Two separate officers called SECTOR "adequate" and "deputy proof," but they understood that there is difficulty capturing each crash to the same level of detail every time. Crash data are very dependent on the officer who is investigating the crash and creating the report. As in Idaho and Oregon, the officers felt that improvements could be made with regard to the work zone and distracted driving sections of the report. One officer explained, "Standards lay the foundation and training provides the tools, though it is a collaborative effort from all." That is, the quality of the crash report is limited by the judgment calls of the investigating officers and the cooperation of the people involved in the crash. The crash report form has the opportunity to capture these details, but only if the officers can appropriately interview drivers and obtain the needed data.

6.1.3.1 Work Zones

Washington officers were asked the same four questions relating to the reporting procedure for work zone and work zone-related crashes; a large deviation in responses was recorded. Each officer had his or her own unique explanation for how to determine whether a crash was work zone-related or not. One officer said that "the crash must be within the influence area," while another said that "signage must be posted and workers present." Another officer said

that “there is a difference of perception depending on if observed in the eyes of a ‘speed zone’ or ‘safety zone’,” while a different officer presumed “anywhere there is a visible traffic cone.” These differences in classifying a work zone clearly demonstrate a training opportunity to clarify this definition. A follow-up question asked the officers, “How many work zone-related crashes are you responsible for documenting in a crash report annually?” No officer said more than four; this low number may be one reason why officers differ so greatly in determining what qualifies as a work zone-related crash.

Each officer described similar causes of work zone crashes, mainly driver inattention and driving too fast into the rear of a developing queue in the construction zone. Further opportunities for obtaining data that could aid in defining work zones were not fully embraced by the officers interviewed in Washington. One officer proclaimed, “It is cut and dry. If work zone related, check the box; the rest of the form captures the crash, [so] not much else should apply.” Another officer expressed a similar opinion, “Not many to write on – is it there between the signs or not?” These responses showed that there is an opportunity to explain the importance of data elements related to crashes in work zones.

6.1.3.2 Distracted Driving

The responses to the distracted driving questions were not as varied as those for the work zone specific questions. Officers were fairly consistent in defining distracted driving and what measures they took to enforce it. When the officers were asked, “Is the current crash report form missing any key details (i.e., a distracted driving section)?” all but one officer responded that the form is complete. The one officer who addressed this question added, “Distracted driving is missing some details; details rely on truth from the drivers.” The following question asked, “Do

you feel that the crash report form appropriately captures a crash caused by distracted driving?" The officer added a comprehensive response,

> "There are many issues in regard to how to describe something as being a result to an incident, and thus a 'distraction' and possible cause of the crash. Many drivers will not indicate if something is a distraction because the person's insurance will already go up due to the crash. There are many distractions that lead to crashes that are not indicated as infractions – putting on make-up, a dog in the lap, etc. So, a general "inattentive driving" is indicated for insurance purposes."

The other officers provided similar remarks stating that "people often will lie to try and get out of an infraction." One officer proposed that if every distracted driving case could somehow be honestly recorded, changes to the legislation that would significantly constrain or not allow use of certain devices would result in public outcry. There was a collective feeling that the officers would be more inclined to report driver inattention in addition to writing a citation for distracted driving if there were positive legislative outcomes. One officer admitted that often times no ticket was issued if it was a clear mistake and the situation did not result in injury or excessive property damage; the officer felt that the effects of the driver's increasing insurance rates was punishment enough.

6.1.4 Summary

The primary and probing questions from the protocol used in the interview captured officer opinions on opportunities for streamlining and improving the crash report forms. A regional survey was developed on the basis of these officer responses, in particular those regarding distracted driving and crashes in work zones.

A limitation of the current crash report forms is that much of the information is dependent on the cooperation of the drivers involved and the information readily available at the scene of the crash. Some crashes, such as rear-end crashes, are considered standard and information is easy to determine. However, complex crashes, such a multiple vehicle crashes involving driver inattention, are often difficult to capture on the crash report form because the form restricts the amount and type of data that the officer can submit, or the individuals involved in the crash may mislead officers about the events and actions that preceded the crash and the officer's arrival on scene.

The regional survey expanded on the questions from the interviews and provided additional quantitative data for consideration.

6.2 Survey

This section summarizes the responses to the online survey and includes information relating to data collection, review procedures, training, and additional information related to distracted driving and work zones. The following sections explore key statistics from each part of the survey.

6.2.1 Demographic

Responses to the online survey included 182 officers, with 79 from Washington, 60 from Idaho, and 49 from Oregon. The distribution of responses from an agency level resulted in 77 state officers, 30 county officers, and 76 local officers. The average years of service per state and agency level is shown in figure 6.1; note that the range of service was from 1 year to 38 years, with 47 percent between 1 and 10 years, 33 percent between 11 and 20 years, 16 percent between 21 and 30 years, and the remaining 4 percent in service for more than 30 years. Table 6.1 displays the summary statistics for each state and the response types from the survey.

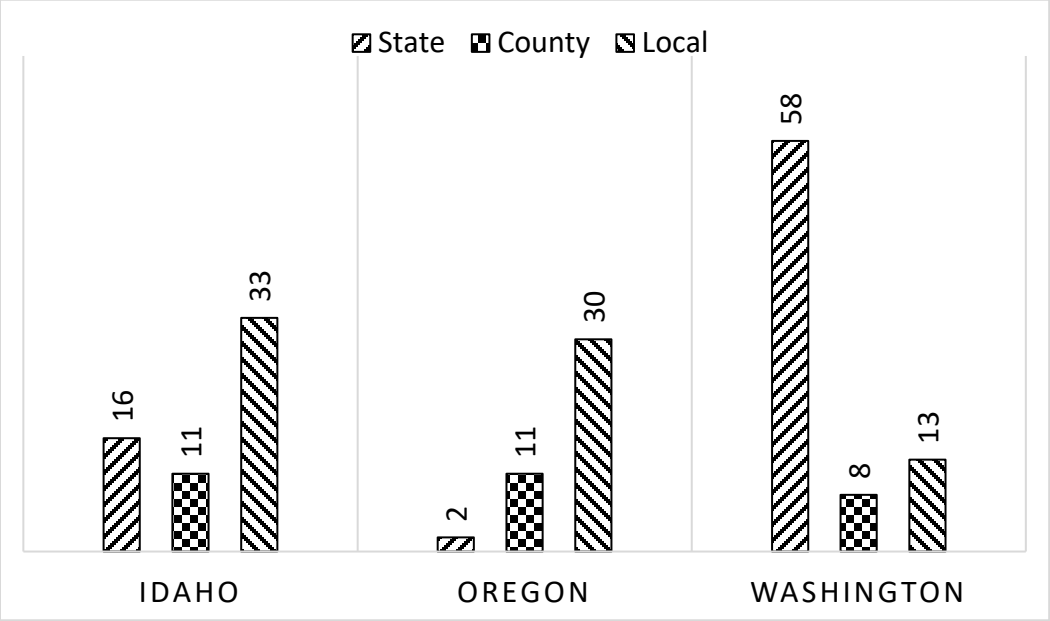

Figure 6.1 Agency level of responding officers

Table 6.1 Officer range of service in years

Idaho	**Mean**	**Std. Dev.**	**Min**	**Max**
County	13.8	8.6	2	25
State	15.1	8.8	1	36
Local	12.2	8.6	2	37
Oregon	**Mean**	**Std. Dev.**	**Min**	**Max**
County	14.3	5.5	5	22
State	21.0	5.7	17	25
Local	16.3	9.5	2	38
Washington	**Mean**	**Std. Dev.**	**Min**	**Max**
County	12.4	8.7	1	28
State	11.2	9.0	1	36
Local	12.3	8.6	2	37

6.2.2 Procedural Responses

In the online survey, participants were asked several questions pertaining to the type of data collection they performed upon arriving at the scene of a reportable crash. The questions asked details about the type of format used to collect, report, and submit crash report forms and whether there were common revisions that they experienced. The survey also asked about the general layout, usability, and accuracy of the crash report forms to adequately narrate the crash and whether the officers believed certain opportunities were present to improve the data collection process. General questions about crash report training, the frequency of the training, and whether they felt confident about the data needed were also asked. Each of the following sections incorporates results from each state and highlights some unique officer responses on data collection and processing.

6.2.2.1 Data Collection

The first survey items asked about when the officer had last completed a crash report form and the number of reports submitted on a weekly basis. These questions were asked to ensure that officers were familiar with recent crash reporting processes when responding to the survey. The majority of responding officers (85 percent in Idaho, 86 percent in Oregon, and 90 percent in Washington) answered, "When was the last time you completed a crash report" with "within the last month." The weekly frequency for how often the responding officers complete a crash report form is shown in table 6.2; officers on average completed a crash report about three times per week.

Table 6.2 Weekly frequency crash report form completion

State	N	Mean	Std. Dev.	Min	Max
Idaho	57	2.4	2.9	0	15
Oregon	43	3.2	6.5	0	40
Washington	78	3.3	3.2	0	20

Some responding officers (i.e., a chief or director) reviewed crash reports rather than created them. The insight from these participants pertained more to the procedural and training questions, and their opinions were included in the survey responses.

The second survey item asked about the format of crash data collection, how the crash form was submitted, and to whom the form was submitted. Figure 6.2 shows that the format for crash reporting in Idaho and Washington is primarily electronic, although two responders from both states claimed to still use paper submissions even though both Idaho and Washington's DOTs no longer accept paper submissions. The responses from Oregon officers agreed with the statements from ODOT that their state is nearly split on the two formats.

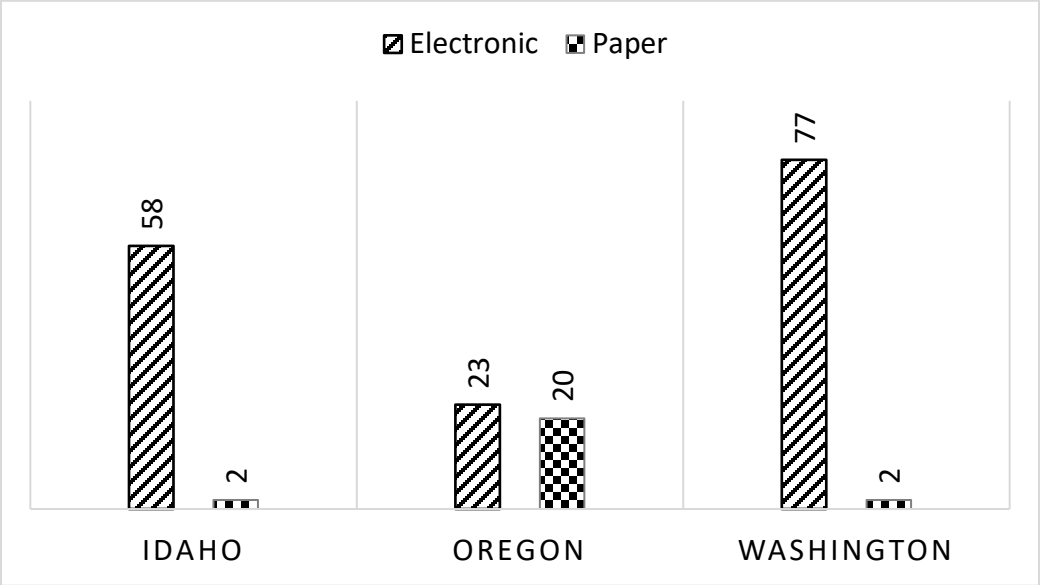

Figure 6.2 Crash reporting format for each state

With regard to how the crash forms are typically sent for review, Idaho and Washington have made the switch to an electronic platform because of the ability to track the reports and the convenience of having real-time interactions between reporting officers and their superior during the review stage. The risk of damaging a file, transfer errors, and shipment errors were all expressed by Idaho and Washington officers during the interview stage as reasons for the electronic platform. Table 6.3 shows that Oregon officers handle the crash report forms differently, with the most popular form being the internet portal or mailing a hardcopy.

Table 0.1 Distribution of submission types per format

Electronic Submission	**Idaho**	**Oregon**	**Washington**	**Paper Submission**	**Idaho**	**Oregon**	**Washington**
Internet Portal	55	19	77	Printed	2	7*	2
E-mail	0	1	0	E-mail	0	0	0
Flash Drive	3	0	0	Mailed	0	14*	0
Printed	0	3	0				

* One Oregon officer responded both submissions of printed and mailed are performed

6.2.2.2 Review Process

The officers were asked how frequently revisions were required in a given year, along with who communicated the need for the revisions and the most common reasons for a revision. To adequately represent these results some adjustments were made to the responses. Some officers used percentages to answer these questions or subjective terms such as “too many” and “lots.” Those responses were not tabulated because of an inability to quantify hem. Table 6.4 shows that Idaho had the highest annual average of revisions with 14, and Washington and Oregon followed with seven and six, respectively.

Table 6.4 Annual frequency of revised crash report forms

State	N	Mean	Std. Dev.	Min	Max
Idaho	29	13.8	26.6	2	100
Oregon	9	5.6	2.7	2	10
Washington	54	7.8	5.8	1	30

Typical reasons for crash report errors requiring revision varied among the three states. Figure 6.3 shows that of the 180 responses, Oregon represented only 9 percent of the revised crash report forms, Idaho represented 35 percent, and Washington 56 percent. The three most common reasons for revision in order of greatest percentage were location description and drawings (27 percent), driver and vehicle information (18 percent), and contributing factors (17 percent).

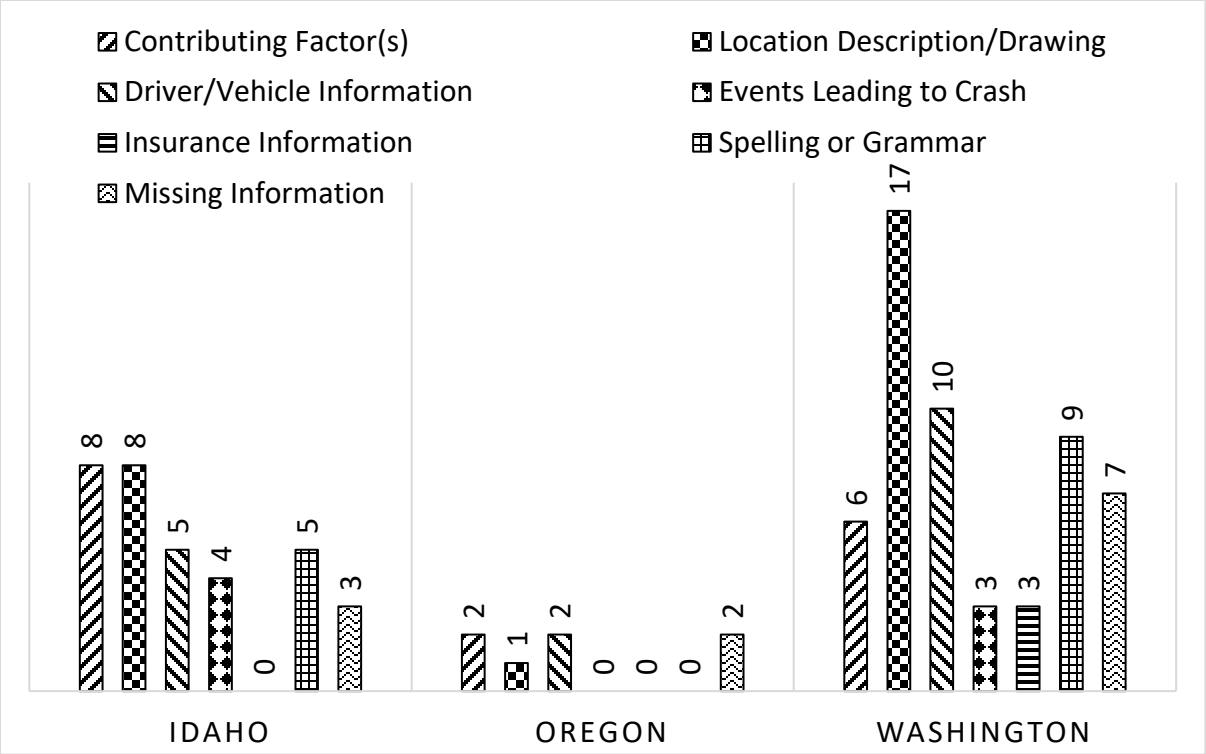

Figure 6.3 Common revisions on crash reports

Officers were asked whether the reasons for revisions was due to the crash report form being unclear and inadequate. The following questions were asked, “Do you believe that the crash report is structured to match the flow of your investigation process?” and “Do you believe that your crash report form adequately captures the incident?” The responses from the survey confirmed results similar to those from the officer interviews; nearly 20 percent thought the crash report form needed to be revised to better follow the investigation of a crash. Additionally, 15 percent of Idaho and Oregon officers and 5 percent of Washington officers felt that the crash report form needed to better capture relevant crash information (i.e., more details on events leading up to a crash and type of contributing factors). The distribution for each question is shown in table 6.3 and table 6.6, respectively.

Table 6.5 Responses for "Do you believe that the crash report is structured to match the flow of your investigation process?"

Responses	Idaho		Oregon		Washington	
Strongly Agree	3	(5%)	3	(7%)	9	(11%)
Agree	26	(43%)	21	(49%)	44	(56%)
Neither Agree nor Disagree	19	(32%)	11	(26%)	15	(19%)
Disagree	8	(13%)	5	(12%)	10	(13%)
Strongly Disagree	4	(7%)	3	(7%)	1	(1%)
TOTAL	60		43		79	

Table 6.6 Responses for "Do you believe that your crash report form adequately captures the incident?"

Responses	Idaho		Oregon		Washington	
Strongly Agree	3	(5%)	2	(5%)	13	(16%)
Agree	39	(65%)	25	(58%)	52	(66%)
Neither Agree nor Disagree	9	(15%)	9	(21%)	10	(13%)
Disagree	9	(15%)	4	(9%)	4	(5%)
Strongly Disagree	0	(0%)	3	(7%)	0	(0%)
TOTAL	60		43		79	

6.2.2.3 Training

Participants were asked about the level of crash reporting training received at their current agency and whether continuing training was required. The participants were also asked how frequently training took place, who provided the training, whether they felt competent upon completion of the training to fill out a crash report form and understood the importance of the data elements collected, and whether they felt training was needed. Participants were also given the opportunity to suggest possible improvements to the training process and materials.

Every officer responded that they were trained on the crash reporting process and its importance, with 13 percent responding that some sort of training had been received within the past year and 45 percent responding that it had been more than five years since their last training. When asked whether they felt competent upon the completion of their training, no officer

responded with “strongly disagree,” although 26 percent of them expressed that they did not feel a need for training on crash reporting. Table 6.7 shows that only 78 percent of the officers felt competent to fill out the crash report after receiving training.

Table 6.7 Responses for “Do you believe that upon completion of your training, you were competent on how to fill out the crash report form?”

Responses	**Idaho**		**Oregon**		**Washington**	
Strongly Agree	6	(10%)	7	(16%)	20	(25%)
Agree	40	(67%)	22	(51%)	48	(61%)
Neither Agree nor Disagree	10	(17%)	9	(21%)	9	(11%)
Disagree	4	(7%)	5	(12%)	2	(3%)
Strongly Disagree	0	(0%)	0	(0%)	0	(0%)
TOTAL	60		43		79	

6.2.3 Distracted Driving

Participants were asked several questions about the distracted driving field on the crash report form from their state. The questions asked whether the officer felt that the form accurately captured all necessary information associated with driver distraction during a crash, and whether they felt that improvements could be made to the form to gather additional useful information. The survey also asked whether it was difficult to obtain the information necessary to complete the existing distracted driving section and whether they believed this section of the form could be revised to promote simplicity.

One such question asked, “Do you think this [section] accurately captures all the information relating to driver distraction during a crash?” Figure 6.4 shows that approximately two-thirds of officers surveyed in Washington and Idaho believed that their form was sufficient, but only 50 percent of officers in Oregon thought that the crash report form collected enough information. While a majority were content with the current version of the form, the number of

officers surveyed who responded with “no” warrants further examination of the crash report field.

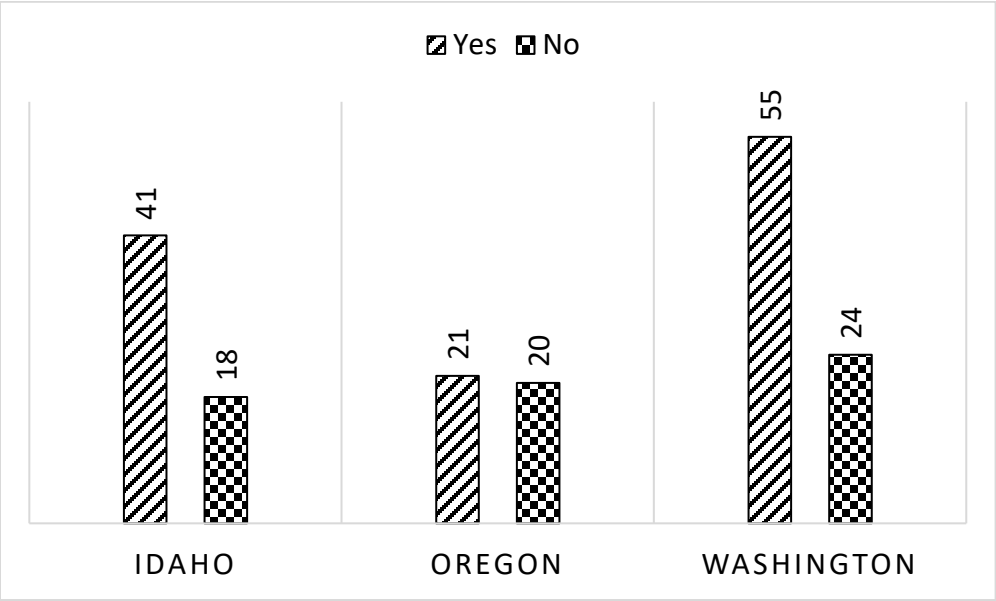

Figure 6.4: Responses for “Does the current version of the crash report form collect enough information about distracted driving crashes?”

When presented with an alternate version of the form consistent with the current MMUCC recommendations, most officers agreed that some form changes should be made to add details about the type of distraction present at the time of the crash (figure 6.5). However, as revealed during the interviews, most officers were hesitant to fill out the distraction section of the form unless they are told explicitly that there distractions were present during or preceding the crash.

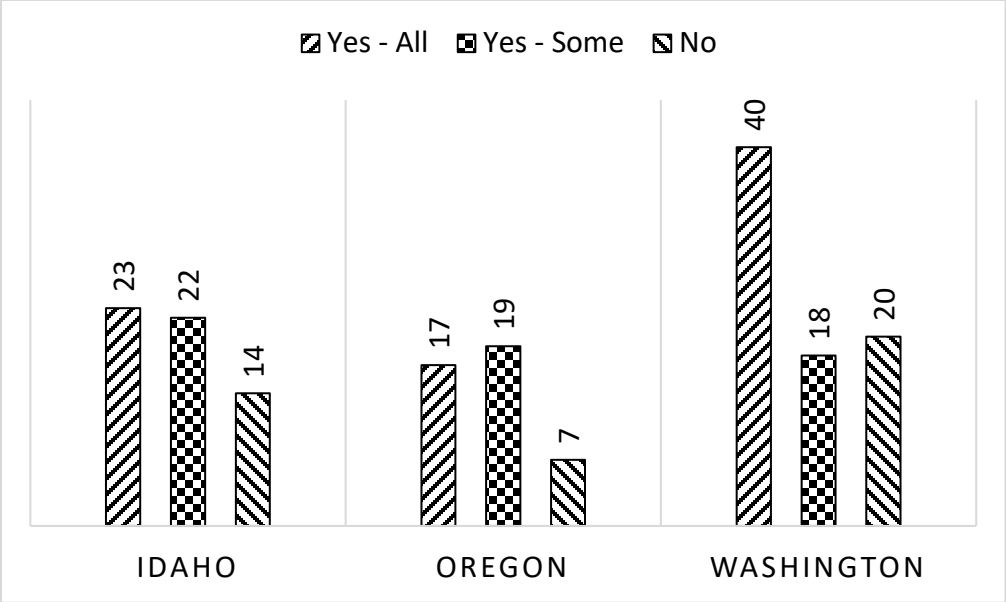

Figure 6.5: Responses for "Should a field be added to identify type of distraction?"

The responses from the survey confirmed that most officers felt that it was hard for them to gather information to fill out the distracted driving portion of the report. When asked, "Do you believe that gathering information for the following crash report is difficult to correctly obtain in the field?" most officers in Washington, Oregon, and Idaho agreed (see table 6.8).

Table 0.2: Responses for "Is it difficult to obtain the data required to fill out the distracted driving section of the report?"

Responses	**Idaho**		**Oregon**		**Washington**	
Strongly Agree	5	(8%)	9	(21%)	11	(14%)
Agree	19	(32%)	10	(23%)	26	(33%)
Neither Agree nor Disagree	16	(27%)	8	(19%)	15	(19%)
Disagree	16	(27%)	12	(28%)	22	(28%)
Strongly Disagree	3	(5%)	4	(9%)	5	(6%)
TOTAL	59		43		79	

6.2.4 Work Zones

The survey presented participants with the current portion of the crash report form used in their state to record whether a crash occurred in a work zone. A follow-up question asked, "Do you believe that this collects enough information about a crash occurring in a work zone?" The responses confirmed that a majority of law enforcement officers surveyed believed that their crash report form contained all necessary information. However, as shown in figure 6.6, one-third of respondents said that they believed that the form did not collect enough information. Washington state's crash report form does not have a section specifically identifying whether a crash occurs in a work zone, but approximately two-thirds of respondents believed that the form collected enough information.

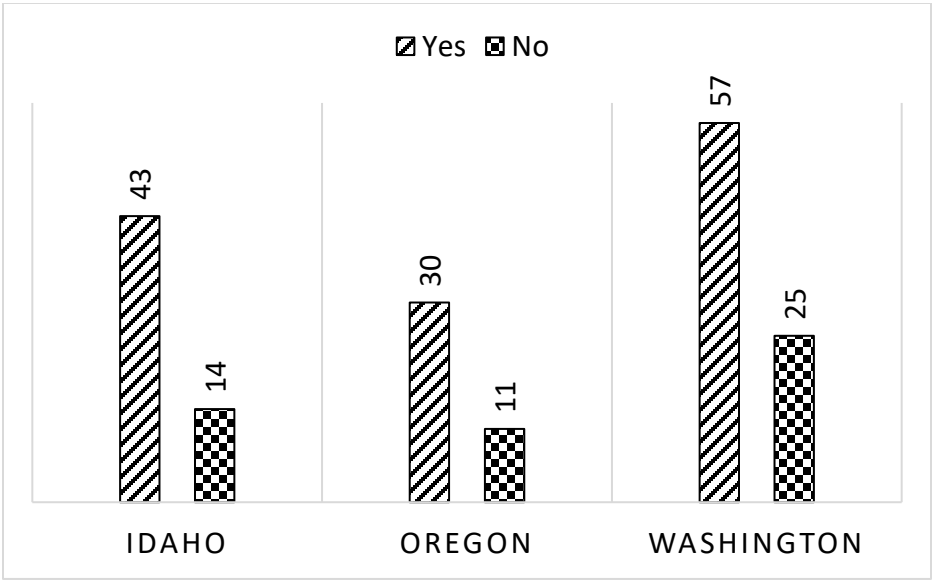

Figure 6.6: Responses for "Does the current version of the crash report form collect enough information about work zone crashes?"

When presented with an alternative design for the work zone field (based on the Alaska crash report), most officers agreed that more fields, such as the type of work zone, would be beneficial (see figure 6.7). This indicates that officers who responded that the current crash

report form was sufficient with regard to work zones may not have been previously presented with alternatives. As supported from the interviews, officers were generally accepting of the current crash report format but did not consider how it could be improved without additional prompting.

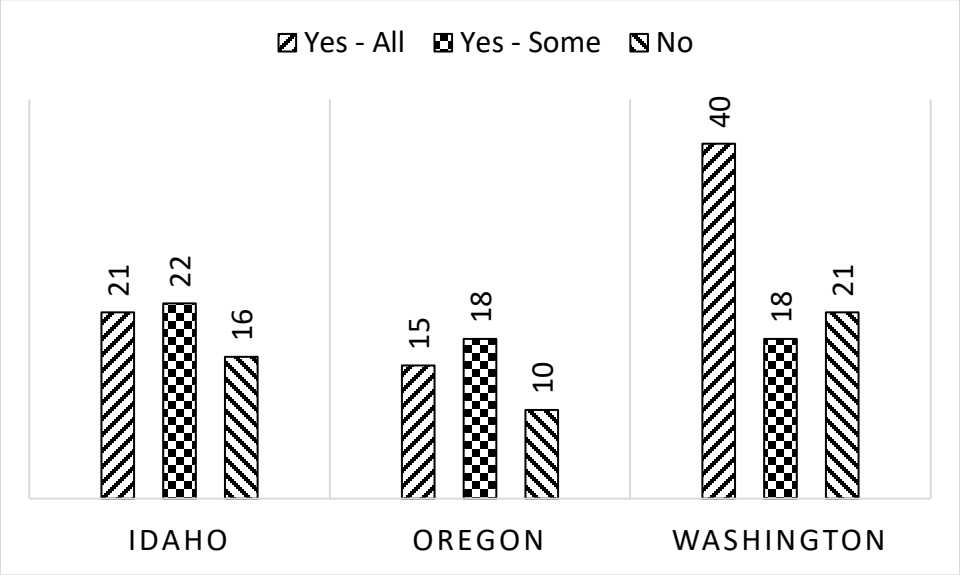

Figure 6.7: Responses for "Should a field be added to differentiate the type of work zone?"

When asked, "Do you believe that gathering information for the following work zone crash report section is difficult to correctly obtain in the field?" a majority of officers answered in agreement (see table 6.9). This supports information gathered in the interviews: officers were confident in their ability to determine whether a crash occurred in a work zone, but the same criteria may not be used consistently across different agencies or even within agencies. If a field were to be added to differentiate a work zone (figure 6.7), it might clear up confusion on how to fill out the form and define a work zone. More descriptive fields in the work zone section would create a clearer picture of the conditions at the time of the accident and make it easier for officers to know how to report the crash.

Table 6.9 illustrates that most officers did not agree that it is difficult to complete the work zone field of the form. However, as evidenced by the in-person interviews, not all officers were using the same definition of a work zone but simply assumed that their definition was correct.

Table 6.9: Responses for "Is it difficult to gather the information needed to complete the work zone field of the report?"

Responses	**Idaho**		**Oregon**		**Washington**	
Strongly Agree	0	(0%)	2	(5%)	0	(0%)
Agree	6	(8%)	3	(7%)	7	(12%)
Neither Agree nor Disagree	29	(38%)	12	(29%)	25	(43%)
Disagree	34	(44%)	15	(36%)	21	(36%)
Strongly Disagree	8	(10%)	10	(24%)	5	(9%)
TOTAL	77		42		58	

Chapter 7: Conclusions and Recommendations

The primary objective of this research was to document the process by which crash data are collected and archived in the Pacific Northwest and determine how errors or inconsistencies may be introduced. The process flow diagrams showing data collection (at the scene of the crash) to statewide data recording highlight opportunities for improvement by handlers during review. Additionally, this research discovered that officers within the same state or agency gauge improvement opportunities differently. Many officers expressed that they feel there is opportunity for improving the crash report form with regard to flow and type of questions asked.

The findings from this research support the need for both streamlining and standardizing crash report forms. The states of Alaska and Oregon record both citizen and law enforcement crash reports, whereas Idaho and Washington record only law enforcement reports. Idaho and Washington submit through electronic platforms, whereas Alaska submissions are 70 percent electronic and 30 percent on paper, and Oregon submissions are split equally. The revision process for each state is similar at the agency level (a superior officer reviews the recording officer's crash report and submits it to the state), although once the agency has submitted the crash report to the state, the manner in which the states process the identifiers on the crash report form differs. Citizen reports are combined into official reports in Alaska and Oregon, whereas Washington refines almost all elemental data from the agency level and Idaho uploads the information as submitted by the recording officer. The officers interviewed agreed that the most important element of good data output is good data input. Officers also noted the importance of accepting and understanding the information needed in an investigation of a crash, how the information is captured on the crash report, and the value of good, continuous training.

Upon conclusion of the officer interviews, it was apparent that there are significant opportunities to improve crash report forms and officer training practices. Many officers claimed that they have expressed their opinions to improve crash reporting to their superiors but little has changed over the years. Many officers said that they felt that training is the key to successful crash data collection. Additional training allows for more constructive feedback opportunities early in the process, leading to the reduced need for corrections in the later review stages. Increased training for officers would also help to address confusion about how to complete certain fields of the form, including those describing work zone and distracted driving crashes. Officers from the same agency are not using consistent definitions when completing these sections; this could be addressed by an increased or more robust training schedule, as well as more consistent statewide or regional definitions.

Officers from Idaho and Washington acknowledged the electronic-only platform and elaborated on its benefits in comparison to paper forms. Some officers felt that simplifications could be made to the crash report forms to aid in their investigation of a crash while other officers felt that more details could be included. Given the opportunity to improve the flow and structure of the crash report forms, a regional survey was structured to gather more details on sections that need improvement.

The officer responses from the regional survey provide further insight into the areas of possible improvement. The responses from Idaho and Washington were nearly identical. The majority of officers in those two states felt that the crash report forms did not adequately capture a crash completely, and there were issues with the crash report capturing details despite similar crash investigation procedures. On the other hand, officers in Oregon felt that the crash report captured enough detail. The results from the regional survey also highlighted the need for more

and better training, with the methods of properly and effectively documenting each field investigation cited as a primary topic.

The responses received as part of this research effort included law enforcement officers with years of service ranging from less than one year to nearly 40 years. Because these individuals collect and submit the data, their narrative supports the need to further streamline and standardize crash reporting processes.

7.1 Recommendations

Although the MMUCC was established in 1998 to encourage greater uniformity in crash data collection, identifying minimum motor vehicle crash data elements and their attributes that states should consider collecting and including in their state crash data system, improvement opportunities still remain. Although the MMUCC is now in its fifth edition and NHTSA states that it allows for even more flexibility and that enhanced data collection efforts will improve data quality, many states that have still not fully embraced the recommended changes.

State officials from Idaho claimed that "to change the crash report is a big process. The goal behind the crash report is to make it more MMUCC compliant, [though it takes] a team put together with law enforcement and ITD [to get] data needed, as well as what law enforcement wants on it." That is, there are many stakeholders involved that would be affected by changes to the crash report forms. A state official from Oregon mirrored this observation by saying:

> "Each time a form reaches its natural reorder point or a statute affecting the form is implemented, the form will go out for a formal review by the stakeholders. For the crash report form, major stakeholders include: DMV, Oregon Transportation Development Division, Oregon State Police, Oregon Transportation Safety Division, and insurance representatives. This review gives

the stakeholders a chance to make any edits they deem necessary to the crash report form. If a revision does occur, the revised form will be drafted and sent out for second review; this review process will repeat until all stakeholders agree with the revisions made to the form."

Despite the MMUCC being a voluntary guideline, an effort should be made to establish a standard from these guidelines. The data elements incorporated into the MMUCC are deemed necessary and comprehensive for states to follow, so why are states not complying? It is understood that situational identifiers differ among states; for example, snow will not be a contributing factor in Florida as it could be in Idaho. If all states were to use an electronic platform, then this information could be retained on the crash report form; the system could be programmed to recognize patterns in submission and not display inapplicable elements, such as snow, as a feature. This recognition-type programming is present within Washington's SECTOR; the software records typical responses and provides them at the top of drop-down selection menus when the officer is filling out the crash report. Spelling of street names and labeling of type (street, boulevard, lane, court etc.) are also patterned, which provides streamlined filing of crashes within cities and counties.

It is assumed that if all states used the same interface for data collection, all forms of processing would be streamlined, making the available data collectively better and more consistent for all users.

7.2 Future Work

This study has initiated the narrative of officers in the Pacific Northwest and their thoughts on streamlining and standardizing crash reporting. A logical next step would be to assess additional states and to determine whether trends were similar in other sections of the

nation. A comparison among narratives could confirm whether electronic platforms should be implemented in every state, whether citizen reporting is necessary for good data, and whether additional federal funding should be dedicated to train officers on the importance and methods of data collection. This could be done by issuing a national survey or conducting targeted regional research efforts.

Another suggested effort could examine what sections each state uses and does not use from the MMUCC and capture \ narratives about why and which stakeholders are responsible for those decisions. A restructuring of a single electronic platform could be administered throughout the country and used to compare data collection efforts, thereby aiding in improvements to software applications and streamlining future efforts.

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Appendix A Interview

PacTrans Focus Group Questions Guide

1. Introductions

Hello, [name of officer]. My name is [Ellie Simpson/Shane Warmbrodt] and I am a graduate student at the [Oregon State University/University of Idaho]. I am working on a project with [the University of Idaho/Oregon State University] that is focused on crash data collection and processing. The goal of this conversation is to establish a foundation that will help us in making a regional survey.

I would like to begin by confirming that all of your answers will be held confidential.

If you do not understand a particular question please ask me to clarify. You can chose not to answer any particular question at any time, and if at any point you wish to stop the interview for any reason it is absolutely acceptable to do so.

i. Expected time of interview - 20 minutes

2. Description of research project

a. PacTrans
   i. PacTrans project is examining crash reporting in the Pacific Northwest.
b. Outline of project
   i. To overlook crash reporting process that maximizes usability, accuracy, and accessibility for incident responders, local and state agencies, citizens, and academics.
   ii. To determine where errors occur in the reporting process, and what the root causes of those errors are;
   iii. Explore the reporting of pedestrian and bicycle crashes and determine if there are opportunities to address any missing needs.

We'd like your help with our research project: Our goal is to examine crash report forms and try to establish how you record and input the information after a crash occurs.

We have about 20 questions that will aid in our studies:

So let's get started.

3. Questions

First I have some general questions that relate to the process of reporting the crash report forms.

1) Which agency do you work for?
2) How many years have you worked in law enforcement?
3) When you are at the site of a crash, do you complete a crash report form on paper or online?
4) How long does it normally take to fill out a crash report form?
5) When is this crash report form submitted after the crash occurrence?
6) Who is the crash report form submitted to?
    a. Is there a specific person?
7) Is there a different protocol for the completion of a crash report form if there is a fatality?
    a. Is the information compared to the Trauma Data from the hospital before submission?

Next I just have several short questions regarding the crash report forms themselves. I have reviewed forms in Idaho, Washington, Alaska, and Oregon and they all vary slightly. Some states have lengthy forms, while others do not. In your opinion:

8) If there is confusion with an element of your crash report form after submission, are you contacted?
    a. Or is it more common to have someone else make the correction?
9) What part(s) of the crash report form do you think could be consolidated?
10) Is there anywhere on the crash report form that you think should be more detailed?
11) What is the most difficult information to determine and record while at the scene of a crash?
    a. [Follow-up question] How are "contributing factors" changed (if ever) if more information of the incident surfaces after the crash, for example, the driver is not coherent at the scene and therefore can't explain how the crash happened.
12) Is the current crash report form missing any key details? (i.e., a distracted driving section)
13) Do you feel that the crash report form appropriately captures a crash caused by distracted driving?
14) Do you like the check box or bubble section of the crash report form more than the paragraph section of the crash report form?

15) How do you determine is an incident is work zone related?
16) In your opinion, is there any information related to work zone crashes that is currently not recorded on the crash report form?
17) How many work zone related crashes are you responsible for documenting in a crash report annually?
18) What is the most common contributing factor to a work zone related crash?

And lastly, in your opinion:

19) Is there any information related to bicycle or pedestrian crashed that is currently not recorded on the crash report form?

4. Thank you and conclusion

Thank you so much for you time. Your information today will aid in creating a regional survey that we will send out to agencies in the coming month.

If there is any of your colleagues that you believe would be willing to answer these questions could you pass on my information to them, or could you provide me with theirs?

This conversation has been my pleasure, again thank you for your time. Please feel free to contact me back anytime. And if there be the reason for me to contact you back is e-mail the best or do you have another means of contact that you wish I would use? Thank you, have a wonder rest of your day.

Appendix B Regional Survey Distribution E-mail

Good [Morning/Afternoon] [Officer Rank] [Officer's Last Name],

My name is Shane Warmbrodt and I am a graduate student at the University of Idaho. I am working on a thesis project that is focused on crash report form data collection and processing. We currently are distributing an online confidential survey throughout the Pacific Northwest, and your agency was randomly selected.

Your responses are needed for our analysis. The feedback provided will help us to better understand how crashes are recorded and gather opinions on the presentation and effectiveness of the current crash report form. The survey will take each participant approximately 5 to 10 minutes to complete.

In order to obtain statistically valid results, we need to gather a sufficient number of responses. Would you be amenable to helping us distribute our survey through your contact lists and listservs? If so, please send a quick reply that you received this and please forward this message with the provided survey link.

Thank you very much in advance for supporting our transportation safety efforts in the Pacific Northwest. Please feel free to contact me if you have any follow-up questions.

Copy and paste the URL below into your internet browser:
https://uidaho.co1.qualtrics.com/jfe/form/SV_78Oc70ACwhEdXMh?Q_CHL=e-mail

Appendix C Regional Survey

PacTrans Crash Reporting Process

Start of Block: Intro Slide

The University of Idaho, in partnership with Oregon State University, requests a few minutes of your time. We seek your insights on crash data collection and processing and we recognize that this process typically begins when a crash occurs and is documented by you, the responding officer.

The purpose of this survey is to better understand how you record such an incident and to gather your opinion on the presentation and effectiveness of the current crash report form. At the conclusion of this study we hope to construct a comprehensive narrative as to how: officers complete a crash report, report revisions are processed, and the crash reporting process could be enhanced.

This project has been approved by the University of Idaho's IRB office. Your responses are confidential and will only be used for this study. Only general outcomes will be reported and no responses will be linked to you or your agency.

End of Block: Intro Slide

Start of Block: Information on performing crash collection

Performing Crash Reports

Q1. When was the last time you completed a crash report?

- ○ Within the last week
- ○ Within the last month
- ○ Within the last year
- ○ Over a year
- ○ Not applicable/never

Q2. What type of crash report form do you typically submit?

- ○ Electronic form
- ○ Paper form

Display This Question:
If What type of crash report form do you typically submit? = Electronic form

Q2a. How do you typically transmit the electronic form?

- ○ Internet portal
- ○ Flash drive
- ○ E-mail
- ○ Other (please specify) _____

Display This Question:
If What type of crash report form do you typically submit? = Paper form

Q2b. How do you submit the paper form?

- ○ Paper in hand/on desk
- ○ Mail to
- ○ Other (please specify) _____

Q3. On average how many crash reports do you complete in a weekly basis?

_____

Q4. How long does it typically take to fill out the [electronic or paper] crash report form once all data are obtained?

- ○ Less than a 30 minutes
- ○ 30 minutes to less than 1 hour
- ○ 1 hours to less than 2 hours
- ○ 2 hours or more

Q5. Who do you typically submit the crash report forms to?

- ○ Commander
- ○ Sergeant
- ○ Officer in Charge
- ○ Secretary
- ○ Other (please specify) _____

Q6. In a typical calendar year, how many crash reports do you receive back for revisions?

- ○ None
- ○ Other (please specify) _____

Display This Question:
If In a typical calendar year, how many crash reports do you receive back for revisions? != None

Q6a. Who typically communicates to you revisions need to be made?

- ○ Internal agency (i.e., by a supervisor)
- ○ External agency (i.e., by state DOT)
- ○ Other (please specify) _____

Display This Question:
If In a typical calendar year, how many crash reports do you receive back for revisions? != None

Q6b. What is the most common revision that needs to be made on crash reports?

- ○ Driver/Vehicle information
- ○ Insurance information
- ○ Location description/drawing
- ○ Contributing factor(s)
- ○ Events leading to crash
- ○ Other (please specify) _____

End of Block: Information on performing crash collection

Start of Block: Opinion on the form itself

Opinions of Crash Report Forms

Q7. Do you believe that the crash report is structured to match the flow of your investigation process?

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Agree
- ○ Strongly agree

Q8. Do you believe that your crash report form adequately captures the incident?

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Agree
- ○ Strongly agree

Q9. Do you believe that your crash report form should be revised to capture more details on the following sections?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Distracted Driving	○	○	○	○	○
Work Zones	○	○	○	○	○
Bicycle	○	○	○	○	○
Pedestrians	○	○	○	○	○

Q10. Do you believe that gathering information for the following crash report is difficult to correctly obtain in the field?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Distracted Driving	○	○	○	○	○
Work Zones	○	○	○	○	○
Bicycle	○	○	○	○	○
Pedestrians	○	○	○	○	○

End of Block: Opinion on the form itself

Start of Block: Distraction and Work Zone State Specific Questions

The following questions are in regards to distractions and work zones related information on your state's crash reports.

Q11. What state do you work in?

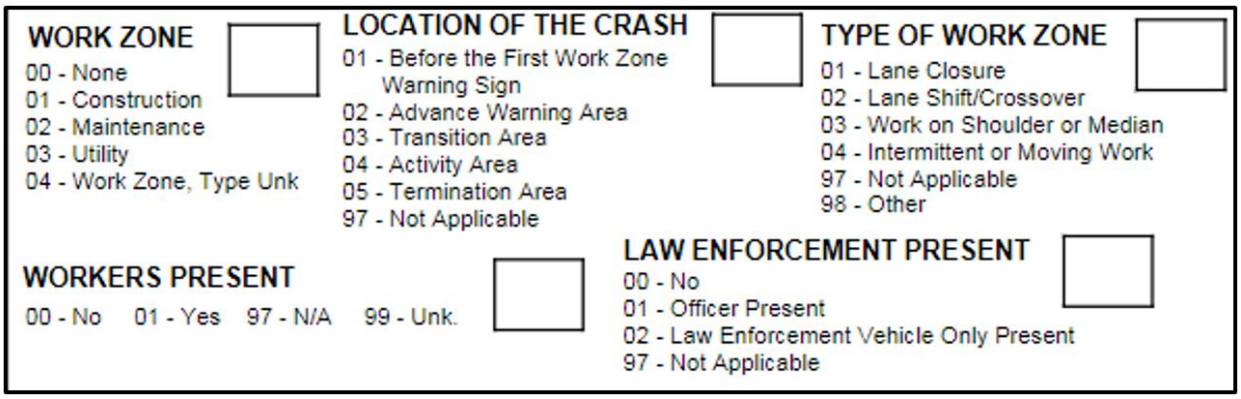
- ○ Alaska
- ○ Idaho
- ○ Oregon
- ○ Washington
- ○ Other (please specify) _____

Q12. How many years have you worked in this state?

_____

Display This Question:
If What state do you work in? = Alaska

Q13a. This is the current portion of the crash report form used in your state that records whether a crash occurred in a work zone.



Do you believe that this collects enough information about a crash occurring in a work zone?

- Yes
- No

Display This Question:
If What state do you work in? = Idaho

Q13b. This is the current portion of the crash report form used in your state that records whether a crash occurred in a work zone.

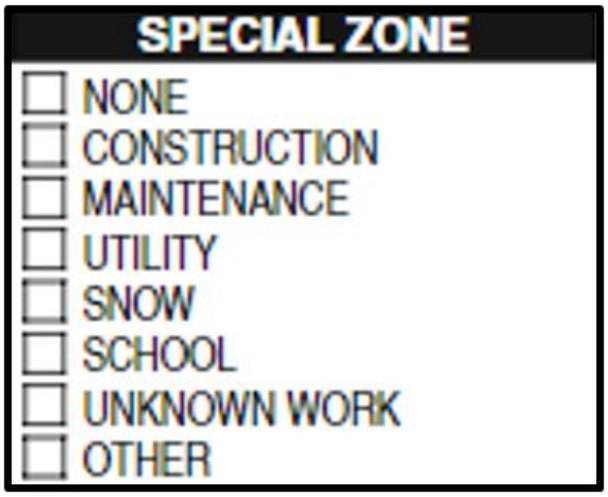
Work Zone Crash Location		1 Before the First Work Zone Warning Sign 2 Advance Warning Area 3 Transition Area 4 Activity Area (Work incident area) 5 Termination Area
Work Zone Type		1 Lane Closure 2 Lane Shift / Crossover 3 Intermittent or Moving Work 4 Work on Shoulder or Median 9 Other
Work Zone Workers Present		Y Yes N No -U Unknown
Work Zone Law Enforcement Present		1 No 2 Officer Present 3 Law Enforcement Vehicle only

Do you believe that this collects enough information about a crash occurring in a work zone?

- Yes
- No

Display This Question:
If What state do you work in? = Oregon

Q13c. This is the current portion of the crash report form used in your state that records whether a crash occurred in a work zone.



Do you believe that this collects enough information about a crash occurring in a work zone?

- Yes
- No

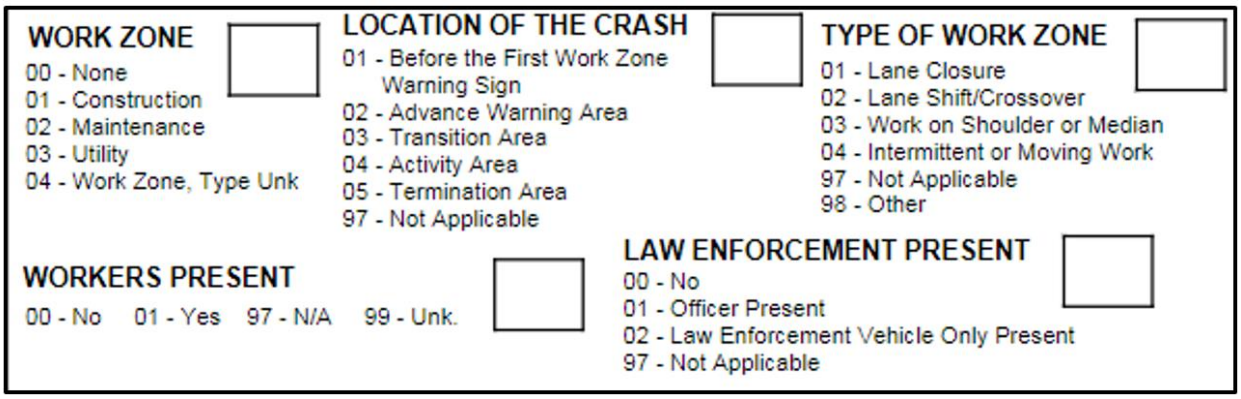
Display This Question:
If What state do you work in? = Washington

Q13d. There is currently no section of the crash report specifically capturing data about an accident occurred in a work zone in your state. Do you feel that a section should be added to the form to record this information?

- Yes
- No

Display This Question:
If What state do you work in? != Alaska

Q13e. The following figure is from the Alaska crash report form. This includes a field to identify the type of work zone.

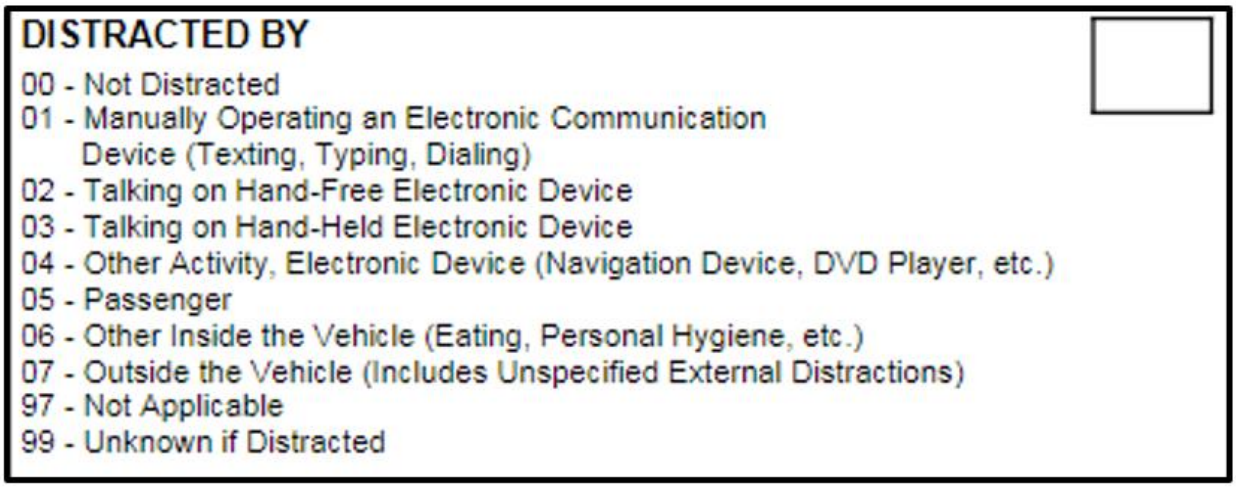


Do you think that a similar field should be included in the form from your state?

- Yes - all
- Yes - some
- No

Display This Question:
If What state do you work in? = Alaska

Q14a. This is the current portion of the crash report form used in your state that records whether a driver was distracted at the time of the crash.

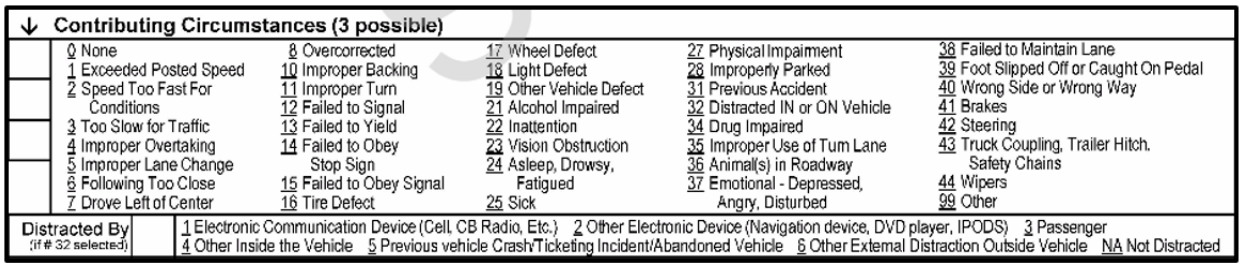


Do you think this accurately captures all the information relating to driver distraction during a crash?

- ○ Yes
- ○ No

Display This Question:
If What state do you work in? = Idaho

Q14b. This is the current portion of the crash report form used in your state that records whether a driver was distracted at the time of the crash.



↓ Contributing Circumstances (3 possible)

	0 None	8 Overcorrected	17 Wheel Defect	27 Physical Impairment	38 Failed to Maintain Lane
	1 Exceeded Posted Speed	10 Improper Backing	18 Light Defect	28 Improperly Parked	39 Foot Slipped Off or Caught On Pedal
	2 Speed Too Fast For Conditions	11 Improper Turn	19 Other Vehicle Defect	31 Previous Accident	40 Wrong Side or Wrong Way
	3 Too Slow for Traffic	12 Failed to Signal	21 Alcohol Impaired	32 Distracted IN or ON Vehicle	41 Brakes
	4 Improper Overtaking	13 Failed to Yield	22 Inattention	34 Drug Impaired	42 Steering
	5 Improper Lane Change	14 Failed to Obey Stop Sign	23 Vision Obstruction	35 Improper Use of Turn Lane	43 Truck Coupling, Trailer Hitch, Safety Chains
	6 Following Too Close	15 Failed to Obey Signal	24 Asleep, Drowsy, Fatigued	36 Animal(s) in Roadway	44 Wipers
	7 Drove Left of Center	16 Tire Defect	25 Sick	37 Emotional - Depressed, Angry, Disturbed	99 Other

Distracted By (if # 32 selected)

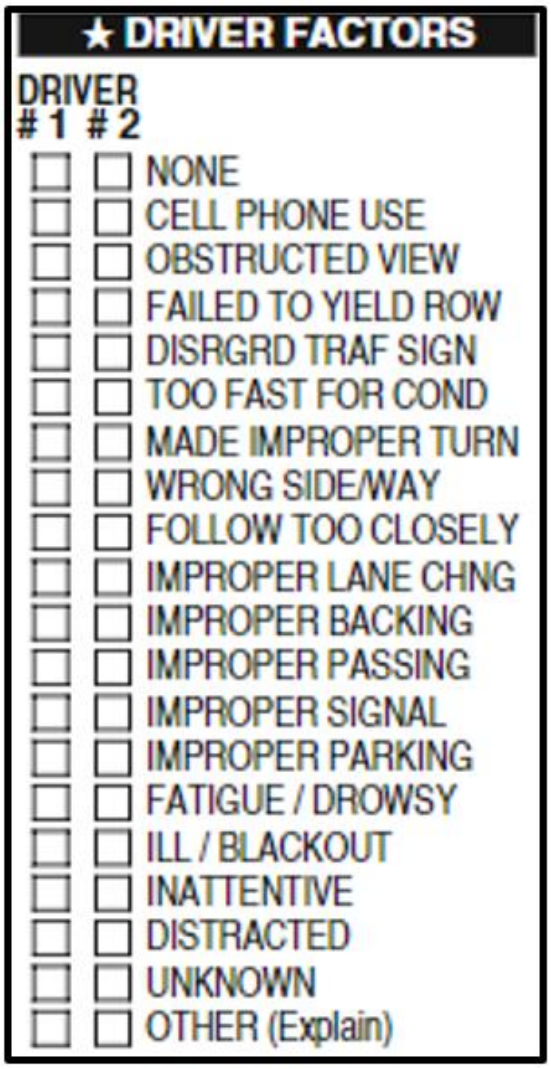
1 Electronic Communication Device (Cell, CB Radio, Etc.) 2 Other Electronic Device (Navigation device, DVD player, IPODS) 3 Passenger
4 Other Inside the Vehicle 5 Previous vehicle Crash/Ticketing Incident/Abandoned Vehicle 6 Other External Distraction Outside Vehicle NA Not Distracted

Do you think this accurately captures all the information relating to driver distraction during a crash?

- Yes
- No

Display This Question:
If What state do you work in? = Oregon

Q14c. This is the current portion of the crash report form used in your state that records whether a driver was distracted at the time of the crash.

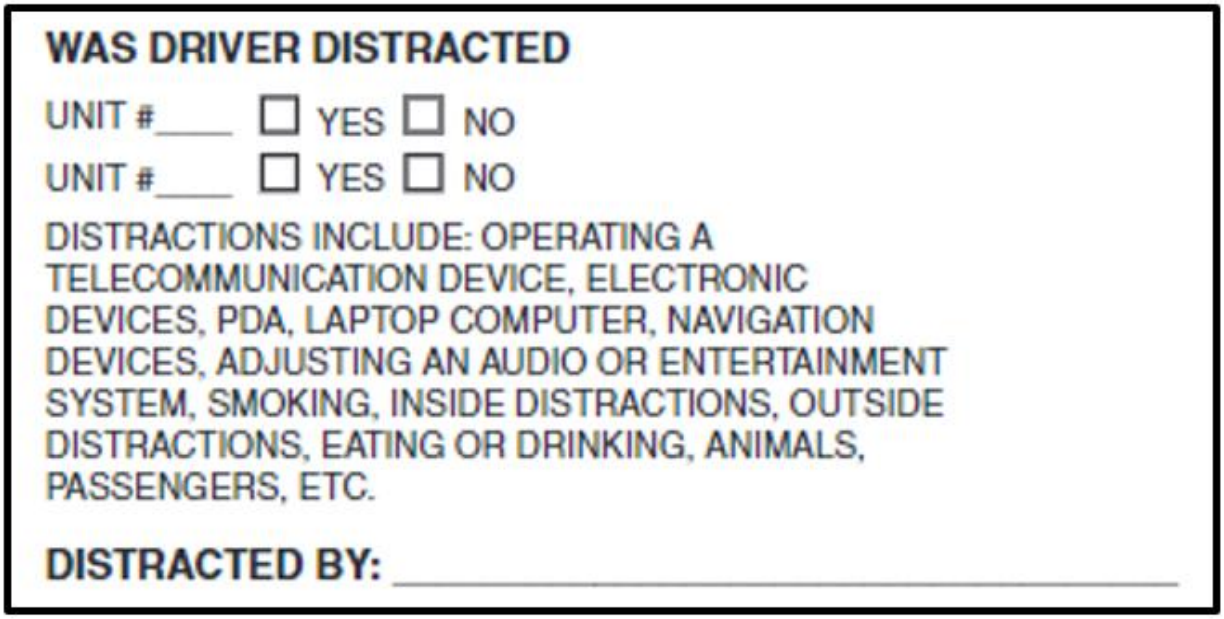


Do you think this accurately captures all the information relating to driver distraction during a crash?

- Yes
- No

Display This Question:
If What state do you work in? = Washington

Q14d. This is the current portion of the crash report form used in your state that records whether a driver was distracted at the time of the crash.

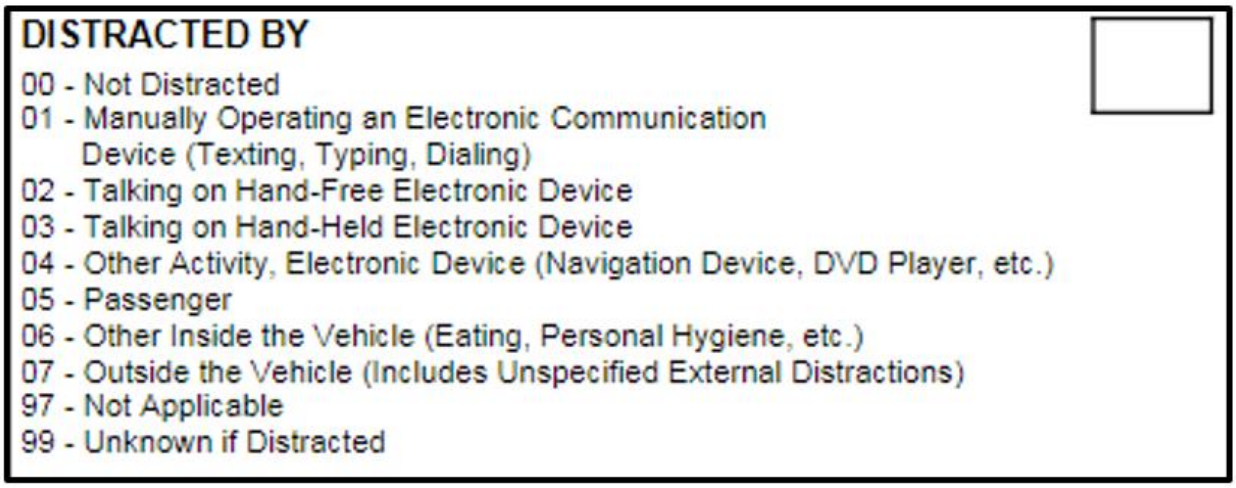


Do you think this accurately captures all the information relating to driver distraction during a crash?

- ○ Yes
- ○ No

Display This Question:
If What state do you work in? != Alaska

Q14e. The following figure is from the Alaska crash report form. This includes a field to identify the type of distraction.



Do you think that a similar field should be included in the form from your state?

- ○ Yes - all
- ○ Yes - some
- ○ No

End of Block: Distraction and Work Zone State Specific Questions

Start of Block: Block 8

Training Questions

Q15. Have you been trained on how to fill out the crash report forms?

- ○ Yes
- ○ No

End of Block: Block 8

Start of Block: Training Questions

Display This Question:
If Have you been trained on how to fill out the crash report forms? = Yes

Q15a. When was your last training?

- ○ Within the last year
- ○ 1 year to less than 3 years
- ○ 3 years to less than 5 years
- ○ 5 years or more

Display This Question:
If Have you been trained on how to fill out the crash report forms? = Yes

Q15b. Who performed your training?

- ○ State agency (DOT)
- ○ Your agency
- ○ Other (please specify) _____

Display This Question:
If Have you been trained on how to fill out the crash report forms? = Yes

Q15c. Is there continued training at your agency?

- ○ Yes
- ○ No

Display This Question:
If Is there continued training at your agency? = Yes

Q15d. How frequent is the continued training?

- ○ Quarterly
- ○ Yearly
- ○ Every two years
- ○ Every 3+ years

Display This Question:
If Is there continued training at your agency? = Yes

Q15e. Does your training allow for feedback to changing the crash report forms?

- ○ Yes
- ○ No

Display This Question:
If Have you been trained on how to fill out the crash report forms? = Yes

Q15f. Do you believe that upon completion of your training, you were competent on how to fill out the crash report form?

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Agree
- ○ Strongly agree

Display This Question:
If Have you been trained on how to fill out the crash report forms? = Yes

Q15g. Did your training adequately explain the importance of the data collection elements on the crash reports?

- ○ Yes
- ○ No

Q16. Do you believe there is a need for training of crash reporting?

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Agree
- ○ Strongly agree

End of Block: Training Questions

Start of Block: Demographic Information

Basic Demographic Information

Q17. What agency type do you work for?

- ○ Local
- ○ Tribal
- ○ County
- ○ State
- ○ Other (please specify) _____

Q18. How many years have you worked at this agency?

_____

Q19. How many years have you worked in law enforcement overall?

_____

Q20. What is your age?

- ○ Less than 25
- ○ 26 to 45
- ○ 46 to 64
- ○ 65 or older
- ○ Prefer not to answer

Q21. What is your gender?

- ○ Female
- ○ Male
- ○ Prefer not to answer

End of Block: Demographic Information

Start of Block: Final notes page

Q22. Please feel free to share any additional thoughts regarding crash reporting of the training process here.

_____

End of Block: Final notes page