CRASH REPORTING IN THE PACIFIC NORTHWEST:

AN ASSESSMENT UTILIZING LAW ENFORCEMENT NARRATIVES

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by

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AUTHORIZATION TO SUBMIT THESIS

This thesis of Shane G. Warmbrodt, submitted for the degree of Master of Science with a Major in Civil Engineering and titled "CRASH REPORTING IN THE PACIFIC NORTHWEST: AN ASSESSMENT UTILIZING LAW ENFORCEMENT NARRATIVES" has been reviewed in final form. Permission, as indicated by the signatures and dates below, is now granted to submit final copies to the College of Graduate Studies for approval.

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ABSTRACT

There were nearly 6.3 million traffic crashes reported in the United States in 2015, and vehicle crashes resulted in over 2.4 million injuries and 35,485 fatalities. In the Pacific Northwest, there were 1,231 fatalities on public roads in 2015. The documentation process for every crash begins at the scene of the incident with information gathered by a member of the law enforcement community or by the private citizen(s) involved in the crash. This information is subsequently transmitted to a local or state agency for data entry, processing, and aggregation for the purpose of future analysis. Given the sheer volume of incidents and the requirement of multiple handoffs between different stakeholders, the likelihood for transmission error and interpretation deviation necessitate a comprehensive cradle-to-grave examination of this reporting process in the Pacific Northwest. Furthermore, each state has developed its own independent tracking system, thereby rendering data comparisons across state boundaries to be inconsistent. This reality presents a barrier to strategic safety planning on a regional scale. These collective issues justify the need to examine crash reporting and identify a process where data entry is streamlined to best meet the needs of all system users including: law enforcement, local and state agency data analysts, national and state agency safety officers, and researchers and academicians who must rely on good data to draw conclusions and recommend purposeful safety improvements.

The objectives for this project specifically responded to current gaps in research and identified a methodology to benefit system users: fully document the crash reporting process in the Pacific Northwest (Alaska, Washington, Idaho, and Oregon) and identify the differences that exist, determine where the introduction of errors occurs in each state's reporting process and what the root causes of those errors are, and develop a reporting process that minimizes the introduction of errors while maximizing the robustness of crash archives.

The availability of consistent, high quality data will support regional transportation safety decision-making, a critical resource not currently available in the Pacific Northwest.

ACKNOWLEDGEMENT

DEDICATION

This work is dedicated to my mother Tina Maria Warmbrodt, and all my friends, local and far, for believing in me. Their constant encouragement and everlasting support throughout my studies have given me the strength to continue my dream. Without their guidance and moral support, this would not have been possible.

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ACRONYMS AND ABBREVIATIONS

ACN	Automatic Collision Nonfiction
ADOT	Alaska Department of Transportation
AK	Alaska
CAC	Collision Analysis Corridor
CAL	Collision Analysis Location
CAR	Crash Analysis Reporting
CARE	Critical Analysis Reporting Environment
CDR	Crash Data Repository
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 Recorders
eIMPACT	electronic Idaho Mobil Program for Accident Collection
EMS	Emergency Medical Services
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
HAS	Highway Analysis System
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
SECTOR	Statewide Electronic Collision and Ticketing Online Records
SQL	Structured Query Language
TxDOT	Texas Department of Transportation

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

CHAPTER 1: INTRODUCTION

1.1 PROBLEM STATEMENT

Fatal traffic accidents increased by 7.2 percent on U.S. roadways to over 35,000 in 2015 and recorded injuries increased by roughly 4 percent to over 2.4 million in the same time period (NHTSA, 2016). A collective analysis of state crash reports conducted by the National Highway Traffic Safety Administration (NHTSA) showed that nearly 6.3 million police crash report forms were submitted and processed in 2015. With such a large number of crashes, final recording of this data, which may include processing and interpreting by numerous people, requires multiple hand-offs during the entry process, and the potential for error increases as data pass through each the transmittal stage.

The number of hand-offs and handlers required can be dependent upon the: amount of staff at each agency, size of their dispatch jurisdiction, quantity of crashes being processed, and public population size of the jurisdiction. For instance, smaller agencies may not have the resources to perform complete crash investigations and will 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 are reviewed by some form of approval process prior to transmission. For some agencies, this is one person of higher authority, while with other agencies there may be multiple people confirming certain attributes of the crash report form. This process has not been fully captured for each individual agency in each state, though some foundational information is regulated by federal law.

1.2 OBJECTIVE OF RESEARCH

The scope of this research is to assess 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. For this study, the processes currently in place in the states of Alaska, Idaho, Oregon, and Washington were examined through state Department of Transportation (DOT) and law enforcement narratives.

1.3 THESIS OUTLINE

The thesis is divided into two parts: the first part presents foundational information regarding previous research and current methods of data collection in each state, and the second part presents methodology and findings of this research.

PART-I: FRAMEWORK OF CURRENT CRASH REPORTING

Chapter 2: "LITERATURE REVIEW": This chapter summarizes relevant previous and existing research conducted on streamlining crash reporting both in the United States and overseas.

Chapter 3: "CRASH REPORT ELEMENTAL COMPARISION": This chapter compares the systematic flow and recordable information on the crash report forms for each state.

Chapter 4: "STATE-LEVEL STATE-OF-THE-PRACTICE": This chapter narrates the key handlers throughout the process flow of data collection and data processing for each state.

PART-II: LAW ENFORCEMENT NARRATIVES

Chapter 5: "METHODOLOGY" This chapter summarizes the methods used in this research to construct, facilitate, and collect initial data in the interview setting to obtain data for creating the regional survey. The construction, distribution, and collection of the survey data is also discussed.

Chapter 6: "RESULTS" This chapter discusses the relevant findings from the officer interviews and regional survey.

Chapter 7: "ANALYSIS" This chapter describes how a Kruskal-Wallis rank sum (chi-squared) was used to test significance between officer responses from Idaho, Oregon, and Washington from the regional survey to identify the opportunity for improvements in crash reporting practices.

Chapter 8: "CONCLUSION" This chapter includes recommendations and future work suggestions based on the findings from this research.

PART-I: FRAMEWORK OF CURRENT CRASH REPORTING

CHAPTER 2: LITERATURE REVIEW

Every time there is a crash occurring on a non-private road that results in injury or death, a crash report form is created that includes information regarding the people and vehicle(s) involved, contributing factors to the incident, and location. Depending on where the crash occurs, each state and agency type determines its own means of filling out and processing the forms. If there is no evident injury as a result of the crash, each state's requirement for submission is subject to the cost of the damage. According to state DOT and 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 particular crash report form is then reviewed and confirmed by the responsible local or state agency of the responding officer of citizen, and 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 each state had a different: way of data collection, process of data review and confirmation, crash report format, storage method, and database used. 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 & 209	DMV, CDR (Crash Data Repository)	TraCE, Traffic Records Program Traffic and Criminal Software, Oracle	*Old:* HAS (Highway Analysis System) *New:* CARE (Critical Analysis Reporting Environment)
ID	eIMPACT, electronic Idaho Mobil Program for Accident Collection	DOT district level	Downloaded daily to CIRCA (Crash Information Retrieval Collection and Analysis)	WebCARS, access
OR	Paper forms sent to DMV	CAR (Crash Analysis Reporting) unit within DOT gets reports from DMV and inputs (by hand) into FARS and DOT	SQL (IBM software, Structured Query Language)	N/A
WA	SECTOR, Statewide Electronic Collision and Ticketing Online Records, supplied by DOT	DOT	CLAS (Crash Location and Analysis System)	SafetyAnalyst (which replaces CAL/CAC methodology, Collision Analysis Location and Collision Analysis Corridor, as well as IAL, Intersection Analysis Locator)

The handling process of a crash report form is similar between each state. Initially the crash report is created by the responding officer. The reviewing authority then confirms if the responding officer's report is consistent and complete. Finally, there is the submission to the state for final review and filing. Each handler in the process has a review and approval of their work. Once the crash report is approved by all handlers it is transmitted to a state-level database.

The platform used to process a crash report form differs amongst states. Alaska, Idaho and Washington use electronic platforms to create and transmit the initial crash report form, while Oregon uses a paper submission. Each local agency processes the initial report within its own office and provides to their reviewing authority who then submits the documentation to the state. In Oregon, the paper crash report forms are inputted 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 their 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), Oregon uses Structured Query Language (SQL) which is an International Business Machines (IBM) software, and Washington transmits into the Crash Location and Analysis System (CLAS). These databases are used to confirm that the inputted crash data information matches the actual location of the crash and other definable elements. Accessibility of this processed crash data by public and research agencies vary 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 of 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 similarities explaining why collaboration was difficult, and these factors were attributed to "consistency and flow" factors between agencies.

For these reasons, there are three major opportunities for collaboration by internal and external agencies on the crash incident to crash database process: training, software applications, and standardization of the crash report forms and their respective questions.

2.1 TRAINING

When adequate training is provided to law enforcement officers, thorough and accurate completion of the crash report forms, understanding of the information most important on the

crash report forms and the usage of that data, and proper processing of the transmittal can be achieved. Further training includes understanding software improvements that are available to automate, and ultimately, improve crash data collection. Training can be performed several different ways, but due to differences in collection measures a universal approach for training all agencies should be considered. Research opportunities as to what data lack on the forms, what data are not often used, and identifying current best practices of how to transmit the information is key to understanding what training should be performed within each agency.

When a state DOT revises the process of reporting, or the format of the crash report form, there is extensive effort to train the officers. These efforts require corporation between agencies and DOT officials scheduling successful training seminars to inform officers of the new reporting practices. Protentional issues arise as observed in the Texas Department of Transportation (TxDOT) revised Peace Officer's Crash Report form in January 2010. TxDOT held three Train-the-Trainer workshops in Austin to update law enforcement agencies with the new crash report form (CR-3). The goal was to allow agencies from across the state to send representatives to be trained on how to properly complete the form and have they return and train other officers in their respective agencies. It was recorded that approximately 900 officers attended and were trained during these workshops, which is a small representative sample for the state of Texas (TxDOT, 2010). This required the Texas Department of Public Safety (DPS) to facilitate mobile Train-the-Trainer workshops to ensure adequate training throughout the state. These resources sometimes are not available which delays the conformation exchange of changes in the crash reporting practices.

One method of preference for training agencies from the DOT perspective is through online videos that facilitate crash form training sessions. These typically are records of live training sessions that are sent to all agencies in the state and used for training. The state DOT typically sends a memo to each agency with instructions on how to access the training material and provides descriptions of each training session (WDOT, 2016). This method ensures that the changes to crash reporting practices are obtained by all agencies.

Board's *NCHRP Synthesis 350: Crash Records Systems*. Accuracy of data comes from the understanding and continued efforts of making changes to the data collection process. The synthesis (Delucia, B. H., & Scopatz, R. A. 2005) pinpointed that no single crash records

system can be identified as a best practice of approach for reporting, management, and analysis; rather, continued efforts of linking data from different organizations needs to be standardized for improvements to 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 have the capability of submitting 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). The enforcement of citizen reports in Oregon is punishable by a suspension of licensure if no report is performed within 72 hours of the incident. The Department of Motor Vehicles (DMV) warns: "*A police report does not count as filing an accident report with DMV.* [The citizen] *must also file an accident report with DMV*" (ODOT, 2015).

Submission of citizen crash report forms is either in the form of a paper or web-based filing. The data collection that comes from the citizen is similar to the police report and is usually less detailed; however, it can be very valuable with regard to information processing. While agencies have established tutorials explaining their filing process for both the citizen and police officer, 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 crash form walk-through 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 forms are offered based on 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 the advancements in computers and networks and made projections on how they would streamline data collection in the future. With improvements to

electronics in the past decade exceeding beyond Pfefer's projections in web technologies, high-speed wireless connections (such as 4G and soon to be 5G), and radio transmitting, electronic crash data collection becomes increasingly feasible. There have been multiple attempts at software implementation in the patrol car for data collection and processing. An online search conducted in March 2017 revealed that there were over forty 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 while others perform dispatching, writing, and data collection as a complete package, but little research has been conducted comparing all the package platforms against each other. Two popular platforms include SmartCOP and TraCS (SmartCOP, 2008 & 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, the disadvantages are attributed to software troubleshooting. It is a typical assumption if there is a software error, there must be a paper version of the crash report form filed by the officer until troubleshooting is complete, but this introduces the possibility of incomplete data collection from an outdated paper version compared with an updated electronic version.

Bejleri (2010) looked into simplifying platform-based software and using only a web-based model for data collection. The proposed model is an improvement from the paper submission as the standalone platform and yields 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 for all locations due to connectivity constraints so the officer will have to rely on paper forms for those situations. Nevertheless, electronic data collection and processes serve to be more beneficial than paper crash report forms in the long run.

Additional software is now being installed in some new manufactured vehicles such as Event Data Records (EDRs). 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 could be downloaded directly from a car and yield an opportunity to understand details on contributing factors leading up to

the incident such as: pre-crash vehicle dynamics and system status, driver inputs, vehicle crash signature, restraint usage/deployment status, and 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 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 uses the same form; rather the format, type of questions, and respective verbiage are consistent. For example, research efforts on understanding distracted driving, work zone hazards, and school zones (NCHRP, 2005 & Ullman, 2004) are recent hot topics. There is also need for more data to be collected about these topics and standardizing crash forms could serve as an opportunity. Some agencies still use crash report forms that were last revised in the early 2000s (NHTSA, 2017).

The Wisconsin Department of Transportation (WisDOT) recently collaborated with local law enforcement representatives and other stakeholders to update the existing Wisconsin MV4000 crash report form. The redesigned form was used by officers beginning on January 1, 2017 and is an effort to improve the crash database management system and the types of information collected on crash report forms (WisDOT, 2016). The database included several new fields in accordance with the Model Minimum Uniform Crash Criteria (MMUCC) regarding crash level, vehicle level, and person level. An example of the changes between the old and new MV4000 forms is shown in Figure 2.1; the old form included five choices for an officer to identify the location of a pedestrian at a crash and the new MV4000 form includes 15 choices.

Pedestrian Location (Existing MV4000)	Non-Motorist Location at Time of Crash (New MV4000)
Blank	Blank
In Crosswalk	Intersection – Marked Crosswalk
	Intersection – Unmarked Crosswalk
	Midblock – Marked Crosswalk
	Median/Crossing Island
In Roadway	Travel Lane – Other Location
	Bicycle Lane
	Shoulder/Roadside
	Intersection – Other
Not In Roadway	Driveway Access
	Non-Trafficway Area
On Sidewalk	Shared-Use Path or Trail
	Sidewalk
	Other
	Unknown

Figure 2.1 Example of standardization efforts by Wisconsin DOT (WisDOT, 2016)

Overseas advancements in crash reporting could encourage collaborative relationships of data management between countries. Elvik and Mysen (1999) studied the reporting differences between police and hospital reports in thirteen different countries. The studies collectively showed that there is a large range 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 may not be revised on the field crash report forms if updated information becomes available.

This research examines the standardization of crash report forms and develops an understanding of where potential gaps exist in the file processing process from the moment a crash occurs to final processing in a crash system database. An opportunity exists to improve the data collection process and to learn more from these system reports. Enhanced crash report forms would improve agency and public understanding of locations of safety risk so that appropriate enforcement and training opportunities could be developed in the future.

In the next chapter, the flow and data available on the crash report forms for each state is discussed. The opportunity for discovering improvements is first to understand how the forms differ and what information, if any, is missing between the states. All sections of the crash report forms for each state are summarized along with a comparison of the differing elemental identifiers. These comparisons represent standardization opportunities for data collection and its inputs.

CHAPTER 3: CRASH REPORT ELEMENTAL COMPARISION

Prior to establishing direction for determining whether opportunity for improvement exists between the different state crash data report forms, a thorough investigation into the reportable elemental information was conducted. This chapter explains the structure of the crash forms for each state and summarizes the similarities and differences. The structure of the crash reports was obtained from state data information resources provided by the National Highway Traffic Safety Administration (NHTSA, 2017); the Alaska Motor Vehicle Collision Instruction Manual (2014), Idaho CIRCA Crash Data Dictionary (2011), Oregon Code Manual Version 2.0 (2007), and Washington Crash Data Dictionary and Crash (2006) and Crash Manual (2011). NHTSA also provided a copy of the crash report forms for direct comparison of amendments made from the most recent data dictionary and the crash report form in use by law enforcement.

An additional search was conducted that obtained the citizen crash and insurance reports, when applicable. It was also discovered that some states only record law enforcement crash reports, while some record both. The form code numbers, file type responsibility, and the most recent revision dates per state are shown in Table 3.1.

Table 3.1 Crash Report Form Information

State	Alaska		Idaho	Oregon		Washington	
File Code	12-209	12-200	ITD0090	735-32	735-46A	3000-345-161	3000-345-161
File Type	Citizen	Officer	Officer	Citizen	Officer	Citizen	Officer
Revision Date	04/2012	04/2012	03/2011	06/2015	06/2015	01/2015	01/2015

Of the four states, Idaho is the only state that does not have a citizen crash report form. Oregon requires every citizen involved in a crash to submit a citizen crash report. Alaska and Washington allow citizens to create a report if there was no officer present at the scene of the incident. If the severity of a crash that is recorded by a citizen is more than a property damage only (PDO), or if there is conflicting or confusing information, a law enforcement officer will follow-up with the person(s) involved in the crash and conduct their own investigation;

subsequently creating a crash report form and submitted to the state for processing. The goal of summarizing the crash report form per state was to determine if there is significant improvement opportunity with regard to the types of questions, how the questions are asked, the organization and placement of the questions, and the systematic flow of the reports. The first observation was the systematic flow differences between the states; Table 3.2 summarizes the layouts.

Table 3.2 Systematic Flow of Crash Report Forms

Sec.	Alaska	Idaho	Oregon	Washington
I.	Crash Information	Environment Elements	Crash Level	Collision Level
II.	Motor Vehicle	Conditions Elements	Vehicle Level	Vehicle Level
III.	Person	Property Damage Elements	Participant Level	Property Owner Level
IV.	Charges for Crash	Event Elements	System-Generated Codes	Driver Level
V.	Witnesses to Crash	Unit Elements		Passenger Level
VI.	Attachment/Image	Commercial Elements		PED Level
VII.		Person Elements		Commercial Level
VIII.		Narrative		
IX.		Crash Diagram		

Each crash report form requires the basic information of who, what, when, where, and why. Idaho breaks this information into separate sections including the person, unit, time, environment, and condition. The other states incorporate the needed information into the motor vehicle, person, and crash/collision information sections. In general, each state captures the same necessary information, however the amount of information required to capture the general information is significantly different between states. Figure 3.1 shows that the state that asks the greatest number of questions is Alaska with 210 questions, while Oregon asks the least amount of questions at 109. Idaho asks the second most, though it has the smallest number of elemental identifiers to answer the 183 questions.
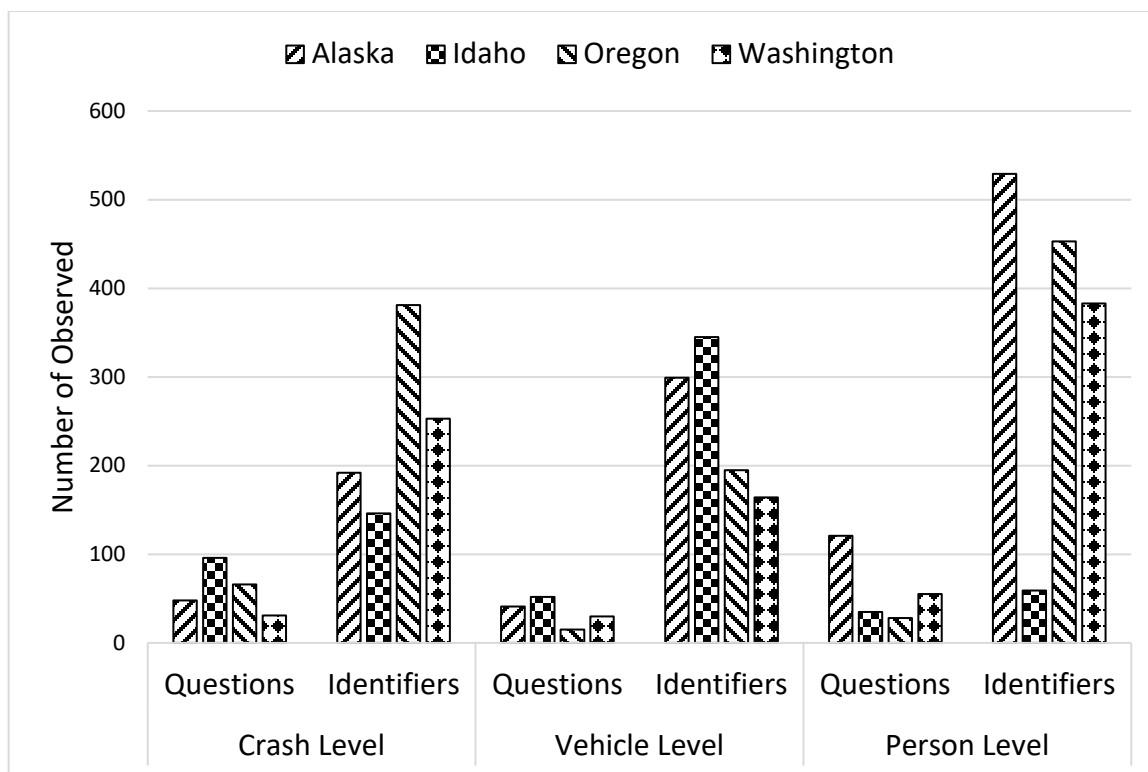
Figure 3.1 Quantity of State Crash Reporting Questions and Identifiers per Level

Most questions allow the submission of one or multiple answers, in terms of a numbering system or checked box. An example of this is shown in Figure 3.2, from the Idaho crash report form. The officer has the choice of 28 different numeric identifiers that can be selected to identify the vehicle or person (Unit) type involved in the crash.

Figure 3.2 Example Categorical Numbering System; Idaho

The question observed in Figure 3.2 provides a conflict with the categorical numbering system. There are situations where an officer may know more information about a crash though is restricted with identifying the situation because the question only allowed one identifier. For example, this question in Figure 3.2 only allows for one identifier to be selected.

If the officer knew the type of vehicle involved, and that it was a hit and run, the officer would have to leave out some information and either select "-U" as a Hit and Run or the number that defines the vehicle type. Depending on what the officer submits, the data available upon collection is absent some detail. Including additional subsections for granular details or allowing the officer an unlimited amount of categorical responses could strengthen the details of the investigation. This issue was observed in many categorical sections for each state; there are many questions that only allow for one answer and of the officer must decide which information best captures the crash.

One possible shortcoming of the categorical numbering system is that it is not concludable that more elemental identifies are better. Figure 3.3 illustrates that Idaho is potentially the most concise of the four states by the total quantity of data points that the responding officer needs to collect when investigating a crash. The state with the most data points that the officer needs to collect is Alaska.
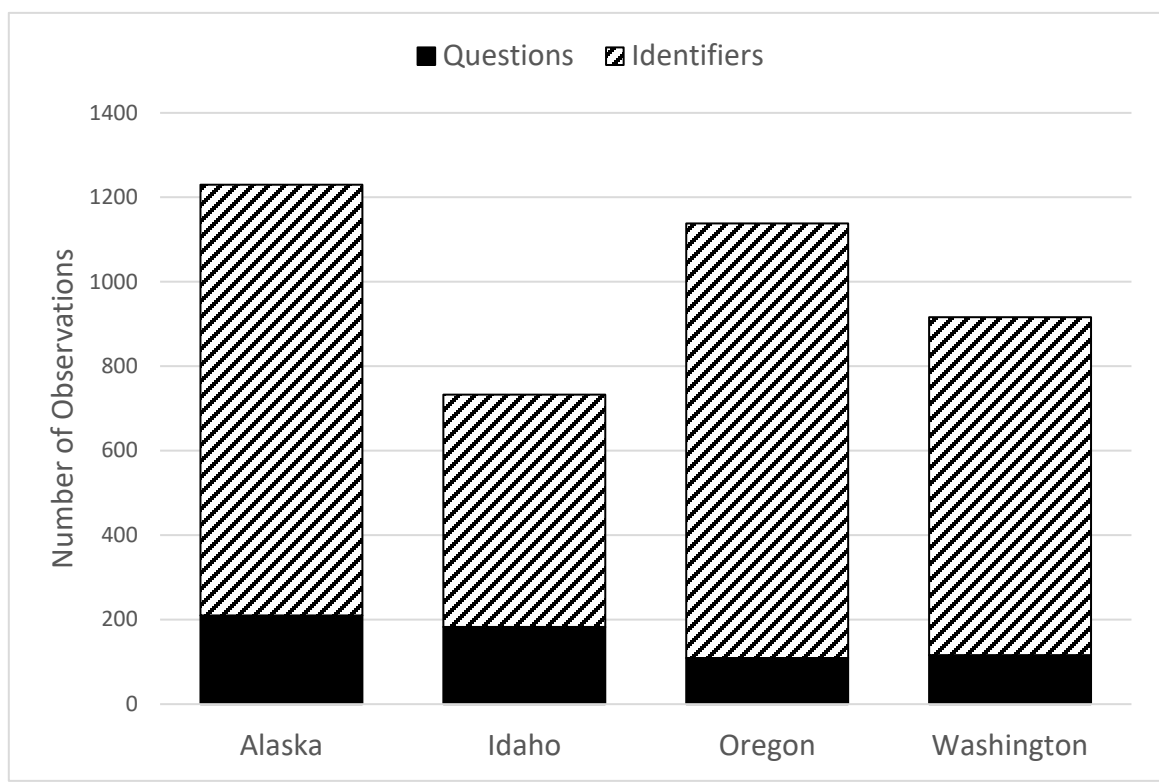
Figure 3.3 Complete Quantity of State Crash Reporting Questions and Identifiers

Due to the range of elemental possibilities in each question, comparing the state crash forms was difficult. It was determined that capturing the main topics of the crash report forms, and not all of the possible data responses, gave a general understanding of the opportunities that each state provided with regard to crash data collection. A granular comparison of each elemental identifier was attempted, though deemed to be insufficient due to placement and quantity of certain crash information. The initial task of recording the crash report form data was copying the verbiage from the data dictionaries, though because the verbiage was often different between the states, some similarities were made between questions. A general summary of this demonstration of crash form comparisons shows the opportunity for streamlining efforts because of the differing lengths of questions and the respective quantity of identifies. This discovery aided in establishing questions for the focus group interviews with local officers.

CHAPTER 4: STATE-LEVEL STATE-OF-THE-PRACTICE

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

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

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 created and filed electronically if the officer has a compact computer in their patrol vehicle with the mobile software Tufbooks installed. In the case where no officer is present to file a report, the citizen is responsible of printing and filing the Accident Participant Form #209 provided by the DMV. This is most common on property damage only (PDO) incidents, however the DMV recommends documenting all minor injury crashes. Due to insurance companies limiting damages via citizen reports to approximately $500, an officer can be contacted to provide a report shortly after the occurrence of the crash. Approximately 60 percent of the State's crashes are recorded by law enforcement and the remaining 40 percent by citizens.

Once a citizen completes the crash report the form is mailed to the DMV; once the officer completes 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 if 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 Alaska Department of Transportation (ADOT). ADOT is the last handler of the crash report form. The crash report is thoroughly reviewed with their primary aim being entering the data into the state database. To process the data the crash data is geolocated. If multiple crash report forms are submitted for the same crash then these forms are consolidated into one report. On occasion, an outside agency may be contacted to confirm details but ADOT typically is able to adjust or edit the report to properly reflect narrative details. The process flow diagram is shown in Figure 4.1.
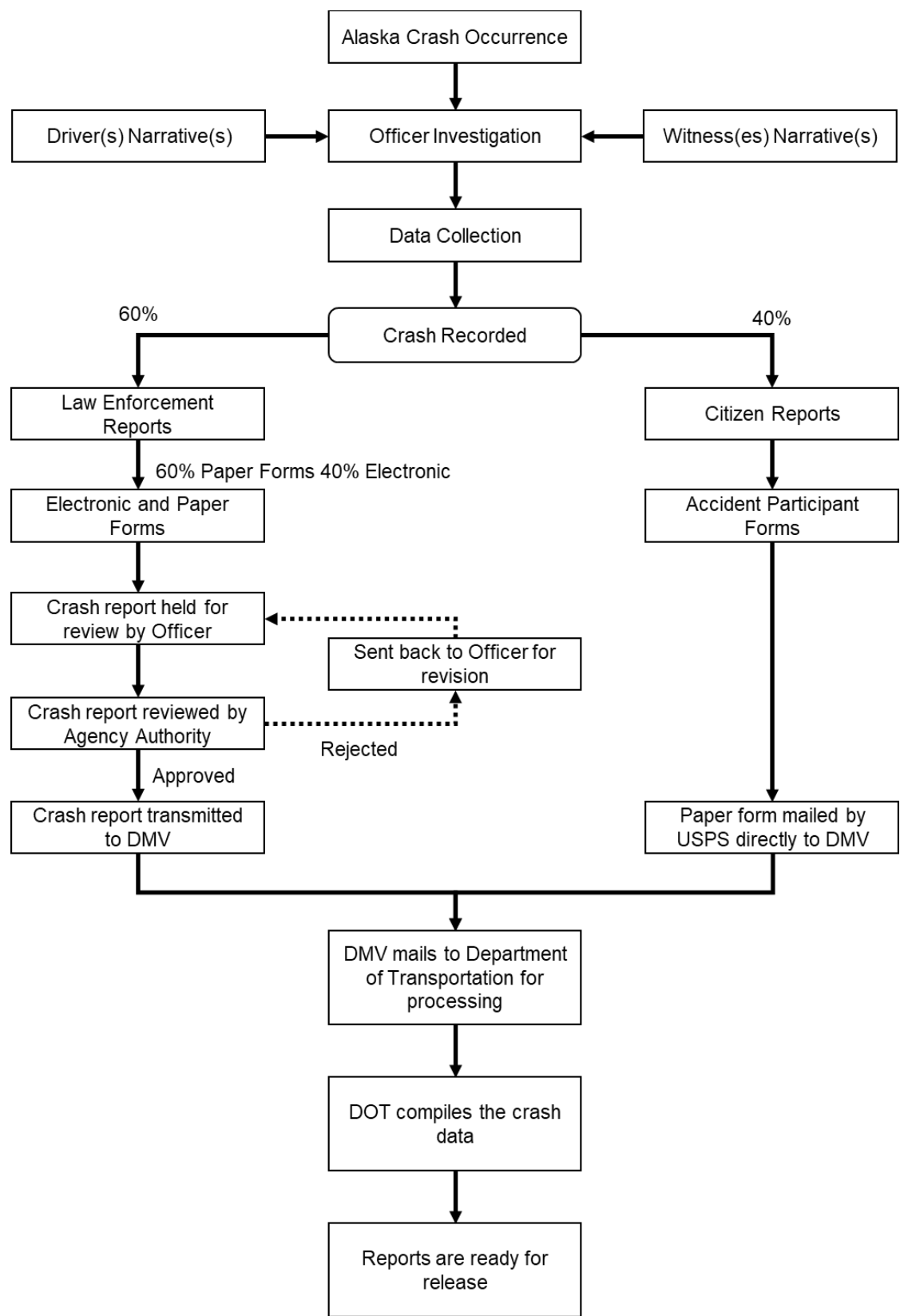
Figure 4.1 Alaska Process Flow Diagram

4.2 IDAHO

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

Every responding officer accesses eIMPACT either from his or her car or at the station. All crashes must be reported in eIMPACT, no paper report is accepted in the State of Idaho. Similar to 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 within the program and held for review until the superior officer approves the form or requests a revision. Since eIMPACT will not allow the officer to proceed with transmitting if there is missing information, 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 for revision and transmitted back to the computer. There is a code that the reporting officer uses to access the report and make appropriate revisions. Once the revisions are complete, the process starts over with the crash report transmitted back to the superior officer and again flagged for review. If the superior officer approves the crash report the report is added to the daily transmission to the Idaho's Crash Information Retrieval Collection and Analysis (CIRCA) database, and the report is held there for further review by ITD. Some agencies have the reporting officer submit though the eIMPACT software on their respective computers if the information does not require a thorough review by the superior officer (i.e., 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 include the correlation between:

- 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 any information that needs to be improved or fixed. 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.

The data is now available for research opportunities in the queue database. There are three primary locations in which the data are sent: WebCARS, to monthly Highway Technical Advisory Board meetings, and to direct researcher requests through online request procedures. The process flow diagram is shown in Figure 4.2.

Idaho Crash Occurrence

Driver(s) Narrative(s) → Officer Investigation ← Witness(es) Narrative(s)

Data Collection

Crash Recorded

0%

Citizen Reports

100%

Law Enforcement Reports

Collision Information Exchange

eIMPACT Electronic Forms

Involved parties submit CIE to Insurance Company

Crash report held for review by Officer

Sent back to Officer for revision

Crash report reviewed by Agency Authority

Rejected

Approved

Crash report transmitted to ITD into CIRCA and held for review by Agency Authority

Either corrected by DOT or a call is made to the Officer for clarification

Crash report reviewed by DOT technicians

Rejected

Approved

Reports are ready for release

Figure 4.2 Idaho Process Flow Diagram

4.3 OREGON

In Oregon it is state law that for every accident, no matter the severity, or if an officer arrived and created a crash report form, every citizen must submit their own crash report. The Oregon Citizen Traffic Accident and Insurance Report Form 735-32 is obtained from the DMV officer 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 it requires fewer details and is only from the point of the individual driver. Roughly 50 percent of the crash reports in the state of Oregon are filed by law enforcement officials because they meet the criteria outlined in (ORS § 811.745) that either damages exceed $1500, someone is hurt, or there is a fatality.

The responding officer is either equipped with paper forms in the patrol vehicle or with electronic forms available for printing once back in the officer. ODOT estimates that approximately 75 percent of the officer crash report forms are performed on paper only and not with the assistance of an electronic platform. This has the potential of error in data transfer through the authority ladder. Like other states, when the responding officer completes the crash report form it is submitted to the superior officer for review. If the superior requires corrections then the form is returned to the responding or another form is created. Once the revisions are complete 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 the reports and confirms that the information regarding vehicle(s) and driver(s) comply with their records. The crashes that require an officer report are only processed after both the officer and citizen reports are received. Oregon statute 811.720 requires that citizens must 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, though 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 report.

After the DMV processes 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 inputted into three different programs: the Statewide Crash Program, FARS, and State Motor Carrier's FMCSA SafetyNet Program.

The Statewide Crash Program thoroughly reviews each element of every crash report. The coding for analysis and evaluation takes place here, 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.
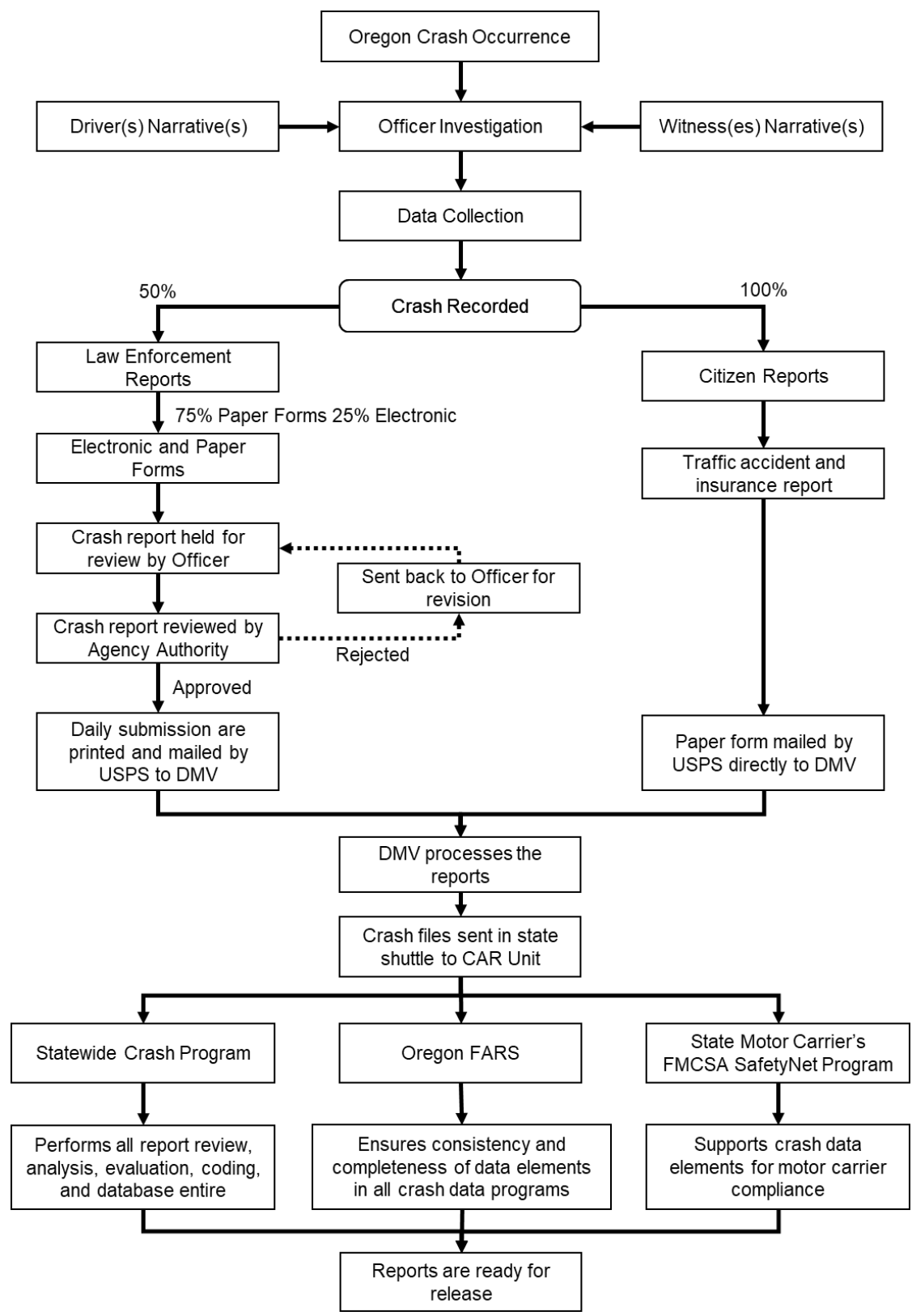
Figure 4.3 Oregon Process Flow Diagram

4.4 WASHINGTON

Similar to Idaho, the State of Washington does not process any citizen crash report forms through their crash database. WSDOT receives citizen reports but does not use the data for the state's database because issues arise trying to do so. If there is a citizen report submitted that includes an injury or excessive damages an officer simply follows up. The officer will create a new crash report for the incident and process with the state. If damages exceed $1000, or if someone is hurt or dies, a crash report form must be submitted (RCW § 46.52.030). PDO incidents are not registered in the Washington State database. Most law enforcement in the State of Washington is equipped with a fully electronic Statewide Electronic Collision and Ticketing Online Records (SECTOR) software. Ninety 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 (WSDOT, 2017).

The paper crash report forms are received by the Washington State Patrol (WSP) team that is embedded within the Washington State Department of Transportation (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 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 is approved, WSP scans and indexes the raw data from the reports into WSDOT's CLAS system.

The process of revision and confirmation of the SECTOR crash reports is similar to Idaho's eIMPACT software. There are administrator protections within SECTOR that do not allow for 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. Reports are reviewed daily within SECTOR and has additional reviewing protections. If there are any issues with the crash report the SECTOR file is flagged for revision and the reporting officer must make the appropriate changes. It was discovered through officer interviews that each agency process is slightly different. 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 officers his or her own patrol either to take home or leave at the station. This reduces the time constraint due to the officer always having access to the same computer. When the report is 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 applied with X and Y coordinates based on the location information submitted by the reporting officer for the Law Enforcement Database. WSDOT data analysts review and refine each data element on the crash report to fix the "Data Analysis Workflow". The review refines 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 is complete, 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.
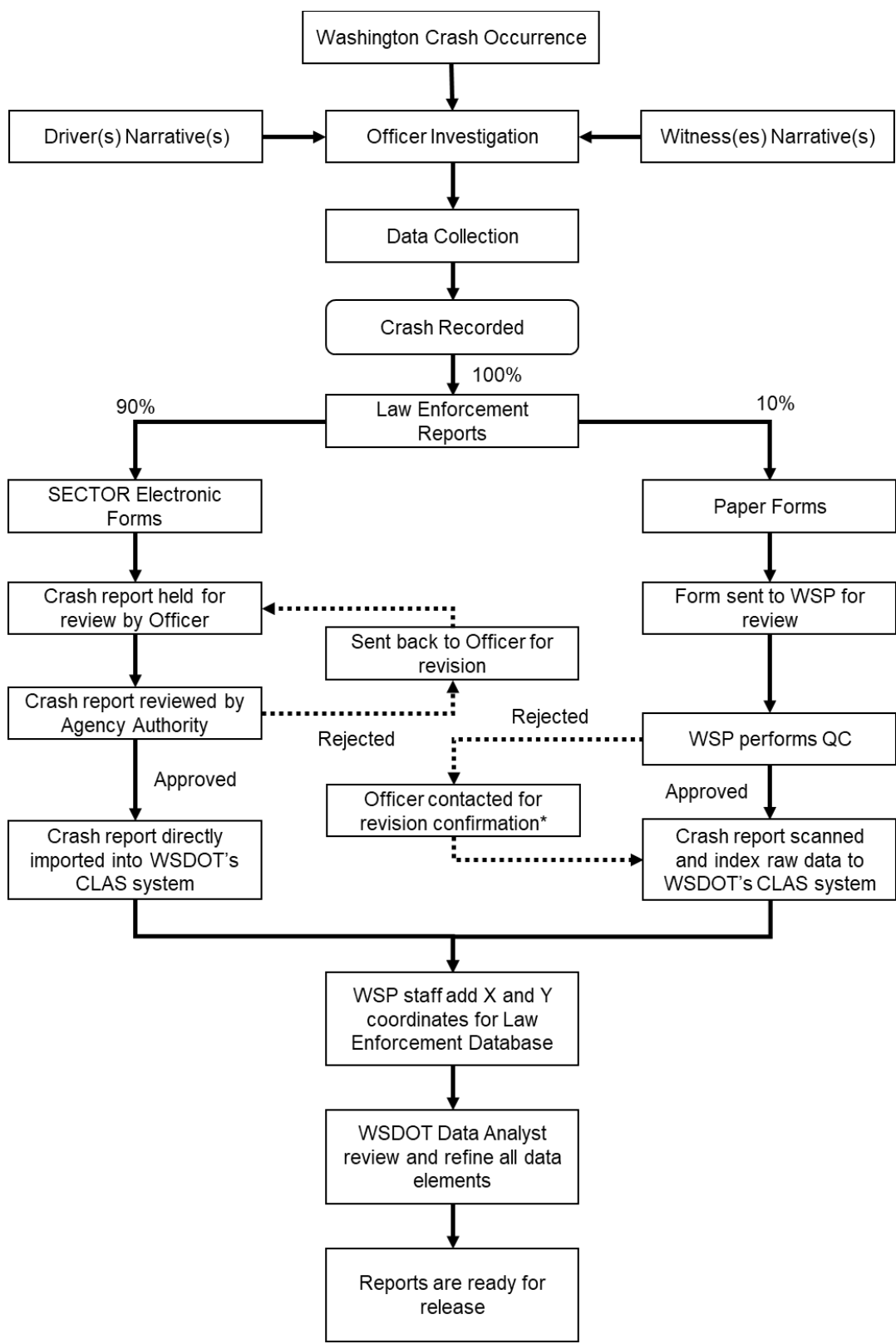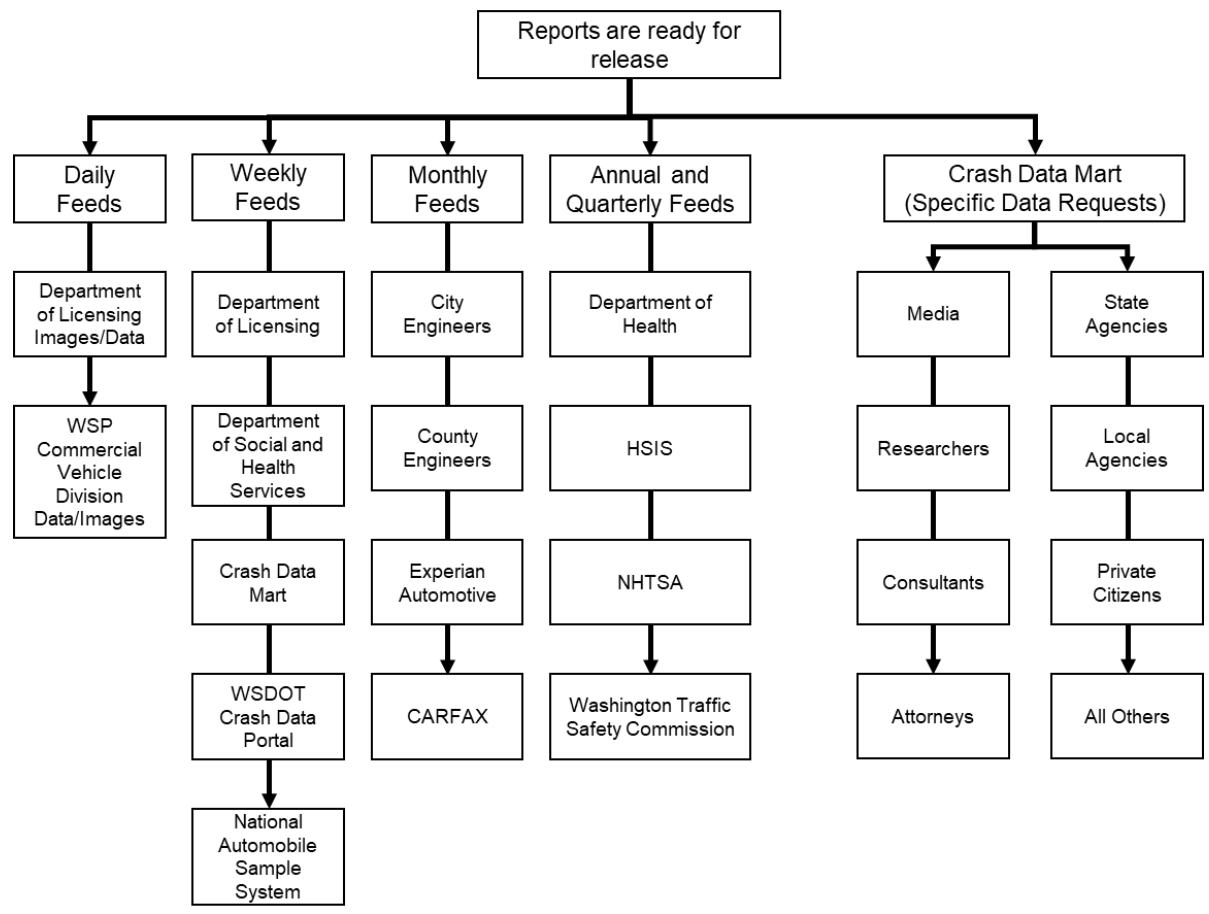
```
                        ┌─────────────────────────┐
                        │ Washington Crash Occurrence │
                        └─────────────────────────┘
                                    │
┌─────────────────────┐   ┌─────────────────────┐   ┌─────────────────────┐
│ Driver(s) Narrative(s) │──▶│ Officer Investigation │◀──│ Witness(es) Narrative(s) │
└─────────────────────┘   └─────────────────────┘   └─────────────────────┘
                                    │
                          ┌──────────────────┐
                          │ Data Collection  │
                          └──────────────────┘
                                    │
                          ┌──────────────────┐
                          │ Crash Recorded   │
                          └──────────────────┘
                                    │ 100%
                90%       ┌──────────────────┐       10%
                          │ Law Enforcement  │
                          │ Reports          │
                          └──────────────────┘
```


Figure 4.4 Washington Process Flow Diagram

Figure 4.5 Washington State Data Release Flow Diagram

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

PART-II: LAW ENFORCEMENT NARRATIVES

CHAPTER 5: METHODOLOGY

This chapter describes the motivation, structure, and process used to conduct officer interviews prior to facilitating 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 if they had any specific insights 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 interviews sought to determine where errors could occur in the crash reporting process and the potential causes of these 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 were conducted as a way to maintain a consistent, directive, and personable format between the interviewer and interviewee. The interviews were held in a rotating manner between Idaho and Washington to ensure that the questions being asked were consistent. By the third interview in each state it was discovered that most of the initial 20 questions had the same response. Additional information was provided from each officer which created grounds of asking similar questions during the next interviews. By the time the last interview was conducted only 10 initial questions were asked, with the allocated time replaced by training and general opinion questions. By design, the interviews did not exceed thirty minutes.

An interview protocol 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 interview protocol). Careful consideration of word choice was reviewed before conducting the interviews to ensure objectivity and alignment with the research questions of interest. Before beginning the interview, the project objectives and purpose of the survey were explained and the officers were informed that their answers would be held confidential.

The interview started by determining how and when an officer creates 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 that 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 the state where no additional new information would be acquired by the next interview. Agencies were initially contacted based on their geographical proximity to the project team. To ensure that the responding population accurately represented a collective opinion of each state, additional interviews were conducted in Idaho and Washington by contacting agencies that were located much further from the initial contact, and ensuring that department sizes greatly varied. This approach was conducted in an attempt to record responses from agencies that differed in officer population and geographic location size, so as to represent a collective response for each state. Six to eight officers were interviewed in each of the three states (Idaho, Oregon, and Washington), along with crash record professionals from two state-level departments of transportation. Officers from Alaska were also contacted but an insufficient sample size was collected as part of this study. For this reason, only Idaho, Oregon, and Washington results are reported.

Agencies were primarily contacted via e-mail or phone call and asked if 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 using 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 was already 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 conducting the officer interviews several additional concepts were introduced that needed to be confirmed by a larger population of officer responses (e.g., officer's opinion of needed and received crash report training and 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 assess law enforcement feedback and its implications state was developed using 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; most agencies had websites providing the contact information for the Chief or Sheriff in charge. The agencies that did not provide this information typically had the non-emergency general e-mail or phone contact information.

Initially, after all of the contact information was obtained, a random sample representing fifty-percent of each agency level in each state was contacted by e-mail. The script for this e-mail is included in Appendix B. If there was not an available e-mail obtained from the online search then the agency was contacted by phone.

After two weeks a reminder e-mail was sent to the agencies to thank them for their participation and remind them to take the survey if they had not already done so. At this time the research team decided to reach out to all contacts. A follow-up e-mail was subsequently sent out every three weeks to the entire contact list thanking them and reminding them to take the survey if they had not already.

The final survey consisted of forty-one questions with display logic that reduced the survey to approximately thirty questions for each officer depending on their response to certain questions. The survey was divided into five sections: performing crash reports, opinions of [respective] crash report forms, driver distraction and work zone related, training, and basic demographics. Officers were also allowed to provide a narrative of any additional thoughts 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 frequent the officer conducts crash report forms, how crash report forms are submitted (electronic or paper), how and who the officers submit their crash report form to, how long it takes to complete the report, and how the revision process goes, if applicable.

The next section asked the officer for opinion on his or her state's crash report forms. This section consisted of five-point Likert scale questions pertaining to: the officer's opinion on the structure of the crash report form, if there was a need for revision to any sections of the form, and if they felt that crashes are adequately captured by the form.

The distraction and work zone related section focused on obtaining the officer's opinion as to whether or not each of these spotlight areas 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 to each officer pertaining to: the adequacy of their training, the length of time since their 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 correlate training with the officers' knowledge of the data elements on the crash report form, and to determine correlate if there is opportunity to improve officer training or identify potential changes to the crash report forms.

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 as used to compare the states collectively and separately 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 and approved by the institutional review board for distribution. 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. Qualtrics data from the surveys were collected and a raw data summary report was printed so that the results could be analyzed separately.

CHAPTER 6: RESULTS

Based on the activities described in the previous chapter, the results of the interviews and survey are separately presented and discussed. A discussion on the correlation between the flow charts and survey responses is also provided. (Note: Because of an insufficient number of responses from Alaska, the results from that state were not included in the results chapter.)

6.1 OFFICER INTERVIEWS

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

6.1.1 Idaho

The responses to the interview questions varied significantly between different agencies. Some officers were very vocal with their frustrations with the reporting protocol, while other officers were content with the current reporting process. These differences of opinions 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 responses differed with regard to opinion and definition of some crash report form subsections including how a crash in a work zone is reported and contributing factors (i.e., driver speeding, inattentive, or too aggressive) that likely contributed to a crash. The majority of the officers felt that there are opportunities for further data collection. The same officers believed that usability could be improved 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 there needs to be a stronger relationship between citizens and officers to discourage the reporting and recording of false information. Additionally, the officers felt there needs to be improved training so that officers are knowledgeable as to why each data element on the crash report is important 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 are comfortable with the structure and number of questions and felt that data are adequately captured.

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 occurring because the parties involved were not completely honest about what actually happened prior to the crash. Each officer defines this dilemma in a similar manner, *"Garbage in equals garbage out"*. There were also differences in the definition of work zones, even at the same agency, such as a location that had construction present, with "construction zone" posting, or with "work" being performed. Each officer felt that the crash report form should take no longer than an hour to complete, but with the amount of detail that the form currently requires, each officer agreed that some degree of change with the crash form was needed to improve on how details were captured.

6.1.1.1 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 noted 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 only able to input three leading causes for each crash and these causes must be in the selectable "pull-down" tab on eIMPACT. Due to 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, though 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 narrative is often missing, the crash report form could be rejected requiring the officer to resubmit. Officers remarked that having a crash report form rejected because of a missing link between the data and their narrative is frustrating and time consuming. In most cases, when a crash report form is rejected in review and sent back to the officer, significant time has elapsed that revision of the narrative only seeks to match 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.

6.1.1.2 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 distraction other than cell phones, so officers can only write a citation if the driver was using a cell phone while operating a vehicle. Each officer interviewed has witnessed a driver distracted by other things (i.e., eating or putting on makeup), though this is not enforceable. One of the officers interviewed teaches classes on driver inattention and how to classify and confirm if the crash resulted from it. 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 issue with reporting distracted driving is the absence of truth, and the potential lack of honesty from drivers is one of the most frustrating details of a crash investigation. Without a warrant, the officer is unable to obtain the driver's phone and check to see if it was in use prior to the crash. The officer can ask the driver if a cell phone was being used, though if the driver says "no" then the officer must take that as truth and cannot issue a citation. One officer explained that he can easily conclude if a driver was inattentive, though if the driver does not admit to the imitation then it is nearly impossible to correctly captured in the report. *"Most officers don't even put anything* [in the distraction section] *because they feel it is just is not true"*, the officer explained. If there is a crash that results in injury or death a warrant is typically issued that checks the cell phone records of the driver to affirm if

inattention is the leading cause of the crash; when this is the case the distracted section is updated in the crash records.

6.1.1.3 Work Zones

Officers were asked several questions relating to the reporting procedure of 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, then that situation should also be considered a work zone related crash because the driver was potentially affected by those operations. Most of the officers contemplated 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 of the officers interviewed currently works 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. He proclaimed, *"Almost everything is missing of value. We must observe the* [work] *zone as a point of interest. It is dependent where and what* [the] *work is. Is the work in the road? Along the road? On a hillside?* [Or] *are trucks entering and exiting? Is 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 improve enforcement or policy decisions.

6.1.2 Washington

The responses to the interview questions by Washington officers were very different than those from Idaho regarding acceptance of the crash report form and procedure of data collection and processing. Each officer expressed their 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 more efficient than the previously used paper version; officers can scan the driver 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 EMS was dispatched to the scene of the crash, approximately eight proceeding questions are skipped referring to EMS information. Officers seemed satisfied with the usability of SECTOR and the flexibility that it allows each user.

Despite the officers proclaiming there is no need for consolidation of the current protocol, they did proclaim there is further 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 every crash to the same level of detail every time. Crash data is very dependent on the officer who is investigating the crash and creating the report. Similar to Idaho responses, 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 provide the tools, though it is a collaborative effort from all."* The quality of the crash report is limited by the judgment of the investigating officer and cooperation of the people involved in the crash. The crash report form can capture these details, but only if the officers can appropriately interview drivers and witnesses to obtain the needed data.

6.1.2.1 Work Zones
Washington officers were asked the same four questions relating to the reporting procedure of work zone and work zone related crashes; a large deviation in responses was recorded. Each officer had their own unique explanation of how to determine if 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 suggest the need for additional training 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
may be one reason why determining what qualifies as a work zone related crash differs so
much, and if each officer was to define a work zone in the same manner there many have been
a response of greater than four crashed a year.

Each officer described similar causes of work zone crashes, mainly a result of driver
inattention or driving too fast into the rear of a developing queue in the construction zone.
Further opportunity 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
explaining the importance of data elements related to crashes in work zones.

6.1.2.2 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 take to enforce. 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 and not missing any information. The one officer that addressed this
question noted, *"Distractive driving is missing some details; details rely on truth from the
drivers",* which preceded into the next question asking, "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 led to crashes that are not indicated as infractions –
putting on makeup, a dog in the lap, etc. So, a general "inattentive driving"
is indicated for insurance purposes, though that is all."*

The other officers provided similar remarks stating that *"people often will lie to try and get out of an infraction."* 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 to the driver if it was a clear mistake and the situation did not result in injury or excessive property damage; the officer felt that the driver's increasing insurance rates was punishment enough. One officer added to the debate and proposed that if every distracted driving case could somehow be honestly recorded, legislation would probably be made and would create a significantly constrain (not allow use of certain devices or allow certain activities while driving) and would result in public outcry.

6.1.3 Summary

The primary and probing questions from the protocol used in the interview collectively captured officer opinions on opportunities for streamlining and improving crash report forms. Initially the interviews did not include training questions because it did not seem to affect data collection processing. After the first half of the interviews, many officers were introducing this for opportunity because most shared concerns about training adequacy. Every officer interviewed agreed that to have good data output there needs to be good data input, and if the crash reports are to be streamlined there needs to be standardization as well as a restructure of the data collection and processing procedures. One interviewee in Idaho included a State Occupational Health and Safety (OHS) Law Enforcement Trainer who echoed standardization and restructure:

"Idaho is not a Train the Trainer state [unlike Oregon and Washington].
Law enforcement officers attend trainings [conducted by ITD]. *With that
being said, this is not a rule that an officer cannot perform eIMPACT if they
have not done the training; however, before trying to make a "streamlined
approach" we need to understand the already suggestive material that is
available, then we need to try and determine why curtain states are not*

conforming to the recommendations in the materials... Structure will come from collective adherence to training of the [streamlined] *approaches."*

The comments and concerns from the officers suggest that training can significantly impact efforts to streamline crash reporting. Capturing officer opinions on crash data training and how it correlated to their understanding in the field was one of driving forces in the regional survey; if the officers completing the crash reports felt that change was needed, then opportunity to make such a change is justified.

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. The forms restrict the amount and type of data that the officer can submit, or the people involved in the crash could lie and provide misleading information to the officers about the events and actions that preceded both the crash and the officer's arrival on scene. The regional survey expands on the questions from the interviews and provides additional quantitative data for consideration.

6.2 REGIONAL SURVEY

The dataset was limited to agencies that were willing to invest time to take the on-line survey. Cooperation between the officers and research team was made possible through e-mails and phone calls. The importance of protecting the anonymity and privacy of the responding officers was ensured as the survey did not collect location or personal information. While the survey was active, bi-weekly efforts were made to reconnect with agencies to encourage participation in completing the survey.

This section summarizes the responses to the online survey from Idaho, Oregon, and Washington officers. Key results relating to data collection, review procedures, and training are provided. The following sections explore key outcomes from the survey.

6.2.1 Demographic

The online survey comprised of 182 officer responses; 60 from Idaho, 49 from Oregon, and 79 from Washington. The distribution of responses by agency level consisted of 77 state-level officers, 30 county officers, and 76 local officers. Approximately 47 percent of the total sample of responding officers having served between one and 10 years, 33 percent between 11 and 20 years, 16 percent between 21 and 30 years, and the remaining four percent serving for more than 30 years. Figure 6.1 represents the distribution of years of service per state-level and agency; the "x" indicates the mean value, the bar indicates the median value, and the whiskers extend to the minimum and maximum quartiles. The outliers in the dataset are observed in the Idaho responses of state (33 and 36 years) and local (37 years). Table 6.1 displays the officer summary statistics for each state.
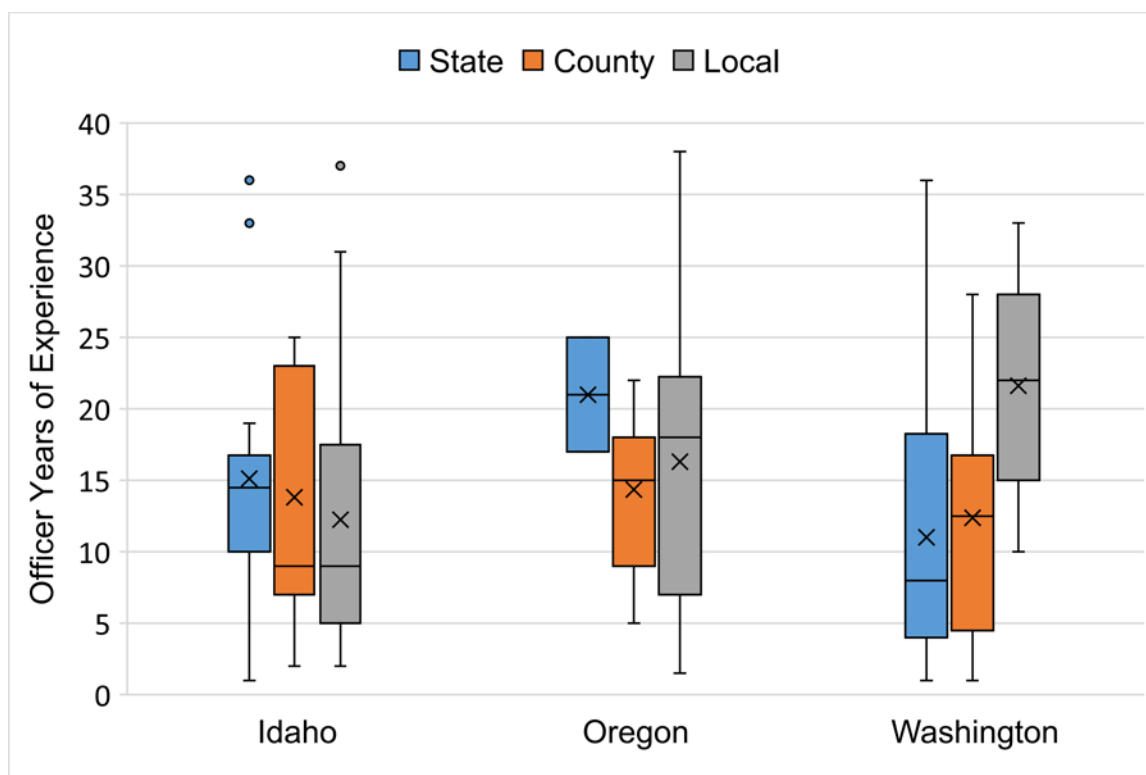
Figure 6.1 Officer Years of Experience

Table 6.1 Officer Years of Experience (Summary)

		N	Mean	Std. Dev.	Min	Max
	State	16	15.13	8.79	1	36
ID	County	11	13.82	8.57	2	25
	Local	33	12.26	8.60	2	37
	State	2	21.00	5.66	17	25
OR	County	11	14.36	5.54	5	22
	Local	30	16.30	9.46	2	38
	State	58	11.01	8.91	1	36
WA	County	8	12.38	8.72	1	28
	Local	13	21.62	7.74	10	33

6.2.2 Procedural

In the online survey, participants were asked several questions pertaining to the type of data collection they perform upon arriving on the scene of a reportable crash. The questions asked details about what type of format is used to collect, report, and submit the crash report forms, and if there are common revisions that they experience. The survey also asked about the general layout, usability, and accuracy of the crash report forms capturing enough information to adequately narrate the crash, and if they believed certain opportunities were present to improve the data collection process. General questions about training of crash reporting, the frequency of the training, and if they felt confident about the data need were also asked. The following sections incorporate collective results from each state and highlight some unique officer responses on data collection and processing.

6.2.2.1 Data Collection

The first survey items asked about when the officer last completed a crash report form and the frequency of reports that they conduct in a weekly basis. These questions were asked to ensure that officers were familiar with current crash reporting processes when responding to the survey. Most responding officers (91 percent in Idaho, 92 percent in Oregon, and 96 percent in Washington) answered "When was the last time you completed a crash report" with "within the last month". Those percentages decrease to 53 percent in Idaho, 64 percent in Oregon, and 82 percent in Washington when responding to having completed a crash report within the last week. The frequency of crash reports completed on a typical weekly basis was also asked, shown in Figure 6.2, and the accompanying summary statistics in Table 6.2, showing that on average, officers complete a crash report about three times per week. It should be noted that

Figure 6.2 is scaled to represent the majority of the officer responses, though one officer from Oregon did submit that he or she typically experience 40 weekly crash reports.
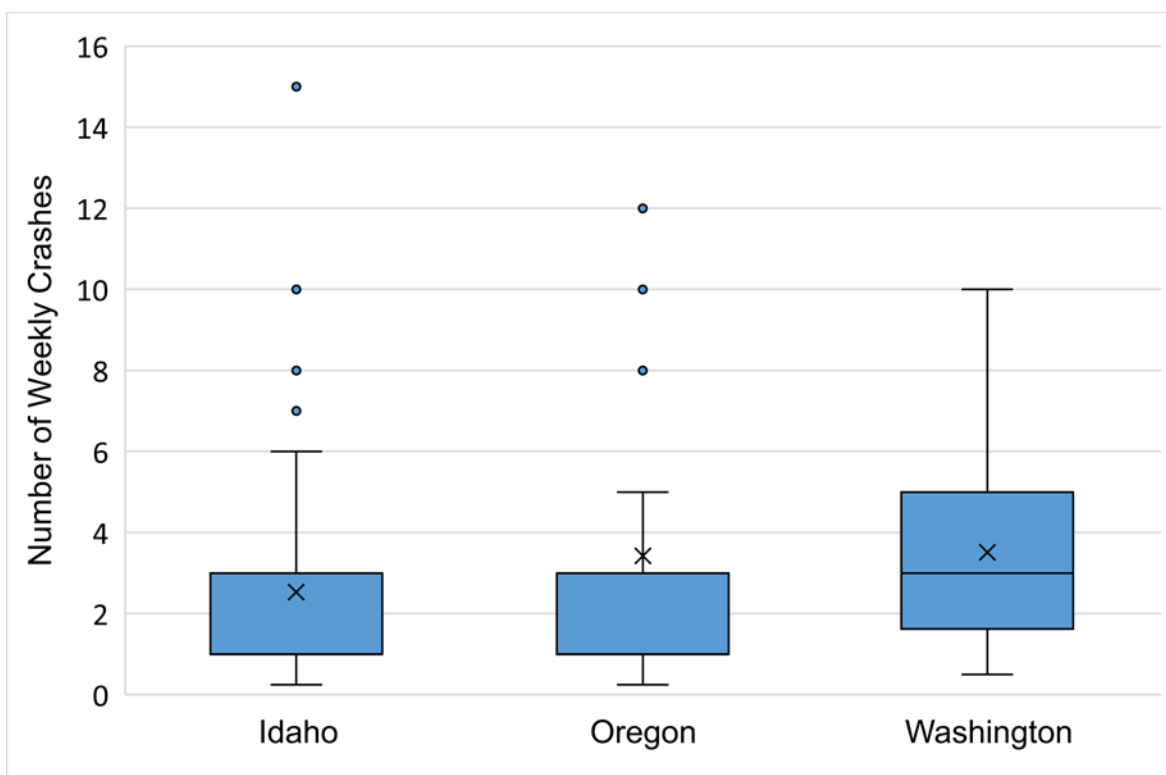

Figure 6.2 Officer response for weekly frequency of crash report form completion

Table 6.2 Officer response for weekly frequency of crash report form completion (Summary)

State	N	Mean	Std. Dev.	Min	Max
Idaho	55	2.53	2.92	0.25	15
Oregon	39	3.42	6.73	0.25	40
Washington	72	3.51	2.58	0.5	10

Figure 6.2 showed that only 162 of the 182 total responding officers report one or more crashes weekly. This observation equates to having 16 officers from the survey being in a position that only reviews crash reports (i.e., a review officer, chief, or director) and does not actively conduct crash reports. The insight from these participants pertained more to the procedural and training questions. Despite not actively creating crash reports, their opinions were still included in the survey due to their experience and ability to respond to further questions.

The second survey item asked about the reporting format and submission process of the crash form and to whom the form is submitted. When creating the survey, the responses from the officer interviews aided in developing the verbiage (i.e., internet portal, e-mail, flash drive, and printed) for the processes used. The survey allowed a "fill-in-the-blank" answer to ensure all possible answers were captured. Some officers submitted the software name of the crash report form (i.e., SECTOR in Washington), so that response was updated to "internet portal". Figure 6.3 shows that the format for crash reporting in Idaho and Washington is primarily electronic, while two responders from both states still proclaim to use paper submissions even though both Idaho and Washington DOTs no longer accept paper submissions. The responses from Oregon officers agree with the statements from ODOT proclaiming that their state is nearly split on the two formats.
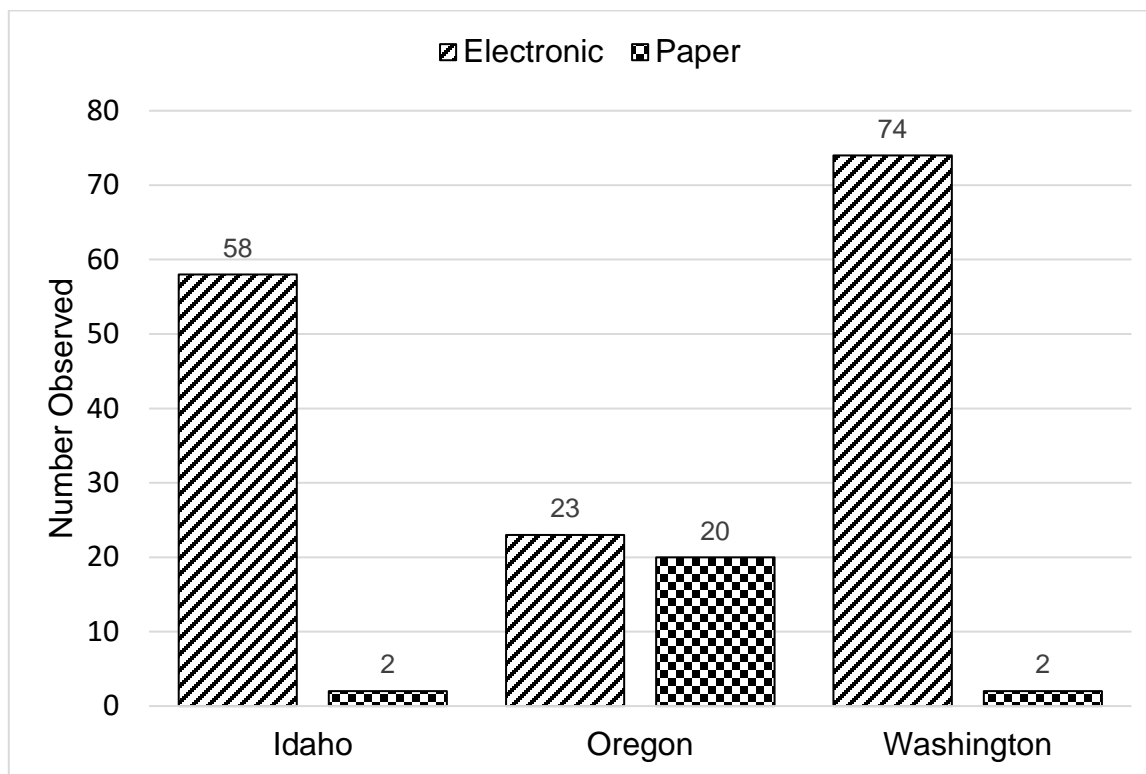
Figure 6.3 Crash reporting format for each state

With regard to how the crash forms are typically sent for review, Idaho and Washington have made the switch to an electronic platform to track the reports and facilitate real-time interactions between reporting officers and the agency authority during the review stage. The risk of damaging the 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 being the internet portal or mailing a hardcopy.

Table 6.3 Crash Record of Submission Types

Electronic Submission	Idaho	Oregon	Washington	Paper Submission	Idaho	Oregon	Washington
Internet Portal	55	19	77	Printed	2	7*	2
Email	0	1	0	Email	0	0	0
Flash Drive	3	0	0	Mail To	0	14*	0
Printed	0	3	0				

* One Oregon officer uses both printed and mail submissions

6.2.2.2 Review Process

The next survey item pertained to the process of revising a crash report form. The officers were asked: how frequent revisions were required in a given year, who communicated the need for the revisions, and what is typically the most common reason for a revision. Some officers used percentages to answer these questions or subjective terms like "too many" and "lots"; these responses were not calculated because of the inability to quantify. Figure 6.4 shows that Idaho has the greatest annual average of revisions due to two responses stating 50 and 100 annual revisions, respectively. Table 6.4 shows that the average number of annual officer revisions in Idaho is 14, while Washington and Oregon follow with seven and six, respectively.
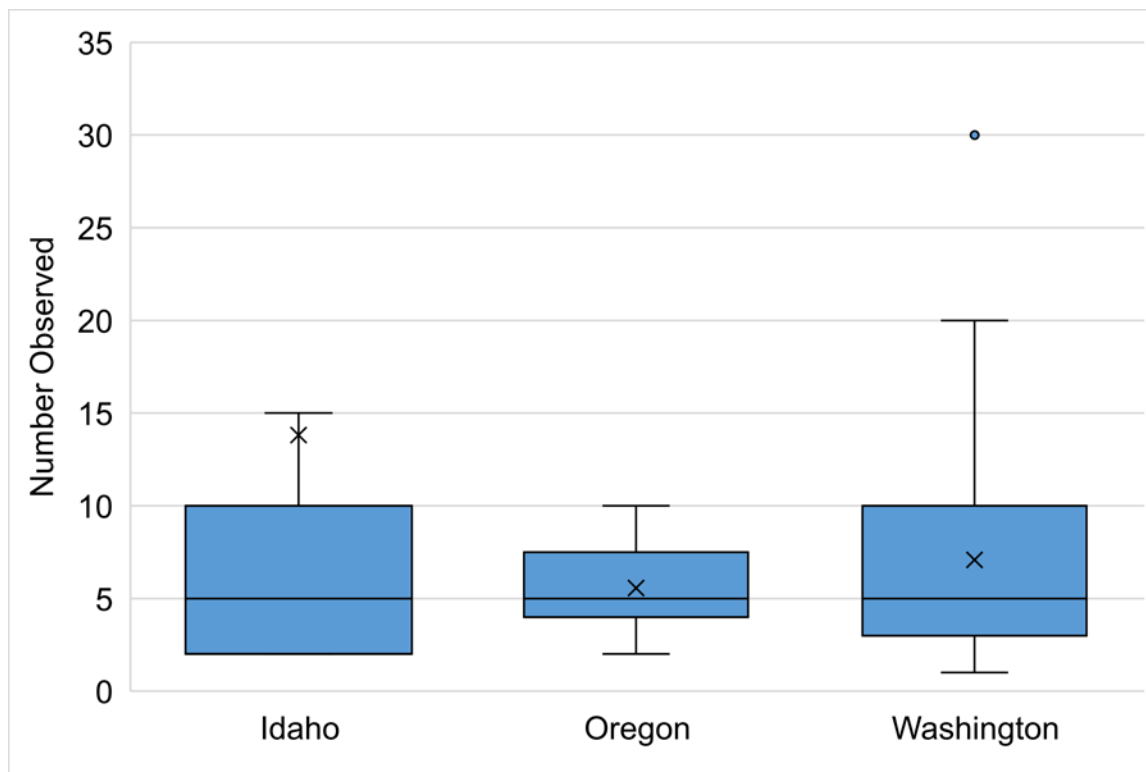
Figure 6.4 Annual frequency of revised crash report forms

Table 6.4 Summary Statistic for annual frequency of crash report forms needed revised.

State	N	Mean	Std. Dev.	Min	Max
Idaho	27	13.82	26.56	2	100
Oregon	9	5.56	2.74	2	10
Washington	52	7.08	5.77	1	30

Typical reasons for errors in crash reports requiring revision varied between the three states. The survey categorized the common areas on the crash report forms that pose issues and these sections included: contributing factors, location description and drawings, driver and vehicle information, events leading up to the crash, and insurance information. The survey question allowed participants to specify other reasons. Upon analysis, "spelling or grammar" and "missing information" were added to the list of typical errors. Figure 6.5 shows that of the 180 responses to this question 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 revisions were: location description and drawings, driver and vehicle information, and contributing factors at a collective 27 percent, 18 percent, and 17 percent, respectively.
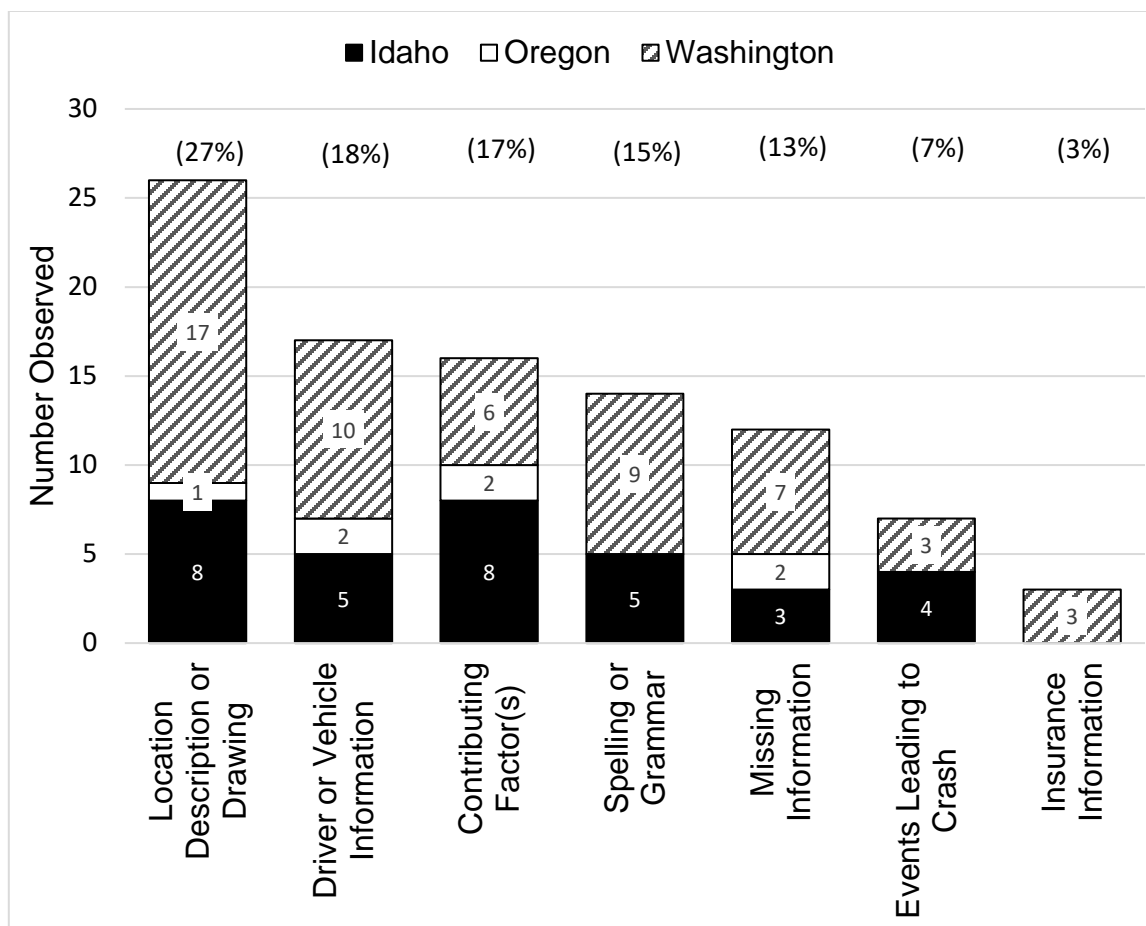
Figure 6.5 Most common revisions on crash reports

To conclude the general procedure questions, the officers were asked if the reasons for revisions was due to an unclear and inadequate crash report form. 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 (Figure 6.6 and Figure 6.7) confirm the results 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 both Idaho and Oregon and 5 percent of Washington officers felt that the crash report forms needed to better capture relevant crash information (i.e., more details on events leading up to a crash and type of contributing factors).
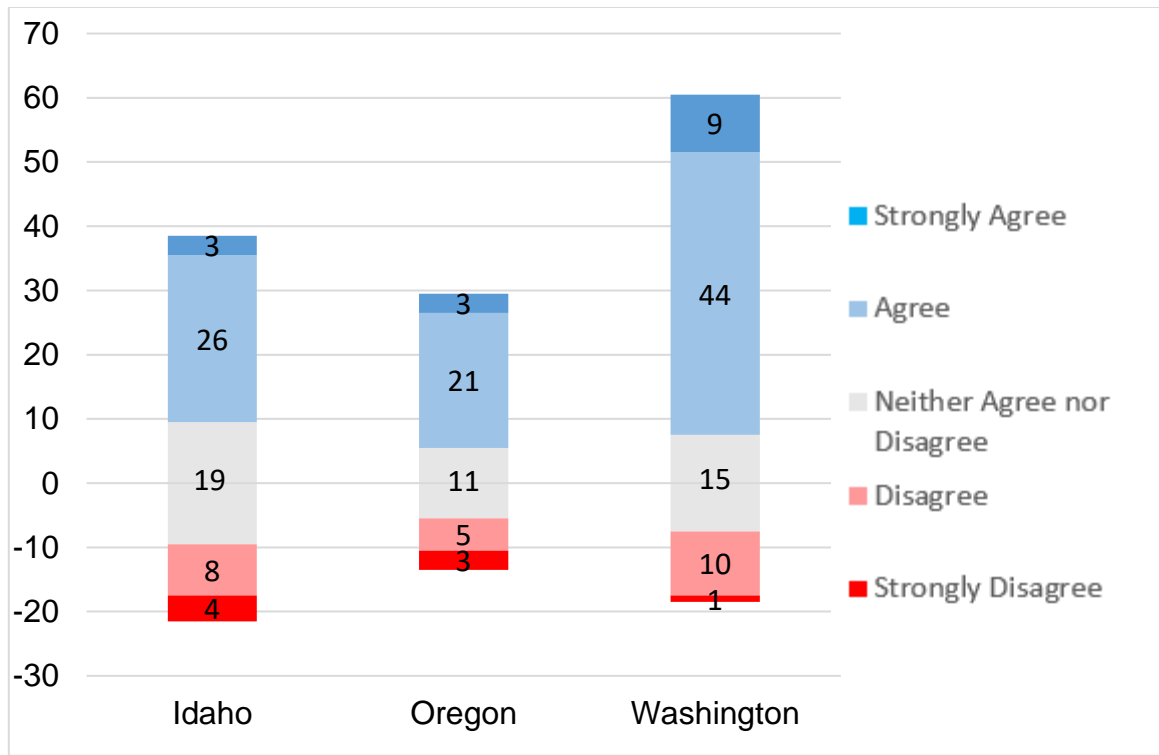
Figure 6.6 Responses for "Do you believe that the crash report is structured to match the flow of your investigation process"
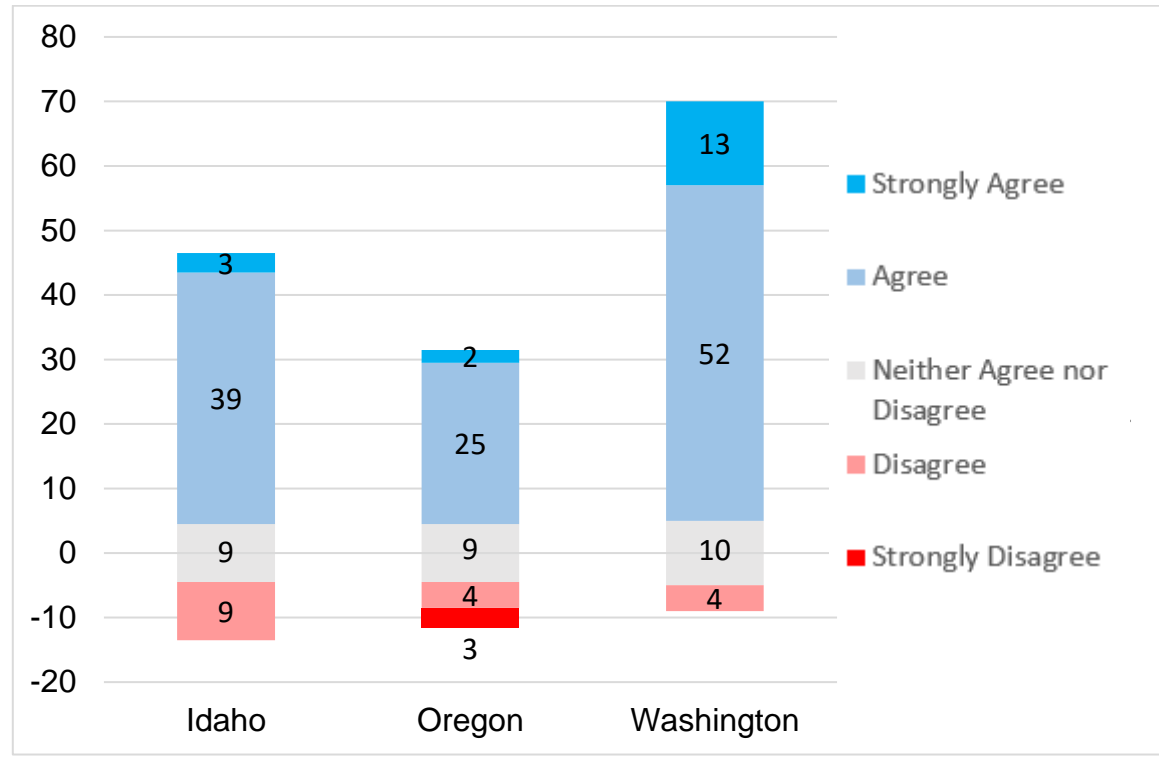
Figure 6.7 Responses for "Do you believe that your crash report form adequately captures the incident"

6.2.2.3 Training

Participants were asked about the level of crash reporting training received at their current agency and if continuing training is required. The participants were also asked: how frequently training takes place, who provides the training, if 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 if they felt training is 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. Figure 6.8 shows that 13 percent had received some sort of training within the past year while 45 percent responded that it had been more than five years since their last training.
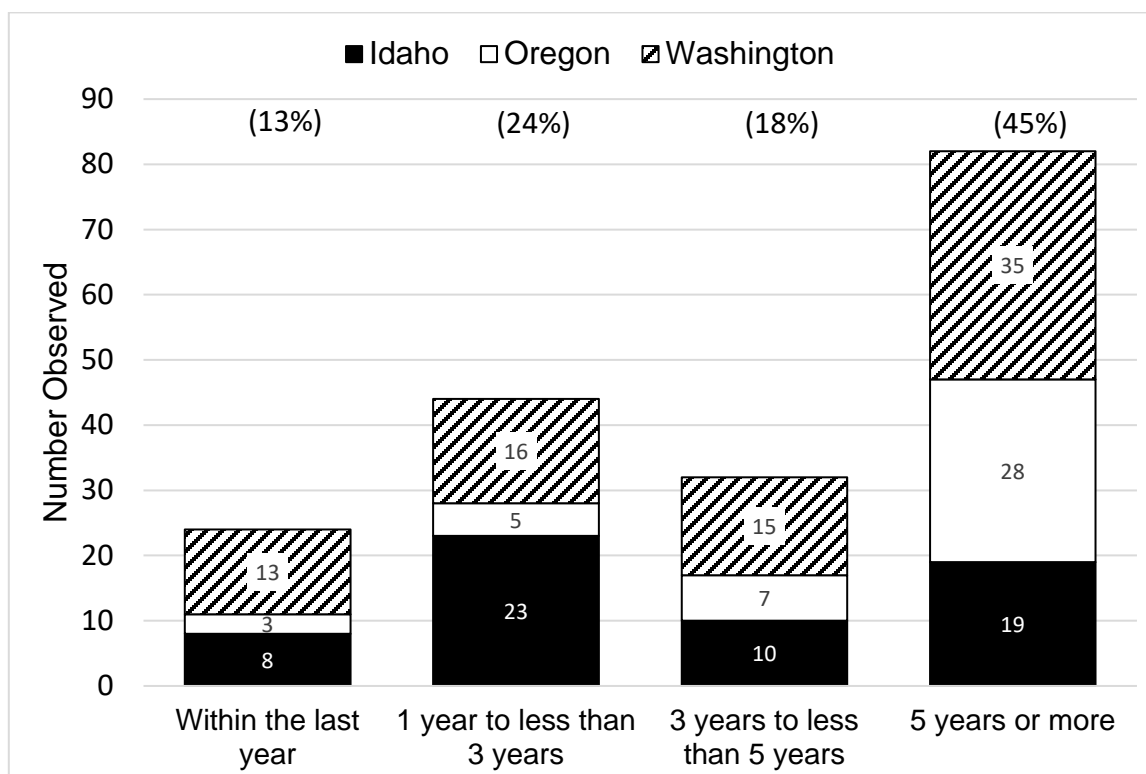
Figure 6.8 Responses for "Do you believe that upon completion of your training, you were competent on how to fill out the crash report form"

When asked if they felt competent upon the completion of their training, no officer responded "strongly disagree", though 26 percent expressed that they did not feel a need for training on

crash reporting (Figure 6.9). Figure 6.10 shows that 78 percent of all officers surveyed felt that they were competent to fill out the crash report after receiving training.
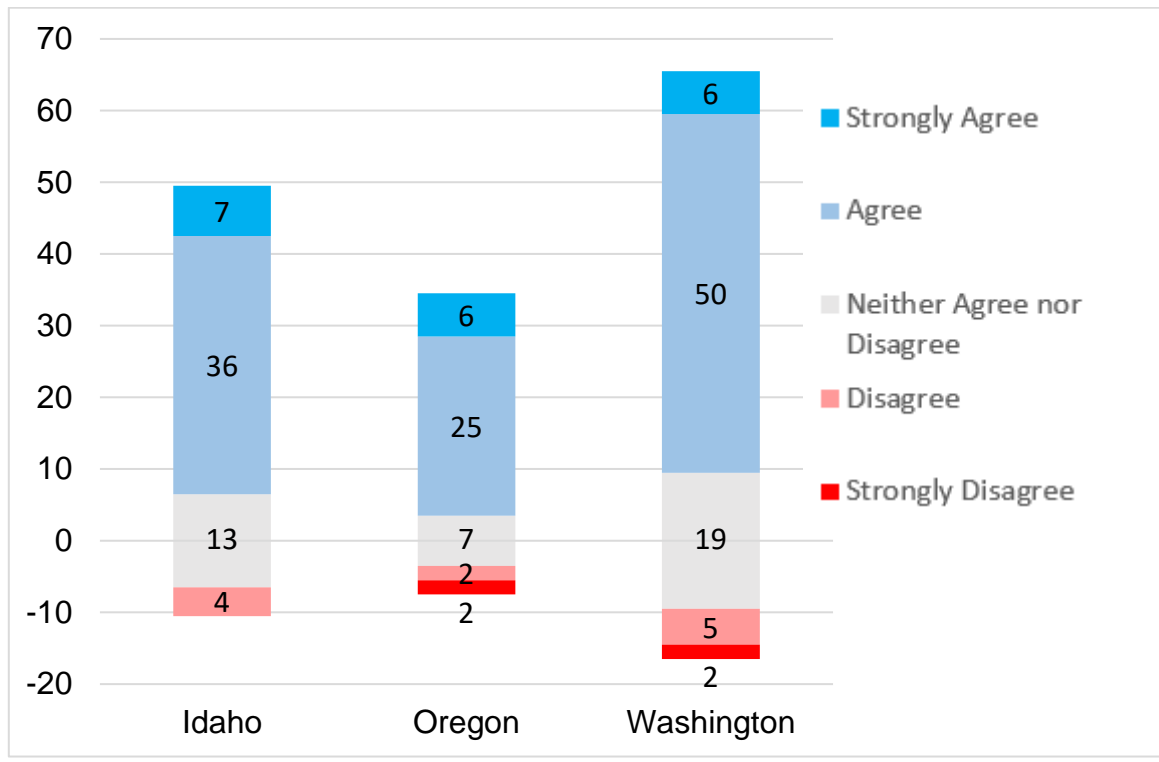
Figure 6.9 Responses for "Do you believe there is a need for training of crash reporting?"
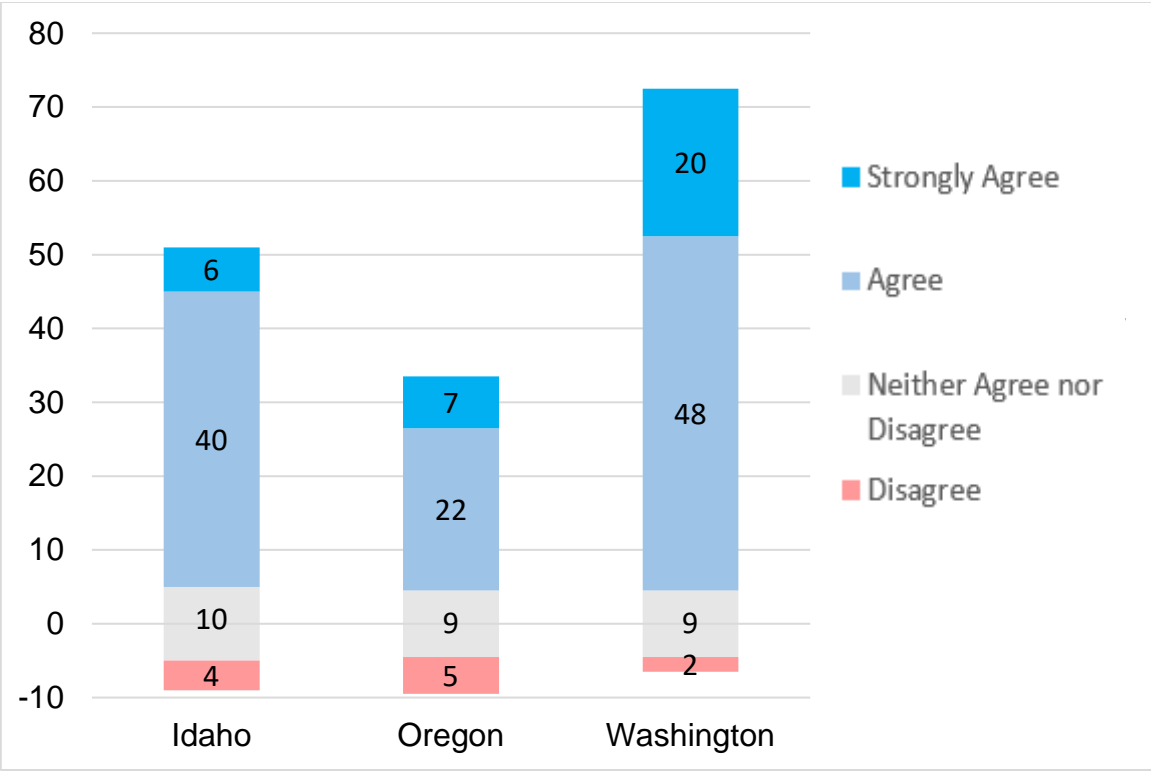
Figure 6.10 Responses for "Do you believe that upon completion of your training, you were competent on how to fill out the crash report form?"

The following chapter administers statistical analysis to the findings in this chapter with all other responses in the regional survey and infers the implications of the results.

CHAPTER 7: ANALYSIS

This analysis section aims to highlight some of the opportunities that might be available to strengthen or support streamlining efforts of crash report forms based on the collective responses of law enforcement officers. Specific opportunities for improving the crash report forms were linked to explaining why revisions were needed, the level of officer competence upon completion of training, and the importance and accuracy of the data on the crash report forms. The survey also confirmed differences between state and agency level regarding opinion of the crash report form, flow and format of the crash report adhering to a crash investigation, and officer opinion on the need for continued training.

As a starting point, Kruskal-Wallis rank sum (chi-squared) tests were administered on all Likert scaled opinion questions to infer the effects of an officer's state and agency level, reasons for revisions, feeling of competence, and importance of and need for crash report training. Additional tests were run on the relationship between crash form platform type and years of service to the number of revisions, competence of the crash report, and need of training. The Kruskal-Wallis test is similar to a one-way ANOVA which is used to test nonparametric data that originate from two or more independent samples of equal or different sample sizes (Corder, 2009). A nonparametric statistical analysis was conducted because Likert scaled survey responses are typically not assumed as data drawn from a normal distribution and the sample sizes in the responses are different. The relationship between participant response is dependent on their feelings and opinions at the time of taking the survey and are not easily measurable; a particular response may differ when asked now and again at another time. As an example, an officer may rank her opinion to a question in the survey as "strongly agree" when she first takes the survey, but select "agree" when asked later. The Kruskal-Wallis test creates an estimated distribution under this form of statistical measurement (Coder, 2009). The variables that were considered for the tests are summarized in Table 7.1.

Table 7.1 Description of Variables Considered for Significance Tests

Variable	Description
Revisions	(1) = at least 1 revision in a typical calendar year; (0) = otherwise
Importance	(1) = Yes - training adequately explained the importance of the data collection elements on the crash reports; (0) = No
LastTraining	(1) = Within the last year; (2) = 1 year to less than 3 years; (3) = 3 years to less than 5 years; (4) = 5 years or more
FreqTraining	(1) = Quarterly; (2) = Yearly; (3) = Every 2 years; (4) = Every 3+ years
Competent	Likert scale response to: "Do you believe that upon completion of your training, you were competent on how to fill out the crash report form?"
NeedForTraining	Likert scale response to: "Do you believe there is a need for training of crash reporting?"
Opinion1	Likert scale response to: "Do you believe that the crash report is structured to match the flow of your investigation process?"
Opinion2	Likert scale response to: "Do you believe that your crash report form adequately captures the incident?"
Opinion3	Likert scale response to: "Do you believe that your crash report form should be revised to capture more details on the following sections? - Distracted Driving"
Opinion4	Likert scale response to: "Do you believe that your crash report form should be revised to capture more details on the following sections? - Work Zones"
Opinion5	Likert scale response to: "Do you believe that your crash report form should be revised to capture more details on the following sections? - Bicycle"
Opinion6	Likert scale response to: "Do you believe that your crash report form should be revised to capture more details on the following sections? - Pedestrians"
Opinion7	Likert scale response to: "Do you believe that gathering information for the following crash report is difficult to correctly obtain in the field? - Distracted Driving"
Opinion8	Likert scale response to: "Do you believe that gathering information for the following crash report is difficult to correctly obtain in the field? - Work Zones"
Opinion9	Likert scale response to: "Do you believe that gathering information for the following crash report is difficult to correctly obtain in the field? - Bicycle"
Opinion10	Likert scale response to: "Do you believe that gathering information for the following crash report is difficult to correctly obtain in the field? - Pedestrians"
State	Categorical value: Oregon, Idaho, or Washington
AgecyLevel	Categorical value: State, County, or Local
SubmitType	Categorical value: Electronic form or Paper form
YearsService	Numerical value for response to: "How many years have you worked in law enforcement overall?"

The Likert scale values ranged from 1 to 5 and represented responses from strongly disagree to strongly agree, with 3 being neither agree or disagree. An alpha value of 0.05 was selected as the significance criterion. If the Kruskal-Wallis test resulted in a p-value greater than 0.05

than there was no evidence to reject the null hypothesis; therefore, it is likely that there was no difference in scoring tendency between levels. If the p-value was less than 0.05 than there was likely difference in scoring tendency between levels. The tests showed significant effects to:

- officer competence upon conclusion of training,
- understanding the importance of data elements on the crash report forms,
- the need for training,
- reasons for revisions,
- the opinion of crash report structure matching the crash investigation, and
- how adequate the incident is captured by the crash report.

Table 7.2 summarizes the tests that yielded significant differences to the test outcome.

Table 7.2 Kruskal-Wallis Tests of Significance

Kruskal-Wallis Test	Kruskal-Wallis chi-squared	df	p-value
Competent **by** State	8.00	2	0.018
Importance **by** State	7.95	2	0.019
Opinion2 **by** State	10.6	2	0.005
Revisions **by** State	31.5	2	< 0.001
Opinion1 **by** Agency Level	8.49	2	0.014
Revisions **by** Agency Level	19.9	2	< 0.001
Need for Training **by** Last Training	8.29	3	0.041
Importance **by** Freq Training	10.9	4	0.028
Revisions **by** Submit Type	14.3	1	< 0.001

By this test it was unclear what state, agency level, and range of last training were and were not significantly similar to one another. To observe this granularity in significance a pairwise analysis was conducted to determine the significant differences in officer response originated from at the state level, agency level, and last training. When variables are significantly similar the outcomes are coded with the same letter (a-a) and when the variables are significantly different the outcomes are coded with different letters (a-b). The mean value of the responses per variable are displayed to show significance is the values. The following sections describe the findings from the pairwise tests of significance.

7.1 SIGNIFICANCE BY STATE

The first outcome tested was officer competence of crash reporting upon conclusion of training by state. Table 7.3 shows that Idaho and Oregon had statistically similar responses, while Washington officers responded significantly different from both Idaho and Oregon officers.

Table 7.3 Pairwise results for competence by state

Competent **by** State			
Variable	ID	OR	WA
Group	a	a	b
Means	3.80	3.72	4.09

This outcome could suggest that the training in Washington is better at preparing the officers for completing the crash report forms, though the proportions of responses are similar. Only 77 percent of the officers in Idaho responded with agree or better (46 of 60) and 67 percent in Oregon (29 of 43), while 86 percent of the officers in Washington (68 of 79) responded with agree or strongly agree.

One could speculate that officers replied with a higher agreement to the question than truly felt because their field experience supplemented any misunderstandings from the agency training received. When speaking with officers during the interview stage nearly half of the officers felt competent upon completion of training. It is also recognized that the question could have been interpreted to mean their competence upon their first training of crash reports and not their most recent training. One could further speculate that the officer responded to this question based on a comparison of what they have learned in the field versus the training. If the officer is seasoned with many years of experience completing crash reports, their knowledge of crash reporting could either be greater than that of what is trained and answer this question with disagreement, or because they understand the reporting process so well they may have just agreed that the training was good whether they received new knowledge or not. More research into the extent of the training in each state would better justify the significance in this test.

The second outcome that was tested was officer belief that training adequately explains the importance of the data collection elements on crash report forms. Table 7.4 shows that Idaho

and Washington had statistically similar responses to importance, while Oregon officers responded significantly different from both Idaho and Washington.

Table 7.4 Pairwise results for importance by state

Importance **by** State			
Variable	ID	OR	WA
Group	a	b	a
Means	0.76	0.58	0.81

A reason for this observation was recorded when performing officer interviews. Every officer from Idaho and Washington proclaimed that the software does a very good job at directing the officer through completing a crash report form; therefore, if anything is missed during the agency training there are plenty of resources available to the officer while filling out the crash report through either eIMPACT or SECTOR. One Washington officer noted: *"During training, SECTOR allows for submission of mock crashes that are reviewed and feedback provided"*. This form of training and continued aid in the field through the software may explain the significant difference in the officer responses. Oregon officers typically are equipped with paper forms and there may be little to no guidance provided with the forms to aid in completing complex crash investigations.

The next outcome that was tested was officer belief that a crash report form adequately captures an incident. Table 7.5 shows that Idaho and Oregon had similar responses to this question, while Washington responses were significantly different from both Idaho and Oregon.

Table 7.5 Pairwise results for crash form adequately capturing an incident by state

Adequately Captures Incident **by** State			
Variable	ID	OR	WA
Group	a	a	b
Means	3.60	3.44	3.94

An observation for this significance corresponds to the proportion of officers that answered agree versus disagree to this question. Idaho and Oregon yielded an approximately 5:1 and 4:1 ratio of agree to disagree, respectively, while Washington yielded a 16:1 ratio. The low ratios of agreement of the crash reports in Idaho and Oregon pair with the poor acceptance responses of crash report flow. Because SECTOR can auto-populate the majority of the driver,

vehicle, and insurance information from the scanners on their computers, the incidents are captured adequately. Officers in Oregon are required to record the incident on the paper form then transfer to an electronic platform which is most likely a governing factor of the low response to this question. If Idaho eIMPACT could auto-populate information like the SECTOR software allows it is speculated that the responses from Idaho and Washington would then be similar.

The last outcome tested if there were different effects on the type of revisions experienced between the different states. Table 7.6 shows that Oregon and Washington reporting practices differ in both the reason and quantity of revisions.

Table 7.6 Pairwise results for types of revisions by state

Type of Revisions **by** State			
Variable	ID	OR	WA
Group	ab	a	b
Proportions			
Contributing factor(s)	23%	22%	10%
Driver/Vehicle information	14%	22%	17%
Events leading to crash	11%	0%	5%
Insurance information	0%	0%	5%
Location description/drawing	23%	11%	29%
Missing Information	11%	22%	10%
Other (please specify)	3%	11%	9%
Spelling or Grammar	14%	11%	14%

This again is equated to the impact of electronic and paper form submissions. If there is a mistake in an electronic form (i.e., information missing or spelled incorrect) the software typically will flag the selection and not allow the officer to proceed without making a change. This option is not available on a paper form, which is commonly used in Oregon.

7.2 SIGNIFICANCE BY AGENCY LEVEL

The next outcome tested an officer's belief that the crash report is structured to match the flow of a crash investigation by agency level. Table 7.7 shows that county and state officers had similar responses to this question, while local officer responses significantly differed from both county and state officers.

Table 7.7 Pairwise results for crash report structured to match investigation by agency level

Structure Match Flow **by** Agency Level			
Variable	County	Local	State
Group	a	b	a
Means	3.80	3.21	3.55

After completing a like means to the responses it was observed that 24 percent of local officers disagreed and only 13 percent and 12 percent of county and state disagreed, respectively. This response contradicts the narrative received in the officer interviews. During the officer interviews it was discovered that it is typical that a local agency would call onto a county and state agency to conduct a crash investigation if there was a severe injury or fatality. The reason explained for this collaboration was primarily a more thorough investigation of the crash with the resources commonly available at the local agency level. In Idaho and Washington, it is typical that the state police will investigate a fatal crash because that information is recorded to the DOT immediately.

Severe and fatal crashes typically will also involve a more rigorous investigation into the contributing factors, impact location, and environmental surrounding. Due to the more rigorous nature of these investigations it was assumed that the officer responses would be more in disagreement at the county and state agency level. However, the opposite was observed; 70 percent of county officers agreed to this question and 64 percent of state officers. Therefore, it is concluded that the majority of the officers feel that the structure of crash report forms follows a more detailed investigation. Additional research into the resources needed for these crash investigations and which agency is and is not equipped with them would have added value to this significance test (i.e., a comparison of agencies with and without a traffic unit at each agency level).

The last outcome that was tested was the type of revisions at the agency level. Table 7.8 shows that each agency level was significantly different for one and the other.

Table 7.8 Pairwise results for types of revisions by agency level

Type of Revisions **by** Agency Level			
Variable	ID	OR	WA
Group	a	b	c
Proportions			
Contributing factor(s)	43%	17%	11%
Driver/Vehicle information	0%	17%	21%
Events leading to crash	14%	10%	2%
Insurance information	14%	0%	4%
Location description/drawing	29%	26%	25%
Missing Information	0%	12%	13%
Other (please specify)	0%	7%	8%
Spelling or Grammar	0%	12%	17%

This outcome agrees with the significant differences in handling processes explained in Chapter 4. The constants for each agency level is the fact that the data collection process begins with the responding officer creating and submitting the crash report to their officer of authority and having it viewed. The variability that affects the outcome of this question is the review process from that point forward; it is very different at each agency level.

At the localized level the officer interacts with the reviewing officer if there is any need for edits. Once the reviewing officer confirms the report it is processed and sent to the state. At the county level sheriff officers either transfer their own reports directly to the state level or have a reviewing officer. At the state level the responding officer is typically the only person who sees the crash report and it is sent to review at the DOT. These differences in review could affect the timeliness of the crash report being submitted and have the potential to affect the quantity of revisions made to certain crash narratives depending on the rank of the reviewing officer and the competence of the reporting officer.

7.3 SIGNIFICANCE BY LAST TRAINING

The significance test corresponding to the last time an officer received training was linked to officer opinions on the need for continued training and updating of crash reports. The test

showed the only difference between opinions came from officers who had been trained within the last year and officers that last received training five or more years ago (Table 7.9).

Table 7.9 Pairwise results for need for training by last training

Need for Training **by** Last Training				
Variable	Within 1 year	1-3 years	3-5 years	5+ years
Group	a	ab	ab	b
Means	4.00	3.80	3.78	3.54

Only 13 percent of the responding officers received training in the last year, while 45 percent of the officers have not received training within the last five years. When the time of last training was paired with the officer opinions of the need for training, 83 percent of the officers with less than a year training and 60 percent with last training exceeding five years agreed there is a need. An interesting observation is that no officer within one year of training selected any form of disagreement to this question, while 29 percent of the officers with 5 or more years since last training did. One possible reason for this significance could be associated to the average years of service for these two response types. The average years of service of the officers that have been trained within the last year was 8.5 years, while the average for officers with training of 5 or more years was 18 years. It is unclear if this is because the responding officers that have a larger number of service years are actively completing crash reports or not. However, the outcome is clear that there is a switch in opinion from the more seasoned veteran officer and those who are just starting in the force.

7.4 SUMMARY

This analysis identified that there is a significant difference between state and agency level regarding factors associated with training, flow and design of the crash report form, and means and methods of revisions. It is observed that Washington officers feel more competent about the training that they have received than officers from the other two states, suggesting that the process followed in Washington should be incorporated by other states to raise officer understanding of crash reporting. Oregon officers tend to better understand the importance of the data elements on the crash reports upon conclusion of training, confirming that the organization and clear definition of sections on the Oregon crash forms aid in the understanding of the elemental data for the officers. Additionally, Washington's

implementation of scanners in patrol cars aids in the adequacy of capturing the details of the incident, which officers also promoted during the interview.

The impact of state officers conducting investigations on more severe crashes did not affect their opinion that crash forms did not follow the crash investigation, rather, officers at local agencies felt that the crash form was too detailed for the more common fender-bender type of crashes. Aside from the structure and flow of the crash report form it had no effect on the quantity of revisions that are experienced at each agency level. This discovery could suggest that improvements could be made to the crash forms, or the reporting process, that would eliminate the possibility of revision (i.e., Washington card readers), or there needs to be more training on good data collection practices at the scene of the crash.

Training is unique in the sense that depending on the years of service that the officer has his or her opinion for the need of training declines. The survey was unable to confirm if an officer believes the need for training declines over the years of experience because his or her learning in the field exceeds what is taught, or the officer simply does not like change. Training could be mitigated if electronic platforms were used in every agency. The ability of the crash report software to monitor issues while the officer is filling out the form would be of added value to enhance learning opportunities.

CHAPTER 8: CONCLUSIONS

The primary objective of this research was to capture the narrative of law enforcement officers regarding crash reporting, explore the reasons why officers felt that the forms needed improvement, and suggest ways to streamline the overall process. The process flow diagrams from data collection at the scene of the crash to statewide data recording highlighted 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 regarding flow and the types of questions asked.

The findings from this research support the need for both streamlining and standardization of the crash report forms. The states of Alaska and Oregon record both citizen and law enforcement crash reports, while Idaho and Washington only record law enforcement reports. Idaho and Washington submit through electronic platforms, while Alaska submits on a 70-30 electronic and paper platform scale and Oregon on a 50-50 scale. The revision process for each state is similar at the agency level (superior officer reviews the recording officer's crash report and submits to state), though once the agency submits the crash report to the state the manner in which the elemental identifiers on the crash report form are processed differs. Citizen reports were combined into official reports in Alaska and Oregon, while Washington refined almost all elemental data from the agency level and Idaho uploaded the information as submitted by the recording officer. The officers interviewed agreed that the most important element of good data output was 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 proclaimed that they have expressed their opinions to improve crash reporting to their superiors though very little has changed over the years. Many officers expressed 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.

Officers from Idaho and Washington acknowledged the electronic only platform and elaborated on its benefits compared with paper forms. Some officers felt there could be some simplifications 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 needed improvement.

The officer responses from the regional survey gave further insight on the areas for possible improvement. Responses from Idaho and Washington were nearly identical. The majority of officers in these two states felt that the crash report forms did not adequately capture a crash completely and there were issues with the crash report following similar crash investigation procedures. Officers in Oregon were not quite as opinionated and most felt that the crash report captured enough details. Again, training was the most predominate factor with respect that it provided significantly different responses between state and agency level responders. The need for and frequency of improved training was echoed in the regional survey, with the difficulty of effectively documenting the field investigation on the crash form cited as an important topic.

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

8.1 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 could consider collecting and including in their state crash data system, improvement opportunities remain. With the MMUCC now on its 5th edition and NHTSA stating that it allows for even more flexibility and enhanced data collection efforts will improve data quality, there are states that are not volunteering to accept the changes.

State officials from Idaho proclaimed 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 want on it." There are many stakeholders involved that would be affected by changes crash report forms. A state official from Oregon mirrored this observations 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 between 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 snow as a feature. This recognition programming is present within Washington's SECTOR; the software records typical responses and will provide them at the top of the 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 streamline filing of crashes within the cities and counties.

It is assumed 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.

8.2 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 if trends are similar in other sections of the nation. A comparison between narratives could affirm if electronic platforms should be implemented in every state, if citizen reporting is necessary for good data, and if 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 topic could examine what sections each state uses and does not use from the MMUCC and capture the narrative on why and which stakeholders are responsible for those decisions. A restructure 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.

REFERENCES

Bailey, L., & Huft, D. (2008). Improving crash reporting: Study of crash reporting practice on nine Indian reservations. *Transportation Research Record: Journal of the Transportation Research Board*, (2078), 72-79.

Bejleri, I., Carrick, G., & Wingfield, N. (2010). Rethinking Electronic Crash Data Collection Transmission Model: Conceptual Framework for Centralized Web-Based Crash Data Collection System. *Transportation Research Record: Journal of the Transportation Research Board*, (2148), 93-100.

Bennett, Lawrence; Perkins, Robert A. A Report of PacTrans: Safety Data Management: Gathering and Using the Data. July 14, 2016.

Gregory, W., & Foreman, D. (2009). Nonparametric Statistics for Non-Statisticians. *Hoboken: John Wiley and Sons*. pp. 99–105. ISBN 9780470454619

Definitions, 17 Oregon State Statute § 811.745 (2015)

Definitions, 35 Alaska State Statute § 28.35.080 (2015)

Definitions, 46 Washington State Statute § 46.52.030 (2006)

Definitions, 49 Idaho State Statute § 49-1309 (1988)

Delucia, B. H., & Scopatz, R. A. (2005). NCHRP Synthesis of Highway Practice 350: Crash Records Systems. *Transportation Research Board of the National Academies, Washington, DC*.

DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical education*, 40(4), 314-321.

Elvik, R., & Mysen, A. (1999). Incomplete accident reporting: meta-analysis of studies made in 13 countries. *Transportation Research Record: Journal of the Transportation Research Board*, (1665), 133-140.

Kim, K. (1999). Lie factor in traffic safety: comparison of police and hospital reporting of seat belt and alcohol use in Hawaii. *Transportation Research Record: Journal of the Transportation Research Board*, (1665), 141-146.

Manual on Uniform Traffic Control Devices (MMUCC). FHWA, U.S. Department of Transportation, 2009.

National Highway Traffic Safety Administration (NHTSA). Event Data Recorder Overview. 2016-11-10T11:08:41-05:00. https://www.nhtsa.gov/research-data/event-data-recorder

National Highway Traffic Safety Administration (NHTSA). Fatality Analysis Reporting System (FARS). https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars. [7/19/2017]

National Highway Traffic Safety Administration (NHTSA). Traffic Safety Facts Research Notes: 2015 Motor Vehicle Crashes: Overview. DOT HS 812 318. August 2016. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318

Oregon Department of Transportation (ODOT). Oregon Temporary Traffic Control Handbook (OTTCH). 2011.

Oregon Revised Statutes (ORS). 2015, Vol. 17, Chapter 811, Section 811.720. When accident must be reported to Department of Transportation.

Oregon State Department of Transportation (ODOT). Oregon Driver & Motor Vehicle Services: Accident Reporting and Responsibilities. http://www.oregon.gov/ODOT/DMV/pages/driverid/accidentreport.aspx

Pfefer, R. C., Neuman, T. R., & Raub, R. A. (1999). *Improved safety information to support highway design* (No. 430). Transportation Research Board.

Scopatz, B., Brown, R., Zhou, Y., Benac, J., Peach, K., Bryson, M., & Lefler, N. (2017). *Crash Data Improvement Program Guide* (No. DOT HS 812 419).

SmartCOP Law Enforcement Technology, SmartCOP Helps Officers Make Informed Decisions. CTS America, Pensacola, Fla., 2001.

Texas Department of Transportation (TxDOT). (2010). *Issues and Recent History of the Texas Peace Officer's Crash Report Form (CR-3*, rep. https://ftp.dot.state.tx.us/pub/txdot-info/trf/crash_notifications/cr3_forum/issues.pdf

Ullman, G., & Scriba, T. (2004). Revisiting the influence of crash report forms on work zone crash data. *Transportation Research Record: Journal of the Transportation Research Board*, (1897), 180-182.

Washington State Patrol (WSP). State of Washington New Vehicle Collision Report Form. Created by: Patrick Gibbs. April 2013.

Wisconsin Department of Transportation (WisDOT). (2016) "Crash Database Improvement." *Traffic Operations and Safety Laboratory*, http://www.topslab.wisc.edu/research/cdi/

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 your answers will be held confidential.

If you do not understand a question please ask me to clarify. You can choose not to answer any question at any time, and if at any point you wish to stop the interview for any reason it is 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 email 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 SUREVY DISTRIBUTION EMAIL

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=email

APPENDIX C: REGIONAL SURVEY

PacTrans Crash Reporting Process

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. After 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 officer. 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.

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

Q2a. How do you typically transmit the electronic form?

◯ Internet portal

◯ Flash drive

◯ Email

◯ Other (please specify) _____

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 minute

○ 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) _____

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) _____

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

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?

_____

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.

WORK ZONE
00 - None
01 - Construction
02 - Maintenance
03 - Utility
04 - Work Zone, Type Unk

LOCATION OF THE CRASH
01 - Before the First Work Zone
      Warning Sign
02 - Advance Warning Area
03 - Transition Area
04 - Activity Area
05 - Termination Area
97 - Not Applicable

TYPE OF WORK ZONE
01 - Lane Closure
02 - Lane Shift/Crossover
03 - Work on Shoulder or Median
04 - Intermittent or Moving Work
97 - Not Applicable
98 - Other

WORKERS PRESENT
00 - No   01 - Yes   97 - N/A   99 - Unk.

LAW ENFORCEMENT PRESENT
00 - No
01 - Officer Present
02 - Law Enforcement Vehicle Only Present
97 - Not Applicable

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

○ Yes

○ No

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

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

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

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

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.

DISTRACTED BY

00 - Not Distracted
01 - Manually Operating an Electronic Communication
     Device (Texting, Typing, Dialing)
02 - Talking on Hand-Free Electronic Device
03 - Talking on Hand-Held Electronic Device
04 - Other Activity, Electronic Device (Navigation Device, DVD Player, etc.)
05 - Passenger
06 - Other Inside the Vehicle (Eating, Personal Hygiene, etc.)
07 - Outside the Vehicle (Includes Unspecified External Distractions)
97 - Not Applicable
99 - Unknown if Distracted

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

◯ Yes

◯ No

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.

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

◯ Yes

◯ No

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

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.

WAS DRIVER DISTRACTED

UNIT #____ ☐ YES ☐ NO
UNIT #____ ☐ YES ☐ NO
DISTRACTIONS INCLUDE: OPERATING A
TELECOMMUNICATION DEVICE, ELECTRONIC
DEVICES, PDA, LAPTOP COMPUTER, NAVIGATION
DEVICES, ADJUSTING AN AUDIO OR ENTERTAINMENT
SYSTEM, SMOKING, INSIDE DISTRACTIONS, OUTSIDE
DISTRACTIONS, EATING OR DRINKING, ANIMALS,
PASSENGERS, ETC.

DISTRACTED BY: _____

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

○ Yes

○ No

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

DISTRACTED BY
00 - Not Distracted
01 - Manually Operating an Electronic Communication
     Device (Texting, Typing, Dialing)
02 - Talking on Hand-Free Electronic Device
03 - Talking on Hand-Held Electronic Device
04 - Other Activity, Electronic Device (Navigation Device, DVD Player, etc.)
05 - Passenger
06 - Other Inside the Vehicle (Eating, Personal Hygiene, etc.)
07 - Outside the Vehicle (Includes Unspecified External Distractions)
97 - Not Applicable
99 - Unknown if Distracted

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

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) _____

Q15c. Is there continued training at your agency?

○ Yes

○ No

Q15d. How frequent is the continued training?

○ Quarterly

○ Yearly

○ Every two years

○ Every 3+ years

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

○ Yes

○ No

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

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