NJ-2017-001

Crash Records Collection Policy Examination and Best Practices Review

FINAL REPORT
May 2017

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In cooperation with

New Jersey
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Bureau of Research

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TECHNICAL REPORT
STANDARD TITLE PAGE

1. Report No. NJ-2017-001	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Crash Records Collection Policy Examination and Best Practices Review FINAL REPORT		5. Report Date May 2017 6. Performing Organization Code
7. Author(s) Titze, Chris; Faron, Whitney		8. Performing Organization Report No.
9. Performing Organization Name and Address Cambridge Systematics, Inc. 38 East 32nd Street, 7th Floor New York, NY 10016		10. Work Unit No. 11. Contract or Grant No.
12. Sponsoring Agency Name and Address New Jersey Department of Transportation P.O. 600 Trenton, NJ 08625		13. Type of Report and Period Covered: Final Report (not covered) 14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

The New Jersey Department of Transportation (NJDOT) Bureau of Research identified critical issues relating to New Jersey's current property damage only (PDO) crash reporting threshold. The costs to maintain crash reporting are great and require the involvement of State and local law enforcement agencies, the NJ Motor Vehicle Commission (MVC), NJDOT and private vendors. Part of these costs are impacted by New Jersey's PDO crash reporting threshold, and raising this threshold may result in cost savings for all, or some of the aforementioned agencies, including NJDOT. The purpose of this document is to: ascertain the impacts of raising the threshold and whether these impacts would be cost-related, efficiency-related, or both; the marginal cost of a crash report; the legislative requirements to update the threshold; and the best practices of crash reporting policies and procedures.

17. Key Words	18. Distribution Statement
Crash reporting cost; crash reporting threshold; property damage only threshold; crash reporting procedures; crash reporting legislation	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. 109 pages	22. Price
Unclassified	Unclassified		

Form DOT F 1700.7 (8-69)

ACKNOWLEDGEMENTS

The authors of this report wish to thank the staff from the New Jersey Department of Transportation's (NJDOT) Bureau of Research and Bureau of Transportation Data and Safety, and the New Jersey State Police of without whom completion of this report would not have been possible. In addition, the authors would like to thank the California Highway Patrol (CHP) Support Services, the Georgia State Department of Transportation (GDOT), the Illinois Department of Transportation (IDOT), the Indiana State Police and Indiana's State Police (ISP) Crash Record System Management Vendor, the Michigan State Police (MSP), and the Washington State Department of Transportation (WSDOT) for making themselves available to the authors and sharing their experiences.

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EXECUTIVE SUMMARY

The New Jersey Department of Transportation (NJDOT) Bureau of Research identified critical issues relating to New Jersey's current property damage only (PDO) crash reporting threshold. Through this research effort, NJDOT seeks to determine if the current threshold optimizes DOT and state crash reporting efficiencies or if it has created more inefficiencies.

NJDOT contracted with Cambridge Systematics, Inc. (the "Research Team") to provide an independent assessment of existing crash reporting threshold practices as they relate to NJDOT's policies and procedures and offer recommendations for policy and procedural changes as needed.

The Research Team conducted a literature review, provided in-depth document and crash reporting process analysis, developed and conducted an interview program with five additional State DOTs, and provided recommendations to assist NJDOT in appropriately updating its crash reporting threshold.

Research Questions

This research effort was guided by the following key questions:

What are the benefits of collecting reports at current levels?

The PDO reporting threshold of $500 provides a large sample of data that provides NJDOT with an extensive set of crash details with which to analyze the safety and performance of particular corridors or intersections. In 2014, PDO crashes accounted for 80 percent of the total crashes, and this large percentage of the total has remained relatively constant over the last 10 years. Collecting a large number of records is beneficial for the analysis process as many of the records received are incomplete or have errors secondary to inconsistent data collection and entry. High numbers of reported crashes ensures that there is usable data for analysis.

What are the costs of collecting reports at current levels (costs to collect, aggregate, verify, and store data as well as police costs to prepare and submit reports)?

The Research Team has estimated an average cost for the NJDOT crash reporting unit. The total budget (including the crash records unit vendor) was $3,347,650 for 2014. During that year, NJDOT processed 289,873 crashes. Therefore, NJDOT's average cost (to collect, aggregate, verify, and store data per crash) in 2014 was $11.55.

Total costs for New Jersey State Police (NJSP), local law enforcement agencies, and other agencies such as the New Jersey Office of Information Technology (NJOIT) was not determined. The Research Team estimates that additional costs to these agencies is significant. The following assumptions were made:

- The present-day median salary for New Jersey State Police (NJSP) officers that report crashes is $67,500 (≈32.45 hourly).

- In 2009 the median salary for New Jersey's 20,525 municipal officers was estimated as $90,672 (≈$43.59 hourly).

- Peer state interviews identified an estimate for officer time necessary to complete each crash record form of approximately 45 minutes (not including time for form review and validation). If this estimate is comparable for NJSP and local law enforcement agencies, then the cost to report each crash for NJSP is approximately $24.34 and approximately $32.70 for municipal police forces.

- Applying this rate to the 2014 total number of crashes (289,873) yields an approximated cost to NJSP and New Jersey municipalities of $7,055,509 to $9,478,847.[1]

Should New Jersey raise the crash reporting threshold (and what are the available options to raise the threshold)?

The Research Team believes that New Jersey should raise the threshold to an amount above $1,000. This amount would put it in line with other states. It would also yield fewer reported crashes, as has been seen in other states that have similarly adjusted there reporting practices. From interviews, two states saw significant reductions in the total number of reported crashes after they increased PDO thresholds, and one state saw a slight increase (not due to threshold increase).

Finding the ideal threshold increase that will yield the greatest reduction of total crash reports, with the least decrease in data quality, will be a challenge; a threshold increase that is too low will be ineffectual and will waste administrative resources to push it through, while an increase that is too high will reduce crash data and weaken safety planning and engineering measures.

What are the positive and negative impacts of raising the threshold?

Given the existing data available, it is difficult to directly link a PDO threshold increase with a specific reduction in total crash reports. However, due to the large percentage of PDO crashes reported, and the relatively stable annual vehicle miles travelled (VMT) numbers for New Jersey, a modest threshold increase may result in cost savings for NJDOT, NJSP, NJOIT, and local law enforcement agencies. Of course, cost savings are possible only if the time savings due to less crash report processing will translate into budget reductions. NJSP and local agencies may also see an improvement in on-time crash report submissions to NJDOT because the backlog of crash reports will decline.

[1] This range represents the minimum (NJSP cost per crash record) and maximum (municipal cost per crash record) costs; a more accurate estimate could be produced if data was available on the breakout of state- and municipal-reported crashes.

A threshold increase and the reduction of the number of crashes reported will provide less useful data for NJDOT to prioritize roadway safety modifications and for NJSP (and local law agencies) to prioritize safety programs.

What should possible legislative updates related to crash reporting take into consideration?

Legislation should consider requiring crash reporting performance standards, such as the timeliness of submissions and accuracy of crash record data to NJDOT. Legislature should include incentives for local law enforcement agencies that meet a set of minimum reporting standards.

Legislation should also mandate a timely and efficient transition for all municipal police forces and relevant agencies to a statewide electronic crash reporting system.

The Research Team recommends that NJDOT open a dialogue with NJOIT, NJSP and local law enforcement agencies to review cost estimates and collaboratively develop legislature, including a threshold change that all agencies support. This cross agency collaboration may assist in generating an institutional consistency for improving state policy.

Lastly, NJDOT should bundle as many legislative actions as possible if they move ahead with a PDO threshold increase. One important element to consider is that of electronic signatures as valid by police officers. While New Jersey currently doesn't use electronic crash reporting, this may change in the future, and if it does electronic signatures may require a legislative action to be valid; this would eliminate one barrier to electronic crash reporting implementation if New Jersey moves ahead with it in the future.

Key Research Conclusions

Relationship Between PDO Threshold Increase and Crash Record Reduction Exists

Researchers determined that a relationship exists between threshold increase and crash record reduction; for example, New Jersey State Police (NJSP) report all crashes but only send reportable crashes (crashes involving injury, death or property damage greater than or equal to $500) to NJDOT; therefore, if New Jersey raised the threshold then NJSP would send fewer crash records to NJDOT.

Reduction in Total Crash Reports Likely for New Jersey

Increasing the PDO threshold may reduce the aggregated time that local law enforcement officers spend to complete crash forms in minor crashes. However, the degree to which the threshold increase impacts the number of crash records that agencies must process depends on factors such as VMT (which the economy, fuel price, vehicle fuel efficiency, etc. all affect), roadway safety projects, outreach and education, and the extent of the threshold increase.

Reduction in Reported Crashes May Not Yield Decreased Costs for NJDOT

Researchers found that the average crash reporting costs for agencies depends on the fluctuation of total crash numbers and the proportion of electronic versus paper reporting. Less crash records may require less state resources to process crash data.

Reduction in Reported Crashes May Impact Public Safety

Less data may negatively impact public safety. While data drives decision making, not all crash records provide meaningful data. Reducing the numbers of reported crashes will result in less data, albeit data of minor fender benders. It is crucial is to ensure high data quality is collected.

BACKGROUND

Vehicle crashes cost States tremendous amounts of resources, both in terms of lost life and property damage, as well as the costs to maintain crash reporting operations. The costs to maintain crash reporting are great and require the involvement of State and local law enforcement agencies, the NJ Motor Vehicle Commission (MVC), NJDOT and private vendors. Part of these costs are impacted by New Jersey's PDO crash reporting threshold, and raising this threshold may result in cost savings for all, or some of the aforementioned agencies, including NJDOT. The purpose of this document is to ascertain the impacts of raising the threshold and whether these impacts would be cost-related, efficiency-related, or both, and what agencies would be affected.

OBJECTIVES

The goal of this research was to provide NJDOT with a comprehensive understanding of the following crash reporting threshold elements:

- The benefits of collecting crash reports at the current threshold
- The costs of collecting reports at current levels (costs to collect, aggregate, verify, and store data as well as police costs to prepare and submit reports)
- Whether or not New Jersey should raise its crash reporting threshold (and what are the available options to raise it)
- The positive and negative impacts of raising the threshold
- If a legislative process is necessary to update and align State practices with national norms
- Given a necessary legislative process, what crash reporting elements should be taken into consideration

INTRODUCTION

The performed research was designed to provide the NJDOT Bureau of Research with a specific set of crash reporting threshold information. This information includes the marginal cost of a crash report, the legislative requirements to update the threshold, and the best practices of crash reporting policies and procedures. In addition to this information, the report provides recommendations on what New Jersey should set its updated threshold to, how to maximize private vendors in the crash reporting process, and the impacts of upgrading from manual to electronic crash reporting.

SUMMARY OF THE LITERATURE REVIEW

The research team performed a literature and best practices review including academic and governmental studies, reports, and websites that documented best practices for setting thresholds, identifying the marginal cost of reporting a crash, and understanding strategies for electronic data collection. The literature and best practices review references are detailed below.

Threshold Literature and Best Practices

Key threshold setting references include:

Governors Highway Safety Association (GHSA) Model Minimum Uniform Crash Criteria (MMUCC), Fourth Edition (2012)

The National Highway Traffic Safety Administration (NHTSA) funded and led the development of the fourth edition MMUCC. Key contributors included the GHSA and the Federal Motor Carrier Safety Administration (FMCSA). The goal of the updated document was to standardize crash data and collection techniques across local, state and federal jurisdictions. The MMUCC specifies a minimum set of uniform data elements that should be collected for motor vehicle traffic crashes. It also indicates for which motor vehicle crashes MMUCC data should be collected. The MMUCC Guideline does so by setting the threshold for reporting the most significant motor vehicle crashes. MMUCC recommends the following threshold for all motor vehicle crashes, both traffic and non-traffic, as necessary to generate the cases needed to improve highway safety:

- All crashes statewide involving death, personal injury, or property damage of $1,000 or more should be reported and entered into a statewide database.
- Crash data should be reported for all persons involved (including the injured and non-injured).
- Each State should adopt a reporting threshold that is uniform and consistently implemented statewide.[2]

[2] http://www.mmucc.us/sites/default/files/MMUCC_4th_Ed.pdf

Mapping to MMUCC: A Process for Comparing Police Crash Reports and State Crash Databases to the Model Minimum Uniform Crash Criteria (2015)

To assist States in evaluating their consistency with MMUCC, NHTSA and GHSA developed a methodology for mapping the data collected on police accident reports (PARs) and the data entered and maintained on crash databases to the data elements and attributes in the MMUCC Guideline. This methodology is intended to standardize how States compare both their PARs and their crash databases to MMUCC. The document outlines thresholds for what person, vehicle and crash attributes should be as well as how they should be collected. The process recognizes that while State data systems often use different terminology and formatting, different data sets often can be mapped to the recommended MMUCC data elements and attributes. [3]

National Telephone Survey of Reported and Unreported Motor Vehicle Crashes (2015)

NHTSA publishes crash statistics based on police accident reports, but many crashes are never reported by the police. In 2008 NHTSA sponsored a telephone survey to estimate the incidence of unreported crashes. The present survey, completed in 2010, collected data on 2,299 crashes, 697 of which were unreported to police. When the data were properly weighted, the participant responses indicated that approximately 30 percent of crashes go unreported. In both surveys the crashes were mostly property-damage-only crashes, although some unreported injury crashes were found. This document can help outline commonly missed crash reports that are never reported and circumstances for how that occurs.[4]

State Data System Crash Data Report: 2000-2009 (2014)

Since the early 1980s, the NHTSA has been obtaining, from various States, computer data files coded from police crash reports. NHTSA refers to the collection of these computerized State data files as the State Data System (SDS). The SDS is maintained by NHTSA's National Center for Statistics and Analysis (NCSA). Currently, there are 34 States participating in SDS: Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Missouri, Montana, Nebraska, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, Texas, Utah, Virginia, Washington, Wisconsin, and Wyoming. This report presents descriptive statistics summarizing motor vehicle traffic crashes that occurred from 2000 to 2009 in the SDS. The States' crash data files are unique, contain large amounts of information, and are used by NHTSA analysts for a broad range of motor vehicle traffic crash research and reports and in the development of U.S. DOT regulation and policy.

[3] http://www-nrd.nhtsa.dot.gov/Pubs/812184.pdf

[4] http://www-nrd.nhtsa.dot.gov/Pubs/812183.pdf

Information in the report serves as a guide for data collected from 34 states on their crash reports.[5]

National Highway Traffic Safety Administration (NHTSA) State Data Information Resources (2015)

The NHTSA website contains reporting thresholds, state-published crash facts, and crash reporting files for all 50 states plus US territories. Crash reporting files include officer reports, insurance reports, data dictionaries, and code manuals.[6]

AAA Damage Threshold Reporting Practices (2015)

The AAA website summarizes the minimum damage thresholds all crashes must meet before reporting to the authorities becomes mandatory. The thresholds set by each state vary with respect to types of crashes reported, property damage amounts, and deadlines to file reports. According to the website, 47 States have specific guidelines that specify a minimum damage threshold that all crashes must meet before reporting to authorities becomes mandatory. Approximately 66% of the States have damage thresholds that are $1000 or higher.[7] Reporting thresholds from the document are summarized in Figure 1.

[5] http://www-nrd.nhtsa.dot.gov/Pubs/812052.pdf

[6] http://www.nhtsa.gov/nhtsa/stateCatalog/stateData.html

[7] http://drivinglaws.aaa.com/tag/accident-reporting/#

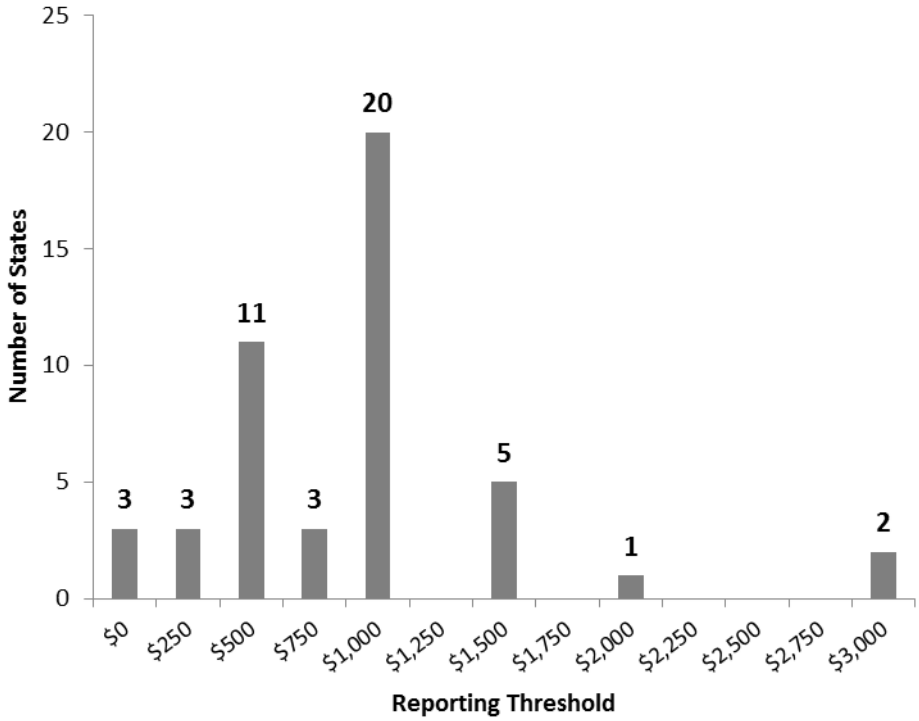

Figure 1. Property Damage Only Thresholds (Source: AAA and State Interviews)

Marginal Cost Literature And Best Practices

Key marginal cost to report a crash references include:

National Cooperative Highway Research Program Synthesis 350: Crash Records Systems: A Synthesis of Highway Practice (2005)

This document provides information on practices in crash reporting and processing, as applied to highway and traffic safety. Surveys were sent to state transportation agencies and follow-up interviews were conducted with selected agencies to help identify the current practices in crash reporting and processing. The discussions focused on the following issues:

- Who is responsible for administering crash data and how is it collected?
- Who is responsible for maintaining the crash databases?
- How are data quality (e.g., timeliness, accuracy, completeness, and uniformity) ensured?
- How are crash data integrated and linked to other databases?
- How crash data are made accessible to users?
- What barriers exist to the above activities?

This report details the cost to develop and implement crash data systems. The document notes "the average cost to develop a system was just over $850,000. There were 10 systems that cost less than $1 million and 3 systems that cost more than $1 million. It also noted that 11 states documented the cost of having data in the crash records system. The cost varied widely - from a high of $38.85 per crash (Washington) to a low of just over $1.50 per crash (California).[8] Researchers estimate that discrepancies in crash costs reported could be the result of inconsistencies in the cost components taken into consideration in the estimates, the methods used to calculate the component costs, and actual differences in the costs of labor in the surveyed states.

Electronic Data Literature and Best Practices

Key electronic data collection references include:

I-95 Corridor Crash Data Reporting Methods (2009)

This report summarizes research conducted on the I-95 Corridor States' crash data reporting systems and procedures. It provides a state by state summary of the type of technology and software used to collect, maintain, and distribute crash data, if the software is provided by the State or a private vendor, and who uses the technology/software. The report also includes stakeholder contact information for crash data collection (lead agencies for collection, reporting, system contacts, crash from contacts, and traffic record coordinating committee contacts). This information will be helpful when setting up interviews with various states at a later date. [9]

Federal Highway Administration (FHWA) Crash Data Improvement Guide (2010)

FHWA published this guidance document to assist a variety of state entities in identifying, defining and measuring the timeliness, accuracy, completeness and consistency of the crash data in their databases. The entities this document was aimed to help include state crash database administrators and managers, State Traffic Records Coordinating Committee members, State Departments of Transportation, and State Highway Safety Offices.

FHWA's Crash Data Improvement Program (CDIP) Guide details the benefits of electronic data collection over a system that relies on paper reports. These advantages include:

- More accurate data
- More timely data
- More complete data
- Faster data retrieval and easier access

[8] http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_350.pdf

[9] http://i95coalition.org/wp-content/uploads/2015/03/Crash_DataTask_1_Technical_Memo.pdf?dd650d

- More effective use of resources
- Better opportunity for quality control monitoring
- Better opportunity for electronic integration with other databases[10]

State systems that integrate data by linking police accident reports to medical records provide important information that can be used to better understand motor vehicle crash injuries. The objective of this study was to better understand the facilitators and barriers to successful data linkage systems. Data for this study were collected by questionnaire, focus group, and a literature search. Twenty-five states completed the survey and 19 participated in focus groups. Facilitators of these systems included a community context that supports linkage, one lead agency to oversee the system, coalition of data owners, memorandums of understanding to obtain data, high quality data, staff with the right mix of technical and non-technical skills, technical assistance and training, and stable funding. The study identified the following barriers to successful data linkage systems:

- Lack of funding
- Staff turnover
- Lack of documented procedures
- Lags in obtaining data
- Statutory requirements for data use
- Complex linkage techniques
- Failure to adequately market information available from linked databases[11]

[10] http://safety.fhwa.dot.gov/cdip/finalrpt04122010/ch1.cfm

[11] http://www-nrd.nhtsa.dot.gov/Pubs/812180.pdf

SUMMARY OF WORKED PERFORMED

The research team divided the work effort into three tasks, as follows:

1. Comparative Analysis
2. Interviews
3. NJDOT Crash Reporting Analysis

The following sections of this report include detailed analyses of each category.

Task 1 - Comparative Analysis

The research team began with a review of NJDOT's existing crash reporting practices, including policies, procedures, and legislation related to setting property damage only (PDO) thresholds and costs of reporting an accident, in addition to the latest NHTSA Traffic Records Assessment report conducted in New Jersey.

New Jersey State Legislation

The research team reviewed New Jersey State legislation related to reporting motor vehicle crashes. N.J.S.A 39:4-130 (May 24, 1983) increased the damage threshold for reportable motor vehicular accidents from $200 to $500. New Jersey State law N.J.S.A. 39:4-131 (December 4, 2008) requires law enforcement officers who are investigating a motor vehicle crash to submit a completed crash report to the MVC within five (5) days. Thus, the current practice is that these reports must be submitted by all law enforcement agencies in the State for any motor vehicle traffic crash resulting in injury to or death of any person, or damage to property of any one person in excess of $500.

At the crash scene, police officers complete New Jersey's crash report form (NJTR-1) and submit the information to the appropriate agencies. There is a 12-hour reporting requirement for the State Police, and a 24-hour requirement for submission to the New Jersey Division of Highway Traffic Safety (DHTS). The MVC shares information between NJDOT and DHTS.

The crash reporting process has remained consistent for police officers in New Jersey, but the crash records system has experienced many changes. The system was privatized in 1996; however, the company responsible for completing a crash records database failed to do so. In 2002, NJDOT assumed responsibility for the system and hired a vendor to scan the NJTR-1 image and input data into the NJDOT Oracle Database.

NJDOT Policy

The research team reviewed The Police Guide for Preparing Reports of Motor Vehicle Crashes, revised by the MVC in 2011, the "Traffic Records Strategic Plan", produced by the New Jersey Statewide Traffic Records Coordinating Committee in 2014; and a

National Highway Traffic Safety Administration (NHTSA) “2012 Traffic Records Assessment” (of New Jersey). In addition, NJDOT provided the research team with the following examples of State policies related to crash record collection procedures.

Police Guide for Preparing Reports of Motor Vehicle Crashes (2011)

The Police Guide for Preparing Reports of Motor Vehicle Crashes, revised by the MVC in 2011, is a straight-forward document that instructs police officers in how to properly complete the NJTR-1 (New Jersey’s standardized crash report form). The Guide outlines very detailed aspects of NJTR-1 completion, from defining terms to properly collecting the required data.

The Guide contains bullets of the most important points for police officers to know when completing the NJTR-1, the responsibilities of the driver(s) involved in a crash, the police officers’ responsibilities, and comprehensive instructions of all aspects of crashes. The Guide also covers additional information relevant to crash reporting, such as fatal- and non-fatal crash reporting protocol, the definitions of key terminologies, and examples of common crash types.

Traffic Records Strategic Plan (2014)

The Traffic Records Strategic Plan, produced by the New Jersey Statewide Traffic Records Coordinating Committee (TRCC) in 2014, aims to achieve three goals: to document New Jersey’s existing safety data practices, systems and stakeholders; identify opportunities to improve the normalization and interrelation of data sets; and target future investments that represent a cohesive vision.

The Plan includes a discussion of NHTSA‘s best practices of safety data planning and traffic records systems that it recommends all states follow. New Jersey’s existing Traffic Records System is documented, with multiple graphics that show how the components of the system relate and who owns/manages them.

NHTSA’s 2012 assessment of New Jersey’s Traffic Records Information Systems, as compared to NHTSA’s Traffic Records Program Assessment Advisory, is detailed. The assessment lists New Jersey’s system strengths, weaknesses, and opportunities for improvement.

In addition, best practices applicable to all states and ideal practices applicable to New Jersey’s seven traffic records components are included in the Plan. The Plan concludes with data systems’ performance attributes and analyzes particular New Jersey projects related to these data systems.

Traffic Records Assessment (2012)

A NHTSA Technical Assessment Team conducted a traffic records assessment for the New Jersey Division of Highway Traffic Safety (DHTS) from March 19-23, 2012. The purpose of the assessment was to determine whether New Jersey’s traffic records system could identify safety issues with the State highway system, manage the

solutions levied to solve or mitigate those issues, and evaluate the effectiveness of those solutions.

The Team assessed the status of the State's TRCC, strategic planning, data integration and data uses, and program management against nationally established guidelines and documented its findings in a Traffic Records Assessment report. The report concluded with recommendations for improvement of New Jersey's traffic records system.

NJDOT Existing Crash Reporting Practices

The research team reviewed NJDOT's existing crash reporting practices – focusing on legislation, policies, and procedures related to setting thresholds and costs of reporting a crash. Per the State's policies, the following steps for processing crash data[12] in New Jersey were identified:

1. Crash occurs
2. Reportable crash: Officer determines crash damage occurred over $500 or an individual was injured or killed.
3. Data collection: state or local law enforcement agencies complete form NJTR-1
4. Data Submission:
    a. Non-fatal crashes: NJTR-1 mailed to NJDOT (within 5 days)
    b. Fatal crashes:
        i. Local law enforcement agency and medical examiner conduct preliminary crash investigation
        ii. Local law enforcement agency reports the crash to the State police through "Criminal Justice Information System" (CJIC2000) (within 24 hours)
        iii. Local law enforcement agency mails copy of NJTR-1 to the MVC, Fatal Accident Review Board (within 72 hours)
            1. Copy of the completed report mailed to State police, Fatal Accident Investigation Unit
    c. Commercial crashes: data go to SafetyNet

[12] The Police Guide for Preparing Reports of Motor Vehicle Crashes, New Jersey Motor Vehicle Commission, 2011; Traffic Records Assessment (of New Jersey), NHTSA, 2012

5. Data processing: Crash data are cleansed then verified.

6. Data posting: data are entered into NJ's Accident Records Database (ARD) which is used by NJDOT and maintained by.NJ Office of Information Technology (OIT).

7. Data usage: NJDOT engineers and planners use data to develop and implement a variety of safety programs and projects.

NJDOT also provided the research team with an overview of the process by which records are received and entered into the NJ crash records database (Figure 2).

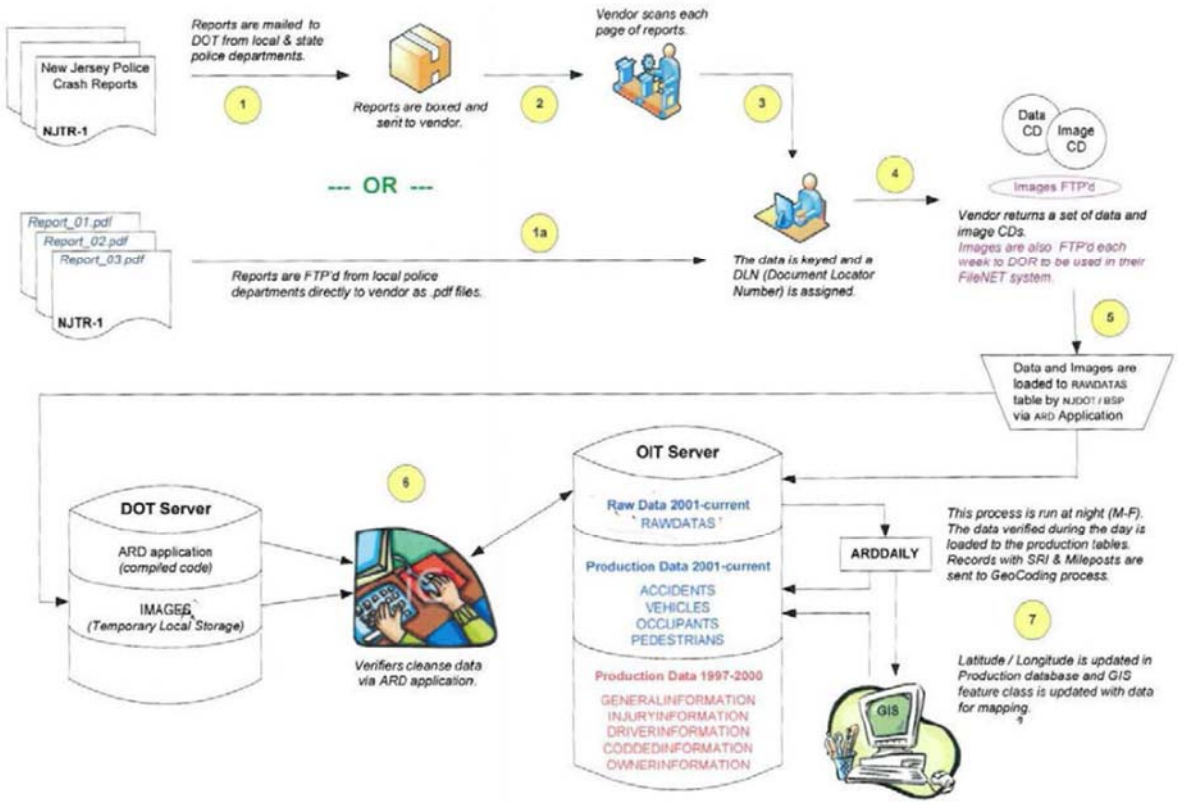

Figure 2. ARD Overview (Crash Records to Database) – NJDOT 2015

NJDOT developed Figure 3 that describes the manner by which local and State police offices, NJDOT, and the MVC coordinate efforts to collect, verify and maintain crash data. The figure highlights the complexity and inefficiencies in the crash reporting process.

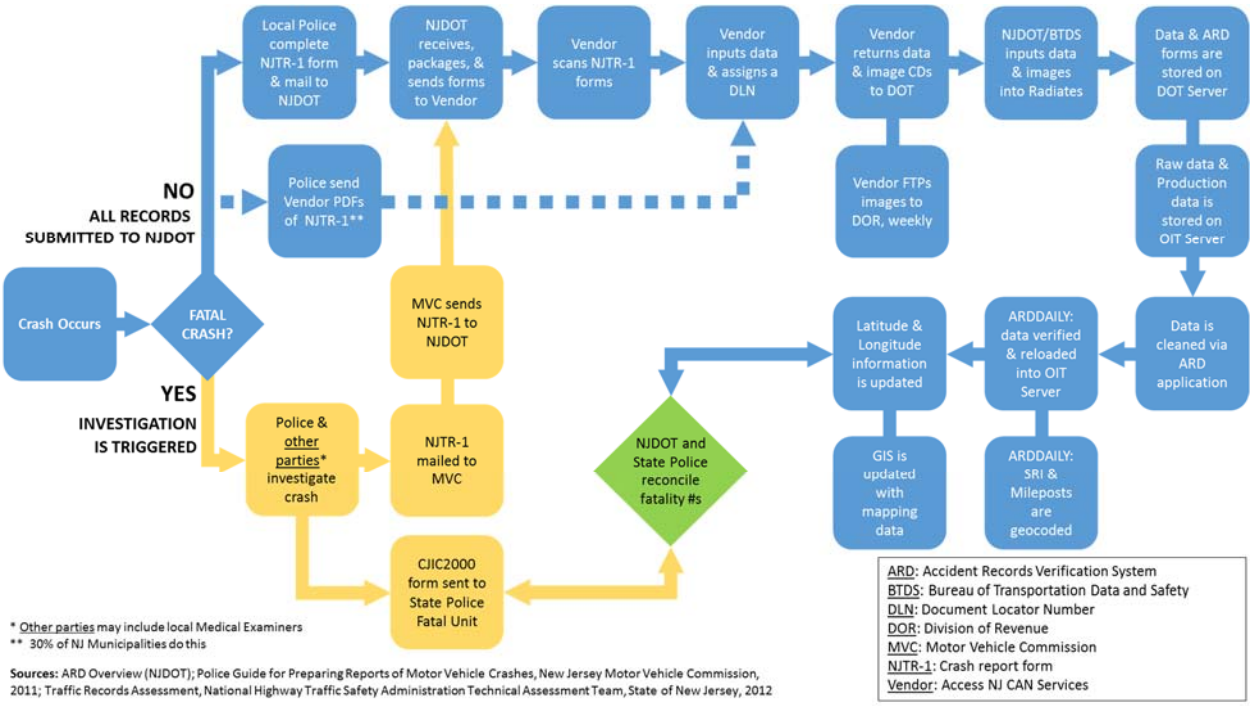

Figure 3. Original NJDOT Crash Reporting Process

It is important to emphasize the relationship between this flow chart and the State's crash reporting thresholds: lower crash reporting thresholds mean more reports must follow this process, while higher thresholds would reduce the number of reports put through this process.

Electronic crash reporting would eliminate multiple steps, increase the speed of data delivery and reduce the costs of printing, shipping and storing the hardcopy crash forms in multiple locations. Therefore, crash reporting thresholds and traditional or electronic reporting have great impacts on the cost, accuracy and speed of crash reporting.

State-by-State Comparison

Next, the research team performed an initial scan of PDO crash reporting thresholds for all 50 States; this was done by utilizing readily available data from NHTSA, the Transportation Research Board, and the I-95 Corridor Coalition, and focusing on identifying states that have a high accident reporting threshold.

Total crash statistics are not compiled at the Federal level, but are available in numerous, disparate locations. States have different property damage only (PDO) crash reporting thresholds, in addition to different criteria for injury crashes, which negate the possibility of a single source of standardized or complete data. For the purpose of this analysis, the research team collected total crash data from: NHTSA's State Data System Crash Data Report: 2000-2009, NHTSA's compilation of Annual State Reports and multiple strategic highway safety plans (SHSP). Despite these reporting challenges, researchers found 40 out of the 50 states' total annual crash statistics.

Researchers examined total annual fatal crashes and injury crashes for all states, but found the total crash statistics were more useful in generating meaningful conclusions about crash records systems. Crash records systems manage data aggregated from all crash types and sources, therefore it was not productive to analyze entire systems by isolating individual crash types. Even with an incomplete data set, total annual crashes by state yielded the most insight into crash reporting systems.

Threshold, total crashes, injury crashes and total licensed drivers for all 50 states are cataloged in Appendix A. Information collected in the database includes:

- Property damage threshold that triggers vehicle crash reporting
- Total licensed drivers
- Total crashes
- Total injury crashes

Threshold Comparison

Figure 4 shows states' reported crash thresholds and those without a crash reporting threshold (per the NHTSA 2014 State Data System Crash Data Report and AAA's

2011[13] Digest of Motor Laws). Crash reporting thresholds span a range of $400 in Ohio to $3,000 in Hawaii. Three states do not have minimum PDO thresholds.

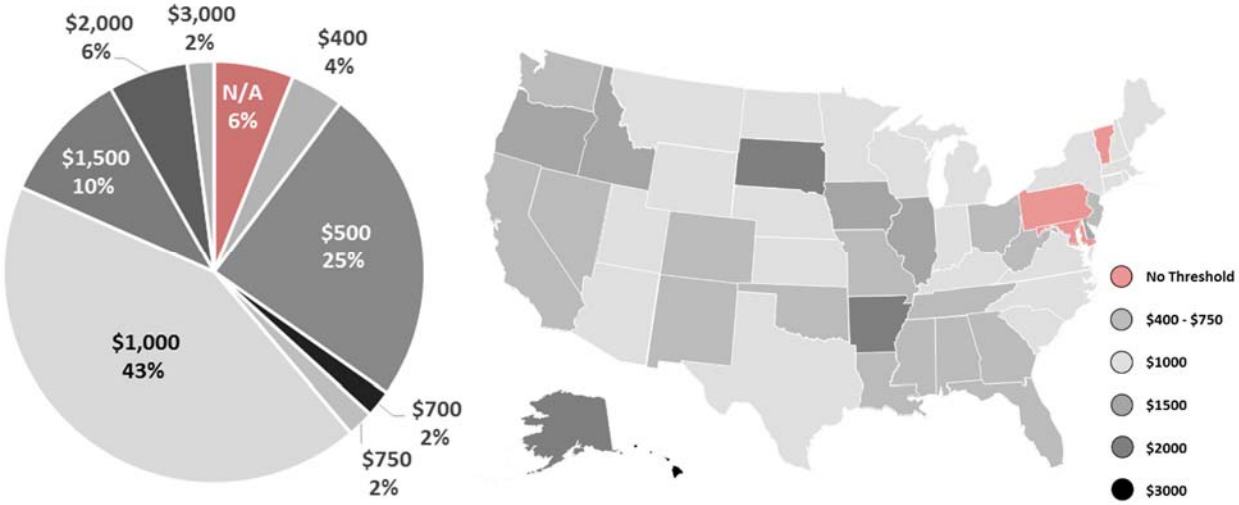

Figure 4. Property Damage Only Thresholds by Share of States (L) and National Context (R)

With a threshold of $500, approximately 65% of the states have reported a higher threshold than New Jersey which is one of only 15 states that have a threshold below $1,000.

Detailed Ten State Comparison

From the initial scan, researchers further examined the crash reporting practices of nine states. Reporting practice were cataloged and assessed against New Jersey's crash reporting practices for comparison. The research team conducted a more detailed comparison of New Jerseys' crash data collection policies and procedures to other states. Along with the key comparative statistics for all 50 states, researchers also analyzed factors including:

- Annual VMT
- Change in a state's property damage threshold (the threshold from/to amount change and what year it changed, if applicable)
- Does a state participate in electronic reporting
- What technology or software is utilized to record crashes
- Who is the software provider

[13]About the AAA Digest of Motor Laws (http://drivinglaws.aaa.com/about-the-digest-of-motor-laws/)

- What percent of crash reports are submitted electronically (if any)

Annual VMT Comparison

Figure 5 and 6 show the ten highest statistics of total crashes per licensed drivers in 2014, and per 1 million Annual VMT in 2013. Annual VMT is an important metric when comparing the amount of driving activity among states. Alaska has the lowest annual VMT, at 4,848 (in millions), while California has the highest annual VMT, at 329,534 (in millions). Texas, Florida and New York follow California, respectively.

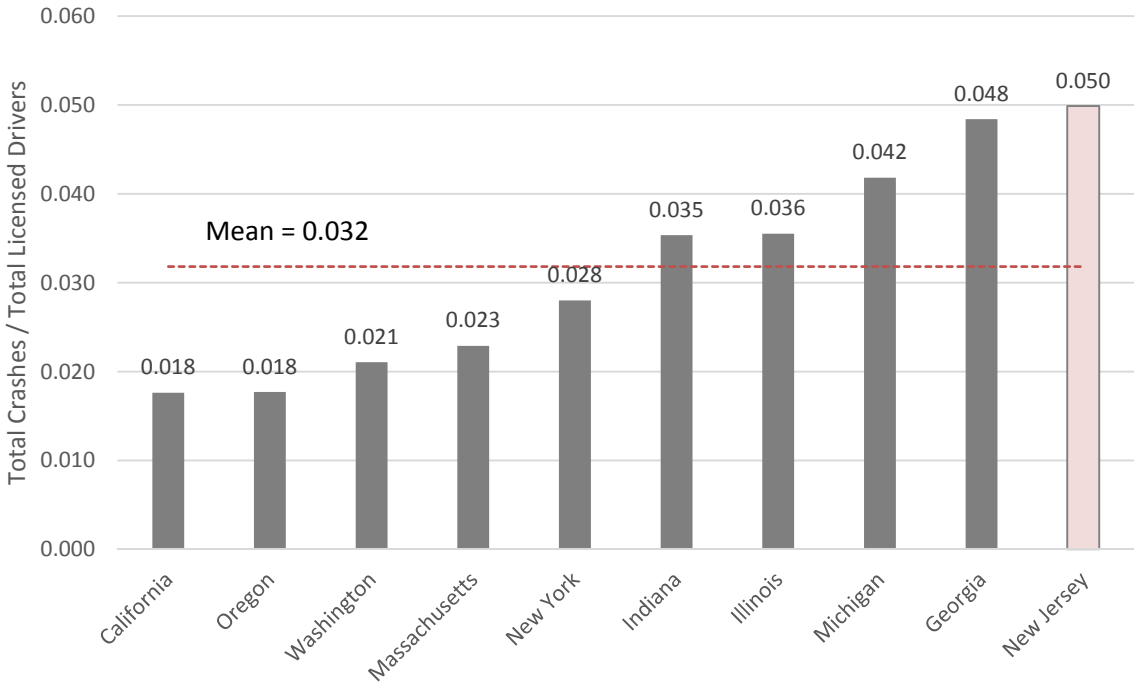

Figure 5. Total Annual Crashes per Total Licensed Drivers; 9 Focus States, Max & Min (Source: FARS, NHTSA 2014 and State Highway Safety Documents)

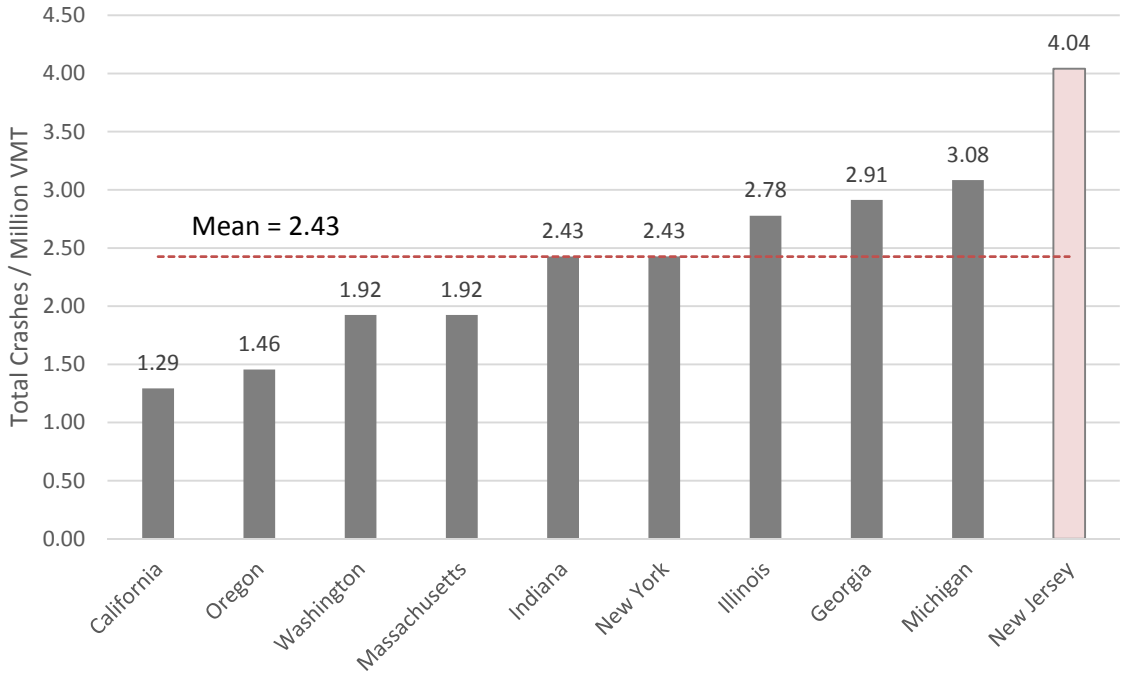

Figure 6. Total Annual Crashes per 1 Million VMT; 9 Focus States, Max & Min (Source: State Data System Crash Data Report: 2000-2009 - NHTSA; 2014, State Traffic Safety Information - NHTSA; 2013)

When analyzing crashes across the states the data must be normalized or the most populous states, California, Texas, and Florida, will yield the most crashes. When normalizing by annual VMT and the total licensed drivers in a state the comparisons become meaningful.

- The state with the highest total crashes per total licensed drivers is New Jersey, followed by Georgia then Michigan; the state with the lowest rate is California, followed by Oregon with the second-lowest rate.

- The state with the highest total crashes per 1 million VMT is New Jersey, followed by Michigan, then Georgia; the state with the lowest rate is California, followed by Oregon with the second-lowest rate.

Electronic Data Submission

Figure 7 shows the breakdown of electronic data submittal. Of the 38 states that report electronically or are in the planning or pilot phases (34 currently report electronically), the technology that states most frequently use is Traffic and Criminal Software (TraCS). Multiple states also use LexisNexis eCrash for electronic reporting, while technologies differ among the remaining states.[14]

[14] The electronic reporting status of eight states is unknown.

Electronic reporting differs greatly among all the states, from states that do not report any crash data electronically, to Utah, where electronic reporting is mandatory; Utah achieves just under 100% reporting because Native American reservations do not require it. States that partially report electronically vary significantly in their shares of electronic to paper submissions.

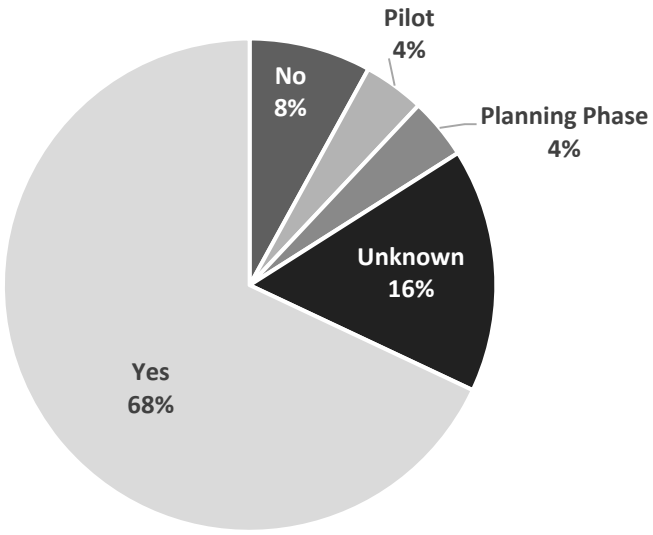

Figure 7. States that Submit Crash Reports Electronically
(Source: NHTSA 2014, I-95 Corridor Crash Data Reporting Methods[15])

Focus States

After reviewing the available literature, crash statistics and reporting policies, the following nine focus states were identified for comparison with New Jersey:

California was selected because it was one of the few states to report the cost per crash (NCHRP Synthesis 350 2005). California reported a lower cost per crash when compared to the two other states reporting this information (Oregon and Washington). California has one of the highest number of total crashes of the nine focus states, so this may reflect the low cost per crash.

Georgia was selected because of its similarities to New Jersey: both states have the same PDO threshold ($500), both have similar total crash numbers (approximately 300,000 – 320,000, 2010-2014 average), and both have similar numbers of licensed drivers (approximately 6M – 6.5M). Figure 8, shows Georgia and New Jersey similarities. In contrast to states that were selected because they recently raised their PDO threshold, Georgia has not recently increased their threshold and therefore is a useful comparison point to other states.

[15] Cambridge Systematics, 2009
http://i95coalition.org/wp-content/uploads/2015/03/Crash_DataTask_1_Technical_Memo.pdf?dd650d

Illinois was selected because it increased its crash reporting threshold in 2009 from $500 to $1,500. Illinois has a much higher crash reporting threshold than New Jersey, but both states have similar numbers of total crashes, injury crashes, annual VMT, and licensed drivers.

Indiana was selected because Indiana is similar to New Jersey in VMT and number of licensed drivers. In 2005 Indiana increased its crash reporting threshold from $750 to $1,000. Indiana recently worked with a private vendor to develop an e-crash system.

Massachusetts was selected because it is geographically close and has a similar degree of urbanization to New Jersey. Massachusetts also has a similar ratio of annual VMT to total reported crashes as New Jersey.

Michigan was selected because in 2003 it increased its crash reporting threshold from $400 to $1,000. Michigan has similar numbers with New Jersey for total crashes, and Licensed Drivers.

New York was selected because it neighbors New Jersey and has a similar degree of urbanization. New York and New Jersey have similar numbers of total crashes.

Oregon was selected because it is one of the few states to report an estimated cost per crash (NCHRP Synthesis 350 2005). Oregon and New Jersey have similar ratios of annual VMT per licensed drivers. Oregon will provide a comparison point because this State has far fewer total reported crashes, injury crashes, licensed drivers, and annual VMT.

Washington was selected because it was one of the few states to report the cost per crash (NCHRP Synthesis 350 2005). Washington will provide a comparison point as this State has far fewer total reported crashes. Washington's licensed drivers and annual VMT numbers are slightly less that New Jersey's. Washington has a similar reporting threshold to New Jersey ($700).

Figure 8 highlights the nine states that the research team chose to focus on, in pink. The figure compares 37 of 50 states by reporting threshold (bubble size), total reported crashes (Y-Axis), and licensed drivers (X-Axis).

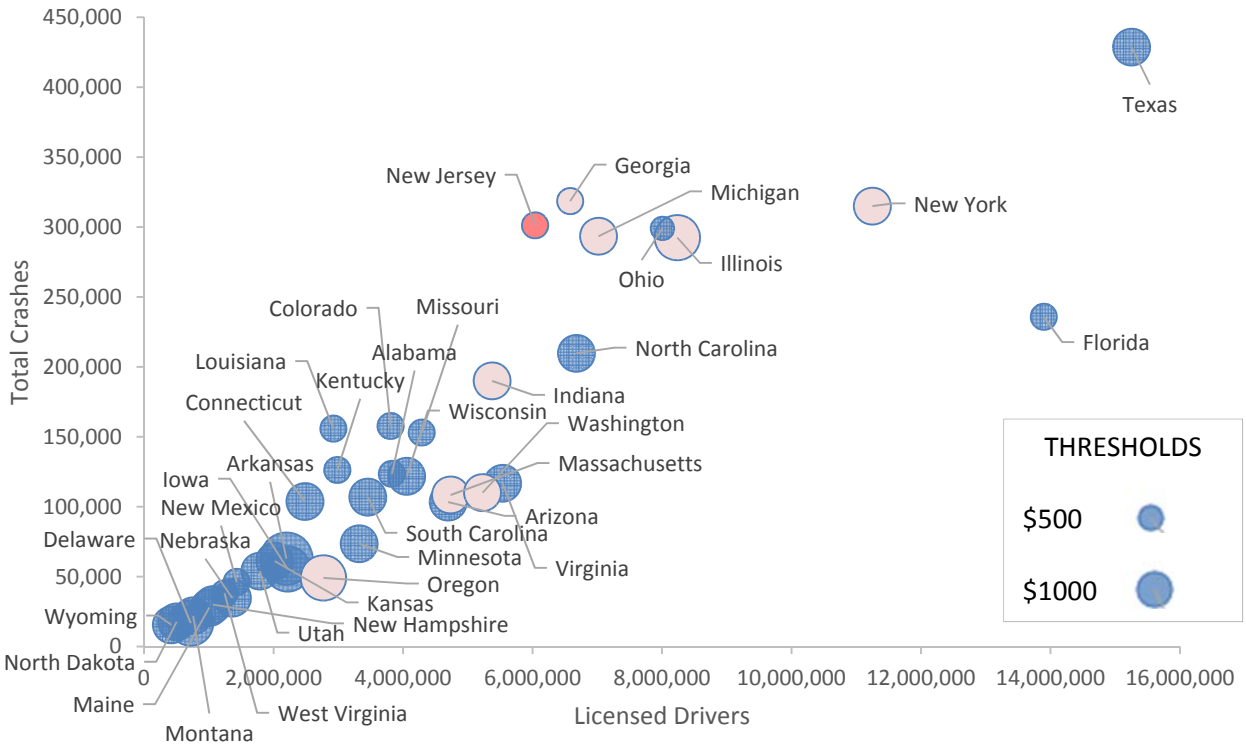

Figure 8. Comparison of States by Crash Reporting Threshold, Total Reported Crashes, & Licensed Drivers

The above comparison shows that the states chosen represent a broad cross section of licensed drivers and crash reporting thresholds, but also include several with similar total reported crashes. This should allow New Jersey to compare its crash reporting process with systems that share several contexts.

It should be noted that of the nine states chosen, six reported they utilize electronic crash reporting systems (Georgia, Illinois, Indiana, Massachusetts, New York, and Washington). The research team estimates that if NJDOT launched an electronic crash reporting system the State's crash reporting operating costs would significantly decline (this would lower operating costs fare more than raising the PDO threshold). Because New Jersey currently utilizes a system that does not allow electronic submission of crash records, it is important to compare NJDOT's practices with states that similarly utilize both electronic and non-electronic systems.

A detailed comparison of the nine focus states is cataloged in Appendix B.

Task 2 - Interviews

Researchers developed a detailed interview guide to support interview discussions with DOTs, State Highway Safety Offices, highway patrol staff members, and private vendors, to augment and clarify information gathered in earlier research tasks. Researchers requested interviewees complete the interview guide to the best of their ability and submit it to them for further review prior to the scheduled interview.

The guide for state interviews included the following:

Figure 9. Interview Guide

Reporting Thresholds:

1. Please describe your department's background and responsibilities for crash reporting.
2. What agency is the statutory record holder of crash records?
3. What is your state's current crash property damage threshold?
4. Has this threshold changed in the last fifteen years? If yes:
   a. What was the impetus to change the threshold?
   b. Who were the biggest proponents and opponents of the threshold change?
   c. How did your state decide what the new threshold would be?
   d. What was the process to change the threshold (legislation enacted, amended, etc.)?
   e. What were the benefits (or drawbacks) on your state's crash record reporting system?
   f. Were there any costs associated with the threshold change?
   g. How did the crash numbers change after the threshold increase (compare before & after)?

Reporting Costs:

1. How many total crashes (including fatal, serious injury, non-serious injury, etc.) did your state report this last calendar year?
2. Please describe your crash reporting process from start to finish, with what happens after a crash occurs to who stores the data. Please provide a diagram of your state's crash reporting process if available.
3. Does your state cover all associated costs for crash reporting or does it partner with outside private organizations/vendors to assist with the collection and retention of crash records? Please explain.

4. Does your state track the total annual cost to report crashes?
    a. How did you determine that (note source or research referenced)?
5. Does your state track the cost to report a single crash?
    a. What are the most important factors that impact the cost to report each crash?
6. How much does it currently cost your state to:
    a. Create a crash report?
    b. Intake a crash report (including any data entry or QA/QC)?
    c. Store a crash report?
7. Does your state track the crash related costs associated with the following areas? If yes, what are the approximate costs to:
    a. Collect data?
    b. Aggregate data?
    c. Verify data?
    d. Input data?
    e. Maintain data?
    f. Disseminate data?
    g. Police costs to prepare and submit reports?

Electronic Reporting:

1. Does your state electronically submit crash records? If yes:
    a. What were the most significant challenges to bringing the electronic system online (e.g. political, capacity, or technical challenges)?
    b. What was the approximate cost to implement this electronic reporting system?
    c. What percentage of crash records are submitted electronically?
    d. What parts of the crash reporting system are electronic and what parts are not?
    e. What is preventing all crash records from being submitted electronically?
    f. Have you evaluated the cost differential between paper and electronic crash reporting? If yes what have you found?
    g. Is there one standard vendor/crash reporting format or template or multiple formats?
    h. What crash reporting software does your state use?
    i. What is the timeframe from the crash occurring to the report being available for extraction from the system?

j. How has the implementation of the electronic reporting system impacted reporting costs and time?

k. Are there any disadvantages to implementing an electronic crash reporting system?

2. Does your state measure the performance of its crash reporting system?

3. If your state does not electronically report crashes, why is this the case?

Selected Interviewees

With the assistance of NJDOT, the research team selected key transportation agencies to interview. In the previous task, researchers had conducted a detailed comparison of New Jersey's crash data collection policies and procedures to other states. After reviewing the available literature, crash statistics, and reporting policies, five key states and one alternate were identified for interviews. California, Georgia, Illinois, Indiana, and Washington were the key states, while Michigan was chosen as the alternate.

In general, state crash data are utilized by Departments of Transportation, State Highway Safety Offices, State Police/Highway Patrol, and Motor Vehicle Commissions. The roles of transportation agencies for each of the selected states were assessed and agencies were selected to interview. Agencies contacted represented a comprehensive cross-section of crash reporting systems while touching upon specific elements that are similar to, or would enhance, NJDOT's potential revision of its own crash reporting system and threshold. The following transportation agencies were selected for interview:

- California Highway Patrol (CHP) Support Services – CHP was selected because marginal cost research indicated the state had developed early estimates for the per crash costs of its record keeping system. Also, the CHP Commander of Support Services is directly involved with all aspects of crash data: collection, processing, input, Caltrans involvement, maintenance, and supply.

- Illinois Department of Transportation (IDOT) – The Research Team selected IDOT because they house the Traffic Safety Division and Safety Data and Data Services Bureau, which oversee the collection, processing, maintenance, and utilization of Illinois' crash data.

- Indiana's State Police (ISP) Crash Record System Management Vendor – Appriss was selected as a vendor by ISP because the state was looking for a single self-sustaining portal to process all of Indiana's crash records.

- Indiana State Police – ISP was selected in order to corroborate information gathered from Appriss, to give a balance information provided from a private-sector vendor with a public-sector agency, and to augment information specific to Indiana's property damage only (PDO) threshold increase.

- Michigan State Police (MSP) – MSP was selected because their Traffic Crash Reporting Unit Manager and IT Programmer/Analyst work with the vendors that process the state's electronic reports (85% of all reports), as well as the technicians that perform quality control checks and validation of the paper forms.

- Washington State Department of Transportation (WSDOT) – WSDOT was selected because they house the Crash Data and Reporting Branch, which interfaces with all of Washington State's agencies that collect, process, manage, and purvey its crash data.

Following the original selection process NJDOT requested that an additional state, Georgia, be included in the interviewed states.

- Georgia State Department of Transportation (GDOT) – Per Figure 8, Georgia has similar numbers to New Jersey for reported crashes, licensed drivers, and existing PDO reporting threshold ($500). Georgia reported an increased annual VMT (109,355 million miles / ≈ 47% more than NJ) and annual reported crash fatalities (1,080 fatal crashes / ≈ 107% more than NJ). GDOT recently entered into contract with Appriss to manage the state's crash report repository and promote the electronic submission of crash reports. In January 2013, eighty percent of Georgia's crash reports were being submitted to GDOT electronically; that has increased to over ninety percent as of May 2014.

Interview Structure

Interviewees were initially contacted by email for introduction and once they agreed to a conversation the interviews were scheduled. The interview guide was included in the introductory email to provide an opportunity for review. Between February 18th, 2016 and February 29th, 2016, the research team interviewed 10 individuals from five transportation agencies via telephone. Each interview lasted about one hour and included at least two research team members and one NJDOT Transportation Data and Safety staff member.

A complete list of interviewees is detailed below (Table 1).

Table 1 - Interview Details

State	Agency	Interviewee(s)	Interview Date & Time	Appendix
California	CHP	• Isaac Tillman, Commander, CHP Support Services	Feb. 22, 2016 2:00 p.m.	D
Illinois	IDOT	• Jessica Keldermans, Bureau Chief, Safety Data & Data Services • Ken Martin, Manager, Crash Information Section • Charles Adams, Manager, Technical Services • Mark Blankenship, Manager, Crash Studies & Investigation Unit	Feb. 23, 2016 10:30 a.m.	E

State	Agency	Interviewee(s)	Interview Date & Time	Appendix
		• Anne Hillen, Specialist, Crash Production		
Indiana	Appriss	• Kevin Sifferlen, Account Manager • Craig Roth, Project Manager	Feb. 18, 2016 3:00 p.m.	F
Indiana	ISP	• First Sergeant Robert Simpson, Commander of Information Technology Unit • Captain Larry Jenkins, Commander of Criminal Justice Data Division	April 1, 2016 11:00 a.m.	G
Michigan	MSP	• Sydney Smith, Traffic Crash Reporting Unit Manager • Brian Sine, Traffic Crash Reporting System (TCRS) IT Programmer/Analyst P12	Feb. 18, 2016 9:00 a.m.	H
Washington	WSDOT	• Warren Stanley, Senior Crash Data Systems Project Manager	Feb. 29, 2016 2:00 p.m.	I
Georgia	GDOT	• Andrew Heath, State Traffic Engineer, Georgia Department of Transportation • E. David Adams, State Safety Program Manager, Georgia Department of Transportation	June 10, 2016 1:00 p.m.	J
New Jersey	NJSP	• Michael Rizol, Traffic Officer	Dec. 13, 2016 9:30 a.m.	K

Findings

After completing the interview program the research team generated the following preliminary findings for the agency interviews. Interview findings have been arranged using the following sections

- General Crash Reporting Information
- Crash Reporting Threshold Practices
- Crash Reporting Costs By State
- Electronic Report Submission

General Crash Reporting Information

For all of the interviewees, the research team sought to gain a general understanding of the process by which records were collected, stored, maintained, and extracted.

Background

In California, 40 percent of California's crash records are submitted electronically. This figure represents all of CHP's records - CHP is working on a solution for local law enforcement agencies to submit records electronically. At this time, local law enforcement sorts crashes by type (fatalities, non-fatalities, commercial motor vehicle), then manually enters records into the Statewide Integrated Traffic Records System (SWITRS), the electronic crash repository. Paper crash reports are forwarded to Caltrans to input milepost data and geocode each crash location. When the data are entered, Caltrans returns the reports to the CHP because they are the statutory crash report holders.

Illinois' crash reporting process begins by sorting paper reports by fatalities, commercial motor vehicle (CMV), and all remaining crashes. Next the reports are scanned, then keyed into the Crash Information System (CIS) database, with location data added and quality controls performed. CMV crash reports go to SafetyNet[16] and fatalities go to FARS[17]. 32 percent of Illinois' law enforcement agencies submit crash reports electronically, which comprises 51 percent of all crash reports statewide. The process for electronic reports is much simpler: law enforcement officers key reports into laptops in their vehicles; reports pass through validation rules or bounce back for additional data entry or correction; reports that pass validation rules go into CIS.

In Indiana, 100 percent of all crash reports are submitted electronically. While local law enforcement agencies have the option for supervisor validation, not all agencies perform this consistently. Reports are submitted to the Indiana State Police's Automated

[16] An office-level database management system that allows entry, access, analysis, and reporting of crash data operated and maintained by the Federal Motor Carrier Safety Administration (FMCSA)

[17] Fatality Analysis Reporting System (FARS) managed by NHTSA

Record Information Exchange System (ARIES) that is administered by their vendor, Appriss. Indiana is unique in that all of the data are centralized and every law enforcement agency uses the same software. The software performs data edit checks to prevent officers from submitting incomplete or inaccurate reports. Vendor staff can edit and update crash locations as needed.

Michigan's law enforcement agencies submit 97 percent of the crash reports electronically. Technicians conduct quality control checks on the paper reports, then scan and upload the forms into the Traffic Crash Reporting System (TCRS). Technicians validate this data, then images move into the On-line Transaction Processing (OLTP) database. For electronic forms, law enforcement enter crash report data which go to the FTP server and then moves to the OLTP database. Technicians review an event log to determine what agencies sent crash data. Finally, technicians check data and location information before the data move into the Reporting database.

In Washington, a Washington State Police (WSP) unit within the DOT checks, scans and simultaneously indexes paper reports into the law enforcement database and WSDOT's Crash Location Analysis System (CLAS) database. Eighty five percent of Washington's crash reports are submitted electronically to CLAS. WSDOT receives, analyzes, and adds additional fields to the records and returns the forms to the WSP if clarification is needed. These records are stored in the CLAS database and provided to state, local and county engineers, researchers, and safety partners.

Washington's electronic reports go to law enforcement supervisors who approve and forward them to the Justice Information Network Data Exchange (JINDEX). Next the reports go to WSDOT where they are validated for business edits and issued a report number. Finally the reports are sent back to the WSP and Department of Licensing's Driver Responsibility Unit.

In Georgia, GDOT is responsible for all statewide crash reports. This is defined by Georgia State Code. In particular, the responsibility falls within Traffic Operations Division and the safety programs unit. At present Georgia's PDO threshold is $500 and has been so for approximately 20 years. There hasn't been any interest in raising it and over the last 10 years it has not been put on the legislative docket. Georgia is an absolutely open state. This means that local law enforcement is allowed to partner with whomever they choose. They partnered with Open Portal (later Appriss) because after much research they learned that Open Portal was the least expensive option.

Appriss directly receives 90% of Georgia's crash reports, electronically, while some law enforcement agencies still report on paper. These paper forms are received and keyed by a vendor to Appriss, which creates a big challenge as all software updates need to be coordinated through Appriss and GDOT for the system to work. While the system is complicated and has some drawbacks GDOT feels that this business model saves its citizens a tremendous amount of money. GDOT stated that 10% of law enforcement agencies do not report electronically due to a lack of comfort with the technology and because the small numbers of crashes in their municipalities do not warrant the capital costs of the technology upgrades.

Crash Record Holder

Indiana is the only state, of the six interviewed, where a single vendor manages the hardware, software, support, development, and training related to crash reports and data. The vendor manages this at no cost to the state, via a contractual arrangement with the Indiana State Police (the statutory crash record holder), and shares this data with all state agencies that require access.

For all of the states interviewed, the State Police/Highway Patrol are the crash record holders. Illinois and Georgia are exceptions, where those states' DOT holds the crash records.

Crash Reporting Forms

The number of paper crash reporting forms varies widely between the six states. While one form is used statewide in Washington and Michigan, many of California's municipalities utilize different crash report forms, resulting in 150 different versions of the form statewide. Electronic formats are less varied. One electronic form is used statewide in Indiana and California, and in states with multiple vendors for electronic crash report submission, such as Michigan and Illinois, the multiple forms must contain the state's minimum required fields.

Crash Reporting Threshold Practices

The interview process specifically focused on the minimum PDO threshold and the relationship between shifts in PDO threshold and the number of crash reports each state collected. The threshold practices in the states were organized into separate categories: Single Thresholds, Multiple Thresholds, No Threshold.

Single Thresholds – Insured and Uninsured

Michigan increased its PDO threshold from $400 to $1,000 in 2003. The impact of this increase included a reduction in total reported crashes from approximately 375,000 in 2003 to approximately 300,000 in 2004.

More recently, Washington raised its PDO threshold from $750 to $1,000 in January, 2015. WSDOT wanted to raise the threshold to $1,400, but the Chief of State Patrol decided on $1,000. The $750 threshold was too low to allow law enforcement to respond to every reportable crash. Additionally, the threshold had fallen behind inflation as virtually all minor damages cost more than $750 to repair. WSDOT faced no opposition to its threshold increase and incurred no additional costs other than staff time, though they did have to update the crash reporting manual and change a business edit in their electronic crash processing system.

Following the threshold increase, Washington did not see a reduction in crash records; 99,709 total crashes were reported in 2014 and 117,113 were reported in 2015. During the past two years Washington has actually seen a 15 percent increase in reported crashes. This is attributed to an increase in vehicle miles traveled due to an improved

economy. Interviewees surmised the State may have experienced a total reported crash reduction if its threshold had been raised by more than $250.

Separate Thresholds – Insured and Uninsured

Illinois is the only state with separate thresholds for insured ($1,500) and uninsured ($500) drivers. Illinois made these changes in 2009 and increased the insured PDO threshold from $500. The state has two thresholds because of the state's Safety Responsibility Law[18], which penalizes at-fault, uninsured motorists by suspending his or her driver's license and/or vehicle registration; a lower threshold penalizes a greater share of at-fault, uninsured drivers in crashes than would a higher threshold. As an additional penalty to uninsured motorists, Illinois is currently deliberating increasing this violation from a misdemeanor to a felony.

Initially the 2009 threshold change confused law enforcement officers, and IDOT was criticized for not capturing all crashes, though this technically erroneous because all crashes were captured but not officially reported. The benefits of the threshold increase were a dramatic decrease in total reported crashes, from approximately 419,000 in 2008 to approximately 285,000 in 2009.

Illinois set its new threshold by analyzing crash data and finding a large number of crashes reported around $500. IDOT initially wanted to double the threshold from $500 to $1,000 because the state last doubled its threshold from $250 to $500 in 1992. However the $1,500 and $500 change complied with the Safety Responsibility Law. The law favors insurance companies by allowing them to seek restitution for damaged properties from uninsured drivers. The lower threshold ($500) enables restitutions to be obtained from a greater share of uninsured, at-fault motorists.

The legislative process to raise the threshold required the involvement of various IDOT divisions. The Traffic Safety Division proposed the threshold increase to the Legislative Affairs Office (LAO), who reviewed the proposal, gauged its support, and required the Traffic Safety Division to explain the benefits of a threshold increase (i.e., quicker data submissions, increased accuracy of submitted data, reduced resource expenditure and labor costs, reduced data maintenance / storage requirements, etc.). The IDOT's LAO worked with local law enforcement agencies to ensure that the negative impacts of the change would be minimized.

[18] https://www.cyberdriveillinois.com/departments/drivers/drivers_license/SR-22_uninsured_crashes/safefinlaw.html

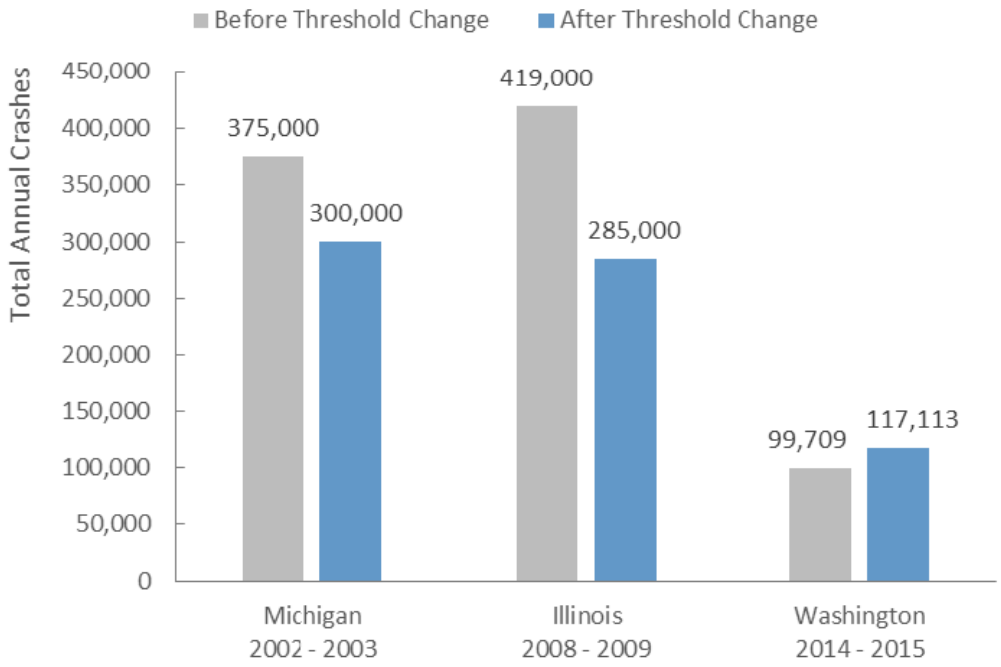

Figure 10. Annual Crash Records Differences Before and After PDO Threshold Changes
(Source: Interviews with agency staff and FHWA)

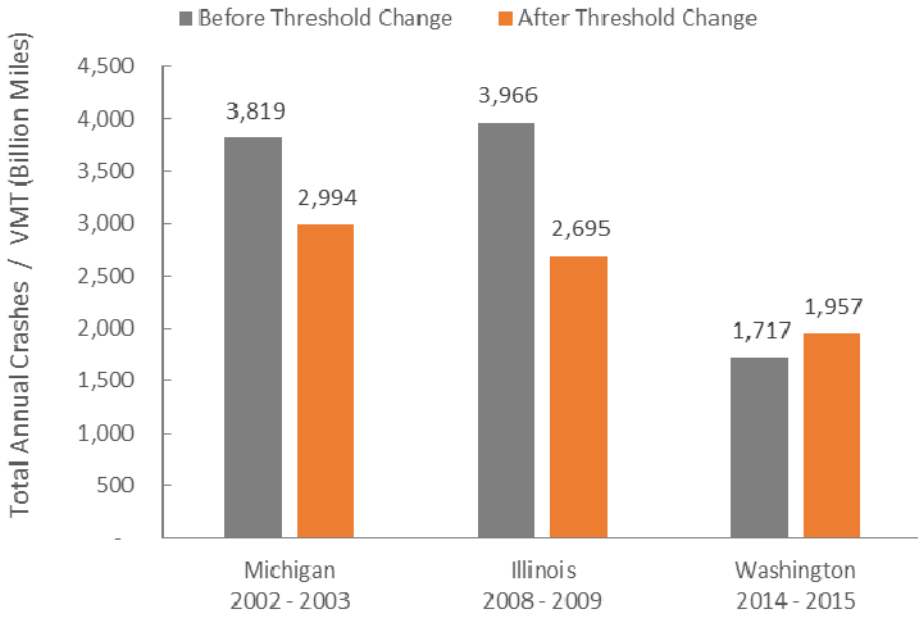

Figure 11. Ratio of Total Crashes to Billion Miles VMT (Right) Before and After PDO Threshold Changes (Source: Interviews with agency staff and FHWA)

The above charts demonstrate the annual reported crash totals for states that changed their reporting thresholds. Michigan and Illinois saw significant reductions in the total number of reported crashes after they increased PDO thresholds. In 2003, Michigan

increased its threshold by $600 and saw a 20 percent reduction, while in 2008 Illinois increased its threshold by $1,000 and saw a 32 percent reduction. In 2014, Washington's $250 threshold increase yielded a 17 percent increase in reports.

The chart normalizes the trends by VMT for the years in question adjacent to the threshold change. Per the above:

- 2002 – 2003: Michigan saw a VMT decrease of 2 Billion miles
- 2008 – 2009: Illinois saw a VMT decrease of 100 Billion miles
- 2014 – 2015 Washington saw a VMT increase of 1.8 Billion miles

It is important to view these changes in the larger context of changing trends occurring at the time of the threshold reductions. In general, 2015 saw an increase in VMT of approximately 2.6 percent between 2014 and 2015. Other states may have seen a much larger increase in crash reports per VMT than did Washington.

No Threshold

In California, CHP encourages all investigating law enforcement agencies to report as many PDO crashes as possible. Although California does not have a required PDO threshold statewide, local law enforcement agencies are not prohibited from setting their own thresholds to encourage PDO crash reporting.

Crash Reporting Costs by State

The second key focus of the interview process was to gain an understanding of the statewide costs for collecting data and maintaining crash data records.

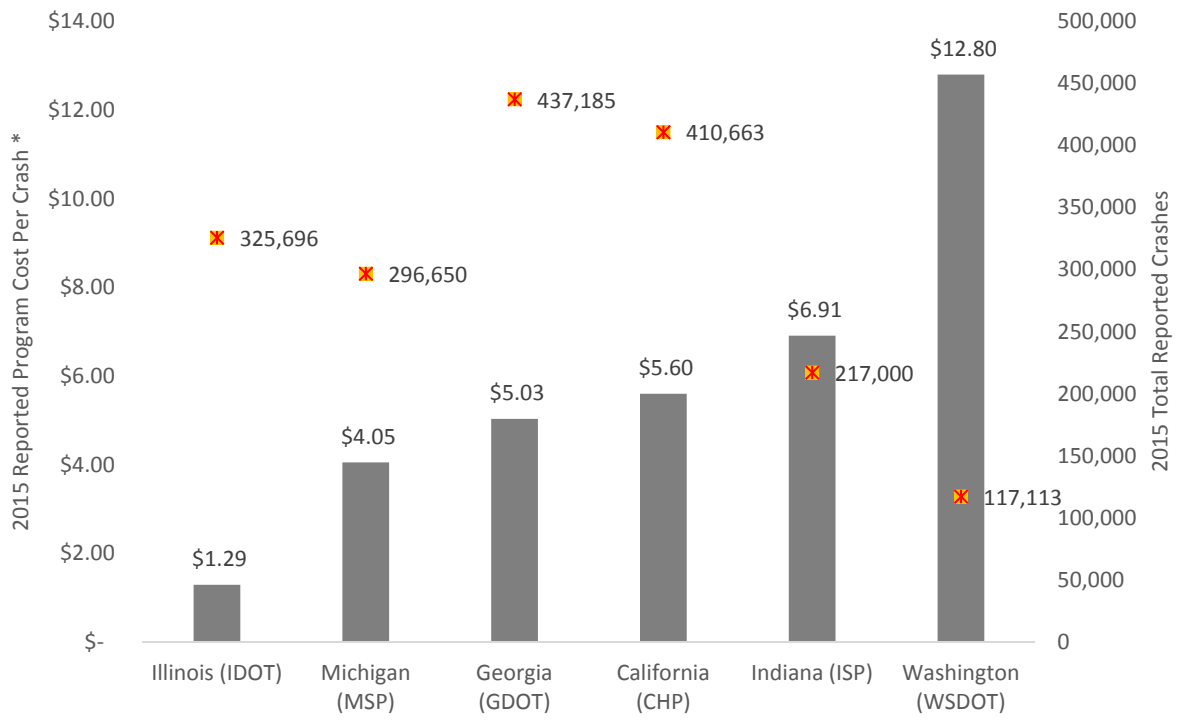

Figure 12: 2015 Average Costs per Crash* vs. 2015 Reported Crashes (Source: Interviews with agency staff)[19]

The above figure summarizes the cost per crash data provided by the interviewees. At the state level, crash reporting requires extensive collaboration and coordination between multiple agencies, and is dependent on the resources and abilities of a state's diverse mix of local law enforcement agencies to complete crash report data entry in a consistent, timely, and error free manner. It is important to emphasize that the data above, and the notes below do not capture the costs of non-agency efforts required to report crashes (state police, local police, EMS staff, etc.).

California: The budget of California's CHP Support Services Division, which processes crash reports, was $2.3 million in 2015. With 410,663 total crashes reported in 2015, the average cost per each crash was $5.60.

Illinois: IDOT is responsible for the development, production, and shipping of paper reports, as well as maintenance of their CIS database; local law enforcement agencies incur the costs of shipping paper forms to IDOT. For their 2009 threshold increase, IDOT spent approximately $200,000 to $300,000 to revise the 1050 crash report form and update, print, and mail the forms to local law enforcement agencies. In addition to these costs, IDOT's Traffic Safety Division estimates that it spends approximately $420,000 per year for its 12 staff. With 325,696 total crashes reported in 2015, the average cost to IDOT per each crash was $1.29.

[19] * Reported cost figures do not capture non-agency personnel involved in the crash reporting process.

Indiana: Indiana's AIRES involves no direct expense to Indiana for crash reporting. Indiana's vendor incurs all crash reporting costs and shares two-thirds of revenues from crash record sales with the supporting law enforcement agencies. The vendor reports spending $1.5 million in 2015 to input and maintain crash data. Approximately 217,000 total crashes occurred in 2015. While no state funds were used, the average cost to the vendor per each crash was $6.91.

Michigan: Michigan State Police (MSP) own the crash records but the Michigan Department of Transportation (MDOT) funds the Traffic Crash Reporting Unit, which includes both staff and the system. The state also receives federal funds to support the unit, as well as funds from the sale of vehicle and driver records. Examining crash reporting costs from a micro perspective, MDOT's Traffic Crash Reporting System unit had a program budget of approximately $1.2 million in 2015. The State reported 296,650 crashes in 2015. Therefore, on average, MDOT spent $4.05 per crash.

Michigan shared internal research documents on the total costs of reporting crashes. For 2013, one estimate of Michigan's total statewide crash reporting costs was $8.66 billion. This included elements such as emergency medical services, emergency response, trauma, police, fire, MDOT, vendors, and others. More recently, the Michigan Department of State Police, Criminal Justice Information Center, estimated the cost of generating a single crash report through the Traffic Crash Purchasing System (TCPS). Individuals or agencies use this system to obtain crash reports, which were estimated to cost $14.10 each to generate, in 2015.

Washington: WSDOT spent $1.5 million in 2015 for its 18 full time employees who collect, analyze and report crash data. In 2015 WSDOT processed 117,113 total crashes. Based strictly on WSDOT's Crash Data and Reporting Branch budget, it spent an average of $12.80 per crash.

Georgia: Like Indiana, Georgia's AIRES involves no direct expense to Georgia for crash reporting. Georgia's vendor incurs all crash reporting costs and shared two-thirds of revenues from crash record sales with the supporting law enforcement agencies. The vendor reports spending $1.6 million in 2008 (approximately $2 million in 2015 dollars) to input and maintain crash data. 437,185 total crashes occurred in 2015. GDOT reported that it spent approximately $260,000 in 2015 to manage the Appriss contract, manage the paper scanning process and manage the multiple vendors. Therefore the average total cost (in 2015 dollars), to Appriss and GDOT, to process and maintain each crash was $5.03.

Electronic Report Submission

Electronic crash reporting is a relatively recent trend in using technology to streamline public service delivery. Thus, a key factor in understanding costs for crash records was to determine the extent by which each state collected this data electronically.

System Basics and Funding

Of the states interviewed, Michigan made the earliest implementation progress. Its first electronic report was submitted in 2006. MDOT created the electronic submittal requirements and private vendors created the software. Electronic submissions comprise 97 percent of Michigan's reports. Michigan required approximately $2 million to design the system and $2.5 million to implement it. Ninety-five percent of the cost to develop and implement the program were funded via federal grants.

Illinois launched its original electronic reporting software, Mobile Capture Reporting Systems (MCR), in 2006. Use of the MCR system was discontinued in December 2014. Currently, the state's Crash Information System (CIS) system is operated and maintained by IDOT staff and consultants. Illinois' Traffic Records Coordinating Committee (TRCC) provides strategic oversight and direction for the state's various traffic safety information systems. Law Enforcement agencies have two crash report submission options: paper report forms or electronic reporting via third party submission. If local law enforcement agencies submit their crash data electronically they must choose to enter into a contract from a list of eight approved and registered vendors.[20]

Two of these vendors are "no cost" and don't charge the agencies to use their system, but generate revenue through the sale of crash reports; a portion of that money goes back to the agency. The remaining "cost" vendors charge agencies for the use of their systems. 32 percent of Illinois' local law enforcement agencies have chosen to submit electronically, representing 51 percent of Illinois' total reports. IDOT staff interviewed estimated $420,000 in annual program costs.

Of note, Chicago generates 25 percent of Illinois' crash reports but does not uniformly submit them electronically. In 2015, IDOT received a $400,000 grant from the National Highway Traffic Safety Administration (NHTSA) to implement electronic reporting in Chicago. The funding will come directly from NHTSA. IDOT is in the process of updating their information on the agencies around the state; they have sent out letters to the agencies asking for an update on their number of active sworn officers and their number of active patrol squad cars. They will use this information to develop grants based on an agency's real needs, and will be able to distribute funds so that an agency can go fully electronic. Once live in Chicago, IDOT plans to roll out this electronic system to other law enforcement agencies.

California's electronic submission system went live in October 2015. Currently, all CHP officers submit electronically. This represents 40 percent of California's total reports. The state provides resources to local law enforcement agencies to implement electronic submission systems where funding is based on geographical crash frequency. The CHP representative interviewed provided an estimate of $2.3 million annual program costs.

[20] http://www.idot.illinois.gov/transportation-system/local-transportation-partners/law-enforcement/crash-reporting

Between 2005 and 2008, Indiana deployed a phased electronic implementation. A statewide vendor was selected that initially released its electronic system with the Indiana State Police (ISP). Next the program was rolled out across the state at the county, then municipal levels. Currently, 100 percent of Indiana's reports are submitted electronically. The vendor reports this service is delivered at no cost to the State. In 2015, the vendor spent approximately $1.5 million to input and maintain crash data for Indiana.

Washington's program was implemented in 2007, and currently 85 percent of Washington's reports are submitted electronically (Figure 13). Similar to Chicago Seattle generates 11 percent of Washington's crash reports but does not submit them electronically.

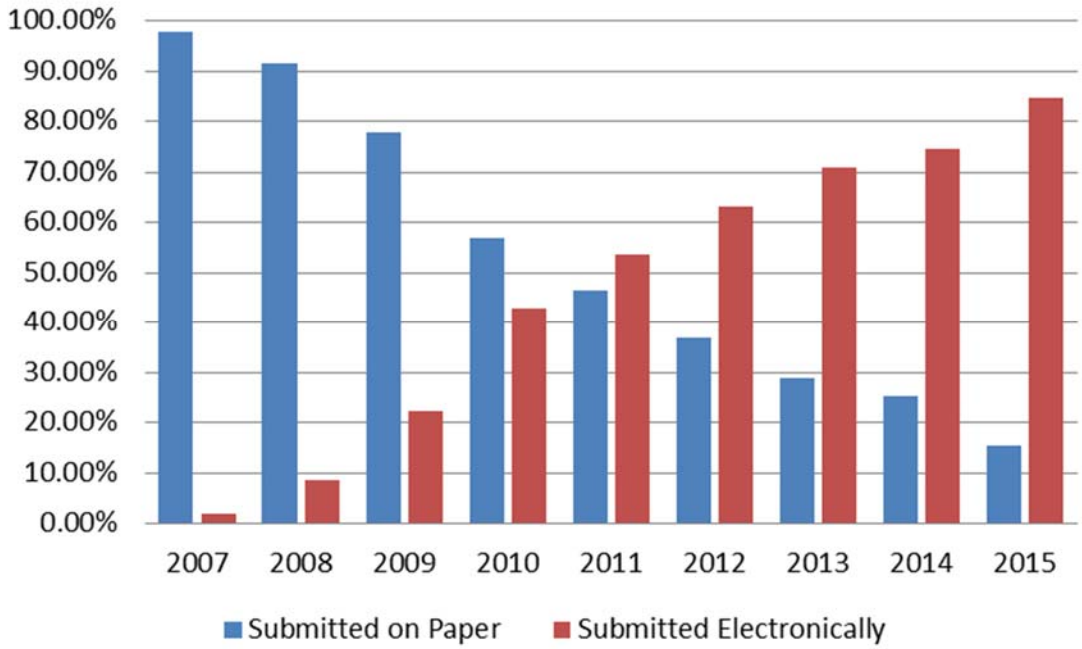

Figure 13. Washington Crash Records Submitted Electronically and By Paper (Source: WSDOT)

Washington spent approximately $450,000 to build their Statewide Electronic Collision and Tickets Online Records (SECTOR). This software was created by a contractor and paid for by state and participating local agency money. WSDOT reported that some federal funds had been utilized to update local law enforcement technology, including barcode scanners and laptop computers. An important difference between Washington and the other states interviewed is that while a contractor was employed to develop the software, it is owned and operated by the state, and private vendors are not utilized to input and maintain crash data.

Vendor Management / Revenue Sharing

With the exception of Washington, all states interviewed relied heavily on vendors to develop and implement electronic crash reporting systems.

Vendors generate revenue either through the sale of crash records, local law enforcement fees, or a hybrid approach. For example, if certain Michigan vendors sell enough crash records they will waive the fees to local law enforcement agencies. Some Illinois vendors generate revenue from both sources as well, while other vendors are strictly "no cost."

Illinois vendors are able to sell crash records the same way that other states allow: a state statute permits local law enforcement to sell crash records or have a vendor do so on its behalf. In Illinois, vendors charge approximately $10 to $15 per record and local law enforcement keep approximately $5. These rates are similar to all states interviewed.

Indiana's single vendor is a "no cost" vendor that generates all of its revenue from the online sale of crash records[21]. Law enforcement and traffic professionals are given free access to crash records via a second database called Aries Portal. The vendor provides all hardware, software, and software updates to law enforcement and gives two thirds of crash records sales back to the investigating law enforcement agencies.

Georgia's crash records are managed by Appriss. Appriss manages 90 percent of the State's crash records, which are electronic, and has hired a sub-vendor to manage the paper reports. Law enforcement agencies forward the paper crash records to GDOT, who forwards them to the sub-vendor, who keys them in.

Challenges to Implementation

All states cited the expense of equipping and maintaining law enforcement officers with up-to-date equipment to run crash reporting software as a financial obstacle. Additionally, crash data storage could prove onerous if the amount of incoming data suddenly increased due to a switch to electronic reporting. The most common challenge to universal electronic reporting is a lack of financial incentive for small law enforcement agencies who experience low crash numbers.

Training law enforcement staff on the new electronic reporting procedures proved a challenge in Indiana, with a single vendor and "universal" participation. In Michigan, the state government exercised caution so as to not be seen as entering into, and profiting from, private sector vendors that would assume the responsibilities of selling crash records. Building a single electronic crash reporting system for all local law enforcement agencies was seen as politically problematic. In Washington, the legal validity of law enforcement officers' electronic signatures required changes in state legislation.

Benefits of Electronic Crash Reporting

All interview states cited timeliness, increased accuracy, and record completeness as principal benefits of electronic reporting. They all experienced significant reductions in the amount of labor and time required to process and validate reports. In addition to time savings, other benefits included reduced reporting backlogs and cost savings.

[21] https://buycrash.com

In Michigan, the purchase of crash records from a website has alleviated much administrative burden. Michigan also saw huge improvements in crash report accuracy, timeliness, and completeness. Indiana reported a significant increase in crash record completeness, accuracy and timeliness. Georgia recorded tremendous timeliness improvements: it took three to nine months to process paper forms, but now electronic reports are submitted and updated the following day.

Washington cited additional savings in the time it takes law enforcement officers to complete crash reports: 30 minutes for paper and 10 minutes for electronic reports. Indiana also cited significant time savings: officers need 20 minutes to complete electronic reports compared to 45 minutes for paper reports. Reduced time spent entering data and completing crash reports represents cost savings; this time savings enables law enforcement officers to tend to other tasks, such as clearing crashes more quickly, which in turn more quickly returns traffic to normal flow.

Across the states interviewed, agency anecdotes described the scale of benefits of a transition to electronic record keeping. In Illinois, while specific cost savings were not indicated, IDOT reported the program saved the state of Illinois “millions annually.” When Indiana’s crash record vendor assumed management of the crash reporting system, an entire unit of the ISP that was previously responsible for crash reporting activities was reassigned to other tasks.

Georgia stated that from a cost perspective, Appriss management is a wonderful arrangement; instead of the State paying Appriss to provide a service, Appriss provides the service at no cost. Prior to electronic reporting under Appriss GDOT spent $2.5 million annually for a huge room of people to key in data and process and maintain crash records; now they have redirected these funds to safety and engineering projects. Georgia estimates cost savings of $1.2 million just in reduced paper purchases for the crash report forms.

Comparative Analysis Summary

Determining a significant relationship between threshold increase and crash record reduction, as well as the impacts on required state resources and traffic safety, is not possible given the small sample size of the study.

Based on the results of the five state interviews, enacting a higher PDO threshold may relieve state and local law enforcement officers of the time and expense of completing forms in relatively low impact accidents. However, the degree to which the threshold change impacts the number of crash records agencies must process is dependent on existing trends, including VMT (which is affected by performance of the economy, cost of gasoline, vehicle energy efficiency, etc.), and the extent of the threshold increase.

The average costs for agencies is dependent on the fluctuation in total crash numbers, and the proportion of electronic versus paper reporting. Of the agencies interviewed, only MSP indicated they had explored the marginal cost of reporting crashes to include costs incurred across many state and local agencies. This statewide cost of a threshold

increase is an important factor that was explored in the New Jersey context in Task 4 of this project.

Less crash records may represent the need for less state resources to input and process the data. However, crash records databases are designed to collect statistical data that are used to enhance public safety. Ideally, crash data should be harnessed by state agencies to better understand the causes of traffic crashes, to inform and prioritize traffic safety interventions, and to estimate the economic impact of road safety.

As the numbers of reported crashes are reduced, all agencies receive less data on the safety performance of roads and infrastructure. Not all crash records provide meaningful data to the process. The states interviewed noted that due to inconsistencies in data collection, crash records often contain incomplete or erroneous information related to the circumstances or location of each incident. Simply reducing the numbers of reported crashes may result in significant impacts in data quality.

Changes in the threshold will make comparisons between previous years more difficult. Therefore, crash data predictions that rely on historical crash data such as the Highway Safety Manual's Safety Performance Functions (HSM SPFs) will need to be recalibrated once crash thresholds are adjusted. The HSM SPFs in particular require at least three years of crash data to develop an effectual predictive model.[22]"

What the interviews suggest is that the likelihood of cost savings with an electronic record submission system is high. States with a greater reliance on electronic record systems also saw increases in the quality of the crash data submitted. These benefits should be kept in mind as New Jersey weighs its options for both increasing the reporting threshold and implementing a standardized electronic reporting system for all local law enforcement agencies.

While only raising the PDO threshold, without implementing a comprehensive electronic crash reporting system, will not necessarily translate to cost savings for New Jersey, it may translate to time savings; if the staff that process crash reports have additional time to process fewer reports, there is an increased likelihood that the accuracy, timeliness, and completeness of crash data will increase. This is important both for the integrity of the crash data itself and for the safety interventions that utilize it.

[22] Jalayer, Mohammad; LaMondia, Jeffrey J.; Williamson, Michael; Zhou, Huaguo. "Developing Calibration Factors for Crash Prediction Models with Consideration of Crash Recording Threshold Change." *Transportation Research Record: Journal of the Transportation Research Board*. 2015. Page 2.

Task 3 - NJDOT Crash Reporting Analysis

Marginal Cost - Average Cost

For the final research task, the research team planned to estimate a marginal cost per NJDOT's crash records system. Marginal costs are the change in the total costs due to a one-unit change in the level of current operations. In other words, marginal cost is the increase or decrease in costs resulting from an increase or decrease of one crash. Marginal cost calculation represents a more precise method to estimate program costs or benefits for each crash record added to or subtracted from the system.

The research team's goal was to identify the relationship between crash records and total crash records system costs over a multiyear period and perform a regression analysis to estimate the marginal cost of a crash. Both budget data and crash data are necessary for such a calculation; however NJDOT's Crash Unit was only able to supply both pieces of data for one year: 2014.

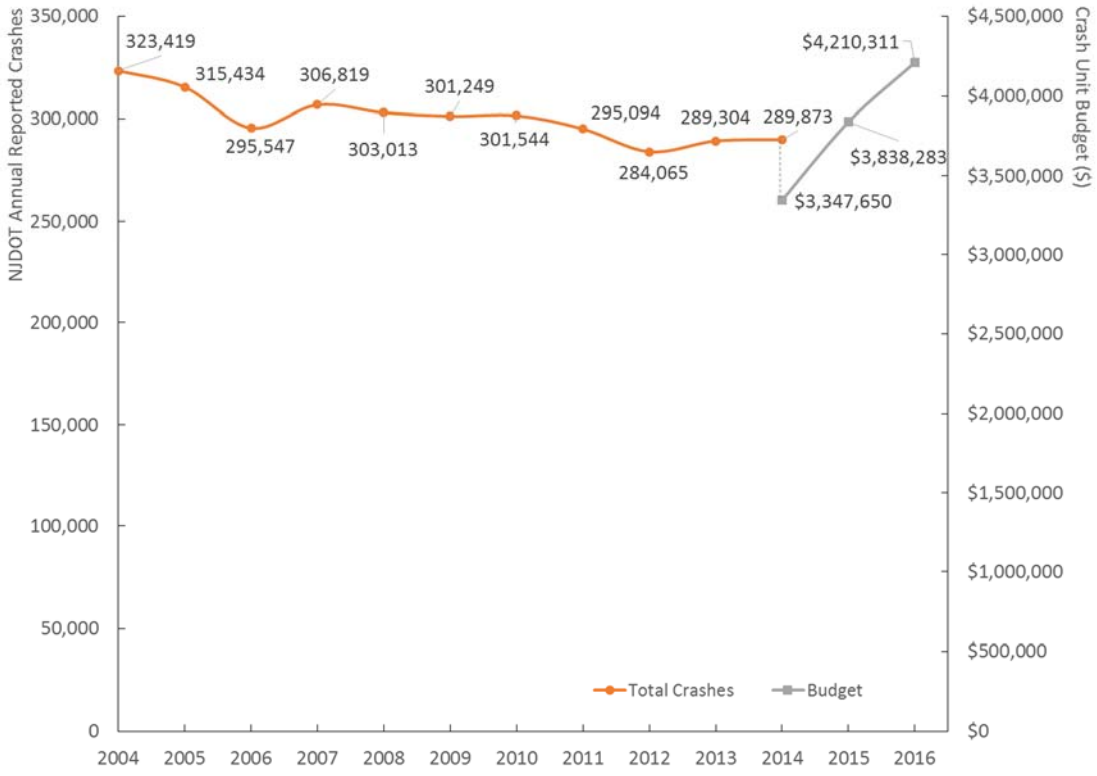

Figure 14. 2004 to 2016 Annual Crashes and Crash Unit Budget

Estimating marginal cost is not possible given only one data point for 2014. Instead of marginal cost, an average cost is most appropriate given the available data. The average cost is the total cost divided by the number of crash records processed. It is also equal to the sum of average variable costs and average fixed costs. Average cost is detailed above in Figure 14.

Comparing Costs

Researchers compared the costs of reporting crashes in New Jersey to other states. Through our in depth interviews, the research staff found that states were not explicitly tracking marginal costs to measure the performance of their crash records programs.

Typically in public service provision, once capacity is built, the marginal cost of processing an additional record (or serving an additional customer) is always lower than the average cost. Analyzing average cost data can be especially useful where it is difficult to track the cost associated with individual units of production, or when variable supply costs move around an average cost point in an unpredictable manner.

In this case, using average cost data may be preferred as it is straightforward to calculate and it relies on data that are easier to obtain. Thus, moving forward with an average cost approach, we can compare the budget numbers for NJDOT's Crash Records Unit with the budget data that was gathered during the multi-state interview step (Figure 15).

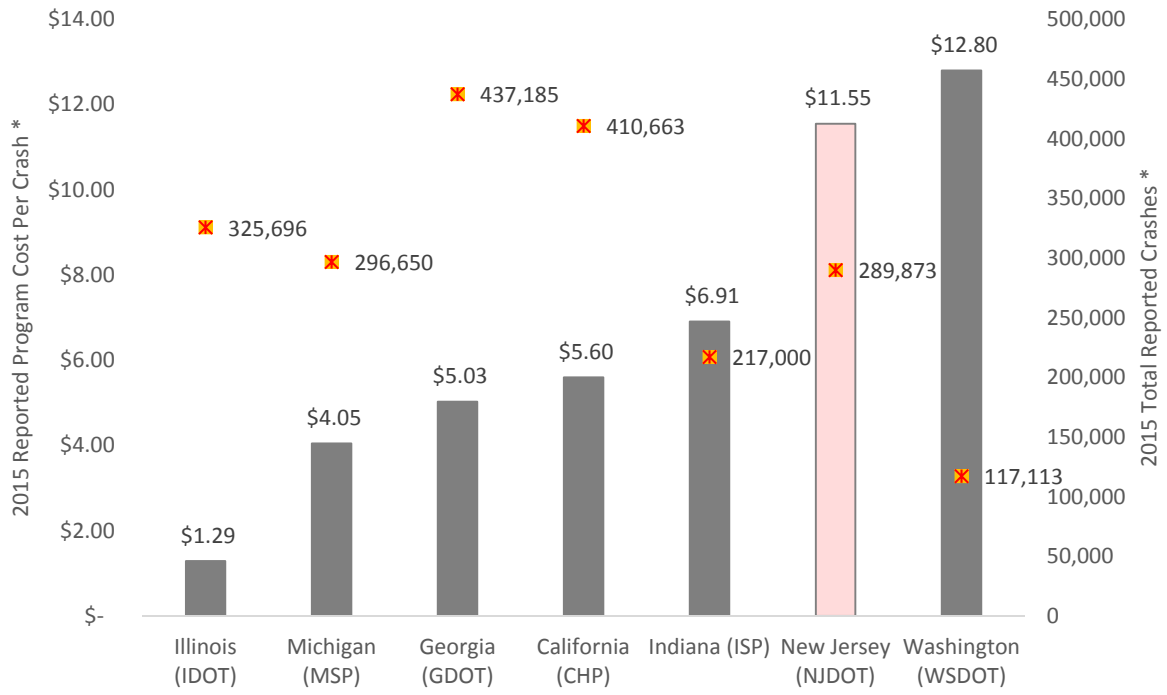

Figure 15. Average Cost per Crash and Total Reported Crashes[23]

New Jersey's average cost per crash of $11.55 is significantly higher than other states with similar numbers of reported crashes (Georgia, Illinois, Michigan, and Indiana). This average cost difference could be explained by regional differences in costs of labor,

[23] * New Jersey data for the above figure are from 2014. Other states' data are from 2015.

materials, utilities, etc. It also suggests that NJDOT expends significant resources processing the crash data and may benefit from policy or process modifications (such as electronic record submission, or increasing the PDO threshold). For example, of all the states compared, New Jersey does have the smallest number of records that are submitted electronically (20%) when compared to Illinois (51%), Georgia (90%), Michigan (97%), or Indiana (100%). It should be noted that this difference cannot be entirely attributed to the percentage of electronic data submitted as Washington's average cost is the highest of the six (at $12.80) while it submits 85% of its reports electronically.

NJDOT Crash Reporting Process

NJDOT reviewed and revised the process flowchart that the research team previously developed during Task 1 "Comparative Analysis." The new diagram clarifies the roles of local and state police departments, the New Jersey Office of Information Technology and NJDOT.

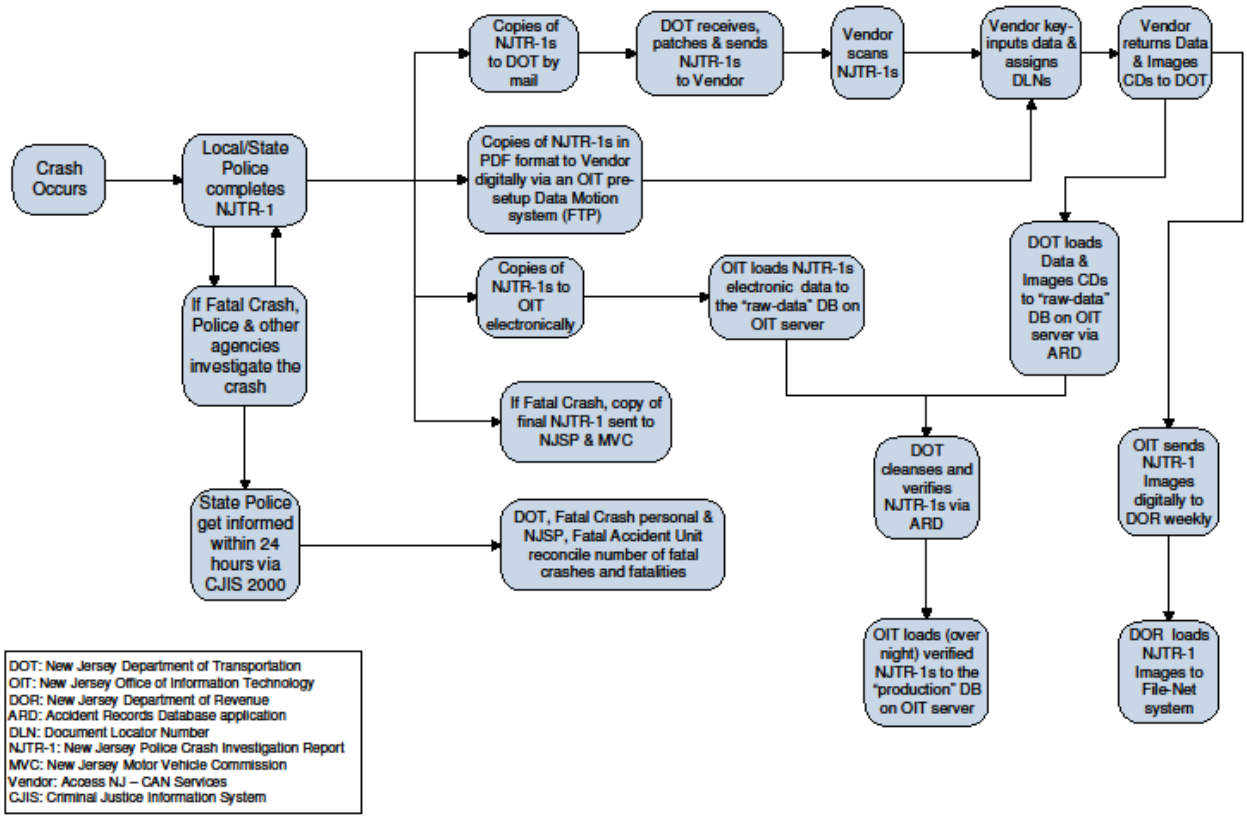

Figure 16. Updated NJDOT Crash Reporting Process; Source – NJDOT Bureau of Transportation Data & Safety, Crash Records Unit, 12/14/16

The above diagram illustrates that NJDOT plays an important role in the data collection process and that NJDOT actions are intertwined with those of the Office of Information Technology (OIT), NJSP, and local law enforcement agencies.

Existing Process Costs

NJDOT also supplied important budget data related to each of the tasks that they are responsible for. The following table includes annual budgets for the Crash Records Unit within the Bureau of Transportation Data & Safety for 2014, 2015, and 2016 as well as the costs associated with each of the key tasks.

Table 2 - NJDOT Crash Records Unit Annual Budgets 2014, 2015, and 2016

	Crash Records Unit Task	2014	2015	2016
1	Receive, Patch & Send NJTR-1s to vendor	$173,183	$237,308	$265,613
2	Load data & Image CDs to "rawdatas" DB using ARD application	$7,620	$11,006	$14,122
3	Cleanse then verify NJTR-1s using ARD application	$994,404	$1,189,079	$1,112,335
4	Reconcile fatality #s with NJSP	$8,438	$11,498	$14,081
	Unclassified Tasks	$264,004	$489,392	$904,160
	Total Budget	$1,447,650	$1,938,283	$2,310,311
5	Crash Records Unit Vendor	$1,900,000	$1,900,000	$1,900,000
	Total NJDOT + Vendor	$3,347,650	$3,838,283	$4,210,311

Missing from the analysis is the budget that was not assigned to a specific task (see the "Unclassified Tasks" in red above) There is a significant increase in this category that has grown from 18% of the total in 2014 to approximately 40% of the budget in 2016. This amount should be identified as it is a significant portion of the total budget. As the ultimate purpose of the study is to identify potential benefits (i.e., cost savings) that the State would see if the property damage only threshold is adjusted, these costs need to be better understood.

In the context of the process diagram and the responsibilities of other agencies in the process, the above costs are only a percentage of resources that are utilized to process crash records for the state of New Jersey. Costs incurred by NJOIT, NJSP, and local law enforcement agencies should also be explored.

NJDOT has indicated the budget data for NJOIT is not available. It is recommended that the agency be contacted to provide a rough estimate of the costs involved in processing crash data.

Costs for State Police and Local Law Enforcement Agencies

Researchers contacted NJSP to get an estimate for the costs of labor involved across the state. Based on a phone interview with Traffic Officer Michael Rizol, it is estimated that currently, the median salary for a NJSP officer that reports crashes is $67,500 annually (≈$32.45 hourly). During interviews, the Indiana State Police (ISP) indicated

that for each crash record form, approximately 45 minutes of officer time was required (this does not include time for form review / validation). If ISP's estimates for office time required per record are comparable to New Jersey's (Officer Rizol could not estimate the average time necessary to complete crash reports) then the cost to report each crash for NJSP is approximately $24.34. This amount represents a rate that is more than double the average NJDOT cost per crash ($11.55), calculated above.

Regarding municipal police officers, it is estimated that in 2009 the median annual salary for New Jersey's 20,525 municipal officers was $90,672[24]. This equates to $43.59 hourly and a cost of $32.70 per crash report (assuming an average of 45 minutes to complete a crash report). However, State and municipal costs to report crashes are not fully comparable in this way, because State officers must report all crashes, regardless of the value of the crash damage, while municipal officers can elect to not report crashes below the PDO threshold.

Because of this, raising the PDO crash threshold in New Jersey would represent cost savings to municipal police forces (some municipal forces may report all crashes; it is beyond the scope of this report to research all New Jersey municipal police reporting policies and procedures.) but not to the State police force.

Existing Process Benefits

NJDOT provided data regarding the number of annual crashes by number of vehicles involved, functional classification and crash severity, between 2004 and 2014[25]. NJDOT is able to utilize this data to prioritize safety improvements across its roadway facilities. The number and location of crashes provides a large sample to analyze the safety and performance of particular corridors or intersections.

As illustrated in the following figures, reducing the total number of crash records may represent the need for less state resources to input, process and store the data. Figure 17 illustrates the potential savings of reducing the number of PDO crashes. In 2014 these crashes accounted for 80% (230,218) of the 289,873 total crashes. It is important to add that this large percentage of crashes has remained relatively constant over the last 10 years.

Using the very rough estimates of per crash average costs discussed above, processing the property damage only crashes cost NJDOT $2,659,017, and NJSP / Local law enforcement agencies $7,055,509 to $9,478,847[26].

[24] http://www.nj.com/news/index.ssf/2015/04/nj_home_to_highest-paid_cops_and_widest_gap_between_them_and_everyone_else_study_finds.html

[25] Source: NJDOT, Bureau of Transportation Data & Safety, Crash Records Unit; May 2016

[26] Please see footnote #1

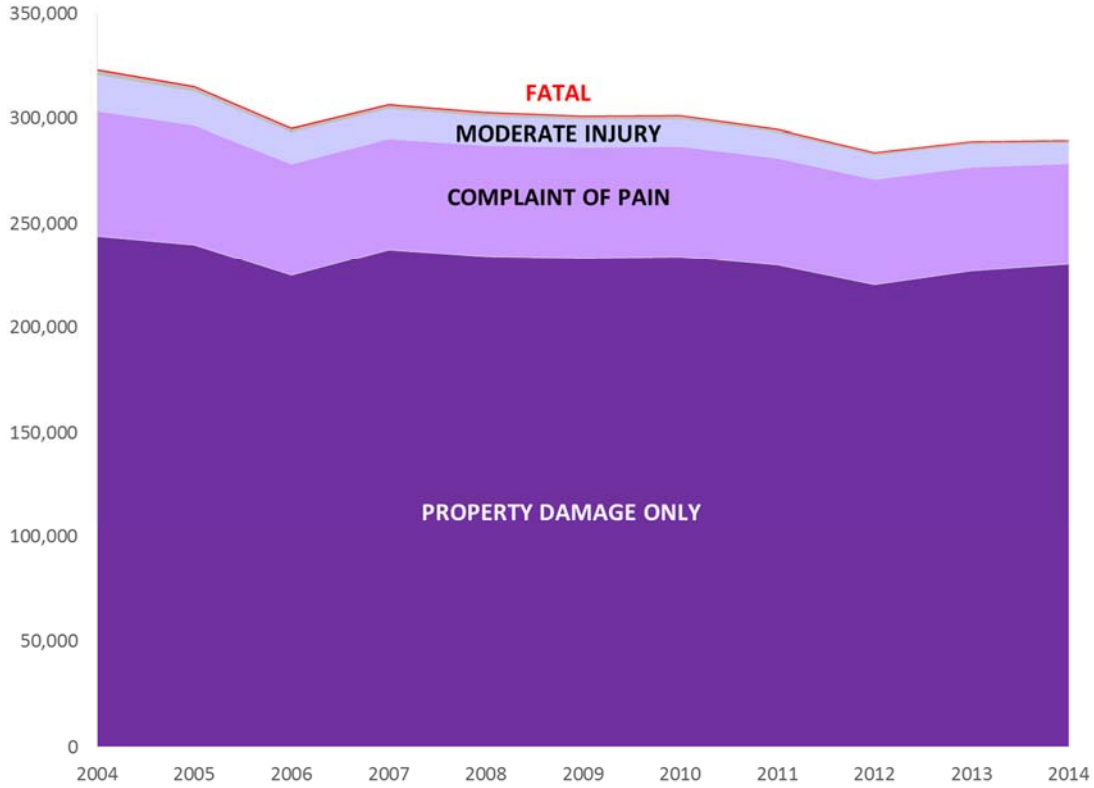

Figure 17. Annual Crashes by Crash Severity

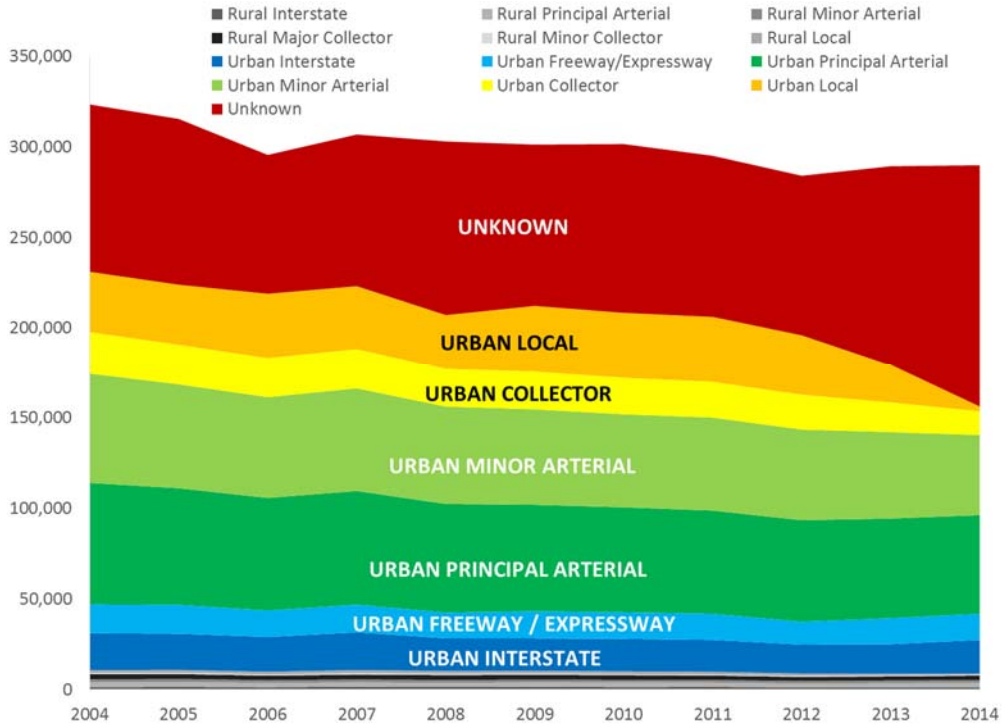

Figure 18. Annual Crashes by Roadway Functional Classification

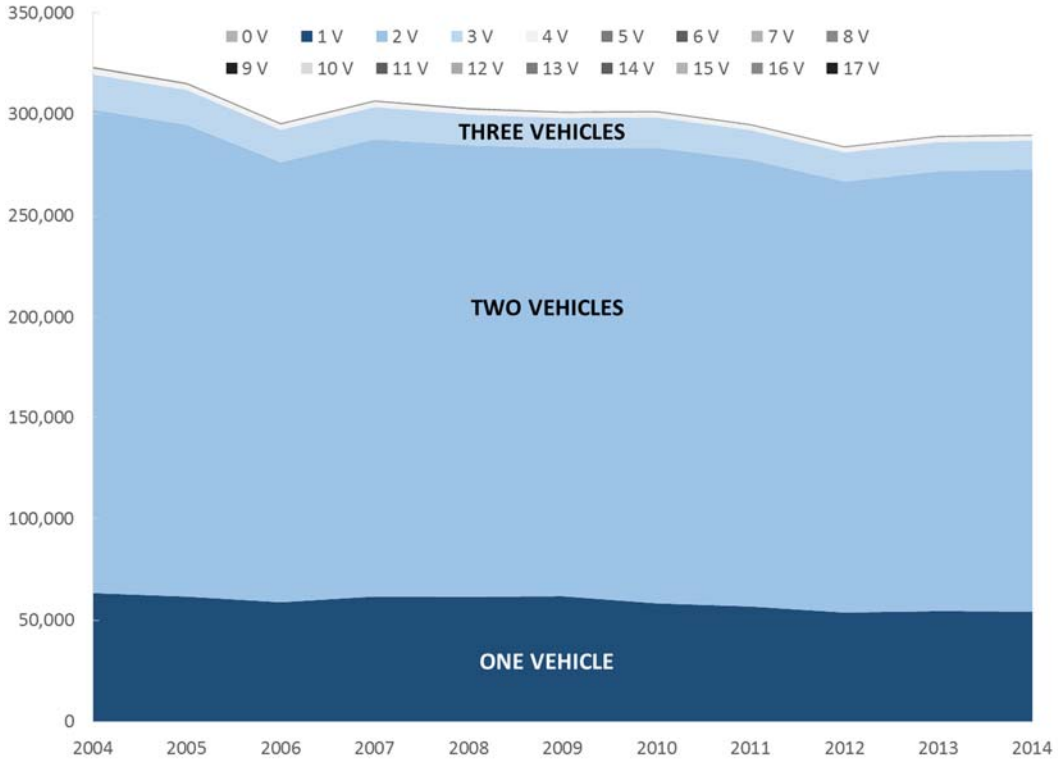

Figure 19. Annual Crashes by Vehicles Involved

As the numbers of reported crashes are reduced, NJDOT receives less data on the safety performance of roads and infrastructure. However, not all crash records received provide meaningful data to the process. For example, Figure 18 illustrates annual crashes by roadway functional classification and illustrates that approximately 50% of the functional classifications per the location of the crash were “Unknown.” Thus, reducing the numbers of reported crashes may negatively impact data quality. Figure 19 provides additional information on the number of annual crashes according to the number of vehicles involved.

CONCLUSION AND RECOMMENDATIONS

In summary, this report has highlighted the objectives, background, and strategies of state PDO threshold setting and general state practices related to crash data collection.

This research effort was guided by the following key questions:

What are the benefits of collecting reports at current levels?

The existing property damage only (PDO) reporting threshold of $500 provides a large sample of data that provides NJDOT an extensive set of crash details with which to analyze the safety and performance of particular corridors or intersections. In 2014 these crashes accounted for 80 percent (230,218) of the 289,873 total crashes. This large percentage of PDO crashes has remained relatively constant over the last 10 years.

Collecting a large number of records is beneficial for the analysis process as many of the records received are incomplete or have errors secondary to inconsistent data collection and entry. For example, 50 percent of the crash records have a functional classification listed as “Unknown.” Thus, the numbers of reported crashes ensures that there is usable data for analysis.

What are the costs of collecting reports at current levels (costs to collect, aggregate, verify, and store data as well as police costs to prepare and submit reports)?

For this research effort, NJDOT provided internal data only, so no estimates of police or NJOIT costs were available. Researchers hoped to study the relationship between crash records and total crash records system costs over a multiyear period and perform a regression analysis to estimate the marginal cost of a crash. However, NJDOT’s Crash Unit was only able to supply both budget and total crash data for one year (2014). Estimating marginal cost is not possible given only one data point.

Given the available data, researchers estimated an average cost for the NJDOT crash reporting unit. The average cost is the total cost divided by the number of crash records processed. The total budget (including the crash records unit vendor) is $3,347,650 for 2014. During that year, NJDOT processed 289,873 crashes. Therefore, NJDOT’s average cost per crash in 2014 was $11.55.

It can be estimated that in 2009 the median salary for New Jersey’s 20,525 municipal officers was $90,672 (≈$43.59 hourly) and NJSP officers reporting crashes is $67,500 annually (≈$32.45 hourly). The interview with Indiana State Police (ISP) indicated that for each crash record form, approximately 45 minutes of officer time was required (this does not include time for form review / validation). If ISP’s estimates for officer time required per record are comparable to New Jersey’s then reporting each crash cost New Jersey municipalities approximately $32.70 and NJSP approximately $24.34. This amount represents a rate two to three times the average cost per crash for NJDOT ($11.55) calculated above.

While it may have been informative to contact NJOIT to provide budget estimates for relevant crash records tasks, the research team was not scoped to contact every public and private agency and firm that touches a crash or its report. Such a scenario would include communicating with NJOIT, auto insurance firms, the Vendor that processes and manages New Jersey's reports, and potentially, emergency medical services. Such an undertaking is beyond the scope of this project and would not necessarily yield more accurate cost and expense information.

Should New Jersey raise the crash reporting threshold (and what are the available options to raise the threshold)?

From the evidence collected, researchers believe the State of New Jersey would benefit from raising the threshold to an amount above $1,000. This amount would put it in line with other states. It would also yield a reduction in reported crashes, as resulted in other states that have similarly adjusted their reporting practices, and the fact that NJSP only sends reportable crashes (those resulting in injury, death, or equal to or greater value of damage) to NJDOT.

From interviews, two states saw significant reductions in the total number of reported crashes after they increased PDO thresholds, and one state saw a slight increase. In 2003, Michigan increased its threshold by $600 and saw a 20 percent reduction in reported crashes, while in 2008 Illinois increased its threshold by $1,000 and saw a 32 percent reduction in reported crashes. In 2014, Washington increased its threshold by $250 but also experienced a 15 percent increase in crash reports. It is important to note that the threshold increase did not yield an increase in reports; rather the number of crash reports surged from the previous year, despite a threshold increase.

What are the positive and negative impacts of raising the threshold?

Due to the large percentage of PDO crashes reported, and the relatively stable annual VMT numbers for the state, a modest threshold increase may result in cost savings for NJDOT, NJOIT and local law enforcement agencies. Local police agencies may also see an improvement in on-time crash report submissions to NJDOT if they are reporting fewer crashes, and thus processing reports more quickly. In addition, because agencies will process fewer crash reports, the number of reporting errors may decrease due to increased staff time, resources and focus.

For NJDOT, cost savings are only possible if the time savings, due to fewer processed crash reports, equates budget reductions for the Crash Unit. However, given the lack of available data, it is not possible to directly link a PDO threshold increase with a specific reduction in total crash reports. It is important to note that the current NJTR-1 does not provide space for police officers to estimate property damages per crash, so there is no way to estimate how many crashes would not be reported if the threshold increases. Of the states interviewed, none provide formal training to police officers to estimate property value damage, though some police forces may provide such training. Instead, police guess to the best of their ability.

Increasing the threshold may reduce the number of crashes reported, which would provide less crash data for NJDOT and the MVC. However, the usefulness of minor crash data is may be low, because roadway safety modifications and programs should utilize data from more serious crashes and not fender benders.

Is a legislative update necessary to align State practices with national norms?

New Jersey Statutes Annotated (N.J.S.A.) 39:4-130 establishes that, "…an officer investigating a motor vehicle accident must submit to Motor Vehicle Services a completed crash report within five (5) days…for any "reportable" motor vehicle traffic crash resulting in injury to or death of any person, or damage to property of any one person in excess of $500.00."[27] Because the PDO crash reporting threshold is an established statute it must be updated via a legislative action. The following steps outline how legislative actions occur in the State of New Jersey:

1. Idea is developed – a legislator sponsors a bill
2. Bill is drafted – Office of Legislative Services provides research and drafting assistance and prepares the bill in the proper technical form
3. Bill is introduced – the Senate Secretary or Assembly Clerk reads the bill's title aloud for the first time, and the bill is printed and released to the public
4. Committee Reference – the bill goes to a committee for review
5. Committee Action – the committee considers the bill at a public meeting
6. Second Reading – the title of the bill is read aloud for a second time and the bill is now eligible for amendment
7. Third Reading – the title of the bill is read aloud for the third time and is considered on the floor of the legislature
8. House Vote – the Senate and Assembly vote on the bill; it passes if approved by a majority (21 in the Senate, 41 in the Assembly)
9. Second House – the bill undergoes the same process in the Second House
10. Governor's Action – the Governor may sign the bill, veto the bill or return it for changes

[27] Police Guide for Preparing Reports of Motor Vehicle Crashes; NJDOT, New Jersey Division of Highway Traffic Safety; http://www.state.nj.us/transportation/refdata/accident/pdf/4300policyguide.pdf

11. Law – the bill becomes saw if signed by the Governor or after 45 days if no action is taken[28]

What should possible legislative updates related to crash reporting take into consideration?

Beyond simply changing the threshold, legislative updates should also include mandated performance requirements, such as the timeliness of submissions and accuracy of crash record data to NJDOT. To encourage participation, incentives should be established for local law agencies to ensure that minimum reporting standards are met and improved data collection practices are followed. Legislation may also mandate a timely and efficient transition for all agencies to a statewide electronic crash reporting system.

The Research Team recommends that NJDOT open a dialogue with NJOIT, NJSP and local law enforcement agencies to review cost estimates and collaboratively develop legislature, including a threshold change that all agencies support. This cross agency collaboration may assist in generating an institutional consistency for improving state policy.

Lastly, NJDOT should bundle as many legislative actions as possible if they move ahead with a PDO threshold increase. One important element to consider is that of electronic signatures as valid by police officers. While New Jersey currently doesn't use electronic crash reporting, this may change in the future, and if it does electronic signatures may require a legislative action to be valid; this would eliminate one barrier to electronic crash reporting implementation if New Jersey moves ahead with it in the future.

Research Conclusions

Little Data Available. In-depth state interviews revealed that information on the marginal costs of reporting crashes is not widely available. Average cost calculations were possible using budget data; however, budgets and total costs are not always in alignment. Also, average cost estimations are not sensitive to the impacts of changes in scale. After leading a six month process with NJDOT, finding adequate data to develop an understanding of marginal costs and year to year cost fluctuations, based on the total number of records collected, was not possible.

A Relationship Between a PDO Threshold Increase and Crash Record Reduction Exists. Researchers determined that a relationship between a threshold increase and crash record reduction exists. While a threshold increase will not impact State police officers that report crashes, it will reduce the number of crash reports that NJSP sends NJDOT, and may reduce crash reports that municipal forces file; if a crash is under the

[28] New Jersey Legislature; How a Bill Becomes Law in New Jersey; http://www.njleg.state.nj.us/legislativepub/legprocess.asp

PDO threshold, and all parties are agreeable, some municipal police forces are not required to file a report.

Reduction in Reported Crashes Likely for New Jersey. Based on the results of the nine interviews, increasing the PDO threshold may reduce the number of minor crashes that local law enforcement officers report. However, the degree to which the threshold increase would impact the number of crash records that agencies must process depends on factors such as VMT (which the economy, fuel price, vehicle fuel efficiency, etc. all affect), roadway safety projects, improvements, education and outreach, and the extent of the threshold increase.

Reduction in Reported Crashes May Not Yield Decreased Costs for NJDOT. Researchers found that the average crash reporting costs for agencies depends on the fluctuation of total crashes reported and the proportion of electronic versus paper reporting. Less crash records may require less state resources to process crash data, but real cost savings would only be realized via staff reductions.

Reduction in Reported Crashes May Impact Public Safety. Less data may negatively impact public safety, because fewer reported crashes will result in less data. However, the data not being captured is from fender benders and minor crashes; more serious crashes, injuries and fatalities will still provide the data to drive roadway, engineering and design improvements. Because of this it is crucial is to ensure high quality data is collected.

Crash Reporting Process Is Error Prone and Labor Intensive. While data drives decision making, not all crash records provide meaningful data. The states interviewed noted that due to inconsistencies in data collection, illegible handwriting and human error, crash records often contain incomplete or erroneous information. To correct this, additional resources are required. For example, NJDOT staff verify the crash data in each report. This adds cost and processing time and still does not ensure 100 percent data accuracy.

Municipalities Have Limited Incentives to Submit Accurate Crash Reports In a Timely Manner. From interviews, states that relied on paper crash report submissions indicated that municipal reports were often not received within policy deadlines. For example, while NJDOT's policy is that municipalities must submit non-fatal reportable crash records within 5 days of completing the crash investigation[29], in accordance with State Statue Title 39, this is rarely the case. Municipalities often take between 30 to 90 days (and sometimes longer) to submit this information to NJDOT.

Electronic Crash Reporting Systems Yield Increased Timeliness and Data Quality. States with a greater reliance on electronic systems also saw increased crash data quality. New Jersey should consider these benefits as it weighs its options for both

[29] http://www.state.nj.us/transportation/refdata/accident/policeprotocol.shtm

increasing the reporting threshold and implementing an electronic reporting system that all municipal police agencies can use.

Only raising the PDO threshold, without also implementing an electronic crash reporting system, will not yield cost savings for New Jersey. It may yield time savings if the number of crash reports that Crash Unit staff process declines, but actual cost savings will only be realized if NJDOT reduces its Crash Unit Budget. However, staff time savings may lead to better crash report processing and increased accuracy, timeliness, and completeness of crash data. This is important both for the crash data integrity and for the safety measures it prioritizes.

Research Recommendations

Raise PDO Threshold to At Least $1,000. Per state interviews, two states saw significant reductions in the total number of reported crashes after they increased PDO thresholds, and one state saw a slight increase. In New Jersey, finding the ideal threshold increase that will yield the greatest reduction of reported crashes with the least decrease in crash data will be a challenge; a threshold increase that is not high enough will be ineffectual while an increase that is too high will reduce crash data and weaken safety planning and engineering measures.

Collaboratively Develop Legislature to Improve Crash Data Quality and Timely Submission. The research team recommends that NJDOT open a dialogue between NJDOT, NJOIT, NJSP and local law enforcement agencies to review cost estimates and collaboratively develop legislature, including a threshold change that all agencies support. This cross agency collaboration may assist in generating an institutional constituency for improving state policy.

While pushing through legislative change, researchers also recommends that NJDOT enable electronic signatures to be valid for crash reports. While this does not currently apply to New Jersey because electronic reporting is not required for municipal police forces, this will be applicable if New Jersey adopts municipal-level electronic crash reporting in the future.

Update NJTR-1 to Include Damage Estimation. Due to limitations in the availability of data from the interviewed state DOTs as well as NJDOT, it is not possible to directly link a PDO threshold increase with a specific reduction in total crash records. The NJTR-1 does not provide space for officers to estimate property damage per crash as do some of the states queried (Indiana, Illinois). This may be a helpful field to include in future NJTR-1 updates, so that this process can be effectively recalibrated in the future. It is important to note that of the states interviewed, none provide formal training to police officers to estimate property value damage; while some police forces may provide such training, police simply guess this value to the best of their ability.

IMPLEMENTATION

As this research stands, the positive and negative impacts of a potential threshold increase are inconclusive. Data provided by NJDOT's Crash Unit are unable to support marginal cost calculations to determine a more realistic per-crash record cost for the agency. Also, general estimates must be developed for the cost impacts for local law enforcement agencies of reporting PDO crashes.

From the states that the project team interviewed who had recently increased their PDO reporting threshold (Michigan, Illinois, Washington), a specific relationship between the increase in threshold and the decrease in crash records was determined with the data provided by the states. The authors propose collecting additional data to develop a better understanding of how trends in individual factors (VMT, fuel costs, general costs of living, etc.) and roadway safety factors, specifically impacted crash rates.