U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

NHTSA
www.nhtsa.gov

DOT HS 811 447

April 2011

Feasibility of Collecting Traffic Safety Data From Law Enforcement Agencies

DISCLAIMER

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade names, manufacturers' names, or specific products are mentioned, it is because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT HS 811 447		

4. Title and Subtitle	5. Report Date
Feasibility of Collecting Traffic Safety Data From Law Enforcement Agencies	April 2011
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Wiliszowski, C. H.,[1] Fell, J. C.,[2] Smither, D.,[3] Vegega, M. E.,[3] Auld-Owens, A.,[2] & Namuswe, E.[4]	

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
[1]Bedford Research 11 Davis Road Bedford, MA 01730-1597 [2]Pacific Institute for Research and Evaluation 11720 Beltsville Drive, Suite 900 Calverton, MD 20705-3111	11. Contract or Grant No. DTNH22-05-D-25043

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
[3]National Highway Traffic Safety Administration 1200 New Jersey Avenue SE. Washington, DC 20590 [4]Association of Schools of Public Health, Fellow On-site at NHTSA	Final Report July 18, 2005 – January 18, 2010 14. Sponsoring Agency Code

15. Supplementary Notes

Dereece Smither was the Task Order Manager for this project.

16. Abstract

The resources expended and the specific activities used by law enforcement agencies (LEAs) to enforce traffic safety laws are generally unknown, at least in the aggregate. It would be beneficial to law enforcement and traffic safety experts to follow increases and decreases in traffic law enforcement over the years in order to understand better the activity levels necessary to reach traffic safety goals. It is important to understand the relationships of these measures with the frequency, rate, and severity of traffic crashes within a community, a State, and the Nation. Currently, no data collection systems capture nationally representative information of traffic safety law enforcement activities and resources. The focus of this project was to learn from law enforcement representatives what information is currently collected; document the resources, strategies, frequency, and intensity of activities dedicated to traffic-safety-related enforcement; and learn how LEAs use these resources. It was concluded that collecting traffic safety enforcement data from LEAs for a new data system is feasible, but initially it will be a difficult and complex task. According to LEA representatives from around the United States who participated in this project, it is *feasible* to collect at least minimum monthly data on traffic law enforcement activities at the police agency level (e.g., staffing, equipment, strategies employed, traffic stops/contacts with drivers, violations issued, calls for service, and crashes reported). Various methods for sampling LEAs are described. Recommendations include clearly defining the data elements to be collected, conducting a pilot study, and collecting appropriate information to make accurate cost estimates of developing and running such a system.

17. Key Words	18. Distribution Statement
Traffic law enforcement, law enforcement agencies, traffic violations, law enforcement activities, resources, strategies	Document is available to the public from the National Technical Information Service www.ntis.gov and the Behavioral Research Reports Library http://ntlsearch.bts.gov/repository/ntlc/nhtsa/index.shtm

19 Security Classif. (of this report)	20. Security Classif. (of this page)	21 No. of Pages	22. Price
Unclassified	Unclassified	72	

Form DOT F 1700.7 (8/72) Reproduction of completed page authorized

Acknowledgement

The authors would like to thank the law enforcement agencies and their representatives who provided us with information regarding their traffic enforcement practices and procedures and other relevant information. Without their help we would not have had adequate data to complete this study.

Additionally, we would also like to thank the participants who attended the three meetings we conducted during this project.

List of Acronyms

Acronym	Meaning
BAC	blood alcohol concentration
CRIMESTAT or COMPSTAT	COMPuter STATistics or COMParative STATistics
e-CADS	electronic computer-aided dispatch
e-Court	court information
e-DMV	driving records
e-EMS	electronic employee management suite
e-lab Results	BAC tests and drug tests
e-NCIC	electronic National Crime Information Center
e-RMS	electronic records management software
e-road Inventory	information on roads
GES	General Estimates System
GIS	geographic information systems
GPS	global positioning system
IACP	International Association of Chiefs of Police
LEAs	law enforcement agencies
MLDA	minimum legal drinking age
MSAs	U.S. Metropolitan Statistical Areas
NHTSA	National Highway Traffic Safety Administration
SHSOs	State Highway Safety Offices
TARs	Time and Activities Reporting System
TraCS	Traffic and Criminal Software

Table of Contents

Tables

Figures

Executive Summary

Very few studies have been performed to examine the amount of resources expended and the specific activities used by law enforcement agencies (LEAs) to enforce traffic safety laws. The results from these few studies speak to the importance of measuring traffic law enforcement activities in order to understand the relationships of these measures with the frequency, rate, and severity of traffic crashes within a community. Other than what has been reported in these studies and what can be gathered by directly querying a specific LEA, law enforcement activity level is generally unknown. In theory, traffic law enforcement strategies, in terms of frequency and intensity, should affect driver behavior that, in turn, affects the risk of a crash. The first step to gain this information is to determine the resources available and the efforts LEAs are making to enforce traffic safety laws.

Though individual jurisdictions collect some form of data on law enforcement activity level, no current data collection systems capture this type of activity and resource information on a national scale. The focus of this project is to learn from law enforcement representatives what information is currently collected to document the resources, strategies, frequency, and intensity of activities dedicated to traffic-safety-related enforcement and to learn how these resources are used by LEAs. From that point, the feasibility of developing a framework for systematically collecting these elements can be determined.

Project Goals

The primary goal of this project is to determine which traffic law enforcement activity data is currently most feasible to collect across varying types of law enforcement agencies around the country. The ultimate goal is to develop a system of data collection from law enforcement agencies that is somewhat similar to NHTSA's General Estimates System (GES). This data could potentially be used to generate national estimates of traffic law enforcement activities on a monthly and annual basis and to relate those activities to changes in traffic crashes, injuries, and fatalities. The feasibility of such a system was examined in four phases.

Prior to beginning Phase I, it was important to determine whether data systems currently exist that provide information about traffic safety enforcement activities and resources and/or to ascertain the feasibility of collecting the pertinent data into a system in cases where the data is not currently collected (and in some cases collected, but not consolidated). This was accomplished by consulting with representatives from LEAs, traffic safety organizations, and related experts. To begin, a sample of LEAs across the country were contacted by telephone, and 33 provided answers to basic questions about available information. (The responses were condensed to show the final tally in Table 1, in the body of the report.)

Phase I—Meeting of the Law Enforcement Agency Working Group

A panel of representatives from several law enforcement agencies was convened to discuss topics related to traffic law enforcement activity data. The panel was comprised largely of law enforcement officers representative of various ranks (e.g., sergeant, lieutenant, chief), agencies (e.g. State, county, city, and sheriff's departments), and regions of the country (e.g., west coast, east coast, midwest). NHTSA Regional Administrators and representatives from the International Association of Chiefs of Police were asked to recommend law enforcement officers who were familiar with law enforcement activity data. In addition to people from law enforcement, representatives from IACP, a State highway safety representative, and the executive director of the Governors Highway Safety Association participated in the panel to provide different perspectives on issues relating to measuring enforcement activity. The basic objectives of the panel meeting were to:

- Define the information LEAs currently collect on traffic law enforcement activity;
- Examine the existing systems that collect pertinent data and determine the availability of that data;
- Define the information required to identify resources and activities dedicated by LEAs to traffic law enforcement and how such information is helpful to the LEAs and highway safety researchers; and
- Define what additional data need to be collected to be able to measure traffic law enforcement activities.

Phase II— Meeting With IACP Traffic Safety Committee Members

A meeting with representatives from the IACP's Division of State and Provincial Police was convened to help clarify the validity and ease of variables to be collected from a sample group of law enforcement agencies. At this meeting, IACP committee members were given a comprehensive list of data elements. Discussions at this meeting centered on:

- The feasibility of collecting this information across all types of law enforcement agencies;
    - differences in definitions and descriptions of activities;
    - measures of time (i.e., weekly, monthly, annual);
- The benefits for the LEAs collecting this information; and
- Guidance/recommendations from the participants (including how to convince agencies to participate).

In addition, a short list of data elements was compiled based on discussions during the first meeting. This short list was proposed as a starting point for collecting traffic safety enforcement data and identified information that the LEA representatives reported *should* be available (see Table 2 in the body of the report). This information was used to further refine the data elements that would be used to collect information and to begin developing a list of contacts to participate in the field test (Phase III) of a small number of agencies.

Phase III— Limited Field Test of the Comprehensive Data Collection Protocol

The purpose of this stage was to perform a preliminary test of an agency's ability to collect the data elements that were generated from the first two phases. Representatives who attended the previous meetings were recontacted to see if their respective agencies would consent to collecting two months worth of data on their law enforcement activities and to providing feedback on the difficulty/ease of performing this task.

Phase IV— Meeting With Sampling Experts

The purpose of this stage was to gather experts in the field of statistical methodology, specifically sampling methodology, to help determine the best strategy for acquiring a nationally representative sample of law enforcement agencies (having various levels of traffic enforcement duties) to collect law enforcement activity data. Due to the large variability in the size, location, jurisdiction, and the amount of traffic enforcement activity of law enforcement agencies across the United States, this meeting required a group that has knowledge of complex sampling methodologies and in the methodology involved in setting up the GES system. During this meeting, the attendees discussed various alternatives, problems, and tradeoffs to a number of sampling strategies and methods.

Overall Conclusions and Recommendations

Data Collection

There is tremendous variability among type, amount, and quality of data currently collected by LEAs. This is mainly due to the fact that the data collection systems, purposes for data collection, and definition of traffic law enforcement activities vary among law enforcement agencies. Any national data system will have to be an automated, standardized, and easy-to-use system in order to gather pertinent information needed to analyze the relationships of traffic law enforcement activities with the frequency, rate, and severity of traffic crashes, and to justify budgetary needs and requests for traffic safety resources as well as for the data capture system.

Recommendations

- It is essential to standardize definitions and provide rules for recording the data elements requested.
- The proposed data-collection system must be easy to use by the LEAs.
- Complete data is more advantageous than partial data; however, it is not always possible to obtain complete data.
- Actual data needs to be collected where it exists, but estimated data is preferable to no data.

Sampling

A random sample, rather than a convenience sample, is preferred, just as actual data is preferred to estimated data. It would be best to begin with a pilot study in a few States, including jurisdictions that have existing data systems, to help determine the desired output. Issues for

consideration in sampling include LEA type, LEA size, geographical size, and population density of the jurisdiction served by the law enforcement agency. The output required from the new system should be considered before designing the data-collection mechanism. Theoretically, this would allow for the automated aggregation of information, such as number of vehicle stops, citations, and locations so that agencies can have an accurate reporting of activities and resources. The proposed system may need to start by tracking data that is most common among participating agencies.

Recommendations

- Although a random sampling of LEAs is preferable to a convenience sample for most analyses, obtaining information from as many LEAs as possible has advantages.
- Recruitment needs to remain an ongoing activity: recruit initially and then retain the relationship with command officers at those LEAs. Command officers and command emphasis change and system participation needs to remain a priority.

Feasibility

Collecting traffic safety enforcement data from LEAs for a new data system is feasible, but initially it will be a difficult and complex task. According to LEA representatives from around the United States who participated in this project, it is feasible to collect at least minimum data on traffic law enforcement activities (see Table 1) at the police-agency level. However, some data elements are not readily available at this time from many LEAs. The results of the limited pilot study showed that most of the participating agencies can feasibly track minimum data elements on staffing for the different enforcement activities, regularly used equipment, regularly employed enforcement strategies, contacts with drivers, violations issued, population areas covered during enforcement,, and enforcement measures. In addition, a few LEAs were able to provide data on the use of special equipment or non-agency-owned material and special strategies employed such as advertisement of checkpoints and the use of red-light cameras.

The analysis of the comprehensive data revealed a problem (also discussed by LEA representatives during the meetings) of the lack of standardized definitions and recording of enforcement activities. This problem is due to an overlap of activities recorded under traffic stops, enforcement measures, and violations issued. These enforcement categories will need to be clearly defined and classified in the proposed data system. Half of the participating LEAs were smaller LEAs from Iowa and had the electronic capability to feasibly provide data on enforcement activities. An indication of the difficulty in collecting data is also demonstrated by the non-participation of half of the agencies who initially acknowledged the availability of data, but did not participate in the two-month pilot study.

Recommendations

- Identify the costs, in terms of funding and resources.
- A pilot test should be conducted.

Such a system will potentially allow highway safety officials to study the relationships between traffic enforcement resources and activities expended and the benefits to public safety and traffic management.

Background

Evaluating Levels of Traffic Enforcement

Most research measuring levels of enforcement has investigated whether increases in police activities (e.g., checkpoints, DWI patrols) above some baseline level are associated with reduced crashes and fatalities. Any such reductions may be examined between intervention communities that implement an enhanced enforcement program and comparison communities that do not, or within the same community before and after such increases in enforcement. Little research, however, has attempted to quantitatively measure enforcement efforts and relate different enforcement levels to specific levels of reductions in outcomes. One recent study used statewide datasets to generate a metric of DWI enforcement/prosecution that focused on the rate of proactive DWI arrests (Dula, Dwyer, & LeVerne, 2007). This analysis found no relationship between the level of DWI arrest activity and DWI-related crashes, suggesting that although current enforcement efforts may maintain the reductions in DWI crashes attained in the 1980s and 1990s, current methods are unlikely to lead to additional systematic reductions unless their deterrence value can be enhanced, such as through social marketing/media components. The authors indicate that such research needs to be replicated in other States and echo the need for accurate data to be collected at all levels of the DWI arrest and prosecution process to facilitate assessments of countermeasure efficacy.

Other studies have demonstrated connections between increased law enforcement activity levels and reductions in crashes. For example, a study in Greece using data from 1998 through 2003 found a clear link between intensification of police enforcement and the reduction in traffic crash casualties (Yannis, Antoniou, & Papadimitriou, 2007). In particular, an increase in the number of breath alcohol controls after 1998 contributed to a reduction in the number of people killed and seriously injured in motor-vehicle crashes.

The relationship between intensity of enforcement and traffic outcomes regarding speed limit enforcement has also been examined. One study, conducted by de Waard and Rooijers (1994), also used experimental manipulations of intensity of law enforcement to establish the most effective method of enforcement in reducing driving speed and to establish the most efficient strategy in terms of police force personnel required. In one study, intensity of enforcement was manipulated by creating three objective levels of apprehension for detected speeders; methods of notifying speeders about their violations and time delay in notification were also manipulated. In a second study, police enforcement was optimized by relating intensity of enforcement to the proportion of speeding vehicles. Results from these studies showed that the largest and longest lasting reduction in driving speed occurred in the highest intensity level condition.

Vaa (1997) reached the same conclusion on the based on a field experiment in which a 35-kilometer stretch of road was subjected to an increase in police enforcement, mostly as stationary speed controls. The level of enforcement reached a daily average of 9 hours over 6 weeks. Speed measurements were obtained before, during, and after enforcement. Increased enforcement

resulted in reductions of 0.9 to 4.8 kilometers per hour for all times of day. For some time intervals, the average speed and the percentage of speeding drivers were reduced for several weeks in the after-period, with a halo effect of up to 8 weeks at most.

In Queensland, Australia, an evaluation was undertaken of Random Road Watch (Newstead, Cameron, & Leggett, 2001), a traffic policing program that differs from conventional traffic policing in that an explicit resource management technique is used to randomly schedule low levels of police enforcement that is intended to provide long-term, widespread coverage of a road network and maximize road safety benefits. Analyses indicated that the program was effective overall in reducing crash frequency. Effects were largest on fatal crashes, with an estimated reduction of 31 percent. Estimated aggregate program crash effects reduced with crash severity and increased with time after program implementation. The opportunity-cost benefit/cost ratio for the program was estimated to be 55:1.

A comprehensive investigation of the effect of intensification of a variety of traffic law enforcement activities on driver behavior and crashes was undertaken by Hakkert and colleagues (2001). Starting in 1997, the National Traffic Police (NTP) in Israel redeployed its forces, undertaking a project of "concentrated" police enforcement on a 700-km area of interurban roads. Based on traffic volumes and accident concentrations, NTP roadway sections were divided into AA (highest) priority roads (about 270 km in length) and A-priority roads, the remainder of the project roads; B-priority was prescribed for all roads outside of the project area. In addition to the one-year period of increased enforcement on preferred roads, a publicity campaign was launched simultaneously and continued throughout the first 4 months of the intervention to inform the public of the police enforcement project and strengthen the public's perceptions of the risk of apprehension.

Efforts to evaluate the program included (1) periodic evaluation of drivers' attitudes and behavior, (2) monitoring of police activity, and (3) assessment of changes in the numbers and severity of crashes. To provide quantitative data on police activity, a special information system was established that included police officers' shift activity reports of all NTP subdivisions involved in the project—a monthly input of 4,500 records. Three groups of indices of police activity were estimated monthly during the study to characterize the police presence on the project roads, the citations produced, and the usage rates of the vehicle fleet and enforcement tools. The first set of indices, inputs, included the number of police officers, patrolling vehicles, and devices per site in a definite time interval (e.g., the number of patrol vehicles within the project area during a regular weekday shift was about 60). The second group of indices outputs captured information on the level of actual police presence and the citations given (e.g., on average, every road section of the 700-km project was patrolled for about 1,800 hours monthly and the average monthly amount of citations in the project area was more than 24,000). The third group of measures, efficiency indices, comprised measures of the performance-against-plan ratios and utilization of resources (e.g., the efficiency of using enforcement equipment was about 5.3 citations per shift with a laser speed gun and 2.7 citations per shift with a radar speed meter).

Based on analyses of the indices, two periods of project performance were determined, and the project roads were divided into two groups as a function of enforcement intensity. A statistically significant reduction in severe crashes and severe casualties was observed on highly enforced roads versus the comparison road group.

Research also shows associations between traffic crashes and certain community environmental and cultural factors, legislation, policies, and law enforcement strategies (Sivak, 2009; Gruenewald, Treno, Taff, & Klitzner, 1997; Holder, 1998; Ross, 1984). For example, it has been reported that the number of fatal crashes are associated with environmental and cultural factors, such as the amount and type of travel, that is, vehicle miles traveled (O'Neill & Kyrychenko, 2006); whether the community is in an urban or rural area (Burgess, 2005; O'Neill & Kyrychenko, 2006); safety belt usage rate, proportion of licensed drivers who are males, proportion of licensed drivers older than 64, income per capita, and deaths caused by alcohol-related liver failures per capita (a proxy for impaired driving; Sivak, 2009).

Various law enforcement strategies, such as the frequent use of sobriety checkpoints, can dramatically affect crashes involving drinking drivers (Elder et al., 2002). Some research on the association of traffic law enforcement frequency and intensity on crash rates (Voas & Hause, 1987; Voas, 2008) has been done, but much more research is needed to determine thresholds. Some research shows associations between publicity and public awareness of enforcement and traffic crashes (Voas, Holder, & Gruenewald, 1997), but other research fails to show any relationships. As mentioned above, very little if any research has shown a relationship between traffic law enforcement visibility measures and traffic crashes.

It is well known in criminal justice research that the perceived risk of being caught committing a violation strongly affects whether people will be deterred from committing an offense. Also important is how close in time a sanction follows the arrest and the severity of that sanction, but the most significant factor is perceived risk of apprehension (Ross, 1982). In general, drivers are at increased risk of being involved in a fatal crash when they drive on roads at high speeds, have high BACs, and/or are unrestrained (Borkenstein, Crowther, Shumate, Ziel, & Zylman, 1974; Peck, Gebers, Voas, & Romano, 2008; Voas, Fell, Tippetts, Blackman, & Nichols, 2007).

The relationship of all of these factors is depicted in Figure 1. Environmental factors and traffic laws and ordinances affect traffic law enforcement activities that, in turn, affect the visibility, publicity, and frequency of those activities. These traffic law enforcement activities may affect the perceived risk of being caught, serve as general deterrents to committing the violations and as specific deterrents to those who are caught. These perceptions by drivers and the public may reduce the number of drivers on the roads in the community who are drinking, speeding, and not wearing safety belts. The number and rate of drivers on the roads drinking, speeding, running red lights, and not wearing seat belts affects the crash, injury, and fatality rates in that community. This is why it is so important to understand better traffic law enforcement activity measures and their relationship to traffic crashes.

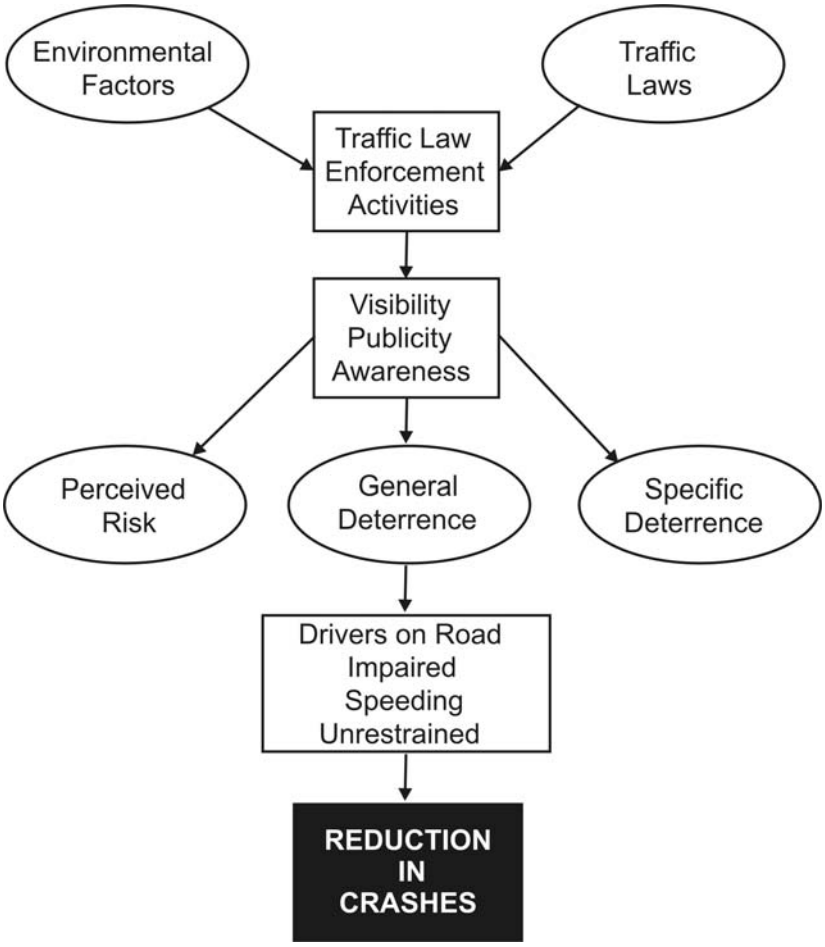

Figure 1. Traffic Law Enforcement Model

We assume the overall goals of traffic law enforcement in any community are to manage the following:

1. Public safety, to reduce or minimize the fatalities, injuries, and property damage due to vehicle crashes.
2. Traffic management, to move people and goods efficiently and with timeliness reducing traffic congestion as much as possible.
3. Public mandate, to enforce the traffic laws that, in turn, result in increased public safety and more efficient traffic management.

Other than those reported in the aforementioned studies, the amount of resources expended and the specific activities used by law enforcement agencies (LEAs) to enforce traffic safety laws are generally unknown. The results from these few studies speak to the importance of measuring traffic law enforcement activities in order to understand the relationships of these measures with the frequency, rate, and severity of traffic crashes within a community. In theory, traffic law enforcement strategies, in terms of frequency and intensity, should affect driver behavior that, in

turn, affects the risk of a crash. The first step to determine the resources available and the efforts LEAs are making to enforce traffic safety laws.

No current data collection systems capture this type of activity and resource information on a national scale. The focus of this project is to learn from law enforcement representatives what information is currently collected to document the resources, strategies, frequency, and intensity of activities dedicated to traffic-safety-related enforcement and to learn how these resources are used by LEAs. From that point, the feasibility of developing a framework for systematically collecting these elements can be determined.

Project Goals

The primary goal of this project is to determine which traffic law enforcement activity data is currently most feasible to collect across varying types of law enforcement agencies around the country. The ultimate goal is to develop a system of data collection from law enforcement agencies that is somewhat similar to NHTSA's General Estimates System. This data could potentially be used to generate national estimates of traffic law enforcement activities on a monthly and annual basis and to relate those activities to changes in traffic crashes, injuries, and fatalities. The feasibility of such a system has been studied in four phases.

Prior to beginning the first phase, it was important to determine whether data systems currently exist that provide information about traffic safety enforcement activities and resources and/or to ascertain the feasibility of collecting the pertinent data into a system in cases where the data is not currently collected (and in some cases collected, but not consolidated). This was accomplished by consulting with representatives from LEAs, traffic safety organizations, and related experts. To begin, a sample of LEAs across the country were contacted by telephone, and 33 provided answers to basic questions about available information. The responses were condensed to show the final tally in Table 1.

Table 1. Initial Responses about Availability of Information from LEAs

	Yes	No	Maybe
Does your agency keep count of officer hours spent per week on certain activities, such as traffic law enforcement activities?	23	10	0
Do you have information on all traffic stops that officers make?	29	4	0
Is this information available to the public?	21	5	7
Do you have data on the number of traffic-related citations and arrests made?	30	1	2

The majority of responding LEAs reportedly do collect some data pertinent to this project. These agencies are located in the following States:

Alabama (2)	Florida (2)	Michigan
Alaska (2)	Georgia (2)	Minnesota
Arkansas (2)	Indiana	Mississippi

Arizona (2)	Kansas	Montana
California (2)	Kentucky (2)	Nebraska
Colorado	Maine	New Hampshire
Connecticut (2)	Maryland (2)	South Dakota
Delaware	Massachusetts	

Phases I and II consisted of two meetings which were attended by LEA representatives and highway safety experts. Thirteen agencies were represented at the first meeting (none from the 33 contacted above), and members of the IACP Traffic Safety Committee attended the second meeting. A data collection protocol of a comprehensive list of pertinent data and information related to traffic safety enforcement activities and resources was developed (see the Comprehensive Data Collection Protocol in Appendix A). In addition, a short list of data elements was compiled based on discussions during the first meeting. This short list was proposed as a starting point for collecting traffic safety enforcement data and identified information that the LEA representatives reported *should* be available (see Table 2).

Table 2. Minimum Data on Traffic Law Enforcement Activities That *"Feasibly"* Could Be Collected

1. Staffing
   - Sworn officers____ Number in traffic enforcement_____
   - Cadets____ Number who help in traffic enforcement____
   - Volunteers____ Number who help in traffic enforcement____
2. Equipment
   - Evidential breath testers ___
   - Preliminary breath testers___
   - Personal computers in patrol cars___
   - Etc. ___
3. Strategies Employed
   - Sobriety checkpoints ___
   - Saturation patrols ___
   - Seat belt usage checks ___
   - Radar for speeding ___
   - Etc. ___
4. Traffic Stops/Contacts with Drivers
   - Purpose for stop:
     - Impaired driving ___
     - Seat belts ___
     - Speed enforcement ___
     - Etc. ___
5. Violations Issued
   - DWI/DUI arrests made ____
   - Citations issued:
     - Seat belt ___
     - Speeding ___
     - Etc. ____
6. Traffic Activity Measures
   - Crashes ____
   - Calls for service____
   - Warnings____
   - Etc. ____
   - (An additional area was suggested)
   - Hours spent on Traffic Enforcement

In Phase II, IACP Traffic Safety Committee members reviewed both the comprehensive protocol and the short list of data elements. Phase III, the Limited Field Test of the Comprehensive Data Collection Protocol, began after incorporating pertinent suggested revisions from both meetings. The comprehensive protocol was field tested by nine LEAs whose representatives had been present at one or both meetings. Representatives from 18 agencies provided as much of the requested information as possible on the comprehensive protocol for 2 months. (The remaining nine agencies were not represented at either meeting, but volunteered to participate.)

After completing the field test, Phase IV, a third meeting of sampling experts was organized to explore different methods of sampling LEAs to provide representative traffic law enforcement activity and resource data. Various alternatives, problems, and tradeoffs to a number of sampling strategies and methods were discussed.

The results and recommendations from the meetings, from contacts at the LEAs, and the results of the initial data collection and field test are presented in this report. The ultimate goal is to determine the feasibility of collecting standardized traffic law enforcement activity data at a representative sample of LEAs around the country, somewhat similar to the NHTSA GES (NHTSA, 2005). These data may be used to generate national estimates of traffic law enforcement activities monthly and annually and to relate those activities to changes in traffic crashes, injuries, and fatalities.

Phase I: Law Enforcement Agency Working Group

Objectives of the LEA Working Group Meeting

Representatives from law enforcement were convened on September 17-18, 2008, to discuss topics related to traffic law enforcement activity data. The working group was largely comprised of law enforcement officers representative of various ranks, agencies (e.g., State, county, city, and sheriff's departments), and regions of the country. The NHTSA Regional Administrators and the IACP recommended the participants (see Appendix B) because they were familiar with law enforcement activity data. In addition to individuals from law enforcement, representatives from IACP, a county-level highway safety representative, and the executive director of the Governors Highway Safety Association participated on the working group to provide different perspectives on the issues.

The objectives of the working group meeting were to:

- Define the information LEAs currently collect on traffic law enforcement activities;
- Examine the existing systems that collect pertinent data and determine the availability of those data;
- Define the information required to identify resources and/or activities dedicated by LEAs to traffic law enforcement and how such information is helpful to the LEAs and highway safety researchers; and
- Define the additional data to be collected in order to measure traffic law enforcement activities.

Current Data Availability and Collection of Traffic Law Enforcement Activities

This section summarizes the working group discussions on current LEA data systems and data-collection methods, data elements, and current uses of the data by the LEAs represented by or familiar to the working group members.

Availability of Data From LEAs

DATA AVAILABLE

- **Special strategy operations (e.g., sobriety checkpoints)**
- **Staff levels (e.g., # of officers, cadets, civilian employees)**
- **Equipment (e.g., # of patrol vehicles, special vehicles, breath testers)**

DATA POTENTIALLY AVAILABLE

- **Officer productivity (e.g., # of citations, # of citizen contacts)**
- **Traffic activity measures**
- **Violations issued**
- **Changes in other criminal activity when traffic enforcement increases**

Most meeting participants agreed that measures of law enforcement activity output include (a) calls for service, (b) arrests and bookings, and (c) citations and warnings. All meeting participants said that their agencies record arrests and citations but do not necessarily compile that information. Some agencies keep track of the hours that officers spend on traffic law enforcement and patrol, but others do not.

Many of the working group members mentioned that their LEAs either use an individual officer sheet or log on to a computer where daily enforcement activities or productivity are recorded (e.g., one working group member mentioned that a measure of productivity for the traffic law enforcement officers is four driver contacts per hour, and one DWI arrest per 8 hours). Some LEAs, however, do *not* record individual officer activities or productivity.

Most working group members also said that they could report on any special traffic law enforcement strategies used in any given month (e.g., sobriety checkpoints, saturation patrols, and special seat belt and child restraint enforcement programs). When checkpoints are conducted (many in cooperation with other LEAs), the number of vehicles contacted and citations issued are usually recorded.

Most working group members mentioned that they record information for all traffic stops, but this is not true for all agencies. Some States have legislation that requires agencies to record information on all traffic stops to study racial profiling issues (e.g., some New England States), but reportedly, that legislation is coming to an end, so many LEAs will not continue the practice.

All working group members stated that they could provide monthly reports on the number of sworn officers in their agency, the number of cadets, the number of volunteers, and the number of citizen staff. They also said that they could provide monthly reports on the kinds of equipment they have available (breath testers, radar guns, etc.). Although some do not currently collect information on traffic stops, they said that it was possible in the future. It was unanimous that, eventually, the participants would like to use electronic recording/reporting systems.

Most said that they periodically join forces with other agencies for some traffic law enforcement activities such as sobriety checkpoints. Some mentioned that when they increase traffic law enforcement activities, area burglaries and robberies go down. Thus, this change in other crimes potentially could be measured when traffic law enforcement activity is increased.

Current LEA Data-Collection Systems and Methods

- **Multiple data systems exist within all LEAs (some agencywide, others small such as an Excel program in a traffic department).**
- **Paper data systems still exist.**
- **Raw data often exist but are not readily available and are not routinely compiled.**
- **New technologies ("e-systems") are increasingly being used.**

As expected, many different types of systems are in use by LEAs to capture data. Many working group members verified that the data collected by their agencies are in different databases (e.g., law enforcement activities entered in one database, citations entered into another, crash data entered into a third, and so on). In addition, much data are not readily available. Some types of data are not routinely compiled, reside only in pa departments or activities. For example, a traffic unit may compile data on officer productivity only for use within that department, or information may be collected only to satisfy requirements for grant funding.

Working group members described using various mapping tools such as GPS and GIS to identify "hot spots" in their jurisdictions as a proactive method that allowed them to deploy patrols to high-problem/high-incident areas.

Many of the working group members said that their agencies record most of the data they collect on paper and then later enter the data electronically into some computerized software package and/or data system. For example, since the late 1970s, the Washington State Patrol has used the Time and Activities Reporting System (TARs), a paper-and-pencil system currently under conversion to an electronic database. This statewide system captures the traffic-stop data for each State trooper, averaging 1.4 million contacts per year. The LEAs with direct electronic information-collection methods ("e" systems), such as e-citations or Traffic and Criminal Software (TraCS), have no paper-and-pencil recording methods. One captain discussed TraCS and the capabilities afforded by such a system. TraCS is a-customized software package that can include data on crashes, citations, warnings, arrests, vehicle inspections, citizen complaints, and time and activity reports. Most police agencies in Iowa use TraCS and, at the time of this report, agencies in 17 additional States were implementing it. Some working group members said their agencies were ready for all electronic data entry; however, others reportedly were not due to a variety of issues, such as system compatibility, funding, and other topics discussed later in this report.

A few participants mentioned that the e-citation system is used to record traffic citations; some systems link to their respective jurisdictions' court systems, streamlining the court-appearance notification process. Some of the other electronic systems mentioned included e-crashes, electronic computer-aided dispatch, and electronic records management software. Others mentioned were e-EMS (employee records), e-DMV (driving records), e-road inventory (information on roads), e-court (court information), e-NCIC (electronic National Crime Information Center), and e-lab results (BAC tests and drug tests). All participants said their agencies are moving toward the use of these systems, but it may take years for their agencies to adopt such systems.

Current Uses of Data by LEAs

COMMON DATA USES WITHIN LEAs

- **Agency budgets and planning**
- **Identify high-problem/high-incident areas**
- **Measure officer productivity (by # of citations or citizen contacts)**
- **Track citizen complaints**
- **Obtain and satisfy grant requirements**

All law enforcement working group members agreed that traffic law enforcement activity data and other types of law enforcement activity data help justify their budgetary needs and requests. Many members mentioned that CRIMESTAT or COMPSTAT (COMPuter STATistics or COMParative STATistics) are used to record criminal arrests but are not used for traffic violations. Comparing crime and crash data can identify specific areas in their jurisdictions that need increased law enforcement attention.

All participants reported that crash locations and DWI arrest locations are used to plan deployment of patrols. One working group member mentioned that traffic law enforcement is deployed based upon the frequency of the causes of crashes in their jurisdiction. (e.g., alcohol, speeding, aggressive driving). Most of the other working group members described how they use traffic-crash data in their jurisdiction to identify problem areas. The meeting attendees also reported tracking citizen complaints and calls-for-service as sources of information to identify high-risk areas within jurisdictions. Many mentioned that information on traffic stops is recorded in order to protect officers from citizen complaints.

The monthly rate of citations issued per officer appears to be one measure of officer productivity. Some mentioned that the rate of citizen contacts per officer is another measure of officer productivity. In a few instances, if an agency has a crime analyst, that person can determine associations between arrests and citations, and crime and violations in their jurisdiction.

Feasibility of Collecting Traffic Law Enforcement Activity Data at The Agency Level: Minimum Data Elements

All working group members agreed that it is *feasible* for their particular agencies to collect the information displayed in Table 2 and many said that most LEAs in their States *could*, at a minimum, collect such data. Funding may be needed to collect and compile data, and definitions would need to be standardized. (Note: A national law enforcement activity data system eventually may include more specific data elements than those shown in Table 2. The feasibility of any additional elements would need to be determined.)

Moving Toward Standardized Traffic Law Enforcement Activity Data at the State Level

Electronic Systems

Many LEAs are moving toward electronic data entry for law enforcement activities. Some participants mentioned a system such as TraCS could make the standardization and reporting of

traffic law enforcement activities at the State level easier depending on how the system is set up. Some electronic systems enable LEAs to customize the data elements and how the data are collected. Such customization may make it difficult to analyze and combine data from different agencies for consolidated reporting. Such issues would need to be considered in establishing electronic data systems.

Challenges

Working group members were asked to list barriers and issues that need to be addressed to move toward the standardization of law enforcement activity data at the agency and State levels. The participants listed the following:

Funding—There was a consensus that substantial funding may be needed by some States and local communities to standardize law enforcement activity data. The level and sources of funding would need to be specified. Vendor stability and hidden costs from vendors were mentioned as potential problem areas. Another problem is the high cost of purchasing hardware, especially in small agencies.

Data inconsistencies—In some States, methods for recording activities, such as arrests and citations, may not result in accurate data collection. For example, one LEA uses daily activity logs wherein each officer records daily activities and summarizes the number of arrests, warnings, citations, etc. that were made. Though a traffic stop may begin with a driver being arrested for DWI, if a subsequent search of the vehicle finds drugs or other contraband, the arrest may be upgraded to a felony, and it is no longer classified as a DWI. Thus, a DWI arrest would be lost in the data system, resulting in underreporting of DWI arrests. Participants also mentioned a problem with unreported and underreported traffic incidences, including crashes, a situation often brought about by laws and policies concerning reporting thresholds, requirements, and terminology.

Court acceptance—In many States, the courts require signed paper documents for arrests and violations. Acceptance of electronic versions would need to be attained.

Existing system incompatibility—Many existing data systems are currently based on paper forms and are not conducive to electronic data entry. There are also issues of compatibility between older computerized systems and new e-systems, maintenance of electronic files, and record retention laws that need to be addressed. Security, memory storage, and confidentiality are other issues that need to be addressed.

Training—Any new system will require training for its proper use. Issues such as who needs to be trained, how long the training should be, and frequency of retraining staff would need to be examined.

Governance and authority—Decisions would need to be made regarding where a traffic law enforcement data system would reside, what agency or agencies would manage the electronic system, and which governmental or other agencies would have access to the data. The lack of e-signature authority was mentioned by several participants.

Uses of the data—Use of the data needs to be clearly defined and unintended consequences of the use must be anticipated and addressed. How the data is used will dictate how the data is collected and entered.

System maintenance and the related costs were also mentioned as issues. How would updates be made and how would changes (e.g., technology, types of data collected, changes in the participating LEAs) be accommodated?

Recommendations for Moving Ahead

The working group recommended that a user's group be assembled to develop guidelines in the following three areas:

- Funding sources;
- Standardization of the data (what data should be collected, minimum data requirements, but not how the data should be collected); and
- Marketing of the system (selling the concept).

The working group also recommended that some of the best practices (and some of the less successful practices) be documented to help States develop good systems. Working group members also recommended that specifications for a successful system be developed. Participants suggested providing two or three case studies of successful implementations of data systems that would be helpful in demonstrating the value of collecting and using traffic law enforcement activity data. The methodologies to implement the systems, the management strategies employed, and any cost-benefit analyses performed should be documented and disseminated.

Conclusions

1. The working group members agreed that key measures of law enforcement activity include (a) responses to calls for services, (b) arrests and bookings, (c) citations and warnings, and (d) officer activity hours.
2. According to working group members and telephone discussions with police agencies around the country, it appears to be *feasible* to collect at least minimum data on traffic law enforcement activities at the LEA level. At a minimum, these data elements appear in Table 2. However, these data elements are currently *not readily available* from many LEAs. For example, the information resides on paper forms; some data is not routinely compiled unless there is a need for the information; and data is often collected for specific purposes (e.g., to satisfy requirements for grant funding, to track a specific enforcement program, to gather data within a specific department for internal management). Therefore, it is important to know the level of information being reported.
3. To facilitate the development of a comprehensive traffic law enforcement data system, it will be necessary to collect specific data elements, such as the hours spent on traffic law enforcement relative to other law enforcement activities, the LEA's annual budget, and the frequency with which certain traffic law enforcement strategies are used.

4. As suggested by participants, it could be advantageous for GPS providers and other vendors to design a uniform program that automates core data and easily extracts data.

Project Recommendations

1. Develop a minimum set of data elements (with definitions) that would record traffic law enforcement activities at the police agency level (for example, start with Table 2).

2. Collect information on existing data systems that might be models and/or that might be compatible with a national system.

3. Conduct two or three case studies documenting best practices of current LEA data systems.

4. Convene various users' groups to suggest guidelines for the new system. One group would manage financial issues in funding such a system. Other groups might address standardization of the system, technical issues, and marketing.

Phase II: Meeting With IACP Traffic Safety Committee Members

Objectives of the IACP Meeting

The Traffic Safety Committee members of the IACP met with project and NHTSA staff on March 15, 2009, to discuss the comprehensive list of data elements and the possibility of collecting this information. The topics of discussion follow.

1. Examination of the feasibility of collecting information on the comprehensive protocol (see Appendix A) and the short list (Table 2)
2. Challenges associated with data collection
    - Differences in data definitions and descriptions of activities
    - Policy and other considerations
3. Benefits for the LEAs collecting this information
    - Accountability
    - Budgets and planning
    - Any additional data elements useful to LEAs
    - Benefits to the LEA for participating in this type of data system
4. Guidance/recommendations by participants
    - How to convince LEAs to participate

Examination of the Comprehensive Protocol

The meeting participants suggested some changes to clarify the data requested on the comprehensive protocol form. Some compared the data requested with what they believed their respective agencies currently collect. Participants discussed differences among agencies in data-collection abilities—some systems are paper-and-pencil; others use advanced technology. In addition,, the data collected vary between and within agencies. In some cases, data are collected, but not compiled or summarized. Moreover, the methods for collecting data may differ within agencies. Rarely can one person or department within an agency provide all of the requested data.

Challenges of Data Collection

The feasibility of collecting the information (requested on the comprehensive protocol) was discussed. One topic of discussion centered on the differences between LEAs in data recording. Participants provided the following examples related to recording arrests.

- There are different definitions of arrests. For example, a driver can be written a summons arrest for driving without a license and can sign it and agree to appear in court. Although they are written a summons arrest, they are really not categorized as arrested because they are not taken to jail. These differences in definition need to be considered during data collection.
- A DUI arrest may also be counted as a traffic arrest and a misdemeanor. So one arrest can appear under three different categories (DUI, traffic, and misdemeanor).
- If for example, an officer arrests a driver for a traffic violation, drug possession, and a suspended or revoked license, the officer only gets credit for one arrest. So the officer has to make a conscious choice on where to mark the arrest on the daily activity report. How they mark their arrests on the activity reports determines the types and numbers of arrests reported at the end of the year–for example, how many impaired-driving arrests are made in a year. In the end, the enforcement activity database may have throughout the year 20 officers who made DUI arrests but also found the offenders to be in possession of cocaine, and thus recorded the incidents as drug arrests on their activity sheets. The DUI arrest is then lost in the database.
- Sometimes when a crash-involved driver is taken to a hospital for blood and urine tests, the officer may forget to record it in the DUI logbook (if it was a DUI). This affects the accuracy of the logbook.

Another example of the differences in data collection was that some LEAs collect private property crash reports that might be included in the number of crashes reported, whereas other agencies only report crashes on public roadways. Others determine reporting methods based on a dollar estimate of damage (e.g., not reported if less than an estimated $1,500 worth of damage) regardless of whether an officer is at the scene or a person walks into the station to report the crash.

As with the participants in the first meeting, the issue of defining the data requested on the protocol form (and in any future system) was viewed as problematic at best. Some participants pointed out that different definitions exist within the same agency. The data collected will not be uniform within or across LEAs if standardized definitions are not provided. For example, LEAs define categories of officers differently—an auxiliary police officer in one agency has no "sworn powers," whereas in another agency, an auxiliary officer is a sworn officer and can write tickets and parking infractions. Reportedly, LEAs in some jurisdictions have paid, part-time sworn officers who handle all traffic enforcement.

Meeting participants indicated that the comprehensive protocol form should provide a category for "participation in mobilizations." That category would need to consider task forcing (i.e., a collaboration of LEAs staffing an enforcement effort) and how the participating LEAs would record the mobilization effort, any resultant arrests, and public outreach efforts. This could

substantially affect the number of enforcement and publicity events recorded by the LEAs in a given month.

Designers of a data system need to consider differences in State laws and agency policies. For example, in Georgia only a State trooper can write someone a speeding ticket for driving less than 10 miles per hour over the speed limit. Another problem articulated by one agency has been police union opposition to officers having to record daily activity logs.

There was concern over different software and hardware capabilities and compatibilities. Participants recommended that the data input should be simple so that officers in the field can provide the information requested with minimal effort.

Benefits for the Participating LEAs

Many participants felt it would be necessary to have a dedicated person to collect and provide targeted information to assist the participating agency. The information could help in setting goals and objectives and in targeting enforcement to problem areas.

One participant said that knowing (eventually) the threshold for enforcement activities that affect the public perception of risk of arrest would be most helpful. For example, what number of traffic stops or checkpoints would deter speeding or impaired driving so that there would be a lower number of crashes?

There was some doubt, however, as to how useful the information would be to small agencies (20 officers or fewer) that respond to calls and crashes but do not conduct proactive enforcement. (Note: Some officers from these agencies may work on joint task forces and other community efforts with other LEAs and may see the benefits to tracking the requested data.)

Guidance and Recommendations From IACP Traffic Safety Committee Members

The committee recommended that the collection effort and request for data from LEAs be as nonintrusive as possible and involve the right people at the agency. Members also recommended incentives, the most important being a dedicated person who collects and analyzes the data for each LEA. There was opposition to collecting "estimated" versus "actual" data. Meeting participants thought that NHTSA should identify and study the best existing systems before designing the new system. It was also suggested that the Traffic Records Coordinating Committees in individual States be contacted because they reportedly have overcome hurdles on establishing data definitions and systems in their respective States. In addition, professional groups such as the IACP's Law Enforcement Information Management Section might provide helpful insight.

There was concern that "typical" agencies of 50 sworn officers are not currently collecting the necessary data and that a dedicated person would have to set up and run the entire internal process rather than locate and compile existing information.

Conclusions

1. The system design should first take the output required or expected into consideration and design the input mechanism accordingly.
2. Hypothetically, data from the proposed system could assist LEAs in conducting traffic safety activities where most needed geographically.
3. Ideally, the proposed system would allow the electronic capture of daily activities from officers directly into the database. This would aggregate the information as to number of vehicle stops, citations, and locations so that agencies can plan for, acquire, and distribute resources. However, the different software and hardware capabilities and compatibilities will need to be addressed.
4. Concern was expressed about different software and hardware capabilities and compatibilities. Data input should be simple so that officers in the field can provide the information with minimal effort. The input system should take into account input errors made by officers and problems with system connectivity in police vehicles.
5. However the system is designed, it should be universally compliant (e.g., using extensible markup language known as "XML" that is a set of rules for encoding documents electronically, or the predominant markup language for Web pages known commonly as "html" for hypertext markup language) that may help with the compatibility issues.

Phase III: Limited Field Test of the Comprehensive Data Collection Protocol

During the meetings, all participants indicated that their agencies could provide at least some of the data requested. Law enforcement representatives from 18 of the agencies that participated in one or both meetings received the comprehensive data collection protocol, in Appendix A. Table 3 displays the rate of actual participation.

Table 3. LEA Participation in Pilot Test of Protocol Form

Meetings	Number of LEAs Asked To Participate	Number of Agencies That Provided (Some) Data
LEA representatives meeting	11*	4
IACP safety committee	4	2
LEAs represented at both meetings	3	3
LEAs not in attendance**	9	9
Total	27	18

*One participant was a former law enforcement officer now representing a traffic safety partnership of a number of LEAs; after repeated requests, none provided data.
**Eight of these agencies were invited to participate by one agency representative who attended the first meeting, all from Iowa; the ninth agency was from Florida.

As indicated in Table 3, only 9 of 18 (50%) LEAs represented at both meetings provided *some* data, despite indicating at the meetings that their agencies could provide at least some of the requested information.

All 27 agencies were asked to provide the information on the form for two separate, recent months. Most agencies that participated provided the information for June and July 2009.

Data Received

Regarding the minimum data elements requested from LEAs (Table 2), all 18 pilot test agencies provided numbers for staffing (sworn officers, cadets, volunteers). Most (16) agencies also at least estimated the number of officers conducting traffic enforcement. Not all pilot agencies (only 14 to 16) could give precise numbers on available equipment, including cars used for traffic enforcement. It is assumed, however, that if an agency is asked to conduct an inventory in any given month, that could be accomplished.

All pilot agencies described the strategies they used or did not use (e.g., checkpoints, saturation patrols); however, only 14 of the 18 could give the number of traffic stops that month, and many did not keep track of the initial purpose for the stop. Almost all (17) of the agencies knew the number of arrests for DWI and the citations for seat belt violations or speeding. The one exception was a State police agency that could not tally up the numbers in all the barracks that

month. All knew whether they investigated crashes or not, but only 13 could give the number of calls for service.

A comparison of the minimum data elements (short list in Table 2) and the comprehensive data collection protocol that was used during the limited field test (Appendix A) was conducted to identify the information LEAs could most and least feasibly collect. Again, the list of minimum data elements was provided by LEAs during the meetings as information they could readily supply. Therefore, the comparison revealed whether LEAs were in fact able to feasibly provide that minimum information during the limited field test. This comparison is displayed in Table 4, below, where the minimum data elements are divided into those that received the most responses (16 or more) and those that received the least responses (3 or less) from LEAs during the limited field test. Additionally, data elements that were not short listed or added to Table 2 but received many LEA responses are shown in the last row.

Number of LEAs Responding to the Minimum (Short-Listed) Data Elements	Table 4. Data Elements With the Most (≥16) and Least (≤3) Reponses From Pilot LEAs Minimum (Short-Listed) Data Elements					
	Staffing	**Equipment**	**Strategies employed**	**Traffic stops/contacts with drivers**	**Violations issued**	**Traffic activities/ enforcement measures**
Elements With ≥16 From LEAs	• Number of officers conducting traffic law enforcement • Officers authorized to make traffic stops • Sworn officers • Civilians • Cadets • Auxiliary • Volunteers • Patrol • Investigatory, administrative, & others	• Number of vehicles used for traffic law enforcement • Description of evidential breath testers • Description of speed measuring devices	• Impaired driving saturation patrols • Impaired driving roving patrols • Seat belt campaigns in past 3 years • Impaired driving campaigns in the past 3 years • Use of high-visibility vests • Speed detection • Traditional traffic patrol vehicles	• Number of officers making traffic stops • DWI/DUI arrests • Child restraint citations • Seat belt citations	• DWI/DUI arrests • Child restraint citations • Seat belt citations • Speeding • Impaired driving	• DWI/DUI arrests • Seat belt citations • Child restraint citations
Elements With ≤3 Responses From LEA		• Use of motorcycles during normal day police activities • Use of both marked and unmarked cars during special events • No. of non-agency	• Agencies that usually, occasionally, or never use signs announcing checkpoints. Agencies that occasionally or never advertise checkpoints in the media • Agencies that never use high-visibility vests	• 1 agency didn't track traffic stops or criminal arrests at checkpoints		• 1 agency did not track officer hours

		owned special vehicles and other equipment	• Checkpoints in the media • Agency definition of enforcement zones and red light cameras • Agency definition of traffic patrol on foot, by motorcycle, and helicopter, marine, aerial, etc.			
Not Short-Listed But Received ≥16 LEA Responses	• Environment: population area covered by agency (18/18)					

Note: A number of limitations are offered for interpreting Table 4. First, the respondents are not representative of all LEAs. However, the respondents did volunteer to participate in the limited test of the data collection protocol. In addition, almost half of the respondents were from one state (Iowa) and were already using an electronic data system. Despite these limitations, Table 4 does provide some suggestions to what data elements may be more easily collected.

As listed in Table 4, staffing and violations issued were the data elements with the highest response rate from LEAs. Additionally, most LEAs were able to provide information on the regular enforcement equipment like vehicles used, breath testers, and speed-measuring devices, but few were able to report on other equipment such as motorcycles used and special event equipment. The limited field test results revealed that most LEAs could provide information on regular enforcement procedures like staffing, saturation patrols, seat belt and child restraint enforcement, speed detection, traffic stops, citations, and impaired-driving arrests. All the agencies could provide information on the population area they cover during law enforcement activities; therefore coverage can be added to the minimum data element list.

It appears that very specific data elements or data elements concerning special equipment or events like the use of marked or unmarked cars, helicopters, high-visibility vests, use of red light cameras, definition of enforcement events, and others listed in Table 4, received the least responses from LEAs. There was also an overlap of data elements under traffic stops, enforcement measures, and violations issued, an example of how one activity could be counted in multiple categories. For example, a seat belt citation can be recorded under traffic stops or contacts with drivers, violations issued, and enforcement measures. The data system should clearly indicate how to categorize and record enforcement activities. In summary, most of the pilot agencies recorded information on the minimum requested data elements, although it required some preparation to collect the data in some agencies. It should be noted that a majority of the LEAs that provided data have some form of e-system, such as TraCS, that may have made it easier to accommodate our request for information.

Feedback From LEAs Regarding Data Collection

LEAs That Provided Data

Ten of the 18 agencies that provided data answered follow-up questions about the challenges to collecting the information.

Contacts at the LEAs that provided data were asked to *estimate staffing and funding levels required if the agency were to provide information on a regular basis*. The estimates varied greatly from a full-time staff person at $65,000 per year for a large agency, to no cost at a small agency that already routinely collects the data. The larger urban agencies that provided follow-up information did not provide any estimates.

The participating agencies were asked to *estimate the amount of effort required to provide the actual and estimated data that they submitted for this project*. Again, as expected, the smaller agencies required less time to provide whatever information (sometimes limited) that they could provide, usually 1 to 8 hours per month. The larger agencies estimated 16 to 40 hours per month, but that could be spread over weeks or months waiting for other officers, departments, and troops to respond.

The contacts at the participating LEAs were asked *which data collected for this project was also useful to their respective agency*. Several agencies reported that the data was

difficult to collect; however, most found the data useful for the purposes for which it had been collected and useful for their own purposes.

The individuals polled at the participating LEAs mostly agreed that it would be possible, though difficult, to collect the data they had provided monthly. External funding would make it more likely that the LEA would participate.

LEAs That Did Not Provide Data

The LEAs that declined to participate in the pilot test told us that, for the most part, they did not have the time or the resources to adequately provide the requested data over a 2-month period. In their estimation, it would take a dedicated officer to track down and record the requested data and would require several hours per month to do so. They felt they could not afford that time.

Phase IV: Meeting With Sampling Experts

Objectives of the Sampling Meeting

A panel of experts was convened on November 20, 2009. These individuals have expertise in sampling plans and highway traffic safety data. The participants were asked to do the following:

1. Discuss sampling methods to provide traffic LEA activity data that would be representative of LEAs across the United States;

2. Address questions about how to derive a sample size; stratification of data or types of LEAs to provide appropriate representation; geographic/environmental considerations and other characteristics of sample sites; frequency of data collection; and limitations of the data collected; and

3. Although meeting participants were not asked to reach a consensus, attendees were asked to enumerate alternatives and discuss trade-offs and limitations to various scientific sampling methods.

Purpose of the Proposed Database

The primary purpose of the proposed database is to provide an accurate national representation of traffic safety enforcement activities and resources. Eventually, this data may be used to study issues such as relationships between enforcement and certain safety outcomes.

The purpose of the database was explained as allowing proposed end users to:

1. Track trends in traffic safety activity and resource levels, and

2. Link measures of safety (crashes, injuries, fatalities) with LEA activity.

Parameters of the Data System

There were discussions among the group as to what are considered the measures of traffic enforcement activities. These ranged from the obvious proactive enforcement tactics (e.g., safety belt enforcement, impaired-driving deterrence measures) to police visibility alone (e.g., officers in marked cruisers not engaged in enforcement but driving or parked along roadways) that can positively affect driving behavior. The following issues, though not all resolved, were listed as topics for continued discussion with resolution necessary before a new data system could be implemented.

Define the Parameters of the Data System Actions and Outcomes

1. What are the LEA activities and resources that need to be defined? They include:

   Enforcement output measures (e.g., citations) performed by LEAs;

   Special enforcement (e.g., saturation patrols, checkpoints);

   Visibility measures (e.g., police presence); and

   LEA resources (e.g., all staffing and traffic safety dedicated staffing and equipment).
2. Define the LEAs that *will* and *will not* be represented in the dataset (e.g., State, city, airport police, sheriffs' departments, university police, park police). Sources of information about LEAs were discussed (FBI list, National Public Safety Information Bureau book [2008] containing an estimated 95 percent of LEAs in the United States, Department of Homeland Security, State public safety agencies).
3. What are the factors to be considered when stratifying the sample of LEAs? Should geographic areas selected from the map of the U.S. Metropolitan Statistical Areas (MSAs) be the starting strata and then select all jurisdictions in an area? LEAs can be stratified by type, size, etc. The measure of size in the strata is needed so some LEAs are represented from every group; otherwise, there could be an excessive number of small agencies represented.
4. How will the data be aggregated? This must be determined early in the design.
5. What is the value of estimated (as opposed to actual) data when actual data is not available? A decision must be made on this, and an estimate of the accuracy should be posed.
6. What decisions will be made concerning the data collected?

   What data will be collected?

   Who will define the data (i.e., definitions of the data to be collected)?

   What questions are to be answered from the data?

   How will the data be used?

Although all of these topics need to be satisfactorily answered for the system design phase, the experienced sampling group was asked to elaborate on specific sampling issues.

Stratification of the Data

A lengthy discussion about how to stratify a sample of LEAs resulted in a list of specific issues to consider.

Sample issues for consideration

- How can/should the LEAs be defined—by population size of the area the LEA serves, population of drivers on the road, number of sworn officers in the agency? (This may be a proxy to how much traffic enforcement is done.)
- Consider LEA type (State, county, sheriff, city, etc.).
    - Should State highway patrol agencies be sampled heavier because their primary focus is traffic enforcement?
    - Then add in LEAs with speed cameras, red light cameras, etc.
    - Add in other types of agencies?
    - Consider geographical size and population density—According to one participant, New York, Chicago, and Los Angeles should certainly be selected.
    - Consider the potential for overlapping jurisdictions
    - What is the sample population served in relation to the size of the agency (number of sworn officers) and the number of crashes?

Design Strategy Issues

Sampling strategy—use large urban, medium, and then small rural locations [or small, medium, and large]—three tiers of Metropolitan Statistical Areas (MSAs) and rural.

Ways to sample:

- Household Survey method (probably not for this data).
- Best measure for selecting and stratifying sample:
    - VMT—however, types of road segments vary from State to State, so may not be comparable.
    - Define exposure and the best way to measure the exposure.
- What would be an acceptable method for choosing replacement LEAs for nonresponse?
- Consider "freebies"—LEAs that already collect the requested data.
- Some experts recommended that agencies with electronically downloadable data be added.

Screening methods—make certain to also represent LEAs that

- Do not currently collect pertinent data,
- Do not currently conduct traffic safety enforcement efforts, and
- Do not currently have resources to conduct traffic safety efforts.
- Some data is either readily available or you can get it in a first "screening" call (number of sworn officers [ideally who do traffic] as a measure of size).

- Consider socioeconomic factors—areas with greater resources capable of producing more enforcement volume (and possibly collecting more data).

Data collection issues that impact sample strategy

- What are appropriate measures of LEA activities?
  - A time to failure measure? How long were officers on a shift before they issued a citation?
  - Where does traffic/drunk-driving enforcement stand in the list of priorities and how does this change over time (month-to-month; year-to-year)?
  - Do we want to measure hours spent on traffic safety efforts? (Yes, but may not be practical or possible.)
  - Officers on patrol? Patrol car mileage? Number of marked cars on patrol?
  - Threats to the validity and reliability of the data collection
  - Attrition (e.g., offer incentives for participation)
  - Study confidentiality

How to Select the Sample of LEAs

The group was asked to confer as to how the LEAs should be selected and whether and how the data should be aggregated, such as by State or by region. Participants discussed the following alternatives.

Alternative 1: Convenience Sample

- Select LEAs that are already collecting the required information. Add other jurisdictions as they collect the needed information.

Alternative 2: Basic Level

Use the 410 LEAs from the 60 GES sites. Advantages are cooperation with these LEAs, available crash data from GES, and on-the-road data from recent National Roadside Surveys (1996 and 2007). However, a question was raised concerning the potential burden on the LEAs in the NASS GES sites.

- Random sampling from among the 410 LEAs; or
- Develop a set of screening questions to determine agencies of interest; ask further questions for final sampling group:
  - What determines LEAs that should be included? (Do not exclude an agency based on information that they cannot provide; support can be provided.)

Alternative 3: Comprehensive Level

Use the 410 LEAs from the 60 GES sites + 4 census regions (defined sample measure of size); population-based (cluster [must be in person], by mail/phone [no need for cluster]) approach for States.

- Random sampling from among the 410 LEAs and/or random sampling of LEAs from the 4 census regions (consider sampling by population, rural/urban, police jurisdiction); or
- Develop a set of screening questions to determine agencies of interest; ask further questions for final sampling group:
    - What determines LEAs that should be included? (Do not exclude an agency based on information that they cannot provide; support can be provided.)

.

Alternative 4: Stratified Random Sample

Collect data from all jurisdictions in a region—national-level data, regional-level data, and State-level data (all 50 States); special studies are possible; all police agencies that can or could do traffic enforcement; collect data from all jurisdictions within a region for special topics.

Stratify (measuring certainty) sites:

- What levels of precision are needed to reach this ideal level?
- What is the minimum—level of precision that is acceptable?
    - A change of 10 percent in a measure over 1 year?
    - A change of 20 percent?

Value of Data Collected

Random versus Convenience Sample

It would be preferable and stronger statistically to select participating LEAs randomly versus having a convenience sample of agencies that might volunteer or be readily agreeable to providing data. However, because currently there is no repository of traffic safety enforcement activity and resource data, any information on the subject would be helpful initially. Perhaps starting with a convenience sample in a pilot and building up to a probability sample after identifying most of the data-collection issues would be a good approach.

Estimated Data Versus Actual Data

Although actual data is always preferred, at least initially, it may not be available for some of the measures. The meeting participants said the value of estimated data depends

on how the method of estimation was accomplished. The following questions and topics were presented by the group for further discussion and consideration:

- What is the value of estimated hours versus actual hours spent on enforcement?
- How good is the estimated data if you cannot get actual hours?
- If it is an estimate-only agency, is it worth keeping?
- The topic of estimated data should be considered in the design process. Before the pilot test, use a focus group of officials to test the use of estimates. Ask them how they estimate.

Conclusions

- The proposed system may need to start by tracking data that is the most common among participating agencies.
- Measures of traffic enforcement activities must be determined, and data definitions must be clarified and standardized.
- A random sample rather than a convenience sample is preferred, as is actual data rather than estimated data.
- The budget will determine the depth and complexity of the system.
- It was suggested that a pilot study be conducted in small States or with jurisdictions that have existing data systems.

Overall Conclusions and Recommendations

Data Collection

There is tremendous variability among type, amount, and quality of data currently collected by LEAs. This is mainly due to the fact that the data collection systems, purposes for data collection, and definition of traffic law enforcement activities vary among law enforcement agencies. Many agencies are still using paper data systems and existing raw data is not routinely compiled. The law enforcement working group members reported that collected data is commonly used for agency budgets and planning, identifying high-problem areas, measurement of officer productivity, tracking of citizen complaints, and for satisfying grant requirements. For a comprehensive traffic law enforcement data system, it may be necessary to collect more detailed data, such as the hours spent on traffic law enforcement relative to other law enforcement activities, the LEA's annual budget, the frequency with which certain traffic law enforcement strategies are used, as well as data on traffic law enforcement visibility. The data system should be an automated, standardized, and easy-to-use system in order to analyze the relationships of traffic law enforcement activities with the frequency, rate, and severity of traffic crashes, and to justify budgetary needs and requests.

Recommendations

It is essential to standardize definitions and provide rules for recording the data elements requested.

- Definitions must be descriptive enough to allow LEAs to collect the same information and be consistent in their reporting.
- Issues such as overlapping jurisdictions and joint agency enforcement efforts should be addressed with instructions on how these should be recorded into the system.
- Differences in State laws relative to LEA operational capabilities need to be considered.

The proposed data-collection system must be easy to use by the LEAs.

- Start with the simplest, most direct measures, such as DWI arrests, traffic stops, and if possible, officer hours on the roadway.
- Data should be tracked using an automated system.
- Make the data-collection task as easy as possible for participating LEAs. For example, set up the input system so that multiple individuals at

different localities from the same LEA can input data, negating or minimizing the need for a LEA to collect all the data before submission (a complaint during our data-gathering effort).

- A system that is easy to use will require less training and will generate fewer self-reporting errors for officers, and fewer reporting errors for system operators.

Complete data is more advantageous than partial data; however, it is not always possible to obtain complete data.

- Accept all data submitted.
- Decide on the system side whether to use partially complete data.

Actual data needs to be collected where it exists, but estimated data is preferable to no data.

- Accept estimated data when actual data is not available. The request for data could initially result in estimated data but could lead to LEA collection of the actual data.
- Designate estimated data as such to limit its use for some analyses.
- Discuss with LEAs how they arrived at estimated data.

Sampling

A random sample rather than a convenience sample is preferred, as is actual data rather than estimated data. It would be best to begin with a pilot study in a few states including jurisdictions that have existing data systems to help determine the desired output. Issues for consideration in sampling include LEA type, LEA size, and geographical size and population density of the jurisdiction served by the LEA. Other alternatives for a pilot study include obtaining the participation of all LEAs in one small State; requesting LEA participation only from jurisdictions that have existing data systems; using LEAs at the GES sites; or selecting a set of LEAs through random sampling.

The output required from the new system should be considered before designing the data-collection mechanism. Ideally, the data collection system would electronically capture the daily law enforcement activities of officers (and would automatically save the information to a database). Theoretically, this would allow for the automated aggregation of information, such as number of vehicle stops, citations, and locations so that agencies can have an accurate reporting of activities and resources. The proposed system may need to start by tracking data that is most common among participating agencies. Ease of use for participating LEAs is essential when designing a data-collection system.

Recommendations

Although a random sampling of LEAs is preferable to a convenience sample for most analyses, obtaining information from as many LEAs as possible has advantages.

- Convenience samples will allow more data to be collected initially and would be of some use, especially to participating LEAs. Consider agencies with different data collection systems and capabilities.
- Consider selecting the LEAs from the 60 GES sites because of the advantages: already nationally representative; crash data already available; on-the-road driver data already available (Lacey et al., 2009; Voas, Wells, Lestina, Williams, & Greene, 1998); cooperation from LEAs already obtained.
- Obtaining a nationally representative sample is an ideal, but may not be feasible.

Recruitment needs to remain an ongoing activity: Recruit initially and then retain the relationship with command officers at those LEAs. Command officers and command emphasis change and system participation needs to remain a priority.

Feasibility

Collecting traffic safety enforcement data from LEAs for a new data system is feasible, but initially it will be a difficult and complex task. According to LEA representatives from around the United States who participated in this project, it is feasible to collect at least minimum data on traffic law enforcement activities (see Table 1) at the police-agency level. However, some data elements are not readily available from many LEAs. The results of the limited pilot study showed that most of the participating agencies can feasibly track minimum data elements on staffing for the different enforcement activities, regularly used equipment, regularly employed enforcement strategies, contacts with drivers, violations issued, population areas covered during enforcement, and enforcement measures. A few of the LEAs were able to provide data on the use of special equipment or non-agency owned materials and special strategies employed such as advertisement of checkpoints and the use of red light cameras.

The analysis of the comprehensive data revealed a problem (also earlier discussed by LEA representatives during the meetings) of the lack of standardized definitions and recording of enforcement activities, because there was an overlap of activities recorded under traffic stops, enforcement measures, and violations issued. These enforcement categories will need to be clearly defined and classified in the proposed data system. Half of the participating LEAs were smaller agencies from Iowa and had the electronic capability to feasibly provide data on enforcement activities. An indication of the difficulty in collecting data is also demonstrated by the non-participation of half of the

agencies that initially acknowledged the availability of data, but did not participate in the two-month pilot study.

Recommendations

Costs, in terms of funding and resources, are an important issue.

- The initial cost to set up an agency to participate will be greater than out-year costs.
- Costs may vary greatly by agency due to:
  - Agency size (amount of data to be collected is greater for larger agencies), and
  - Existing data-collection systems and methods.
- It is important to identify benefits to LEAs:
  - Assist with obtaining grants and meeting reporting requirements,
  - Possibly receive automated analysis, and
  - An interactive system would allow LEAs to use the information internally, possibly promoting better data-collection efforts and better targeted traffic safety enforcement activities in their jurisdictions.

A pilot test should be conducted.

- A pilot test would help assess specific difficulties and assist with cost estimates to set up and run a new data system.
- The pilot test system might stand alone as a test system or eventually grow to become, or be incorporated into, the larger system.
- A pilot test of the system could determine the output NHTSA and other end users desire, and the input system could be designed accordingly and tested.
- A pilot test of the system could collect convenience samples to test the database. Those working on the program would learn about data availability and recruitment levels of effort.
- Pilot tests were used in the creation of FARS, NASS, and GES systems.

To summarize, there has long been a need for a way to track the resources and the specific activities used by LEAs to enforce traffic safety laws across the United States. It is feasible to collect at least the minimum monthly data elements directly from LEAs, and the technology exists to accomplish the task. Such a system will potentially allow highway safety officials to study the relationships between traffic enforcement resources and activities expended and the benefits to public safety and traffic management.

References

Borkenstein, R. F., Crowther, R. F., Shumate, R. P., Ziel, W. B., & Zylman, R. (1974). The role of the drinking driver in traffic accidents. *Blutalkohol, 11*(Supplement 1), 1-132.

Braver, E. R. (2003). Race, Hispanic origin, and socioeconomic status in relation to motor vehicle occupant death rates and risk factors among adults. *Accident Analysis and Prevention, 35*, 295-309.

Burgess, M. (2005). *Contrasting rural and urban fatal crashes 1994-2003* (DOT HS 809 896). Washington, DC: National Highway Traffic Safety Administration.

Caetano, R., & McGrath, C. (2005). Driving under the influence (DUI) among U.S. ethnic groups. *Accident Analysis and Prevention, 38*, 217-224.

Cameron, M. H., Newstead, S. V., Diamantopoulou, K., & Oxley, P. (2003). The interaction between speed camera enforcement and speed-related mass media publicity in Victoria, Australia. In A. f. t. A. o. A. Medicine (Ed.), *Annual Proceedings of the Association for the Advancement of Automative Medicine,* 47, 267-282.

de Waard, D., & Rooijers, T. (1994). An experimental study to evaluate the effectiveness of different methonds and intensities of law enforcement on driving speed on motorways. *Accident Analysis & Prevention, 26*, 751-765.

Decker, M. D., Graitcer, P. L., & Schaffner, W. (1988). Reduction in motor vehicle fatalities associated with an increase in the minimum drinking age. *The Journal of the American Medical Association, 260*, 3604-3610.

Dee, T. S. (2001). Does setting limits save lives? The case of 0.08 BAC Laws. *Journal of Policy Analysis and Management, 20*, 111-128.

Dula, C. S., Dwyer, W. O., & LeVerne, G. (2007). Policing the drunk driver: Measuring law enforcement involvement in reducing alcohol-impaired driving. *Journal of Safety Research, 38*, 267-272.

Eisenberg, D. (2001). *Evaluating the effectiveness of a 0.08% BAC limit and other policies related to drunk driving*. Stanford, CA: Stanford Institute for Economic Policy Research, Stanford University.

Elder, R. W., Shults, R. A., Sleet, D. A., Nichols, J. L., Zaza, S., & Thompson, R. S. (2002). Effectiveness of sobriety checkpoints for reducing alcohol-involved crashes. *Traffic Injury Prevention, 3*, 266-274.

Fell, J. C., Fisher, D. A., Voas, R. B., Blackman, K., & Tippetts, A. S. (2008). The relationship of underage drinking laws to reductions in drinking drivers in fatal crashes in the United States. *Accident Analysis and Prevention, 40*, 1430-1440.

Gruenewald, P., Treno, A., Taff, G., & Klitzner, M. (1997). *Measuring Community Indicators: A Systems Approach to Drug and Alcohol Problems*. Thousand Oaks, CA: Sage Publications.

Hakkert, A. S., Gitelman, V., Cohen, A., Doveh, E., & Umansky, T. (2001). The evaluation of effects on driver behavior and accidents of concentrated general enforcement on interurban roads in Israel. *Accident Analysis & Prevention, 33*, 43-63.

Harper, J. S., Marine, W. M., Garret, C. J., Lezotte, D., & Lowenstein, S. R. (2000). Motor vehicle crash fatalities: A comparison of Hispanic and non-Hispanic motorists in Colorado. *Annals of Emergency Medicine, 36*, 589-596.

Holder, H. (1998). *Alcohol and the Community: A Systems Approach to Prevention*. Cambridge, MA: Cambridge University Press.

Lacey, J. H., Kelley-Baker, T., Furr-Holden, D., Voas, R. B., Moore, C., Brainard, K., et al. (2009). *2007 National roadside survey of alcohol and drug use by drivers: methodology.* (DOT HS 811 237). Washington, DC: National Highway Traffic Safety Administration.

National Academy of Sciences. (1984). *55: A Decade of Experience* (Special Report 204). Washington, DC: National Academy of Sciences, Transportation Research Board, National Research Council.

National Center for Statistics and Analysis. (2005). *Traffic safety facts 2004: A compilation of motor vehicle crash data from the fatality analysis reporting system and the general estimates system*.(DOT HS 809 919). Washington, DC: National Highway Traffic Safety Administration,.

National Public Safety Information Bureau. (2008). *National Directory of Law Enforcement Administrators: Correctional Institutions and Related Agencies*. (44th ed.). Stevens Point, WI: Author.

Newstead, S. V., Cameron, M. H., & Leggett, L. M. (2001). The crash reduction effectiveness of a network-wide traffic police deployment system. *Accident Analysis and Prevention, 33*, 393-406.

O'Malley, P. M., & Wagenaar, A. C. (1991). Effects of minimum drinking age laws on alcohol use, related behaviors and traffic crash involvement among American youth: 1976-1987. *Journal of Studies on Alcohol, 52*, 478-491.

O'Neill, B., & Kyrychenko, S. Y. (2006). Use and misuse of motor vehicle crash death rates in assessing highway safety performance, Insurance Institute for Highway Safety. *Traffic Injury Prevention, 7*, 307-318.

Peck, R. C., Gebers, M. A., Voas, R. B., & Romano, E. (2008). The relationship between blood alcohol concentration, age, and crash risk. *Journal of Safety Research, 39*, 311-319.

Romano, E., Tippetts, A. S., & Voas, R. (2005). Fatal red light crashes: The role of race and ethnicity. *Accident Analysis and Prevention, 37*, 453-460.

Romano, E., Voas, R. B., & Tippetts, A. S. (2006). Stop sign violations: The role of race and ethnicity on fatal crashes. *Journal of Safety Research, 37*, 1-7.

Romano, E. O., Tippetts, A. S., & Voas, R. B. (2006). Language, income, education, and alcohol-related fatal motor vehicle crashes. *Journal of Ethnicity in Substance Abuse, 5*, 119-137.

Ross, H. L. (1982). Prevention and deterrence: The international experience. *Alcohol Health and Research World, 7*, 26-30, 39-43.

Ross, H. L. (1984). Social control through deterrence: Drinking-and-driving laws. *Annual Review of Sociology, 10*, 21-35.

Sivak, M. (2009). Homicide rate as a predictor of traffic fatality rate. *Traffic Injury Prevention, 10*, 511-512.

Vaa, T. (1997). Increased police enforcement effects on speed. *Accident Analysis & Prevention, 29*, 373-385.

Voas, R. B. (2008). A new look at NHTSA's evaluation of the 1984 Charlottesville Sobriety Checkpoint Program: Implications for current checkpoint Issues. *Traffic Injury Prevention, 9*, 22-30.

Voas, R. B., Fell, J. C., Tippetts, A. S., Blackman, K., & Nichols, J. (2007). Impact of primary safety belt laws on alcohol-related front-seat occupant fatalities: Five case studies. *Traffic Injury Prevention, 8*, 232-243.

Voas, R. B., & Hause, J. M. (1987). Deterring the drinking driver: The Stockton experience. *Accident Analysis and Prevention, 19*, 81-90.

Voas, R. B., Holder, H. D., & Gruenewald, P. J. (1997). The effect of drinking and driving interventions on alcohol-involved traffic crashes within a comprehensive community trial. *Addiction, 92*(Supplement 2), S221-S236.

Voas, R. B., Tippetts, A. S., & Fell, J. (2003). Assessing the effectiveness of minimum legal drinking age and zero tolerance laws in the United States. *Accident Analysis and Prevention, 35*, 579-587.

Voas, R. B., Tippetts, A. S., & Fell, J. C. (2000). The relationship of alcohol safety laws to drinking drivers in fatal crashes. *Accident Analysis and Prevention, 32*, 483-492.

Voas, R. B., Tippetts, A. S., & Fisher, D. A. (2000). *Ethnicity and alcohol-related fatalities: 1990 to 1994* (DOT HS 809 068). Washington, DC: National Highway Traffic Safety Administration. Retrieved from http://www.nhtsa.dot.gov/people/injury/alcohol/ethnicity/ethnicity.html

Voas, R. B., Wells, J., Lestina, D., Williams, A., & Greene, M. (1998). Drinking and driving in the United States: The 1996 National Roadside Survey. *Accident Analysis and Prevention, 30*, 267-275.

Wagenaar, A., Maldonado-Molina, M., Ma, L., Tobler, A., & Komro, K. (2007). Effects of legal BAC limits on fatal crash involvement: Analyses of 28 states from 1976 through 2002. *Journal of Safety Research, 38*, 493-499.

Wagenaar, A. C., & Maldonado-Molina, M. M. (2007). Effects of drivers' license suspension policies on alcohol-related crash involvement: Long-term follow-up in forty-six states. *Alcoholism: Clinical and Experimental Research, 31*, 1399-1406.

Winnicki, J. (1995). *Safety belt use laws: Evaluation of primary enforcement and other provisions* (DOT HS 808 324). Washington, DC: National Highway Traffic Safety Administration.

Womble, K. (1989). Impact of minimum drinking age laws on fatal crash involvements: An update of the NHTSA analysis. *Journal of Traffic Safety Education, 37*, 4-5.

Yannis, G., Antoniou, C., & Papadimitriou, E. (2007). Road casualities and enforcement: Distributional assumptions of serially correlated court data. *Traffic Injury Prevention, 8*, 300-308.

Appendix

Comprehensive Data Collection Protocol

Comprehensive Data Collection Protocol

Traffic Law Enforcement Activities

Agency Response Summary

18 PARTICIPATING AGENCIES

Environment

1. Population area covered by your agency: **18 of the 18 agencies responded**
2. Number of registered vehicles in area covered by your agency: **12 of the 18 agencies responded**
3. Average daily traffic in area covered by your agency: **10 of the 18 agencies responded**
4. Other information concerning traffic enforcement: **12 of the 18 agencies responded**

Resources

5. Number of staff members in law enforcement agency:

Sworn Officers	**18 of the 18 agencies responded**
Civilians	**18 of the 18 agencies responded**
Cadets	**18 of the 18 agencies responded**
Auxiliary	**18 of the 18 agencies responded**
Volunteers	**18 of the 18 agencies responded**
Patrol	**18 of the 18 agencies responded**
Investigatory	**18 of the 18 agencies responded**
Administrative	**18 of the 18 agencies responded**

KEY: AD = actual data ED = estimated data NA = not currently available AC = able to be collected if directed

Others (specify) **18 of the 18 agencies responded**

Number of officers who conduct traffic law enforcement: **16 of the 18 agencies responded**

KEY: AD = actual data ED = estimated data NA = not currently available AC = able to be collected if directed

Number of officers who make traffic stops (authorized to make a traffic stop and can arrest or cite a driver for a traffic offense): **17 of the 18 agencies responded**

Number of officers in a dedicated traffic unit: **15 of the 18 agencies responded**

Number of hours all officers typically spend on traffic law enforcement this month (traffic patrol hours, time in court, time preparing for court): **12 of the 18 agencies responded**

Number of vehicles typically used when conducting traffic law enforcement: **16 of the 18 agencies responded**

Routine *(Normal day activities)***:**

13 of the 18 agencies responded *"MARKED"*

10 of the 18 agencies responded *"UNMARKED"*

8 of the 18 agencies responded *"BOTH"*

1 of the 18 agencies responded *"MOTORCYCLES"*

Special Events *(Holiday or local events [e.g., football games])*

11 of the 18 agencies responded *"MARKED"*

6 of the 18 agencies responded *"UNMARKED"*

3 of the 18 agencies responded *"BOTH"*

6. Agency's annual operating budget:
12 of the 18 agencies responded

7. Amount of funding from grants received and used by your agency in traffic law enforcement in the past three years: (Please write in the $ amounts followed by the categories AD / ED / NA / AC.)

	2008	2007	2006
a. Local	$ **4 of the 18 agencies responded**	**4 of the 18 agencies responded**	**5 of the 18 agencies responded**

KEY: AD = actual data ED = estimated data NA = not currently available AC = able to be collected if directed

b. State	$	**14 of the 18 agencies responded**	**14 of the 18 agencies responded**	**12 of the 18 agencies responded**
c. Federal	$	**10 of the 18 agencies responded**	**8 of the 18 agencies responded**	**7 of the 18 agencies responded**

8. Equipment resources used by your agency; please indicate ownership of these items:

EQUIPMENT USED BY THIS AGENCY	PLEASE PROVIDE A DESCRIPTION / IF NECESSARY, PLEASE EXPLAIN	# AGENCY OWNED (AD / ED / NA / AC)	# OWNED BY OTHERS (AD / ED / NA / AC)
a. Evidential Breath Testers	**16 of the 18 agencies responded**	**14 of the 18 agencies responded**	**8 of the 18 agencies responded**
b. Preliminary Breath Testers	**14 of the 18 agencies responded**	**15 of the 18 agencies responded**	**4 of the 18 agencies responded**
c. Passive Alcohol Sensors	**8 of the 18 agencies responded**	**7 of the 18 agencies responded**	**4 of the 18 agencies responded**
d. In-vehicle Video Cameras	**13 of the 18 agencies responded**	**17 of the 18 agencies responded**	**4 of the 18 agencies responded**
e. In-station Video Cameras for DWI/DUI offenders	**14 of the 18 agencies responded**	**13 of the 18 agencies responded**	**4 of the 18 agencies responded**
f. Speed Measuring Devices - Please specify device and describe (*e.g.* LIDAR, Automated Cameras, Stationary Devices): **3 of the 18 agencies responded**	**17 of the 18 agencies responded**	**15 of the 18 agencies responded**	**4 of the 18 agencies responded**

KEY: AD = actual data ED = estimated data NA = not currently available AC = able to be collected if directed

g. Mobile Data Terminal (MDT) / Laptops - Please specify the number in vehicles/in the Station: **3 of the 18 agencies responded /**	**14 of the 18 agencies responded**	**14 of the 18 agencies responded**	**4 of the 18 agencies responded /**
h. Number of MDTs/laptops that have Internet Access: **14 of the 18 agencies responded**	**11 of the 18 agencies responded**	**13 of the 18 agencies responded**	**4 of the 18 agencies responded**
EQUIPMENT USED BY THIS AGENCY	**PLEASE PROVIDE A DESCRIPTION / IF NECESSARY, PLEASE EXPLAIN**	**# AGENCY OWNED (AD / ED / NA / AC)**	**# OWNED BY OTHERS (AD / ED / NA / AC)**
i. Marked Units: **3 of the 18 agencies responded**	**12 of the 18 agencies responded**	**15 of the 18 agencies responded /**	**4 of the 18 agencies responded /**
j. Unmarked Units: **3 of the 18 agencies responded /**	**12 of the 18 agencies responded**	**14 of the 18 agencies responded**	**4 of the 18 agencies responded**
k. Motorcycles: **3 of the 18 agencies responded /**	**10 of the 18 agencies responded**	**12 of the 18 agencies responded /**	**4 of the 18 agencies responded**
l. Aerial – Please specify type (e.g., planes, helicopters, drones): **3 of the 18 agencies responded**	**7 of the 18 agencies responded**	**10 of the 18 agencies responded**	**4 of the 18 agencies responded**

KEY: AD = actual data ED = estimated data NA = not currently available AC = able to be collected if directed

m.	Special Vehicles - Please specify type (*e.g.* BAT mobile, boats, trailers): **5 of the 18 agencies responded**	**13 of the 18 agencies responded**	**13 of the 18 agencies responded**	**3 of the 18 agencies responded**
n.	Other - *e.g., bicycles, horses, segways [electronic stand-up scooters]*: **5 of the 18 agencies responded**	**13 of the 18 agencies responded**	**9 of the 18 agencies responded**	**3 of the 18 agencies responded**

KEY: AD = actual data ED = estimated data NA = not currently available AC = able to be collected if directed

Methods and Frequency

9. Traffic enforcement methods used by your agency.

KEY FOR TABLES BELOW:

Indicate for "Type" *R = roving* *S = stationary* *B = both*

The frequencies in the table below are defined as follows (please check all that apply):

a. Daytime (6 a.m. – 6 p.m.)
b. Nighttime (6 p.m. – 6 a.m.)
c. Daily
d. 2 – 3 times/week
e. Weekly
f. 2 – 3 times/month
g. Monthly
h. 2 – 3 times/year
i. Once a year

KEY: **AD** = *actual data* **ED** = *estimated data* **NA** = *not currently available* **AC** = *able to be collected if directed*

KEY: **AD = actual data** **ED = estimated data** **NA = not currently available** **AC = able to be collected if directed**

METHOD	TYPE	DEFINITION OR DESCRIPTION
TRADITIONAL TRAFFIC PATROL	R/S/B	AGENCY DEFINITION OR DESCRIPTION
Vehicle	**18 of the 18 agencies responded**	**5 of the 18 agencies responded**
Motorcycle	**10 of the 18 agencies responded**	**3 of the 18 agencies responded**
Bicycle	**11 of the 18 agencies responded**	**4 of the 18 agencies responded**
Foot	**7 of the 18 agencies responded**	**3 of the 18 agencies responded**
Mounted	**4 of the 18 agencies responded /**	**1 of the 18 agencies responded**
Other (e.g. Marine, Aerial): Helicopters, fixed wing aircraft	**5 of the 18 agencies responded**	**3 of the 18 agencies responded**

SPECIAL TRAFFIC ENFORCEMENT	R/S/B	AGENCY DEFINITION OR DESCRIPTION
IMPAIRED DRIVING		
Checkpoints - Sobriety or vehicle safety checks used to locate impaired drivers. Systematic stopping of vehicles to check driver's sobriety.	**12 of the 18 agencies responded**	**9 of the 18 agencies responded**
Saturation Patrols - Concentrated enforcement activity in high-volume crash or DUI arrest areas.	**16 of the 18 agencies responded**	**12 of the 18 agencies responded**
Roving Patrols - Dedicated patrols specifically looking for impaired drivers.	**16 of the 18 agencies responded**	**11 of the 18 agencies responded**
Underage Drinking Enforcement - Compliance checks at alcohol outlets. Shoulder -tap activities outside alcohol outlets. Breaking up underage drinking parties and not allowing any drinking youth to drive.	**13 of the 18 agencies responded**	**11 of the 18 agencies responded**
Other (please specify): **1 of the 18 agencies responded**	**3 of the 18 agencies responded**	**3 of the 18 agencies responded**

SPECIAL TRAFFIC ENFORCEMENT	R/S/B	AGENCY DEFINITION OR DESCRIPTION
OCCUPANT RESTRAINTS		
Seat Belt / Child Seat Checkpoints	**15 of the 18 agencies responded**	**7 of the 18 agencies responded**
SPEED		
Speed Detection	**16 of the 18 agencies responded**	**8 of the 18 agencies responded**
Cameras	**5 of the 18 agencies responded**	**1 of the 18 agencies responded**
OTHER TRAFFIC ENFORCEMENT		
Motorcycle Helmets	**5 of the 18 agencies responded**	**5 of the 18 agencies responded that their State does not have a helmet law**
Enforcement Zones	**9 of the 18 agencies responded**	**3 of the 18 agencies responded**
Red Light Cameras	**6 of the 18 agencies responded**	**3 of the 18 agencies responded**
Aggressive Driving Detection	**10 of the 18 agencies responded**	**4 of the 18 agencies responded**
Mobile Awareness Patrols	**5 of the 18 agencies responded**	**1 of the 18 agencies responded**
Other Traffic Enforcement Methods	**4 of the 18 agencies responded**	**5 of the 18 agencies responded**

SPECIAL EVENTS Please specify (e.g., special patrols for sporting events, local celebration days, etc.)	R/S/B	AGENCY DEFINITION OR DESCRIPTION (Please note: Do not include mobilization programs that are in the next section.)
10 of the 18 agencies responded	**4 of the 18 agencies responder**	**3 of the 18 agencies responded**

Methods and Frequency

10 Select ("X") the traffic law enforcement activities performed by your agency:

Impaired driving **18 of the 18 agencies responded**

Safety belt use enforcement **18 of the 18 agencies responded**

Speeding driving **18 of the 18 agencies responded**

Aggressive driving **14 of the 18 agencies responded**

11 Number of other law enforcement agencies operating within your jurisdiction: **13 of the 18 agencies responded**

Collaboration with other law enforcement agencies on traffic enforcement activities*:*

1 of the 18 agencies responded 'No'

If "yes" please specify the activities by indicating how often this occurs	**Frequency (e.g., monthly, quarterly, not on any regular basis, rarely)**
Checkpoints **10 of the 18 agencies responded**	**13 of the 18 agencies responded**
Saturation Patrols **7 of the 18 agencies responded**	**11 of the 18 agencies responded**
Other traffic enforcement (please specify) **7 of the 18 agencies responded**	**10 of the 18 agencies responded**

12. Number of times that your agency participated in the following activities over the past three years followed by category (AD, etc.):

	2008	2007	2006
Seat Belt Campaigns (e.g., Click It or Ticket)?	**16 of the 18 agencies responded**	**15 of the 18 agencies responded**	**14 of the 18 agencies responded**
Impaired Driving Campaigns (e.g., *Over the Limit, Under Arrest; You Drink and Drive, You Lose)?*	**16 of the 18 agencies responded**	**15 of the 18 agencies responded**	**14 of the 18 agencies responded**
Child Safety Seat Programs (e.g., *Special Traffic Enforcement Programs (STEPS); Traffic Occupant Protection Strategies* Training)?	**12 of the 18 agencies responded**	**13 of the 18 agencies responded**	**14 of the 18 agencies responded**

13. Enforcement measures(impaired driving enforcement activities) this month:

a. Officer hours spent this month **13 of the 18 agencies responded**

b. Number of traffic stops this month **14 of the 18 agencies responded**

c. Vehicles passing through sobriety checkpoints this month **12 of the 18 agencies responded**

d. Drivers checked at sobriety checkpoints this month **9 of the 18 agencies responded**

e. Number of equipment violations this month **13 of the 18 agencies responded**

f. DWI/DUI arrests this month **17 of the 18 agencies responded**

g. Drug-impaired driving (DUID) citations/arrests this month **14 of the 18 agencies responded**

h. Open container citations this month **15 of the 18 agencies responded**

i. Underage drinking violations this month **15 of the 18 agencies responded**

14. Enforcement measures (**safety restraint enforcement** activities) this month :

a. Officer hours spent this month **14 of the 18 agencies responded**

b. Traffic stops this month **14 of the 18 agencies responded**

c. Vehicles passing through seat belt checkpoints this month: **10 of the 18 agencies responded**

d. Seat belt citations issued this month **17 of the 18 agencies responded**

e. Child restraint citations issued this month **16 of the 18 agencies responded**

f. Motorcycle helmet violations issued this month **10 of the 18 agencies responded**

15. Enforcement measures(**speed enforcement** activities) this month :

a. Officer hours spent this month **13 of the 18 agencies responded**
1 of the 18 agencies responded that their agency does not track this

b. Traffic stops this month **12 of the 18 agencies responded**
1 of the 18 agencies responded that their agency does not track this

c. Speeding citations this month **12 of the 18 agencies responded**

d. Reckless driving citations issued this month **13 of the 18 agencies responded**

e. Aggressive driving citations this month **8 of the 18 agencies responded**

f. Negligent driving citations this month **7 of the 18 agencies responded**

16. Other traffic citations this month: **12 of the 18 agencies responded** Type (red light, stop sign, etc.) **6 of the 18 agencies responded**

17. Criminal arrests at traffic stops or checkpoints this month: **7 of the 18 agencies responded**
1 of the 18 agencies responded that their agency does not track this

18. Crashes investigated and reported this month: **13 of the 18 agencies responded**

19. Calls for service this month: **13 of the 18 agencies responded**

Visibility

20. Use of high-visibility vests this month*:*

16 of the 18 agencies responded *"YES"*

1 of the 18 agencies responded *"NO"*

Officers required to wear them*:*

12 of the 18 agencies responded *"YES"*

0 of the 18 agencies responded *"NO"*

21. Checkpoints are advertised in the media:

11 of the 18 agencies responded *"ALWAYS"*

1 of the 18 agencies responded *"USUALLY"*

3 of the 18 agencies responded *"OCCASSIONALLY"*

1 of the 18 agencies responded *"NEVER"*

1 of the 18 agencies responded *"DEPENDS ON THE TYPE OF CHECKPOINT"*

22. Agency is required to announce checkpoints to the media:

9 of the 18 agencies responded *"YES"*

4 of the 18 agencies responded *"NO"*

3 of the 18 agencies responded *"DEPENDS ON CERTAIN DETERMINING FACTORS"*

1 of the 18 agencies responded *"FOR SOBRIETY, YES; FOR SAFETY, NO"*

23. Agency uses signs announcing checkpoints *(circle one)*:

13 of the 18 agencies responded *"ALWAYS"*

1 of the 18 agencies responded *"USUALLY"*

2 of the 18 agencies responded *"OCASSIONALLY"*

1 of the 18 agencies responded *"NEVER"*

24. Agency has placards or decals on the side of police cruisers or trailers (*e.g.,* saying "DUI Enforcement" or "Speed Enforcement":

2 of the 18 agencies responded *"ALWAYS"*

1 of the 18 agencies responded *"USUALLY"*

2 of the 18 agencies responded *"OCASSIONALLY"*

11 of the 18 agencies responded *"NEVER"*

1 of the 18 agencies responded *"ALWAYS FOR DUI CHECKPOINTS; NEVER FOR SPEED ENFORCEMENT"*

25. Agency uses Variable Electronic Message Signs announcing enforcement activities:

4 of the 18 agencies responded *"ALWAYS"*

1 of the 18 agencies responded *"USUALLY"*

7 of the 18 agencies responded *"OCASSIONALLY"*

3 of the 18 agencies responded *"NEVER"*

26. Agency uses speed trailers or speed display signs:

10 of the 18 agencies responded *"ALWAYS"*

3 of the 18 agencies responded *"USUALLY"*

4 of the 18 agencies responded *"OCASSIONALLY"*

27. Agency has Speed Camera Warning signs:

0 of the 18 agencies responded *"YES"*

0 of the 18 agencies responded *"NO, BUT WE USE SPEED CAMERAS"*

18 of the 18 agencies responded *"NO, WE DON'T USE SPEED CAMERAS"*

Data Records

28. Data recorded regarding agency traffic enforcement *activities (specify):*

12 of the 18 agencies responded

29. Purpose for data records *(specify)*:

10 of the 18 agencies responded

30. Indicate with an "X" if your agency has electronic records

14 of the 18 agencies responded that their agency has electronic records

Please specify format, software [e.g., TraCS] if proprietary/agency-specific, etc.

9 of the 18 agencies specified the format of their electronic records

Do you have access to these electronic data files?

12 of the 18 agencies responded *"YES"*

2 of the 18 agencies responded *"NO"*

Are they available to the public?

6 of the 18 agencies responded *"YES"* **7 of the 18 agencies responded** *"NO"*

31. Paper records of other traffic enforcement activities *(please specify)*:

14 of the 18 agencies responded "

Available to the public *(circle one)*:

12 of the 18 agencies responded *"YES"*

3 of the 18 agencies responded *"NO"*

DOT HS 811 447
April 2011

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

www.nhtsa.gov