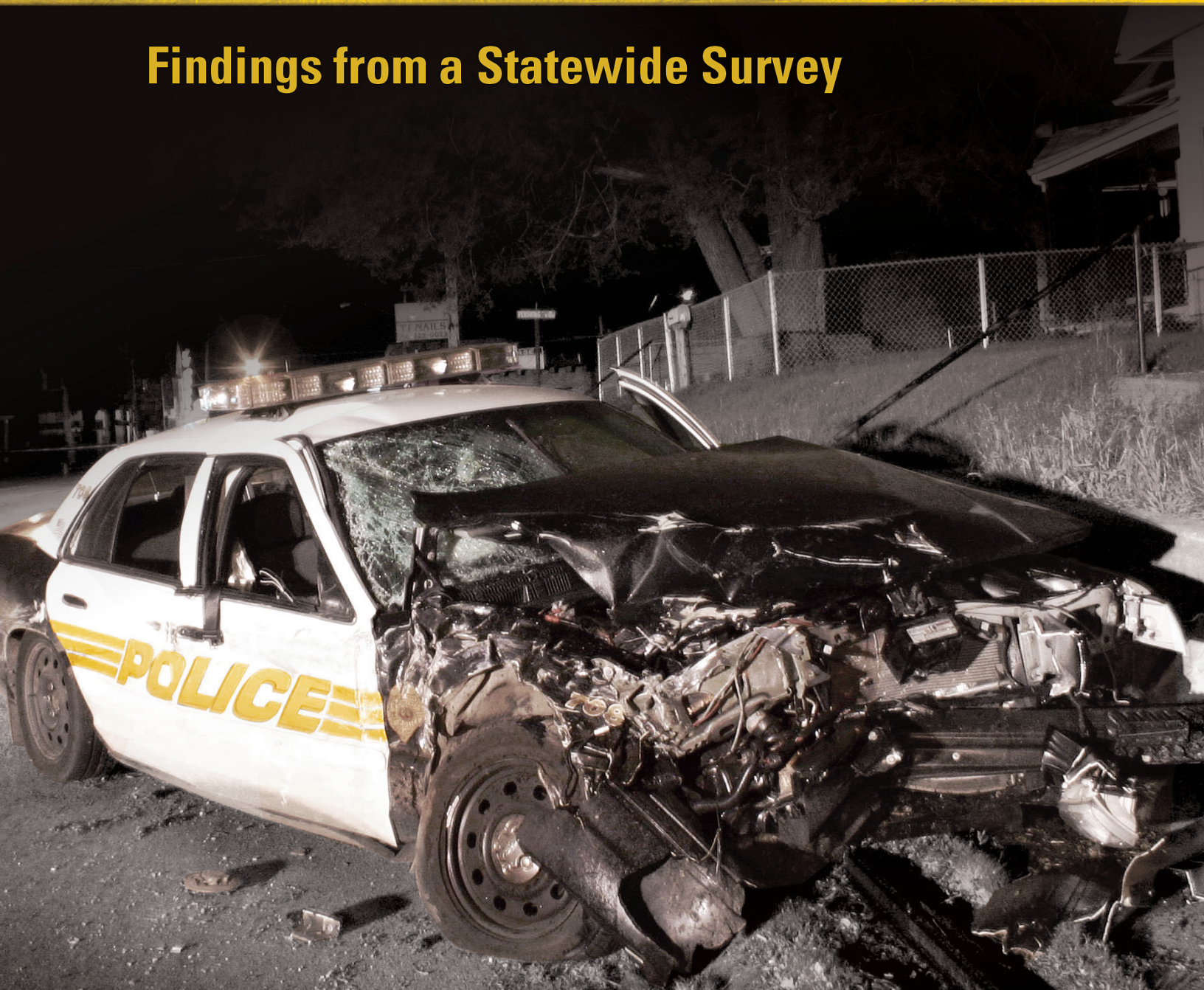


LAW ENFORCEMENT OFFICER MOTOR VEHICLE SAFETY

Findings from a Statewide Survey



Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



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Executive Summary

Research on occupational motor-vehicle operations has largely focused on transportation workers. Significant gaps exist in the research among emergency service personnel, including law enforcement officers (LEOs). Even though motor-vehicle crashes are the leading cause of occupational fatality among LEOs, data on current motor-vehicular injury and crash trends are scant. Unfortunately, the limited availability of data makes it difficult to develop evidence-based prevention programs.

To further our understanding of motor-vehicle operations among LEOs, the National Institute for Occupational Safety and Health (NIOSH) sponsored a statewide survey on officers' thoughts about and experiences with motor-vehicle-related incidents. The survey was conducted in Iowa in 2011 and included a random sample of 60 law enforcement agencies and nearly 1,500 sworn LEOs. Iowa was chosen because of pre-existing relationships with various law enforcement entities. Respondents were queried on a wide range of topics: motor-vehicle crashes and roadside incidents (being struck by or nearly struck by a moving vehicle), seat belt usage, written motor-vehicle policies, and frequency and type of occupational motor-vehicle training.

Key Findings—Training

- Nearly all Iowa LEOs reported receiving some type of in-service training annually (93%); however, only 29% received any type of motor-vehicle training. The most common type of motor-vehicle training was related to the reading and understanding of written motor-vehicle policy. Approximately one-third of officers reported hands-on motor-vehicle training like pursuit driving (37%), use of driving course (38%), or emergency vehicle operation courses (EVOC) (35%).
- Iowa State Patrol officers and those in large agencies (51 or more officers) were significantly more likely to report regular in-service training on motor-vehicle operations.
- Nearly all Iowa LEOs believed that driver training is critical to their safety in the field (96%). Also, only half of Iowa LEOs believed that driver training provided at law enforcement academies adequately prepares officers to safely function in the field, and 12% believed that the average academy recruit has sufficient driving skills to operate a law enforcement vehicle.

Key Findings—Policies

- Ninety percent of Iowa LEOs reported their agency had a written motor-vehicle policy, general order, or standard operating procedure; however, only 66% received formal training on the policy. Officers who worked daytime hours, Iowa State Patrol officers, and those from medium or large agencies (at least 21 officers) were more likely to have been trained on this policy than their counterparts.

- The most common element of agency-written motor-vehicle policies was a seatbelt requirement for drivers (82%). The two least common elements were speed restriction when using lights/siren (27%) and restricting use of cell phones/mobile devices (39%).

Key Findings—Motor-vehicle Crashes and Roadside Incidents

- Twenty percent of Iowa LEOs were in at least one motor-vehicle crash in the prior 3 years. As officers' time in law enforcement increased, the probability of experiencing a motor-vehicle crash significantly decreased.
- Most motor-vehicle crashes occurred during daylight (49%), in clear weather (70%), during non-emergency calls (64%), and at speeds lower than 50 mph (79%). Most officers reported wearing a seatbelt at the time of the crash (93%).
- Sixteen percent of Iowa LEOs reported being struck by or nearly struck by a motor vehicle at a roadside incident in the prior 3 years. Iowa State Patrol officers, officers from small agencies (20 or fewer officers), patrol officers, and those working nighttime hours were significantly more likely to report a roadside incident in the prior 3 years. Law enforcement experience was not associated with fewer roadside incidents.
- The majority of roadside incidents occurred during daylight (60%) and in clear weather conditions (60%). Nearly half of roadside incidents occurred during a traffic stop (47%).

Recommendations

Training

- Regularity in in-service motor-vehicle training varied statewide. Iowa agencies could consider policies to ensure periodic motor-vehicle training, especially among agencies with fewer than 20 officers. One study conducted by the California Commission on Peace Officer Standards and Training found that behind-the-wheel motor-vehicle training resulted in the fewest collisions if conducted every 2 years [CalPOST 2009]. While this research finding needs to be replicated in other studies, our study results indicate that Iowa officers desire more behind-the wheel motor-vehicle training.
- Approaches for improving the frequency and quality of motor-vehicle training could include the development of a statewide training network, sharing of human and material resources across agencies, identification of fixed training sites, and the utilization of mobile driving simulators.
- Only half of officers believed that driver training at the academy level adequately prepared officers for driving in the field. Since the majority

of officers in our study attended the Iowa Law Enforcement Academy, we suggest that the state of Iowa conduct an analysis of their state-based training programs to assess the consistency and effectiveness of their motor-vehicle training efforts. The state could consider expanding hours of motor-vehicle training and providing more opportunities for hands-on training. Also, to ensure that seatbelt safety practices become second nature for new officers, the state could continue to stress the importance of wearing a seatbelt and the practices associated with buckling/unbuckling while wearing full gear.

Policy

- One of the least common components of written motor-vehicle policies was restrictions on cell phone use. Research among commercial drivers shows that cell phone use significantly degrades driver performance, leading to an increased risk for crash. Several large agencies have instituted policies to reduce distractions in law enforcement vehicles. While the impact of these policies on officer-involved crashes has not been scientifically evaluated, state-level cell phone bans appear to significantly reduce fatal crash rates. Based on the current available evidence, agencies should consider implementing similar policies that restrict the use of cell phones while officers are engaged in driving tasks.
- Another uncommon component of written motor-vehicle policies was speed restriction. Both the National Highway Traffic Safety Administration and California Commission of Peace Officer Standards and Training found that “driving too fast for conditions or in excess of posted speed” was a leading factor in many officer-involved crashes. Agencies have implemented or revised their speed-cap policies. Again, the impact of these policies has not been scientifically evaluated. Until stronger evidence becomes available, agencies should consider implementing similar policies that restrict speed.

Use of Personal Protective Equipment

- Eighty-one percent of Iowa LEOs reported wearing a seatbelt while driving a patrol car and 77% when riding as a front-seat passenger. Agencies should strive to get to 100% by implementing policies and supporting officers in the wearing of seatbelts.
- Between 4%–10% of Iowa LEOs reported regularly wearing reflective gear while outside of a patrol car. The wearing of high-visibility personal protective equipment can significantly reduce an officer’s chances of being struck on the roadway. Agencies should encourage officers to wear high-visibility apparel whenever they work in the vicinity of moving vehicles.
- Officers with more law enforcement experience were less likely to have had a motor-vehicle crash in the prior 3 years, more likely to

view driving as a dangerous job activity, and more likely to practice safe driving techniques. Agencies could consider implementing a more formal mentoring program that may help to change the agency's driving culture. Formal mentoring programs in law enforcement have been found to lead to higher job satisfaction and a stronger work ethic.

- Agencies could also consider adding into driving safety training, the personal testimonies of their own officers who have been involved in motor-vehicle crashes. This approach is used in popular programs like Below 100 and the Street Survival Seminar, which utilize personal stories of officers who were involved in critical incidents. Peer-reviewed literature suggests that personal stories can have a large impact on workers of all backgrounds.
- Motor-vehicle-related events have an enormous impact on officer safety and health. Many large U.S. agencies have implemented changes to motor-vehicle-related policies and training agendas to better protect their officers from the risk of motor-vehicle events. We suggest that agencies of all sizes consider adopting the recommendations in this report.

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List of Abbreviations

CPS	Current Population Survey
EVOC	emergency vehicle operations course
LEO	law enforcement officer
NHTSA	National Highway Traffic Safety Administration
NIOSH	National Institute for Occupational Safety and Health
SOP	standard operating procedure

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1. Survey Background

Motor-vehicle-related incidents are the leading cause of occupational injury death in the United States and have a devastating impact on workers, their families, and businesses. In 2010, motor-vehicle-related events accounted for approximately two out of every five fatal work injuries in the United States [BLS 2011a]. Non-fatal motor-vehicle crashes can result in serious long-term injuries, permanent disabilities, and costly medical care. To date, the bulk of occupational motor-vehicle research has focused on transportation workers, such as truck drivers. Notably absent has been research addressing the safety of law enforcement officers (LEOs) who not only spend a significant amount of time behind the wheel, but often drive in dangerous weather and high-speed conditions.

Law enforcement work remains a dangerous occupation. In 2010, the fatality rate for police was five times higher than the national average (18.1 per 100,000 workers versus 3.6) [BLS 2011b]. While officer safety is a principal consideration of law enforcement, motor-vehicle safety has been overlooked. This is surprising given that motor-vehicle fatality rates for police are comparable to rates in other high-risk occupations such as transportation workers [Tiesman et al. 2011]. Regarding non-fatal motor-vehicle crashes, the California Commission on Peace Officer Standards and Training show that on a statewide annual basis, more than 100 officer injury collisions occur for each fatal collision [Gustafson and Cappitelli 2010].

Recent research identified low seatbelt usage among officers and an association between crash risk and unsafe driving behaviors such as driving too fast for conditions. These findings have led many agencies to conclude that wide-spread cultural change is needed [NHTSA 2011; CalPOST 2009]. However, research into current injury and crash trends is scant, and the development of evidence-based prevention programs has been limited by a lack of risk factor data. The law enforcement community recognizes that motor-vehicle crashes are an important and preventable form of occupational death; however, they have little evidence on how to best prevent them. To further understand motor-vehicle operations and crashes among LEOs, the National Institute for Occupational Safety and Health (NIOSH) sponsored a statewide survey from September 2011 to December 2011 in the state of Iowa.

2. Survey Methods

The survey of Iowa law enforcement officers was conducted from September 2011 to December 2011 and respondents were queried about the following:

- Socio-demographics, such as gender, age, race, ethnicity, and education level
- Occupational characteristics, including rank, division, officer certification, years on the job, shift worked, hours worked, agency size, and type of agency
- Motor-vehicle-related training, including regular in-service training and driver training provided at the Iowa State Police Academy
- Motor-vehicle operation policies, general orders, and standard operating procedures (SOPs)
- On-duty driving characteristics and behaviors, including type of vehicle driven, amount of time driving, seatbelt usage, and barriers to seatbelt usage
- Occupational safety practices, including safe driving techniques, wearing reflective gear, and wearing of ballistic vests
- Perceptions of injury or fatality risk associated with assaults, weapons, motor-vehicle crashes, and roadside incidents
- Motor-vehicle crashes and roadside incidents (being struck by or nearly struck by a moving vehicle) in the prior 3 years

Process for Selecting Agencies to Participate in the Survey

At the time of the survey, Iowa's 99 counties had approximately 400 law enforcement agencies, including 98 county sheriff's departments, 292 municipal departments, and 400 state patrol officers (discoverpolicing.org). The survey sample was developed in 2010 using publically accessible online resources (discoverpolicing.org, usacops.com, Wikipedia, iowa.gov). A list of all Iowa law enforcement agencies was compiled and stratified by type of agency (municipal, sheriff, state patrol) and size (small = 20 or fewer officers, medium = 21–50 officers, large = 51 or more officers). Random numbers were assigned to each agency and a simple random sample was drawn using Statistical Analysis Software, version 9.2 (SAS Institute, Cary, North Carolina). A total of 162 agencies were selected—103 municipal and 58 sheriff departments. Though not selected randomly, the Iowa State Patrol was included in the sample. When active recruitment began, 26 agencies (2 sheriff and 24 municipal departments) were no longer active. These were removed from the study sample, leaving a total of 136 agencies (Iowa State Patrol, 56 sheriff, 79 municipal).

Recruitment and Data Collection

The research study was approved by the NIOSH Human Subjects Research Board and the U.S. Government Office of Management and Budget. A variety of

recruitment activities were directed at the head of the agency to gain agency participation. Phone calls were made to the head of each agency, followed by mailing a study packet that included a cover letter, “frequently asked questions,” and flyer. Recruitment emails were also sent. Of the 136 agencies, 60 agreed to participate (32 municipal, 27 sheriffs, and the Iowa State Patrol). The overall agency response rate was 44%. Of the participating agencies, 4 were large, 28 medium, and 27 small.

Survey Development

The survey comprised six sections: (1) demographics, (2) occupational characteristics, (3) motor-vehicle safety training, (4) motor-vehicle policies, (5) occupational safety behaviors, and (6) motor-vehicle crashes/roadside incidents. Sections were derived using existing validated tools when possible. Items on demographics and occupational characteristics came from the questionnaire used in the Buffalo Police Health Study [Violanti 2000]. Questions on motor-vehicle safety training, occupational driving safety behaviors, and motor-vehicle crashes/roadside incidents came from the National Highway Traffic Safety Administration’s (NHTSA’s) Motor Vehicle Occupant Safety Survey [NHTSA 2008]. Questions on motor-vehicle policies and overall occupational safety behaviors were derived from the POST Driver Training Study, a study of vehicle operations and driver training among California officers [CalPOST 2009] conducted by the California Commission on Peace Officer Standards and Training. Questions on officers’ perceptions of risk were independently developed for this study by the authors. The entire survey was pilot-tested and peer-reviewed prior to use in the field.

Data Collection and Management

Study packets, including an introduction letter, paper-and-pencil survey, and self-addressed stamped envelope, were delivered to the head of each participating agency. Questionnaires were coded with a unique alpha-numeric string mapped to each agency, but not to individual officers. These codes were used to monitor survey returns by agency. Agency heads determined how best to distribute surveys to their officers, including hand-delivery and distributing at shift change, weekly staff meetings, or daily briefings. Officers used the self-addressed, postage-paid envelopes to return completed surveys directly to researchers. Four weeks after the distribution of the surveys, agency leadership was told of the number of non-responders and asked to remind officers to return surveys. Additional surveys were left with agencies for this purpose.

Participation Rate

The participation rate was calculated by dividing the number of received surveys (whether complete or not) by the total number (provided by agency leadership) of sworn officers in each participating agency. Using this formula, the participation rate was 79% ($1,157 \div 1,466$).

Data Analysis

The study findings describe Iowa officers by law enforcement experience, agency size, history of motor-vehicle crashes and roadside incidents, perceptions of occupational

risks, as well as their agency's policies for motor-vehicle training and other aspects of motor-vehicle safety. These outcomes were examined separately by gender, age, education, and job characteristics (rank, agency size, type of agency, division, length of shift, years on the job, total hours worked, and time of shift). In order to examine the influence of officer rank, analysis were conducted separately for major occupational categories. Many tables and charts provide two separate tabulations: one by agency size (small, medium, large) and another by agency type (municipal, sheriff, and state patrol). Because numbers presented in this report generally exclude "don't know," "refused," and other similar responses, sample sizes (n) can vary from table to table.

Small agencies include those with 20 or fewer sworn officers, medium agencies include those with between 21 and 50 officers, and large agencies include those with 51 officers or more. While the typical distinction of a large agency in the law enforcement community is greater than 100 officers, this categorization would limit the sample size since there were only 4 agencies with greater than 100 officers. Also, Iowa State Patrol officers were removed from the large agency category since they made up the vast majority of this category. Therefore, data presented by size of the agency only reflect sheriff departments and municipal agencies.

Characteristics of the Sample

The survey sample consisted of 1,157 sworn Iowa law enforcement officers (LEOs). To determine the representative nature of the sample, selected demographic characteristics (age, race, gender, and ethnicity) were compared with U.S. and Iowa LEOs (Table 1). Data for these populations were derived from the U.S. Census Bureau's 2011 Current Population Survey (CPS) [BLS 2003]. The demographic characteristics of the survey sample differed from the Iowa and U.S. LEO populations. Compared to the U.S. LEO population, the survey sample underrepresents Hispanics, Non-Whites, and women. Compared to the Iowa LEO population, the survey sample underrepresents Hispanics, Non-Whites, and men.

Limitations

Study limitations include reporting and non-response biases. Reporting bias refers to a tendency to underreport undesirable behaviors or outcomes. Sworn officers may not provide truthful responses on topics such as safe driving behaviors. However, we attempted to minimize reporting bias by performing the data collection in a completely anonymous fashion. Second, while the individual officer response rate was high at 79%, the possibility for non-response bias cannot be excluded. It is likely that differences existed between officers who returned a survey and those who did not. Also, the overall agency response rate was 44% and there could be differences between agencies who chose to participate and those that did not. Finally, findings from the study may have limited generalizability to agencies and officers in other states.

Table 1. Comparison of demographic characteristics of Iowa law enforcement officers in the study sample, all Iowa law enforcement officers, and U.S. officers

Characteristic	Iowa survey n (%)	Iowa n (%)	U.S. n (%)
Age			
16–24	25 (2)	300 (4)	37,200 (4)
25–34	337 (29)	3,000 (37)	280,900 (29)
35–44	400 (35)	3,500 (43)	335,400 (34)
45–54	289 (25)	1,100 (13)	211,900 (22)
55–64	82 (7)	200 (2)	88,100 (9)
65+	0 (0)	0 (0)	23,300 (2)
Gender			
Male	1,062 (92)	7,900 (97)	831,600 (85)
Female	78 (7)	200 (3)	145,200 (15)
Ethnicity			
Non-Hispanic	1,102 (95)	7,500 (93)	839,800 (86)
Hispanic	21 (2)	600 (7)	137,000 (14)
Race			
White	1,093 (94)	7,300 (90)	812,800 (83)
Non-white	41 (4)	800 (10)	164,100 (17)
Total	1,157*	8,100*	976,800*

*Frequencies do not sum to total because of missing values.

3. Results

A. Law Enforcement Officer Occupational Safety and Health Training

Presence, Level, and Elements of In-service Training

Ninety-three percent of officers reported receiving some type of in-service training at least once per year and of those, nearly all reported that the training was mandatory (n = 1,056, 98%) (data not shown). Thirty percent of officers reported 16 or fewer hours of annual in-service training, 28% reported between 17 and 40 hours, and 21% reported more than 40 hours (data not shown). Officers in small agencies and municipal departments reported the fewest annual in-service training hours. Officers were asked which subjects were commonly covered during in-service training (Table 2). The most common element was Firearms (90%) and the least common was Ethics (25%). For motor-vehicle topics, Pursuit Driving ranked #9, General Driving ranked #10, and EVOC ranked #11. This aligns closely with the current required elements of yearly in-service training for Iowa law enforcement officers (Iowa Administrative Code; Law Enforcement Academy; Chapter 8, Mandatory In-service Training Requirements). These requirements state that Iowa officers must receive annual firearms and CPR in-service training.

Table 2. Most common elements of in-service training

Rank	Element	n (%)
1	Firearms	1,040 (90)
2	CPR	837 (72)
3	Defensive tactics such as hand to hand combat	702 (61)
4	Legal issues	673 (58)
5	General officer safety	628 (54)
6	Less lethal methods (Taser, Pepper Spray)	625 (54)
7	First aid	622 (54)
8	Policy reviews and updates	611 (53)
9	Pursuit driving	389 (34)
10	General driving (seatbelt use, safe driving, misc.)	345 (30)
11	Emergency Vehicle Operations Course (EVOC)	301 (26)
12	Ethics	290 (25)

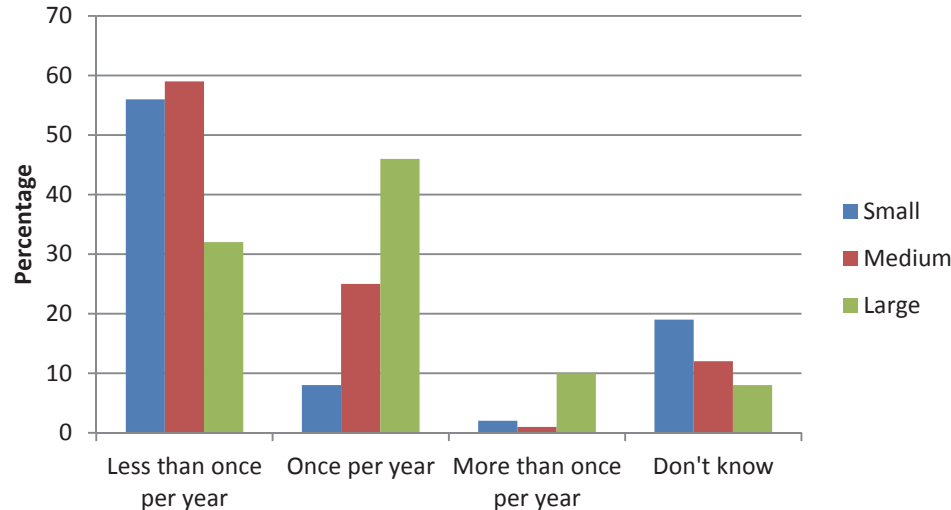
Note: Officers could select "all that apply."

Motor-vehicle-related In-service Training

Half of Iowa officers reported that they received in-service training related to motor-vehicles less than once per year (n = 583, 50%). Over a quarter reported motor-vehicle training yearly (n = 322, 29%), and 4% (n = 44) reported motor-vehicle training more than once per year. Officers in large agencies and the Iowa State Patrol were

significantly more likely than their counterparts to report having annual motor-vehicle training (Graphs 1 and 2). The most common element of motor-vehicle in-service training was Motor-vehicle Operation Policies (51%) and the least common was Driving Simulator (2%) (Table 3). Officers also reported having behind-the-wheel motor-vehicle training such as pursuit driving (37%), EVOC (35%), or driving course practice (38%).

Graph 1. Motor-vehicle-related in-service training by size of law enforcement agency



Graph 2. Motor-vehicle-related in-service training by type of law enforcement agency

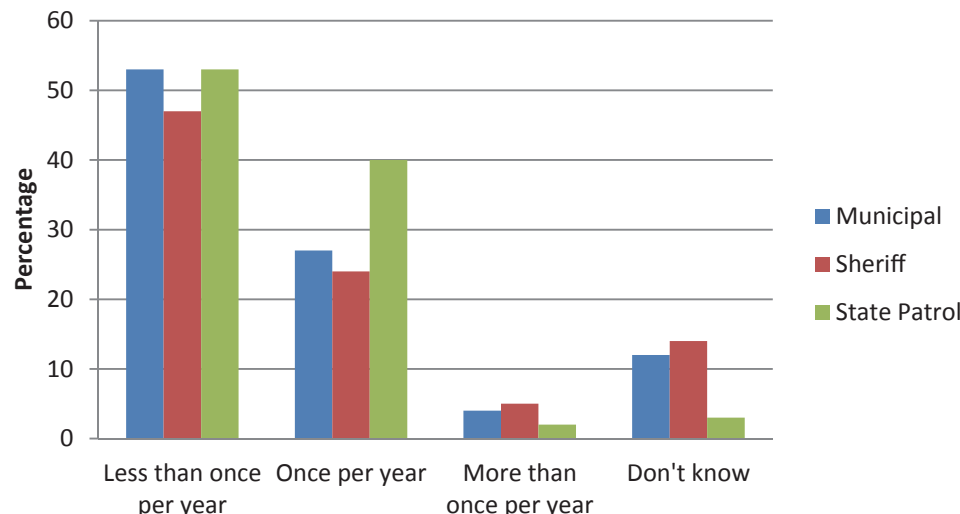


Table 3. Most common elements of motor-vehicle-related in-service training

Rank	Element	Total n (%)
1	Policies related to motor-vehicle operations	590 (51)
2	Driving course	444 (38)
3	Pursuit driving	432 (37)
4	Emergency Vehicle Operations Course (EVOC)	405 (35)
5	Safety at traffic stops/roadway scenes	391 (34)
6	Safety issues inside the vehicle (seatbelt)	290 (25)
7	Driving simulator	27 (2)

Note: Officers could select multiple responses.

Law Enforcement Officers' Perceptions of In-service Training

Officers were asked to choose the in-service training element they deemed the most important to their safety (Table 4). Regardless of age, gender, time on the job, shift, size, or type of agency, officers reported the most important element was General Officer Safety (35%), followed by Firearms (32%). A small percentage of officers ranked driving elements as most important, including EVOC (2.5%), Pursuit Driving (1.7%), and General Driving (1.1%).

Table 4. Officers' ranking of the most important in-service training elements

Rank	Element	Total n (%)
1	General officer safety	402 (35.0)
2	Firearms	373 (32.0)
3	Legal issues	95 (8.0)
4	Defensive tactics such as hand to hand combat	85 (7.0)
5	Emergency Vehicle Operations Course (EVOC)	29 (3.0)
6/7	Policy reviews and updates	20 (2.0)
6/7	Pursuit driving	20 (2.0)
8	First aid/CPR	16 (1.0)
9	General driving (seatbelt use, safe driving, misc.)	13 (1.0)
10	Ethics	11 (1.0)
11	Less lethal methods (Taser, Pepper Spray)	7 (0.6)
Total		1,077

Officers were asked about motor-vehicle operations training provided at the law enforcement academy where they received their certification (Table 5). Ninety-six percent of officers believed that driver training is critical to their safety while on the job; however, only 51% believed the driver training provided at their law enforcement academy prepared them to safely function in the field. This percentage significantly decreased as officers' time on the job increased. Only 12% of officers agreed with the statement, "The average academy recruit already possesses basic driving skills that would allow them to safely operate a law enforcement vehicle in emergency situations." When responses to this question were examined across officers with varying levels of experience, officers with more years of law enforcement experience were less likely to agree with this statement.

Table 5. Officers' perceptions of motor-vehicle training by time in law enforcement

Perception	Less than 6 years		6–15 years		16–20 years		Greater than 20 years		Total*	
	Agree n (%)	Disagree n (%)	Agree n (%)	Disagree n (%)	Agree n (%)	Disagree n (%)	Agree n (%)	Disagree n (%)	Agree n (%)	Disagree n (%)
Driver training at the law enforcement academy prepares officers to safely function in the field	131 (68)	20 (10)	233 (55)	89 (21)	85 (45)	49 (25)	130 (42)	73 (24)	587 (51)	236 (20)
Driver training is a critical component of preparing officers to function safely in the field	189 (98)	2 (1)	414 (97)	2 (0.5)	184 (96)	1 (0.5)	309 (98)	0 (0)	1110 (96)	6 (0.5)
Using a driving simulator would help officers be better prepared to drive safely on the job	109 (56)	18 (9)	273 (64)	37 (9)	124 (63)	20 (10)	183 (57)	33 (10)	701 (61)	109 (9)
Average academy recruit has the driving skills to allow them to safely operate a law enforcement vehicle in emergency situations	45 (23)	102 (52)	52 (12)	275 (65)	21 (11)	145 (74)	16 (5)	259 (81)	137 (12)	792 (69)

* Frequencies do not sum to total because of missing values.

B. Iowa Law Enforcement Agency Written Motor vehicle Operations and Policies

Motor-vehicle Operations Policy, General Order, or Standard Operating Procedures

Ninety percent of Iowa officers reported that their agency had a written motor-vehicle operation policy, general order, or standard operating procedure (SOP) (Table 6). More Iowa State Patrol officers (98%) reported the presence of a written motor-vehicle policy than sheriff’s officers (84%) or municipal officers (95%). Generally, officers from medium (96%) and large agencies (93%) were more likely to report a written motor-vehicle policy than officers from small agencies (80%).

Table 6. Presence of written motor-vehicle policy, general order (GO), or standard operating procedure (SOP) by size and type of law enforcement agency

Policy, GO, SOP	Small n (%)	Medium n (%)	Large n (%)	Municipal n (%)	Sheriff n (%)	State Patrol n (%)	Total* n (%)
Yes	262 (80)	297 (96)	271 (93)	425 (95)	402 (84)	192 (98)	1,044 (90)
No	28 (9)	2 (1)	3 (1)	8 (2)	25 (5)	0 (0)	34 (3)
Not Sure	33 (2)	7 (2)	10 (3)	9 (2)	41 (9)	3 (2)	54 (5)
Total*	329	309	293	449	479	196	1,157

*Frequencies do not sum to Total because of missing values.

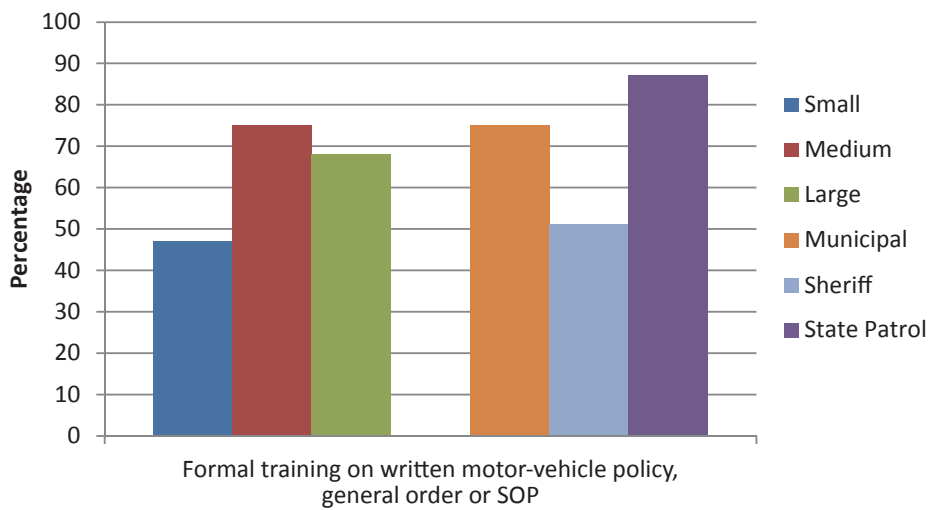
Formal Training on Written Motor-vehicle Policy, General Order, or SOP

While the majority of Iowa officers reported the presence of an agency-written motor-vehicle operations policy, only 66% reported having been trained on the policy (data not shown). Seventeen percent reported that they had not been trained on the motor-vehicle policy and 11% were not sure. Officers from medium (74%) and large agencies (68%) were significantly more likely to report being trained on the motor-vehicle policy than officers from small agencies (47%) (Graph 3). Significantly more Iowa State Patrol officers (87%) reported receiving training on their agency’s motor-vehicle policy than municipal (75%) or sheriff’s officers (51%) (Graph 3). Also, officers who worked daytime hours (6 am to 6 pm) (73%) were significantly more likely to report that they had received training on motor-vehicle policies than officers who worked nighttime hours (6 pm to 6 am) (65%) (data not shown).

Common Elements of Written Motor-vehicle Policy, General Order, or SOP

The most common element of a law enforcement agency’s written motor-vehicle policy was the requirement that the driver wear a seatbelt (82%) and that the front-seat passenger wear seatbelts (78%) (Table 7). The least common element was a speed restriction when using lights/sirens (27%). Iowa State Patrol officers were more likely to have elements requiring the driver to wear a seatbelt (95%), requiring the passenger to

Graph 3. Percent of officers receiving formal training on written motor-vehicle policy, general order, or SOP by size and type of law enforcement agency



wear a seatbelt (93%), and restricting the use of mobile devices (79%) than officers from municipal or sheriff agencies. However, Iowa State Patrol officers were less likely to have procedures for monitoring speed (30%) and elements restricting speed when using lights and sirens (2%) than officers from municipal or sheriff’s agencies. Officers in large agencies were significantly more likely to report elements requiring the driver to wear a seatbelt (90%), requiring the passenger to wear a seatbelt (86%), and restricting the use of mobile devices (38%) and procedures for monitoring speed (59%) than officers in small or medium agencies.

Table 7. Reported elements of written motor-vehicle policy by size and type of law enforcement agency

Element	Small n (%)	Medium n (%)	Large n (%)	Municipal n (%)	Sheriff n (%)	State Patrol n (%)	Total n (%)
Require use of driver seatbelt	246 (75)	237 (77)	263 (90)	363 (81)	380 (79)	187 (95)	951 (82)
Require use of passenger seatbelt	227 (69)	220 (71)	252 (86)	340 (76)	356 (74)	183 (93)	899 (78)
Establish procedures for monitoring speeds	78 (24)	170 (55)	174 (59)	250 (56)	169 (35)	58 (30)	489 (42)
Restrict use of cell phones or mobile devices	76 (23)	102 (33)	110 (38)	183 (41)	103 (22)	154 (79)	447 (39)
Restrict speed when using lights/sirens	58 (18)	162 (52)	79 (27)	193 (43)	105 (22)	4 (2)	307 (27)
Total	329	309	293	449	479	196	1,157

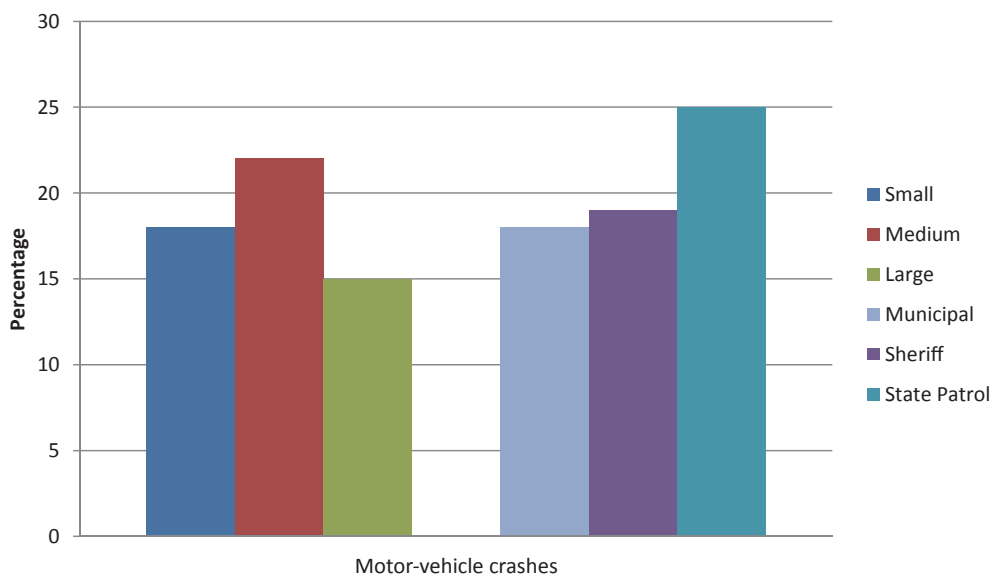
Note: Officers could select multiple responses.

C. Iowa Law Enforcement Officer Non-fatal Motor-vehicle Crashes

Non-fatal Motor-vehicle Crashes in Prior 3 Years

Twenty percent of Iowa officers had been in at least one motor-vehicle crash in the prior 3 years. Slightly more Iowa State Patrol officers reported a motor-vehicle crash (25%) than municipal (18%) or sheriff officers (19%) (Graph 4). Slightly more officers from medium-sized agencies (22%) reported a motor-vehicle crash than officers from

Graph 4. Percent of officers involved in motor-vehicle crashes in the prior three years by size and type of law enforcement agency



small (18%) or large (15%) agencies (Graph 4). These differences were not significant. Twenty-five percent of officers reported being in more than one crash in the prior 3 years ($n = 56$). There were no differences in the prevalence of motor-vehicle crashes by officers' gender, education, length of shift (in hours), or time of shift (nighttime versus daytime). As the officers' amount of time in law enforcement increased, the probability of experiencing a motor-vehicle crash in the prior 3 years significantly decreased (Graph 5).

Characteristics of Non-fatal Motor-vehicle Crashes

Officers reported details on their most recent motor-vehicle crash (Table 8). Of these, 70% occurred in clear weather and 49% in daylight. Nearly all of the crashes occurred in a car or sports utility vehicle (94%). The majority of crashes occurred at speeds below 50 mph (79%) and during non-emergency calls (64%). In approximately half of the crashes, the officer's car was the striking vehicle. The most common type of crashes were broadside (31%), rear-end (27%), and single vehicle (20%). In 6% of the crashes, the officer reported that they were unrestrained. Officers were injured in 17% of the crashes and received medical treatment in 16%. In 13% of the crashes, the officer filed a workers' compensation claim.

Graph 5. Percent of officers involved in motor-vehicle crashes in the prior three years by years in law enforcement

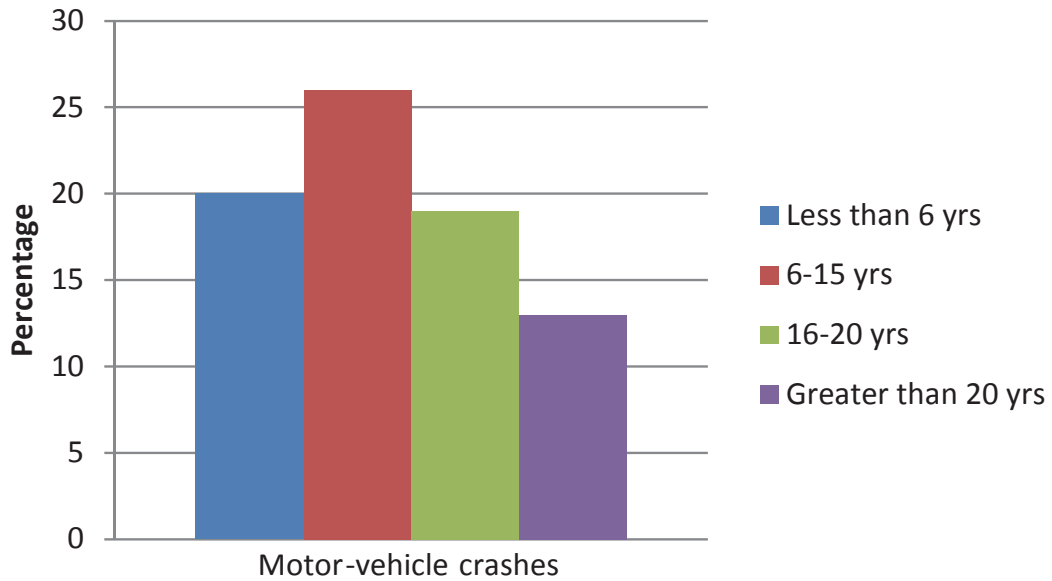


Table 8. Characteristics of non-fatal motor-vehicle crashes

Characteristic	n (%)
Weather	
Clear	157 (70)
Freezing Rain/Snow	47 (21)
Overcast/Rain	19 (9)
Emergency Response	
No	143 (64)
Yes	77 (34)
Speed	
Less than 30 mph	138 (61)
30–50 mph	40 (18)
Greater than 50 mph	44 (20)
Type of Motor-vehicle	
Car or Sports Utility Vehicle	211 (94)
Van, motorcycle, truck	11 (5)
Restraint Status	
Restrained driver or front-seat passenger	208 (93)
Unrestrained	13 (6)

(continued)

Table 8 (Continued). Characteristics of non-fatal motor-vehicle crashes

Characteristic	n (%)
Type of Collision	
Broadside	69 (31)
Rear-end	60 (27)
Single vehicle	46 (20)
Head-on	40 (18)
Rollover	6 (3)
Time of Day	
Day	111 (49)
Night	98 (44)
Dusk	13 (6)
Which Vehicle Were You In?	
Striking	111 (49)
Struck	98 (44)
Total*	225

Note: Rows do not sum to TOTAL because of missing data; Officers could select "all that apply."

D. Iowa Law Enforcement Officer Non-fatal Roadside Incidents

Non-fatal Roadside Incidents

Sixteen percent of Iowa officers experienced a roadside incident in the prior 3 years. Many differences were found in roadside incidents. Significantly more Iowa State Patrol officers (28%) reported a roadside incident than municipal (12%) or sheriff's officers (15%) (Graph 6). Significantly more officers from small agencies (17%) reported a roadside incident than officers from medium (14%) or large (9%) agencies (Graph 6). Significantly more patrol officers (19%) reported a roadside incident than non-patrol officers (11%) (data not shown). Also, significantly more officers working nighttime hours (6pm to 6am) reported a roadside incident (21%) than those working daytime hours (6 am to 6 pm) (15%) (data not shown).

Characteristics of Non-fatal Roadside Incidents

Of the roadside incidents reported by the 184 officers, 47% occurred during a traffic stop, 41% when the officer was working a motor-vehicle crash, 24% when assisting a disabled vehicle, and 3% during a pedestrian stop (Table 9). Sixty percent occurred during daylight and 60% in clear weather. The officer was located on the shoulder in 39% of incidents, next to the involved vehicle in 27%, on the roadway in 26%, and next to their vehicle in 21% of the incidents. In 76% of the roadside incidents, the officer was struck by or nearly struck by oncoming traffic. The officers used a variety of safety precautions to warn other motorists at the time of the incident.

The most common precautions used were warning lights (88%), using the vehicle to block traffic (49%), and wearing reflective gear (39%). Of the roadside incidents reported by the 184 officers, 3% resulted in injury. All of the officers who reported being injured received medical treatment and filed a workers' compensation claim.

Graph 6. Non-fatal roadside incidents by size and type of law enforcement agency

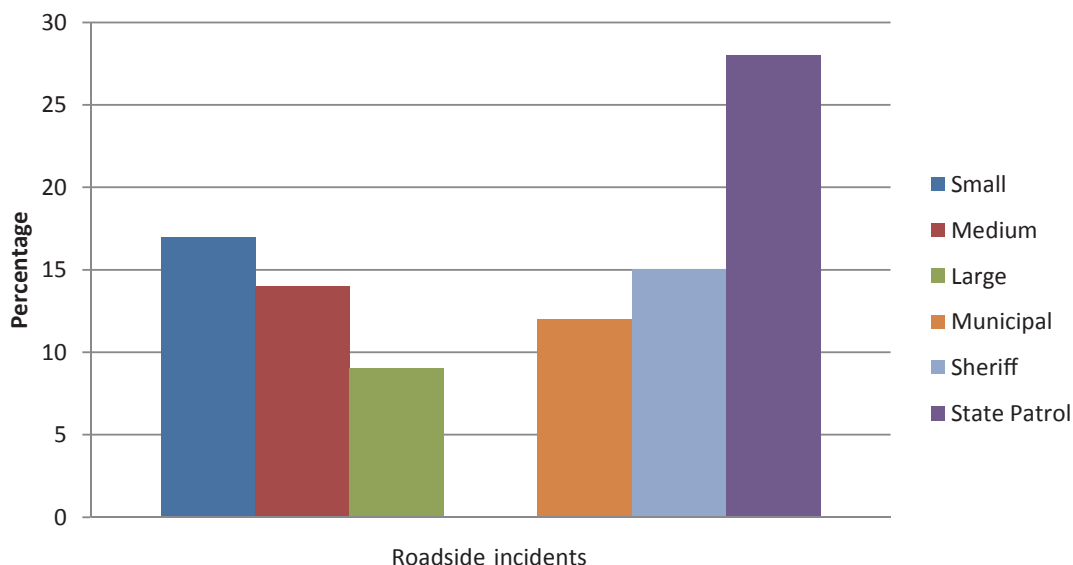


Table 9. Characteristics of non-fatal roadside incidents

Characteristic	Total* n (%)
Type of scene	
Traffic stop	87 (47)
Motor-vehicle crash	75 (41)
Disabled vehicle	44 (24)
Pedestrian stop	6 (3)
Location	
On the shoulder	72 (39)
On the roadway	47 (26)
Next to involved vehicle	50 (27)
Next to emergency vehicle	39 (21)
Striking object	
Oncoming traffic	139 (76)
Opposing traffic	36 (20)
Flying debris	7 (4)
Involved vehicle	6 (3)

(continued)

Table 9 (Continued). Characteristics of non-fatal roadside incidents

Characteristic	Total* n (%)
Time of day	
Day	110 (60)
Night	80 (44)
Dusk	10 (5)
Weather	
Clear	111 (60)
Freezing rain/Rain	73 (40)
Overcast	22 (12)
Safety precautions	
Warning lights	161 (88)
Use vehicle to block traffic	90 (49)
Reflective gear	72 (39)
Flares	17 (9)
Injured?	6 (3)
Received medical treatment?	6 (3)
Placed on restricted duty?	3 (2)
Filed workers' compensation?	6 (3)

* Rows do not sum to TOTAL because of missing data; officers could select "all that apply."

E. Iowa Law Enforcement Officers and On-duty Motor-vehicle Use

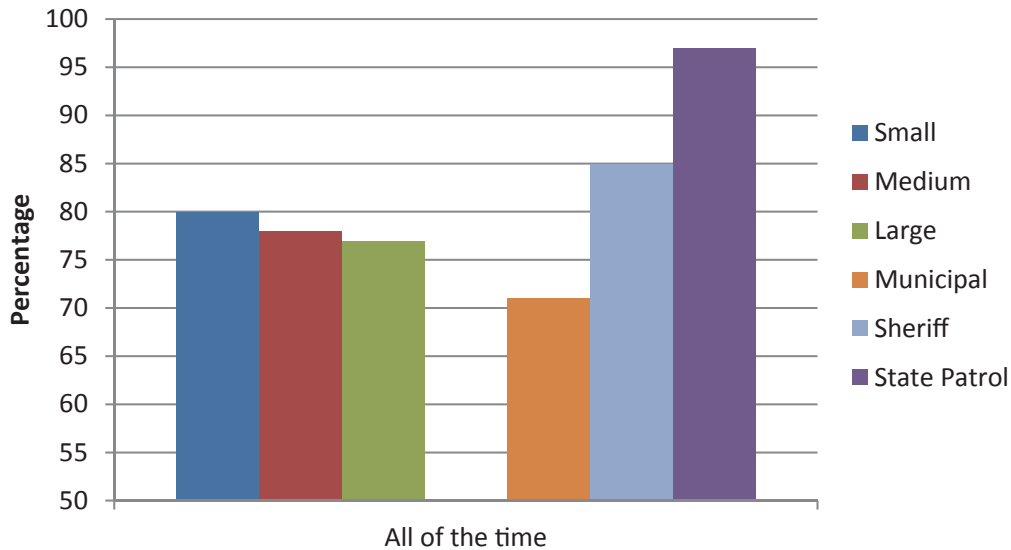
Basic Motor-vehicle Information

Seventy-six percent of officers drove a 2- or 4-door vehicle, 14% drove a sports utility vehicle, and 9% drove a van, pickup, or motorcycle. Officers spent an average of 22 hours a week driving while on the job. Patrol officers drove significantly more hours per week (26.9 hours) than non-patrol officers (13.7 hours). Officers who worked nighttime hours (6pm–6am) drove more hours (25.2 hours) than officers who worked during the day (21.3 hours). Officers in small agencies drove the most hours (small = 23.3, medium = 21.3, large = 18.7). Iowa State Patrol officers drove the most hours per week (municipal = 21.9, sheriff = 20.6, state patrol = 27.7).

Statewide, 81% of officers reported wearing their seatbelt all of the time, 12% reported wearing the belt most of the time, 4% reported wearing the belt some of the time, and 1% reported rarely or never wearing their seatbelt. There were no significant differences across size of agency (Graph 7); however, there were differences across agency type. Iowa State Patrol officers (97%) were significantly more likely to report wearing their seatbelt all of the time than municipal (71%) or sheriff's officers (85%).

There were also significant differences in on-duty seatbelt usage across law enforcement experience (Graph 8). The longer officers were in law enforcement, the more

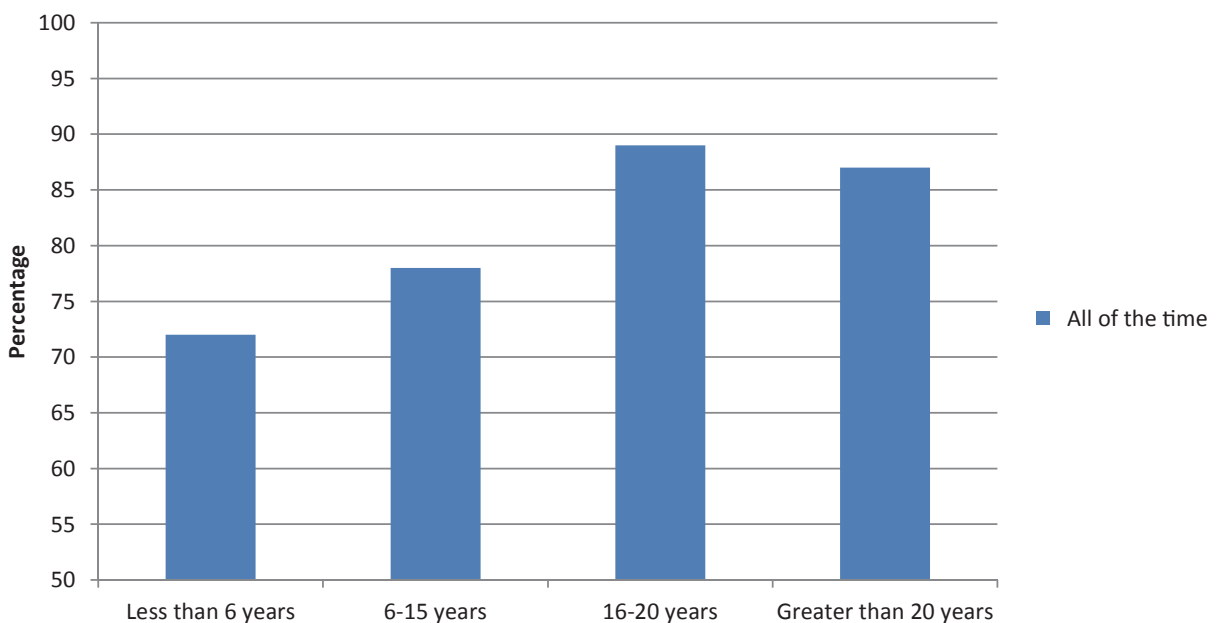
Graph 7. Seatbelt usage by size and type of law enforcement agency



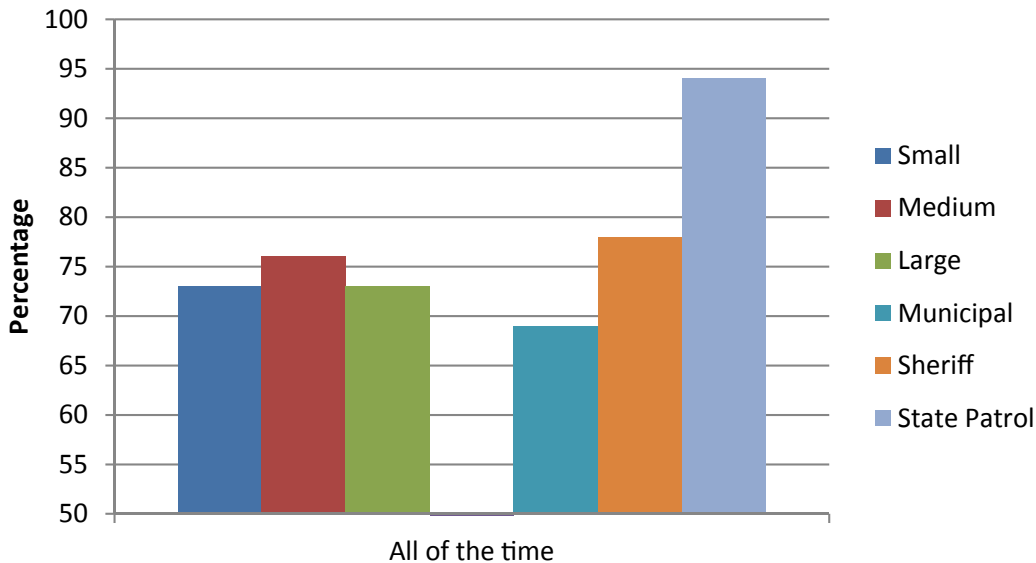
likely they were to report wearing their seatbelt all of the time, (less than 6 years = 72%; 6–15 years = 78%; 16–20 years = 89%; greater than 20 years = 87%). Also, officers working nighttime hours (76%) were significantly less likely to report wearing their seatbelt all of the time than officers working daytime hours (84%).

There were significant differences in on-duty seatbelt usage when officers rode in the front seat as a passenger as well (Graph 9). Statewide, 77% of officers reported wearing a seatbelt all of the time while riding as a front-seat passenger. There were significant differences across agency type. Iowa State Patrol officers (94%) were significantly more

Graph 8. Seatbelt Usage by Number of Years in Law Enforcement



Graph 9. Seatbelt usage while riding as a front-seat passenger on-duty by size and type of law enforcement agency



likely to report wearing a seatbelt all of the time while a front-seat passenger than sheriff’s officers (78%) or municipal officers (69%). The longer officers were in law enforcement, the more likely they were to report wearing their seatbelt all of the time while a front-seat passenger (less than 6 years = 70%; 6–15 years = 71%; 16–20 years = 83%; greater than 20 years = 85%).

Seatbelt Practices

Iowa officers were asked at what point while responding to a call for service did they unbuckle their seatbelt (data not shown). Most officers unbuckled their seatbelts when they arrived at the scene but before the vehicle came to a complete stop (47%), followed by when they arrived at the scene but when the car was at a complete stop (29%). Officers were also asked about specific types of potentially risky driving situations when they would most likely wear a seatbelt (Table 10). Officers were most likely to wear a seatbelt in a high-speed pursuit (96%), driving long distances (95%), in inclement weather (95%), during lights and siren (95%), and while driving on the interstate (95%). Officers were the least likely to wear a seatbelt in a low-speed pursuit (91%), though this was still a large percentage of officers reporting seatbelt usage.

Perceptions of Seatbelt Usage

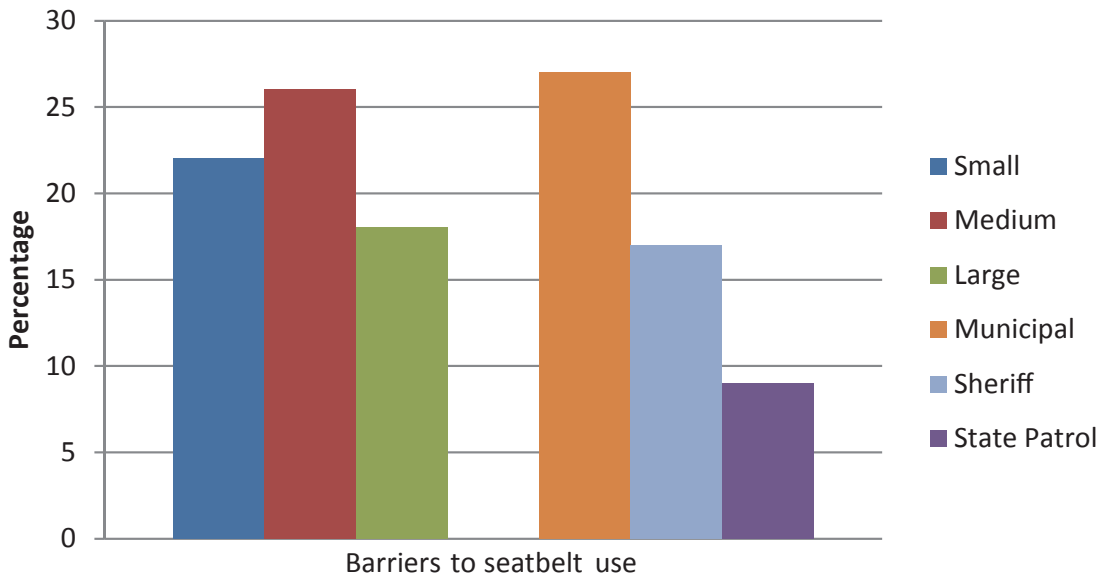
Officers were asked if there were barriers to the consistent use of a seatbelt while on duty (Graph 10). The majority of Iowa officers did not believe there were barriers to consistent use of the seatbelt (79%); however, this differed significantly across type of agency and time of shift. Iowa State Patrol officers (9%) were less likely to report barriers than municipal (27%) or sheriff’s officers (17%). Also, officers who worked nighttime hours (25%) were more likely to report barriers than officers working daytime hours (18%). Officers were also asked to rank barriers to seatbelt use while

Table 10. Driving situations when an officer was ‘most likely’ to wear a seatbelt

Rank	Driving situation	Very likely n (%)
1	High-speed pursuit	1,114 (96)
2	Driving longer distances	1,101 (95)
3	Inclement weather	1,097 (95)
4	During lights and/or siren	1,096 (95)
5	Driving on the highway/interstate	1,095 (95)
6	Ride-along/officer-in-training in the vehicle	1,074 (93)
7	Driving in heavy traffic	1,069 (92)
8	Low-speed pursuit	1,049 (91)

on-duty (Table 11). Of those officers who reported barriers, the most significant was “Design makes it difficult to quickly and easily remove seatbelt when exiting” (46%), followed by “Uniform and equipment interfere with seatbelt use (firearm, Taser™, miscellaneous)” (31%).

Graph 10. Barriers to seatbelt use by size and type of law enforcement agency



Officers were also asked how important specific factors were in their decision to wear a seatbelt (Table 12). Statewide, 75% of officers believed that the risk of a high-speed motor-vehicle crash was a very important factor in their decision to wear a seatbelt. This was followed closely by the risk of a crash while driving long distances (69%) and habit (68%). The factor that was the least popular among officers when deciding to wear a seatbelt on-duty was agency policy. Sixty percent of officers found agency policy to be a very important factor.

Table 11. Ranking of specific seatbelt use barriers

Rank	Barrier	Most significant n (%)	
1	Design makes it difficult to quickly and easily remove seatbelt when exiting	104	(46)
2	Uniform and equipment interfere with seatbelt use (firearm, Taser, misc.)	70	(31)
3	Vehicle equipment locations make it difficult (control panel, shotgun, misc.)	44	(19)
4	Design is uncomfortable to wear on-duty	21	(9)
5	Characteristics that can't be altered (call volume, type of vehicle, misc.)	18	(8)
Total		226	

Note: Officers could select multiple responses.

Table 12. Factors in officers' decision to wear a seatbelt on-duty

Factor	Not at all important n (%)	Minimally important n (%)	Somewhat important n (%)	Important n (%)	Very important n (%)
Risk of high-speed crash	19 (2)	17 (1)	35 (3)	215 (19)	856 (75)
Risk of crash while driving long distances	22 (2)	27 (4)	78 (11)	232 (31)	783 (69)
Habit	38 (3)	28 (2)	54 (5)	242 (21)	782 (68)
Setting a good example for others	44 (4)	46 (4)	93 (8)	219 (19)	741 (65)
Agency policy	71 (6)	58 (5)	96 (8)	233 (20)	683 (60)

Occupational Safety Practices

Officers were asked to rank the importance of several occupational safety practices for their safety in the field (Table 13). The occupational safety practice ranked as most important by municipal or sheriff's officers was the wearing of the ballistic vest (37%); conversely, Iowa State Patrol officers perceived wearing a seatbelt as the most important occupational safety practice (30%). The larger the agency, the less likely it was that the officer viewed the wearing of a seatbelt as important (small, 26%; medium, 20%; large, 15%).

Officers were asked how often they practiced certain roadside safety practices (Table 14). The most commonly used roadside safety practice was activating lights on highways (83%) and activating lights on residential streets (83%). Safety practices such as parking offset behind a stopped vehicle were more common on residential and city streets. Practices such as activating lights and using a passenger-side approach were more common on highways and interstates. The least common roadside safety practice was wearing reflective gear (4%–10%).

Table 13. Ranking of safety practices by size and type of law enforcement agency

Most Important	Size			Type		
	Small n (%)	Medium n (%)	Large n (%)	Municipal n (%)	Sheriff n (%)	State Patrol n (%)
Wearing a ballistic vest	127 (39)	112 (36)	105 (36)	168 (37)	176 (37)	49 (25)
Maintaining good physical condition	85 (26)	63 (20)	77 (26)	113 (25)	111 (23)	32 (16)
Wearing a seatbelt	85 (26)	61 (20)	45 (15)	81 (18)	111 (24)	58 (30)
Using safe driving practices	63 (19)	28 (9)	54 (18)	62 (14)	83 (17)	40 (20)
Training regularly with firearms	47 (14)	35 (11)	45 (15)	56 (13)	70 (15)	30 (15)
Practicing defensive tactics	21 (6)	17 (6)	22 (8)	31 (7)	28 (6)	10 (5)
Training in safe driving techniques	15 (5)	11 (5)	16 (6)	15 (3)	27 (6)	16 (8)
Following agency policy, procedure	23 (7)	14 (5)	13 (4)	18 (4)	31 (7)	3 (2)

Table 14. Regularly practiced roadway safety procedures

Roadway safety procedures	Type of roadway				
	Residential street n (%)	City street n (%)	Highway n (%)	Interstate n (%)	Rural roads n (%)
Parking at an angle behind stopped vehicle	287 (25)	296 (26)	393 (34)	393 (34)	296 (26)
Parking offset behind stopped vehicle	894 (77)	898 (78)	832 (72)	784 (68)	845 (73)
Positioning to observe occupants and roadway	737 (64)	736 (64)	737 (64)	708 (61)	708 (61)
Activating lights to indicate traffic should move over	962 (83)	956 (83)	964 (83)	924 (80)	908 (79)
Using a passenger-side approach	277 (24)	291 (25)	580 (50)	686 (59)	316 (27)
Wearing reflective gear	47 (4)	46 (4)	95 (8)	112 (10)	60 (5)

Conclusions

In 2011, NIOSH sponsored a statewide survey in the state of Iowa on law enforcement officers' experiences with on-duty motor-vehicle incidents. In the prior 3 years, 20% of officers had been in at least one motor-vehicle crash, and 16% reported being struck by or nearly struck by a motor-vehicle while outside their patrol car. These numbers indicate the relatively high prevalence of motor-vehicle incidents among Iowa law enforcement personnel.

Officers were also asked about motor-vehicle-related policy, training, and use of occupational safety practices. Most officers reported their agency had a written motor-vehicle policy; however, only 66% received formal training on the policy. Less than half the officers from agencies with 20 or fewer sworn officers received formal training on motor-vehicle policies (47%). Policy elements varied, but overall, speed restriction when using lights/siren (27%) and restricting use of mobile devices (39%) were the least common elements of written motor-vehicle policies. Statewide, 82% of officers stated that they had a written motor-vehicle policy that required the use of a seatbelt when driving a patrol car.

Regarding training, 29% of Iowa officers and only 8% of officers from agencies with 20 or fewer sworn officers reported receiving annual motor-vehicle training. Among those officers who reported any type of regular motor-vehicle training, just over a third had hands-on driver training such as a driving course (38%), pursuit driving (37%), or an EVOG (35%). Motor-vehicle training provided at the academy level was not viewed in a positive light; just over half of the officers believed that academy motor-vehicle training prepared them to safely function in the field (51%). However, nearly all officers believed that driver training was critical to their safety in the field (96%).

Statewide, 81% of officers reported wearing a seatbelt all of the time while operating a patrol car and 77% while riding in the front seat as a passenger on-duty, but this differed by agency. Members of the Iowa State Patrol generally had better seatbelt wearing practices than their municipal or sheriff counterparts. Overall, 21% of officers believed there were barriers to the consistent use of seatbelts while on-duty and the most common barrier listed was that "design makes it difficult to quickly and easily remove seatbelt when exiting." Regarding roadside safety practices, only 4%–10% of officers reported wearing reflective gear, depending on the type of roadway.

Law enforcement experience played a significant role in the motor-vehicle perceptions and behaviors of officers. Officers with more law enforcement experience were less likely to have had a motor-vehicle crash in the prior 3 years, more likely to view driving as a dangerous job activity, and more likely to practice safe driving techniques than those with less experience. Based on our findings, we suggest the following recommendations:

Training

- Regularity in annual in-service motor-vehicle training varied statewide. Iowa agencies could consider policies to ensure periodic motor-vehicle training, especially among agencies with fewer than 20 officers. One study conducted by the California Commission on

Peace Officer Standards and Training found that behind-the-wheel motor-vehicle training, such as EVOC, resulted in the fewest collisions if conducted every 2 years [CalPOST 2009]. While this research finding needs to be replicated in other experimental studies, our study results indicate that Iowa officers desire more behind-the wheel motor-vehicle training.

- Approaches to consider for improving the frequency and quality of motor-vehicle training include developing a statewide training network, sharing human and material resources across agencies, identifying fixed training sites, and developing mobile driving simulators.
- Only half of officers surveyed believed that driver training at the academy level adequately prepared officers for driving in the field. Since the majority of officers in our study attended the Iowa Law Enforcement Academy, we suggest that the state of Iowa conduct an analysis of their state-based training programs to assess the consistency and effectiveness of their motor-vehicle training efforts. The state could consider expanding hours of motor-vehicle training and providing more opportunities for hands-on training. Also, the state could continue to stress the importance of wearing a seatbelt and practices associated with buckling/unbuckling while wearing full gear to ensure that this safety practice becomes second nature for new officers.

Policy

- One of the least common components of written motor-vehicle policies was restrictions on cell phone use. Research among commercial drivers shows that cell phone use, and other types of distracted driving, significantly degrades driver performance leading to an increased risk for crash [FMCSA 2011]. While no similar studies have been conducted among law enforcement, common officer duties involve many activities that can divert an officer's attention away from driving. Recognizing this, several agencies, including the Washington State Patrol, Florida Highway Patrol (FHP), and Las Vegas Metropolitan Police Department (LVMPD) have instituted policies to reduce distractions in law enforcement vehicles. For example, the FHP Wireless Voice/Data Communications policy states, "Members must be able to maintain both hands on the steering wheel while the vehicle is in motion and using the device (cell phone)" [FHP 2010]. Another example from the LVMPD states that their officers may not type messages or use cellphones during Code 3 responses (lights and siren) and that they may not text or send and receive e-mail in a moving vehicle [LVMPD 2012]. While the impact of these policies on officer-involved crashes has not been scientifically evaluated, state-level cell phone bans appear to significantly reduce fatal crash rates [Lima and Chip 2013]. Based on this current available evidence, agencies could consider implementing similar policies that restrict the use of cell phones while officers are engaged in driving tasks.

- Another uncommon element of written motor-vehicle policies in the state of Iowa was speed restriction. Both the National Highway Traffic Safety Administration and California Commission of Peace Officer Standards and Training found that “driving too fast for conditions or in excess of posted speed” was a leading factor in many officer-involved crashes. Many agencies have implemented and/or revised their speed-cap policies. Again, the impact of these policies on officer-involved crashes has not been scientifically evaluated. Until stronger evidence becomes available, agencies could consider implementing similar policies that restrict speed.

Use of Personal Protective Equipment

- An adequate proportion of Iowa LEOs reported wearing seatbelts on-duty: 81% wore a seatbelt all of the time while driving a patrol car and 77% when riding as a front-seat passenger. Agencies should continue to implement policies and support officers in the wearing of seatbelts on-duty and strive to achieve 100% compliance.
- Depending on the roadway type, between 4%–10% of Iowa LEOs reported regularly wearing reflective gear while outside a patrol car. The wearing of high-visibility personal protective equipment can significantly reduce an officer’s chances of being struck on the roadway. The code of federal regulations states that all workers within the right-of-way of a federal-aid highway and exposed to traffic shall wear high-visibility safety apparel [Worker visibility, 2007]. Agencies should encourage officers to wear high-visibility apparel whenever they work in the vicinity of moving vehicles.
- The amount of officers’ law enforcement experience was associated with motor-vehicle outcomes. Officers with more law enforcement experience were less likely to have had a motor-vehicle crash in the prior 3 years, more likely to view driving as a dangerous job activity, and more likely to practice various safe driving techniques. While older officers may informally mentor younger officers in a variety of police practices, a more formal mentoring program may help to change an agency’s driving culture. Formal mentoring programs in law enforcement have been found to lead to higher job satisfaction and a stronger work ethic [Sprafka and Kranda 2000].
- Agencies could also consider adding into driving safety training, the personal testimonies of their own officers who have been involved in motor-vehicle crashes. This approach is used in popular programs like Below 100 and the Street Survival Seminar, which utilize personal stories of officers who were involved in critical incidents. Peer-reviewed literature suggests that personal stories can have a large impact on workers from all backgrounds [Ricketts et al. 2010].

Given the impact of motor-vehicle events on officer safety and health, we recommend that agencies seriously consider ways to decrease the prevalence of officer-involved motor-vehicle crashes and roadside incidents. Many large U.S. agencies have implemented changes to motor-vehicle policies and training agendas to better protect their officers from these events. It is our hope that this report and its recommendations will be used by more agencies improve safety of their officers.

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