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## International Journal of Law, Crime and Justice

journal homepage: [www.elsevier.com/locate/ijlcrj](http://www.elsevier.com/locate/ijlcrj)

# Education, (re)training, and traffic stops: Felonious law enforcement officer deaths in the United States

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## ARTICLE INFO

## Keywords:

Police

Traffic stop

Traffic enforcement

Training

Education

Policy

## ABSTRACT

Traffic stops continue to be the primary contact between law enforcement and the public, yet little priority is given to traffic stop education and training. A systematic review of felonious traffic stop-related law enforcement officer (LEO) deaths from 1990 to June 2021 revealed the average LEO killed during and after traffic stops was male, in their late 30s, at the rank of officer, with an average tenure of 9.6 years, and killed by a firearm. A synthesis of state and local law enforcement regulations in states with the most officers killed showed the average hours spent in the academy on traffic stop-related training was 20.3 h (3.6%). The overall annual training requirement averaged just 13 h, and only one state required traffic stop-related training, which was once every four years. The lack of education, training, and retraining may precipitate deadly circumstances for a routine law enforcement function.

## 1. Introduction

Due to the complex and unpredictable nature of policing, law enforcement officers (LEOs) require extensive, diverse, and continuing education and training. Training involves a range of approaches, including on-the-job, academic and skills, in-service, and in-class (Cordner, 2016). While the specifics of these requirements are different from state to state and department to department, most LEOs begin their education and training in the academy and continue throughout their careers (Buerger et al., 2021). Due to a lack of national standards in training and education requirements, disparities exist in the quality of training and continuing education demands among LEOs (Blumberg et al., 2019; Buerger et al., 2021). The initial academy training varies from state to state, with a 2013 Bureau of Justice Statistics review of 664 state and local law enforcement agencies showing basic training programs averaged 21 weeks in length or 840 h (Reaves, 2016). There are nearly 45,000 recruits entering academy programs annually (Reaves, 2016), with approximately 655,890 LEOs employed nationally (BLS, 2022). The skills and knowledge acquired during the academy, field training, and continuing education are vital to prepare LEOs for the demanding realities of police work, especially with the regularity of proactive actions like traffic stops.

As officers progress through their careers, including transitioning to special assignments and promotions, refresher training on foundational patrol functions may not occur. States vary dramatically between required perishable skills, with limited requirements on traffic stop-specific training, both in the academy and continuing professional training and education. Such variation in traffic stop education and training may have the unintended consequence of employing unprepared or underprepared officers. LEOs feloniously killed during traffic stops shaped the focus of this investigation into initial academy-based training on traffic stops and continuing

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<https://doi.org/10.1016/j.ijlcrj.2023.100618>

Received 5 January 2023; Received in revised form 7 May 2023; Accepted 20 July 2023

Available online 31 July 2023

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education in perishable skills in states with high numbers of LEO deaths. Therefore, this study assessed the training and retraining regulations and requirements for law enforcement officers, explicitly focusing on traffic stop training specifications.

## 2. Literature review

While the majority of police-community interactions are non-threatening, officers must be prepared for the potential of violence. Violent attacks on law enforcement have been increasing in the 2020s, with 22 officers shot in the first 24 days of 2022, resulting in the death of three law enforcement officers (Mordock, 2022). Line-of-duty deaths were the highest on record in 2021, with 458 LEO deaths (NLEMF, 2022). While the COVID pandemic is responsible for over 300 law enforcement deaths, 84 LEOs were the victims of fatal felonious assaults, with 61 killed by firearms (NLEMF, 2022). There was a 36% increase in firearm-related deaths, up from 45 felonious firearms deaths in 2020 (NLEMF, 2022). FBI Director Christopher Wray outlined a nearly 60% increase in law enforcement murders in 2021, with violence against law enforcement not receiving as much attention as it should (Beals, 2022). Such statistics are a reminder of the complexity and uncertainty of the environment in which LEOs operate and the need for expertly trained LEOs, which is particularly true during traffic stops.

Traffic stops are a staple of proactive law enforcement and continue to be one of the most common interactions with the community (Baumgartner et al., 2018; Eith and Durose, 2011; Wu and Lum, 2019). Traffic stops, due to their high visibility, encourage traffic safety, ensure compliance with traffic laws as well as have an incapacitation effect if illegal items are seized in the course of the traffic stop (Fliss et al., 2020; McGarrell et al., 2001). Traffic stops are generally separated into two categories, traffic stops and felony traffic stops. Felony traffic stops occur when the LEO has a known want for the vehicle or occupant prior to the traffic stop, generally for a felony crime (Borello, 2001). Traffic stops are a proactive measure relating to a traffic violation with no previously known criminal want. Traditional traffic stops comprise the majority of all stops.

Traditional traffic stops typically involve contact between an LEO and a community member, with the LEO having limited to no information about the intent of the driver or their history. The vast majority of traffic stops occur without incident (Woods, 2019), yet there are instances where LEOs must use their skills and training to mentally and physically prepare for the rare situations in which the use of force is necessary (Blumberg et al., 2019; Cowell and Huth, 2010). Traffic stops require a rapid analysis of the environment, including potential hazards, and hypervigilance by the LEO (Gilmartin, 2002). The mental and physical composure required during dangerous stops stems primarily from LEO initial training in the police academy (Blumberg et al., 2019). However, training and education must be a continuous career-long endeavor for LEOs to gain new skills, improve safety, and learn about new technology and tactics.

Training and education, identified as a pillar of President Obama's 21st Century Task Force on Policing, are critical for the expansive range of responsibilities that fall under the umbrella of law enforcement today. LEOs are required to be highly skilled operationally in order to meet a wide variety of challenges and expectations (OCOPS, 2015). The Task Force outlined five specific action steps to enhance 21st-century policing, including reviewing and updating training and increasing transparency (OCOPS, 2015). Training is recognized as the tool to compel change, including training on implicit bias, procedural justice, human rights, and public safety (OCOPS, 2015). Field training policies and procedures were recommended to be revisited, and training was requested to be open to the public to increase transparency (OCOPS, 2015). State law enforcement commissions were requested to review training to strengthen the skills of new and current officers to ensure their ability to provide just and fair policing (OCOPS, 2015). The pillar on training and education noted that training should be of high quality with innovation hubs and that technology should be leveraged to improve the quality of and access to training (OCOPS, 2015).

### 2.1. Education vs. training

Conceptually, education and training differ, though are commonly used interchangeably in law enforcement. Training and education are both considered and reviewed in this research to be more encompassing of learning opportunities and requirements relating to traffic stops. Education includes learning in policies, practices, terms, concepts, and theory, taught using a broad brush, with goals to recognize, understand, and evaluate different circumstances (Haberfeld, 2002). A goal of education is a deeper understanding of a topic, whereas a goal of training is to accomplish a task (Haberfeld, 2002). Training is utilized to teach a specific skill, usually through showing the task and enacting repetition through experiential learning with explicit instructions (Haberfeld, 2002). Law enforcement training prepares LEOs to act as agents of social control and ensure that laws are followed (Charles, 2000). While education can provide reasoning through incidents and a greater awareness of contemporary issues, training can provide consistent responses to a situation and increase confidence in the task (Haberfeld, 2002).

The philosophical foundation of training is that training is never complete; rather, it is a continuous process that can provide updates of knowledge and skills (Haberfeld, 2002). Training starts during the initial academy and continues through field training and annual training requirements (Charles, 2000). While safety is a focal point of training, often little time is devoted to building the foundational components to ensure safety (Cowell and Huth, 2010). Furthermore, LEOs may seek ways to feel safe without actually completing the necessary training to be safe (Cowell and Huth, 2010). An example of this includes an overreliance on technology while not focusing on fundamental skills such as tactical communication.

### 2.2. Initial career training and education

The primary focus of academy training includes, but is not limited to, the law, interpersonal skills, firearm skills, defensive tactics,

patrol, investigations, CPR training, report writing, community policing, ethics and integrity, de-escalation tactics, less-lethal device training, community-oriented policing, and instruction on handling mental health crises (Sloan and Paoline, 2021). Reaves (2016) found that of the average 840 h spent in the academy, a focus is placed on operations (213 h), weapons and use of force (168 h), professionalism and self-improvement (89 h), and legal education (86 h). In operations, academy participants learn about patrol procedures (52 h), investigations (42 h), emergency vehicle operations (38 h), report writing (25 h), first aid and cardiopulmonary resuscitation (24 h), and information systems (9 h). For weapons and tactics training, academy participants learn about firearms skills (71 h), defensive tactics (60 h), use of force (21 h), and non-lethal weapons (16 h). For professionalism and self-improvement, recruits learn about health and fitness (49 h), communications (15 h), professionalism (11 h), ethics and integrity (8 h), and stress prevention and management (6 h). Academy participants also learn about laws, including criminal and constitutional law (53 h), traffic law (23 h), and juvenile justice law and procedures (10 h). From 2006 to 2013, there was an average increase of 8 h of firearms training across the academies, with an 11-h reduction in law, and a 6-h reduction in patrol procedures (Reaves, 2016). The Bureau of Justice Statistics report did not include any breakdowns specifically for traffic stop-related training, though it would likely be included in the patrol procedures area. After successful completion of the academy, LEOs typically go through a field training program to prepare for the realities of police work. The Bureau of Justice Statistics found that 37% of academies required a field training program after successful completion of the academy, and 44% of hiring agencies mandated a field training program (Reaves, 2016), showing that 81% of academy graduates have a field training requirement. Field training officers (FTOs) can significantly impact the success of new officers and have the power to shape the attention given to certain aspects of policing (Dulin et al., 2019). Trainees must demonstrate adequate knowledge and skills before they become full officers and gain the ability to patrol and work independently. The format of FTO programs is structured in such a way that new officers can apply academy knowledge in dynamic real-world situations (Dulin et al., 2019).

### 2.3. Continuing training and education

Education and training do not end upon successful completion of the academy or the FTO program. All states require continuing professional training and education for law enforcement officers; however, the required content and number of hours vary dramatically. Annual or biannual training requirements may be missed due to injury, military obligations, or other personal leave, with the fulfillment of missed training varying by state (CA POST, 2021b).

As officers finish their probationary period, they can apply for special assignments, like detective, narcotics, gang, and community policing roles to enhance their skills. For example, Azusa, CA Police Department cites that their community deserves highly trained LEOs who rotate from patrol to special assignments and back to patrol to gain experience and improve effectiveness (Azusa Police, 2019). However, it is uncommon for officers to be retrained on patrol operations, upon returning to a patrol position. The removal of the LEO from patrol can sharpen skills related to the new special assignment, but may have the unintended consequence of dulling skills that commonly occur in patrol, such as multitasking with a radio, use of the mobile data terminal while driving, and completing traffic stops. The nature of patrol itself requires diligence and situational awareness as it constitutes the majority of contact with the community. Even the most prepared and experienced officers cannot predict how a contact will resolve (Cowell and Huth, 2010). As LEOs progress through their careers, the comfort of experience coupled with a lack of retraining on patrol effectiveness can have the undesired effect of complacency, inattention, fatigue, and tombstone courage.

While most LEOs enter the field between the ages of 21 and 35, the average retirement age is increasing in part due to changes in social security and retirement rules (Etter and Griffin, 2011). With officers staying on the job for longer, older officers are forced to learn new technologies, including the use of body cameras and the collection and processing of digital evidence. The emphasis on educating and training officers on the various new and updated tools at their disposal requires departments to prioritize training and education requirements. The failure of required training is commonly listed in civil lawsuits against LEOs and their agencies (Gray, 2015), which has been seen in high-profile cases dominating the news in the early 2020s. As a result, skills like traffic stop tactics may be regulated as a lower priority for continuing education.

### 2.4. Retraining

Retraining is commonly seen as a reactive measure by law enforcement following an incident at an individual, group, or departmental level. For example, in New York City, retraining was used to regain the trust lost between the New York City Police Department and the community after the use of a chokehold resulted in a fatality (Goodman, 2014; Lowery, 2015). The retraining to remove chokeholds spread internationally, with many states and nations banning the use of chokeholds and retraining officers on intervention strategies (France 24, 2020; Mellnik et al., 2020; Tyler et al., 2020). Retraining sessions are optimally recommended every 12 months to maintain the safety and health of LEOs (Pizarro Anderson et al., 2018). To avoid reactive measures, proactive retraining can occur to better prepare officers for a return to patrol or other duty stations and ensure the basic functions of the position are reviewed and practiced. In doing so, LEOs are better prepared, which can result in greater safety and success in the role. A commitment to lifelong learning and skill development is required of modern-day law enforcement in order to be effective in our rapidly changing society (Etter and Griffin, 2011).

When law enforcement officers separate from a sworn position, some states require requalification or retraining to return to law enforcement. In some states, such as Washington, law enforcement certifications lapse after two years and expire after five years (CJTC, 2022). For lapsed certifications, an equivalency academy is required, which is 80 h in length and includes coursework in crisis intervention, in-service patrol tactics, criminal procedures, criminal law, handcuffing, use of force, and other topics (CJTC, 2021). If

the certificate expires, the returning LEO would need to retake the entire basic law enforcement academy (CJTC, 2022). Similar requalification standards are required for most states, but not all. For example, Georgia allows certification to remain active indefinitely without requalification unless the certification is revoked or suspended for cause (GA CA, 2022).

To summarize, training, retraining, and education are purported to be essential components of effective and informed modern-day law enforcement. Yet, little is known about how much actual attention is given to traffic stop education and training. The current study begins to address this question, utilizing training policies and data from states with the highest number of fatal felonious LEO traffic stop encounters. In doing so, we hope to extend previous knowledge on traffic stop encounters by examining time devoted to this specific LEO function.

### 3. Methods

#### 3.1. Data

Data were derived from a variety of secondary data sources, including the Officer Down Memorial Page (ODMP), Law Enforcement Officer Killed and Assaulted (LEOKA) database, news articles, publicly available court documents, and state and local law enforcement informational websites. ODMP represents a comprehensive qualitative database of felonious and non-felonious deaths of police officers in the United States (ODMP, 2022), while LEOKA is a Federal Bureau of Investigations compiled database of line-of-duty deaths and assaults collected from participating law enforcement agencies (FBI, 2022). With LEO deaths commonly being newsworthy, Google searches were completed for the following search terms: “law enforcement officer killed,” “police officer killed,” “peace officer killed,” “deputy killed,” “traffic stop death,” “car stop death,” and “traffic enforcement death.” LEO agency websites commonly include officers killed in the line of duty. The agency websites were searched for relevant data, including any training information that may be posted. The data from the internet searches was triangulated with databases, publicly available documents, and LEO agency informational websites.

Our study was limited to intentional, traffic stop-related LEO deaths from January 1, 1990, to June 30, 2021. For this study, data was extracted on 125 officers who were killed in the line of duty, with the goal of identifying the training and educational requirements within those states. Data was limited to ante and post-contact incidents, with ante-contact referring to incidents where the LEO and the perpetrator(s) made some type of contact during the traffic stop and the fatal incident occurred before the traffic stop had concluded. Post-contact incidents involve the killing of an LEO who had concluded the traffic stop with either a warning, citation, or arrest. Pre-contact incidents were excluded due to their ambush-style nature and the limitations of training in reducing these types of attacks on LEOs.

Using the above information, the top five states with the most felonious LEO traffic stop deaths were identified as California, Texas, Florida, South Carolina, and Georgia. Each state’s policy of peace officer standards and training materials were collected and coded

**Table 1**  
Demographics of LEOs feloniously killed in the ante- and post-stages of a traffic stop.

Demographic	n (%)	Average	Median
Male	122 (97.6%)		
Female	3 (2.4%)		
Total	125 (100%)		
Age		37.2	36
Tenure		9.6	7
Race	n (%)		
White	104 (83.2%)		
African American	9 (7.2%)		
Hispanic	8 (6.4%)		
Asian or Pacific Islander	3 (2.4%)		
Native American	1 (0.8%)		
Agency Type	n (%)		
Local	73 (58.4%)		
State	25 (20.0%)		
Sheriff	25 (20.0%)		
Educational	2 (1.6%)		
Rank Equivalent	n (%)		
Officer	93 (74.4%)		
Reserve	1 (0.8%)		
Detective	3 (2.4%)		
Corporal	10 (8.0%)		
Sergeant	14 (11.2%)		
Lieutenant	2 (1.6%)		
Rank - Captain	1 (0.8%)		
Rank - Chief	1 (0.8%)		

using content analysis. The states with the highest number of LEO deaths were chosen as the focus since fatal critical incidents tend to shape training and equipment usage to increase LEO survivability (Gilmartin, 2002). Additionally, we compared the top five states with three states with the lowest felonious LEO traffic stop deaths to determine if a noteworthy difference in training or education could be identified.

### 3.2. Variables of interest and analysis

State training regulation and requirement-specific variables include state, academy hours and requirements, mandated annual training requirements with perishable skills, traffic stop training hours in the academy, continuing education requirements for traffic stops, and retraining requirements. Descriptive statistics and content analysis were used for the LEO demographic and incident-specific variables, while content analysis was used to examine the state training regulations and requirements.

## 4. Findings

In the review of law enforcement officers feloniously killed during and after traffic stops from January 1990 to June 2021, a profile of 125 officers was developed. The majority of LEOs were men (97.6%), in their 30s (31.7%), employed with a municipal law enforcement agency (58.4%), at the rank equivalent of a patrol officer (74.4%), and killed during the course of a traffic stop (88.0%). The average age at the time of death was 37.2 years, with an average tenure of 9.6 years, as shown in Table 1.

The year the fatal LEO incidents occurred was reviewed and separated by decade. The highest number of deaths in a single year occurred in 2000, with eight deaths (6.4%), followed by seven deaths in 1991 (5.6%), and six deaths in each 1994 and 2019 (4.8% each year). By decade, the most deaths occurred in the 1990s (50 or 40%), followed by the 2000s (40 or 32%), the 2010s (30 or 24%), and the 18 months of the 2020s examined (5 or 4%), as outlined in Table 2.

As to be expected, the states that employ the most officers generally had the highest number of felonious LEO deaths ante and post-traffic stops. Fifteen officers were killed in California (12.0%), 14 in Texas (11.2%), 10 in Florida (8.0%), eight in Georgia (6.4%), and six in South Carolina (4.8% each), totaling the top five most fatal states. Table 3 lists all states with LEO felonious ante and post-traffic stop deaths and their prevalence.

Most officer fatalities, at 110, occurred during proactive traffic stops (88.0%), with 15 (12.0%) occurring during felony traffic stops, as shown in Table 4. The stage where the fatal injury occurred during the course of the traffic stop was differentiated into the ante and post phases of a traffic stop. Most LEOs were fatally injured in the ante phase of the traffic stop (92.8%) and killed by gunfire (88.0%), with other deaths due to vehicular assault, assault, bombing, and stabbing.

Of the nine LEOs killed post-traffic stop, four (44.4%) were killed when a suspect or passenger returned to their vehicle to retrieve a weapon (see Table 5). Four LEOs (44.4%) were killed using weapons concealed on the suspect that were missed during a search. The missed weapons resulted in the suspects firing at the officers from inside the patrol car.

### 4.1. State training requirement

The above profile was used to determine the top five states with the highest number of ante and post-traffic stop felonious LEO deaths. California, Texas, Florida, Georgia, and South Carolina had the most LEO murders stemming from traffic stops during the years examined, and all above states have a governing body overseeing law enforcement, academy training, and continuing education. The five states were assessed on the number of hours dedicated to traffic stop-related training, education, and retraining, as well as overall training hours. All state training requirements are outlined in Table 6.

**California.** California law enforcement is governed by the California Peace Officer Standards and Training (POST), which sets a minimum academy hour standard of 664 h. Most academies within the state are over 900 h in length, though the length varies by the individual academy (CA CA, 2020). The required traffic stop-specific academy time in California is 14 h, or 2.1% of the total minimum academy time (CA CA, 2020). The academy is separated into 44 Learning Domains that cover topics ranging from terrorism awareness to patrol operations. The training in Learning Domain 22, Vehicle Pullovers, includes scenario testing that involves problem-solving, decision-making, officer safety, and effective communication (CA CA, 2022).

California requires 24 h of training every two years, equating to 12 h of continued education annually as stated in 11 CCR §1005 (CA POST, 2021b). There are five categories of perishable skills, including tactical firearms, driver training and awareness, arrest and control, strategic communications, and use of force. There are 4-h minimum requirements biannually for each of the aforementioned areas, except for strategic communication, which has a 2-h minimum requirement for the continuing education course (CA POST,

**Table 2**  
Decades when LEOs were feloniously killed during traffic stops.

Decade	n (%)
1990–1999	50 (40.0%)
2000–2009	40 (32.0%)
2010–2019	30 (24.0%)
2020–June 30, 2021	5 (0.4%)

**Table 3**  
States where LEOs were feloniously killed during traffic stops.

State	n (%)
California	15 (12.0%)
Texas	14 (11.2%)
Florida	10 (8.0%)
Georgia	8 (6.4%)
South Carolina	6 (4.8%)
Arkansas	4 (3.2%)
Illinois	4 (3.2%)
Indiana	4 (3.2%)
Michigan	4 (3.2%)
Mississippi	4 (3.2%)
North Carolina	4 (3.2%)
Virginia	4 (3.2%)
Alabama	3 (2.4%)
Arizona	3 (2.4%)
Maryland	3 (2.4%)
New Mexico	3 (2.4%)
Pennsylvania	3 (2.4%)
Puerto Rico	3 (2.4%)
Tennessee	3 (2.4%)
Colorado	2 (1.6%)
Minnesota	2 (1.6%)
Missouri	2 (1.6%)
New Jersey	2 (1.6%)
Ohio	2 (1.6%)
Utah	2 (1.6%)
Wisconsin	2 (1.6%)
West Virginia	2 (1.6%)
Alaska	1 (0.8%)
Hawaii	1 (0.8%)
Idaho	1 (0.8%)
Kansas	1 (0.8%)
Louisiana	1 (0.8%)
New Hampshire	1 (0.8%)
Oklahoma	1 (0.8%)
Total	125 (100%)

**Table 4**  
Traffic stop demographics.

Type of Traffic Stop	n (%)
Proactive	110 (88.0%)
Felony	15 (12.0%)
Stage of the Traffic Stop	
Ante	116 (92.8%)
Post	9 (7.2%)
Cause of Death	
Gunfire	110 (88.0%)
Vehicular Assault	11 (8.8%)
Assault	2 (1.6%)
Stabbing	1 (0.8%)
Bomb	1 (0.8%)

**Table 5**  
Circumstances of LEO deaths post-traffic stop.

Circumstances	n (%)
In-custody suspect retrieved concealed firearm from their person while in rear off patrol car	4 (44.4%)
Suspect/passenger returned to car to retrieve weapon	4 (44.4%)
Bomb detonation during vehicle search post-arrest	1 (11.1%)

**Table 6**  
State law enforcement training requirements.

State	Academy Hours (minimum)	Traffic Stop Academy Training Hours <i>n</i> (% total hrs)	Average hours of required continued education hours annually (requirement/years)	Traffic Stop-specific required continued education	Hours of Traffic Stop-specific Training	Requalifi-cation after Separation	Traffic Stop-specific Hours in Requalification <i>n</i> (% total hrs)
California	664	14 (2.1%)	12 (24/2 years)	No	0	Yes	2 (1.39%)
Texas	696	11.2 (1.6%)	20 (40/2 years)	No	0	Yes	0
Florida	770	54 (7%)	10 (40/4 years)	Yes	Not assigned	Yes	0
Georgia	408	12 (2.9%)	20 (20/1 year)	No	0	No	0
South Carolina	320	10.25 (2.2%)	13.3 (40/3 years)	No	0	Yes	0

2021b). Other biannual training requirements include domestic violence complaints, first aid and cardiopulmonary resuscitation, and high-speed vehicle pursuits, with a racial and cultural diversity training course required every five years (CA POST, 2021a).

Should an LEO be separated from qualified employment for three or more years, a 144-h requalification course is required by POST (CA POST, 2021d). A portion of the requalification curriculum includes 2 h of vehicle pullovers (1.4%), and a scenario test is not required (CA POST, 2021e). A detailed training bulletin from April 2021 shows the course objectives for each of the five perishable skills categories, which include judgment and decision-making, as well as officer safety, but do not include any specific training or retraining requirements for traffic stops (CA POST, 2021c). There is no state-mandated training or retraining required for traffic stops for continually employed LEOs in California.

**Texas.** The Texas Commission of Law Enforcement (TCOLE) governs LEO education in Texas, requiring 696 h of academy training (TCOLE, 2020a). The Basic Peace Officer academy training (BPOC) assigns 68 h to the topic of traffic code and crash investigations, which includes 4 h of traffic direction and a sample crash scene for investigation (TCOLE, 2020a). There are no practical scenarios for traffic stops in any of the 39 sections of the traffic code and investigations chapter of the BPOC (TCOLE, 2020a). Chapter 35 of the BPOC, Patrol Skills, outlines traffic stops, provides multiple lecture scenarios, and a practical scenario that includes a foot chase around the vehicle, demonstration of all approaches for the traffic stop, practicing the exchange and delivering of documents, and the use of simunitions. The combination of patrol skills and traffic stops is 46 h of the BPOC academy time. Of the 37 subsections in Chapter 35's Patrol Skills, nine relate to traffic stops (24.3% of the content). While all subsections may not take equal amounts of time, this equates to 11.2 h which is approximately 1.6% of the academy, and the entire Patrol Skills area is 6.6% of the total BPOC academy time.

Biannually, LEOs are required to complete 40 h of training every two years, averaging 20 h per year (TCOLE, 2021). Continuing education includes cultural diversity, crisis intervention, special investigative topics, de-escalation, human trafficking, canine encounters, interacting with deaf and hard-of-hearing drivers, crisis intervention training, and civilian interaction training (TCOLE, 2021).

For those who separate from sworn law enforcement employment and require reinstatement of a license, TCOLE Regulation §223.17 requires that LEOs must meet the reactivation license requirements (TCOLE, 2020b). However, there is no timeline stated for the completion of the requirements (TCOLE, 2020b). There is an 8-h reactivation physical skills assessment that includes handcuffing, firearms training, and emergency medical assistance (TCOLE, 2020a). The TCOLE course curriculum materials and updates do not have other reinstatement curricula or any specific courses for traffic stops listed in their rules and regulations or course curriculum materials. There is no state-mandated training or retraining for traffic stops for continually employed LEOs in Texas.

**Florida.** Florida law enforcement training is governed by the Criminal Justice Standards & Training Commission (CJSTC). The purpose of the CJSTC is to ensure that LEOs are properly trained by establishing minimum standards for training, creating curriculum requirements, and certifying trainers and training agencies (CJSTC, 2022). The academy is 770 h long, including 18 training courses. Two of the training courses in the academy are directly related to traffic stops, including traffic stops and driving under the influence traffic stops (Broward College, 2016). Therefore, recruits receive 54 h of traffic stop-related training, specifically, 30 h of traffic stops and 24 h of driving under the influence-based traffic stops. The 54 h constitute 7.0% of the total academy time (Broward College, 2016).

The CJSTC requires 40 h of in-service training every four years, averaging 10 h of training annually (FDLE, 2022a). Required training courses include human diversity interpersonal skills, use of force training, dart-firing stun gun, firearms qualification (every two years), domestic violence, juvenile sexual offender investigations, discriminatory profiling and professional traffic stops, and misuse of electronic databases (FDLE, 2022a). Most of the courses do not have a specific curriculum or course hour requirement, though the dart-firing stun gun requires 4 h of training initially and 1 h of training annually (FDLE, 2022a). The discriminatory profiling and professional traffic stops course includes training on traffic stops, the interaction between LEOs and diverse populations, and the use of force. The course is unique in that it does not have any assigned training hours associated with the mandated requirement (FDLE, 2022a). New one-time training requirements, starting in 2021 and 2022, outline training in identifying and investigating human trafficking (4 h), and recognizing head injuries in infants and children (no hour requirement). The annual 2 h of traffic stop-related training is offered virtually (FDLE, 2022c). For LEOs who do not complete the mandatory training, LEOs will lose their certification and will not be able to complete the duties of a sworn LEO until they have completed the required training (FDLE, 2022a).

LEO certification is maintained as long as the person is employed with a law enforcement agency and completed the required mandatory training (FDLE, 2022b). After employment ends, the certification remains active for up to four years (FDLE, 2022b). If there is a break of service from four to eight years, the former LEO must complete 40 h of mandatory training before sitting for the certification exam (FDLE, 2022b).

Florida has mandated training relating to traffic stops for continually employed LEOs. The curriculum for the mandated traffic stop course was not developed, leaving agencies to write their own curriculum. However, unlike other mandatory courses, the traffic stop training does not have an associated hour requirement.

**Georgia.** The Georgia Peace Officer Standards and Training Council (GA, 2022) leads LEO training in the state of Georgia and requires 408 h of academy training (GA, 2006). Areas of study include a wide range of topics, such as the criminal justice system, Georgia criminal law, vehicle pullovers, firearms, and defensive tactics (GA, 2006). The GA POST academy requires 12 h of traffic stop training, which constitutes 2.9% of all academy training (GA, 2006).

Similar to the Texas POST requirements, Georgia LEOs are required to complete 20 h of training per year (GA, 2017). The annual training requirement includes 1 h each of firearms requalification, use of deadly force, and de-escalation training, with 2 h of required community policing (GA, 2017). The training is available online and in-person through the Georgia Public Safety Training Center (GPSTC) with full lesson plans. The remainder of the 15 required hours of training are not outlined by GA POST (GA, 2009;

GA GA, 2017). Other courses outlined as being offered by the GPSTC include fostering positive community relations, cultural awareness, police legitimacy, and different weapon qualifications, but do not require or list traffic stop-specific training or education opportunities (GA GA, 2017).

If a Georgia LEO fails to maintain their training standards, they will lose their arrest powers and their certificate will be suspended (GA GA, 2009). Effective January 1, 2022, those who leave law enforcement and have an expired certification no longer require recertification (GA CA, 2022). Before the start of this new standard, requalification required a classroom or online course in legal updates, use of force, de-escalation, community-oriented policing, and firearm requalification (GA CA, 2022). There is no state-mandated training or retraining for traffic stops for continually employed LEOs in Georgia.

**South Carolina.** The South Carolina Criminal Justice Academy (SCCJA), governed by the South Carolina Training Council (SCLETC), requires 320 h of training in the basic academy. As of October 2020, the SCCJA Basic Training Curriculum totaled 469.25 h separated into 79 modules (SCCJA, 2020). The SCCJA Basic Law Enforcement Manual Block 1 briefly outlines South Carolina LEOs assaulted and killed during different types of calls for service and proactive activities, including traffic stops and pursuits. (SCCJA, 2021b). The SCCJA Basic Law Enforcement Manual Block 4 includes training in vehicle tactics (SCCJA, 2021c). The lesson plan on vehicle tactics was last revised in Fall of 2020 and consists of 5 h of classroom time and over 5 h of critical thinking or hands-on experience (SCCJA, 2021c). The lesson plan outlines instructions and tactics when conducting vehicle stops, including high-risk traffic stops (SCCJA, 2021c). The 10.25 h of traffic stop instruction equates to 2.2% of the total academy time.

LEOs are required to earn 40 h of Continuing Law Enforcement Education (CLEE) training every three years, equating to 13.3 h of training annually (SCCJA, 2017). Required courses include one domestic violence course, one vehicle operations course, and one legal update course, with the remainder of the training available from any trainer approved by the SCCJA (SCCJA, 2017). Training programs outlined in Chapter 37 of the SCCJA include specific information on emergency vehicle training operations, firearms qualifications, and speed measurement device operations (SCCJA, 2017). Departmental lesson plans approved for 2021 training include high-risk traffic stop practicals, high-risk traffic stops, and traffic stops, though none are listed as being required (SCCJA, 2021a; SCCJA, 2022). Should law enforcement agencies not comply with training orders of the SCLETC, civil penalties of \$1500 maximum can be imposed (SCCJA, 2022).

South Carolina LEOs who have a break of service of one to three years require a background check with fingerprints, a photograph, and medical examination, a training program approved by the SCLETC, and reapplication for certification through SCCJA (SJCCA, 2017; SC SC Legislature, 2018). LEOs who have been away from their job for more than three years have the same requisites, including reapplication for certification and requalification with a firearm (SCCJA, 2017; SC SC Legislature, 2018). There are no requirements in the statutes of coursework needed to receive recertification, even after three or more years of separation. There is no state-mandated training or retraining in traffic stops for continually employed LEOs or separated LEOs seeking requalification in South Carolina.

There were a total of 16 states with no LEO traffic stop-related felonious deaths. Of the 16 states, one state was chosen from each region (West, Midwest, East) to further examine their policies, which are outlined in Table 7. The states without any LEO deaths were: Connecticut, Delaware, Iowa, Kentucky, Maine, Montana, Nebraska, Massachusetts, Minnesota, Nevada, North Dakota, New York, Oregon, Rhode Island, South Dakota, and Vermont. A state was randomly selected from each region, with Oregon representing the West, Nebraska representing the Midwest, and Rhode Island representing the East.

**Oregon.** The Department of Public Safety Standards and Training (DPSST) governs Oregon criminal justice professionals, private security, and private investigators (State of Oregon, 2023b). The basic police academy is 640 h, with a focus on 59 topics, including tactical medicine, threat assessment, resiliency, defensive tactics, firearms, and behavioral health (DPSST, 2021). Of the 640 academy hours, 32 h are dedicated to traffic stops (5%), including unknown-risk and high-risk stops (DPSST, 2021).

Oregon LEOs are required to complete 84 h of continuing education every three years, or 28 h annually (State of Oregon, 2023a). Annual training requirements include 8 h of use of force training and 1 h of ethics. Three-year training cycle requirements include 3 h of equity training, 2 h of airway circulatory anatomy and physiology, 3 h of a mental health crisis, and first aid/cardiopulmonary resuscitation (State of Oregon, 2023a). Oregon does not have any required traffic stop-related training in its continuing education requirements.

**Nebraska.** Law Enforcement in Nebraska is governed by the Nebraska Crime Commission (NCC) (Nebraska Crime Commission, 2023a). The NCC requires 600 h in their basic police academy, and they link the academy objectives to physical job tasks (Nebraska Crime Commission, 2023b). There is no publicly available breakdown of academy hours or content, and inquiries to the NCC went unanswered.

There are continuing education hours required for Nebraska LEOs, which increased from 28 h in 2022 to 32 h in 2023 (Nebraska

**Table 7**  
State law enforcement training requirements.

State	Academy Hours (minimum)	Traffic Stop Academy Training Hours <i>n</i> (% total hrs)	Average hours of required continued education hours annually (requirement/years)	Traffic Stop-specific required continued education	Hours of Traffic Stop-specific Training
Oregon	640	32 (5%)	28 (84/3 years)	No	0
Nebraska	600	Unknown	32	No	0
Rhode Island	880	10 (1.1%)	0	No	0

Crime Commission, 2023c). The required courses include a minimum of 2 h of anti-bias and implicit bias training annually. The other required courses do not have an associated time requirement and include a refresher in de-escalation, mental health, substance abuse, firearms, officer wellness, vehicular pursuit policy review, and legal updates, including legislative updates and First and Fourth Amendment issues (Nebraska Crime Commission, 2023c). Nebraska does not have any required traffic stop-related training in its continuing education requirements.

**Rhode Island.** Rhode Island LEO training is governed by the Rhode Island Police Officers Commission of Standards and Training (RIPOST) (State of Rhode Island, 2023b). The police academy is 22 weeks or 880 h, with academy courses separated into umbrella topics, including patrol operations, highway safety, firearms, police-community interaction, report writing, and more (State of Rhode Island, 2023a). A total of 52 h are spent on criminal law topics, 106 on firearms, 156 on highway safety, 87 on patrol operations, 38 on report writing, and 24 on police-community interaction (State of Rhode Island, 2023a). Of the 880 total academy hours, 10 h are spent on motor vehicle stops (1.1%), with 4 h focused on unknown and high-risk stops and 6 h focused on counter-terrorism. There are 72 h reserved for role-playing, practical exercises, and mock testimony, though there is no breakdown of any hours spent for traffic stop-specific scenarios (State of Rhode Island, 2023a).

RIPOST advertises continuing education hours, though there are no specifications in their regulations or academy outline of the number of required continuing education hours annually or biannually. RIPOST confirmed that they do not require continuing education for LEOs, with continuing education needs based on assessments with state and national compliance. A list of upcoming in-service training courses included training for supervisors, field training officers, pedestrian and bicycle safety training, taser energy weapon courses, and a motorcycle operators course, with nothing geared towards traffic stops (State of Rhode Island, 2023c). Rhode Island is the only state of the eight examined that does not require LEO continuing education.

## 5. Discussion

This exploratory study utilized training and education data from states with the largest proportion of LEO felonious deaths to determine the breadth of education, training, and retraining requirements. Of the 116 ante-traffic stop-related felonious deaths the majority of LEOs were white males, in their late 30s (37.3 average), working at a local level (61.2%), and at the rank of officer (73.3%). The average tenure was 9.7 years, ranging from 1 year to 43 years of service. Most LEOs were killed during a traditional traffic stop (87.1%), with the cause of death being primarily gunfire (87.9%). The significantly higher number of traditional traffic stop deaths aligns with the higher frequency of traditional traffic stops versus felony traffic stops. LEOs surveyed about their reasons for conducting a traffic stop prioritized speeding and equipment violations, with 9% focusing on suspicion of criminal activity (Harrison, 2021). When suspected felons occupy a vehicle, additional safety measures, including having more cover officers and using different tactics, likely reduce injuries with the known high-risk nature of the stop (CA CA, 2018). Post-traffic stop incidents had a similar profile, with most LEOs killed by gunfire following a traditional traffic stop and had an average tenure of 8.8 years. Of the stops that concluded in an arrest, almost 45% of LEOs were killed as a result of a missed concealed firearm when the suspects were handcuffed in a patrol vehicle.

When reviewing the deaths by decade, the highest number of deaths occurred in the 1990s, with 50 deaths (40%). Violent crimes were at their highest nationally in 1993, totaling over 23,000 homicides, with a spike in homicides in 2020 at nearly 18,000 (FBI, 2023). An argument has been made that one contributing factor to the decline in crime in the 1990s was the increase in the number of law enforcement personnel (Levitt, 2004). The number of police per capita increased by roughly 14% in the 1990s, which was greater than in previous decades (Levitt, 2004). It stands to reason that in response to the rising crime rate, departments hired more LEOs, resulting in more proactive traffic stops, and a greater likelihood of fatal encounters. Likewise, innovative policing strategies may have influenced the proactive policing paradigm, resulting in an increase in traffic stops. For example, Operation Ceasefire in Boston in the 1990s sought to get guns out of the hands of youth, focusing on trafficking and vehicle stops to find illegal firearms (Braga and Pierce, 2005; Walker, 2015). The success of Operation Ceasefire led to other agencies adopting similar proactive traffic stop strategies within their jurisdictions (US Attorney's Office, 2021), which likely raised the number of traffic stops nationally.

There was a 20% decrease in LEO deaths from the 1990s to the 2000s (40 deaths), and another 25% drop from the 2000s to the 2010s (30 deaths). Line-of-duty deaths have decreased over the last 50 years, partially due to improved safety measures in vehicles, availability of trauma care, and bullet-resistant vest requirements, with a clear link between body armor usage and lower risks of death (White et al., 2019). The first 18 months of the 2020s claimed five LEO lives during traffic stops. The COVID-19 pandemic significantly limited proactive law enforcement activity, including traffic stops, so the estimated death count in the 2020s of 17 deaths, if kept on the same trend, is likely a low estimate as LEOs return to proactive activities.

Considering the number of traffic stops that resulted in an LEO felonious fatality is small, and the number of post-traffic stop incidents where the suspect was in custody and able to kill an LEO is even smaller, the overlooking of a concealed firearm appears to be ultra rare. However, in these instances, situational awareness and a more thorough suspect search arguably could have prevented the fatal injuries. The ranges of tenure of the LEOs killed, from 1.25 years to 17.4 years, may hint at the inexperience or potential complacency in the position playing a role in the fatal incidents. Continuing education specifically focused on traffic stops and the searching of persons may have refreshed new and tenured officers on safety protocols and procedures. Three of the LEO deaths occurred in California and Texas, where no continuing education in traffic stops is required. Furthermore, while the focus of this study was on felonious traffic stop deaths of LEOs, traffic stops that result in the deaths of citizens should not be ignored. With continued concerns about racial and gender bias and profiling in conducting traffic stops (Epp et al., 2014), anti-bias training can be incorporated with regular traffic stop-related experiential learning courses. Training and education will not only benefit LEOs but could also keep community members safer.

Traffic stops continue to be the primary point of contact between police and community members, yet it appears little priority is

given to the education, training, and retraining of this particular policing tool. With President Obama's 21st Century Task Force on Policing outlining the critical need for training and education, training was supposed to be the change agent in law enforcement. Current state policy regarding traffic stop-specific training does not reflect the significance of training priority articulated by the Task Force. Transparency of policies and procedures, another action step of the Task Force, is neither consistent nor widely available nationwide. There is a reliance on initial academy training for traffic stops, an essential function of law enforcement, without continued training to integrate newer technology or tactics into the vital task.

The five states with the most LEOs murdered during traffic stops include California, Texas, Florida, South Carolina, and Georgia. The states with the highest number of employed police officers in 2022 were California (70,090), Texas (59,090), New York (50,600), Florida (47,000), and Illinois (29,290) (BLS, 2022). As expected, there is some alignment with the top five states where felonious killings occur during traffic stops and the states that employ the most LEOs. Noticeably absent in the top five states where felonious killings occur are New York and Illinois. For every 1000 people, California has 2.05 LEOs, Texas has 2.09 LEOs, Florida has 2.48 LEOs, South Carolina has 2.64 LEOs, and Georgia has 3.95 LEOs (US Attorney's Office, 2021). Looking at the selection of states with no LEO felonious traffic stop-related fatalities, Oregon has 1.78 LEOs per 1000 people, Nebraska has 2.00 LEOs, and Rhode Island has 2.35 LEOs (US Attorney's Office, 2021). While a larger number of officers and larger populations in a state can lead to a higher number of law enforcement activities, the number of LEOs per 1000 people does not appear to directly correlate with the highest number of LEOs feloniously killed during traffic stops.

States with the most LEOs killed feloniously during traffic stops average 3.2% of academy time and 0.1% of continuing education hours towards traffic stops. California, which is often purported to have the most extensive LEO training requirements, spends only 2.1% of the total academy time on traffic stops and does not require continuing education on the topic. Similarly, Texas spends less than two percent of academy time on traffic stops. Georgia and South Carolina average less than three percent of their academy time on traffic stops. Florida spends by far the most time, with only 7% of academy time allocated for traffic stop training and education. Furthermore, Florida is also the only state in this study that requires traffic stop-specific continued education; however, there is no denoted time requirement.

Hours assigned to traffic stop training and education are minimal in states with the most traffic stop-related LEO murders. Most felonious killings involve tactical errors that turn deadly, denoting the necessity to focus on proactive policy creation and training (Meyer, 2020). As LEO deaths continue, sharing investigatory findings of the felonious LEO traffic stop-related death or holding a debriefing on the incident can help to increase awareness and possibly prevent future similar tragedies. If a debriefing or retraining was completed after the felonious deaths, it was not memorialized into state policy to continue in future years.

States with the most LEO fatalities had an average of 20.3 h of traffic stop-related training in the academy compared to 21 h devoted to traffic stops in states with no felonious traffic stop-related LEO deaths. Continuing education requirements were 27.9% higher (30 h) in states without fatalities compared to 15.1 h for states with the most fatalities, though Rhode Island does not have any continuing education requirements. Only one state, Florida, with the third highest number of fatalities, required traffic stop-specific training though there was not a specific number of hours assigned to the topic. There was not a dramatic difference in terms of dedicated traffic-stop-related training and continuing training hour requirements between states with the highest and lowest traffic-stop-related LEO fatalities. The content of the training, its interactive nature, and its implementation is largely unknown. This suggests that the number of dedicated traffic-stop-related training hours may be less important than the actual content of the training, which should be closely evaluated.

LEOs are expected to be well-versed in an extensive list of skills. LEOs must have some form of training or education on tactical communications, ethics, firearms, use of force, de-escalation, first aid, and other vital topics. Arguably, this is likely why traffic stop training and education appear to be regulated as a low-priority requisite. While LEOs killed in traffic stops are a rare occurrence, it does continue to occur. Many factors come into play during a traffic stop, from training and experience to external factors such as weather and visibility, though research shows that LEOs refer to their training during high-stress, critical situations. Without having continuing training on traffic stops, an LEO's training reference may be from the academy many years prior or field training, where bad habits and inattention may overshadow the primary training objectives.

Training is an important component of building foundational skills, and ensuring LEOs comply with best practices. Prescribing additional training may seem logical, but the type of training must also be taken into consideration. Even with increased and improved training in the last decade, there is not an agreed-upon training model for effectiveness (Jonathan-Zamir et al., 2022). Training needs to include proper structure and education, requiring the curriculum to be well thought out and include a practical component (Comer, 2013 & Nila et al., 2012). Courses should reflect adult learning methodologies in dynamic learning environments, assisting in training LEOs across multiple generations and tenures, while incorporating a review of critical incidents (Cleveland, 2007; Willis, 2011). Failing to mandate regular and specific training may put departments at risk for liabilities. Deficiencies can be identified and corrected during the training process. For example, experienced officers can develop attitude changes, including gravitation towards known undesirable behavior, without fully recognizing the transition and reception to training practices (Garner, 2005). Rookie officers can shift their attitude and practices to mirror more experienced officers (Garner, 2005), which can lead to the dismissal of safety practices and tactics provided in the basic academy. Training and regular follow-up assessments ensure LEO personnel are maintaining the appropriate skills and education, as well as addressing officer safety concerns.

There is no single profile of an offender who kills LEOs, so training objectives should review critical incidents at a local and national level. The review should include what was done, what should be done, what can be done better, and interpret the deadly mix of the LEO, suspect, and circumstances (Willis, 2011). Bridging the gap between a fatal or potentially fatal incident and current practices using real-world examples may increase understanding and interaction with LEOs during training and improve safety for LEOs and the community.

Continued training is commonly built into 8-h days with fillers to ensure the time requirements are met (Connolly, 2008). The mandate of training in and of itself may demotivate LEO attention during the course, coupled with some LEO attitudes that one can only learn while doing (Honest, 2020). Adding course content that will be of interest to the LEOs, tying the information directly to job tasks, and enforcing the necessity of the information can assist in motivating LEOs to engage with the learning (Honest, 2020). Aligning continuing education course goals with job tasks and increasing interactions in the course can assist with the usefulness of the training time and improving or refreshing skillsets.

## 6. Future research

This paper offers an examination of formal policies and procedures, though the informal culture surrounding traffic stop-related and annual training, including the viewpoints of recruits and tenured officers, was not assessed. Commonly identified issues of the police subculture, such as entrenched cynicism and distrust of outsiders, do have an impact on how training is accepted and accomplished. While outside the purview of this study, future research should address the informal culture of traffic stop training for a holistic examination of how required training is received by the law enforcement community, as well as the content of the training. Research devoted to traffic stop-related formal training reactions, content, and how policing is learned through activity on the streets can be examined to provide additional insight into formalized training versus informal on-the-job learning experiences to improve tactics and increase safety.

## 7. Conclusion

Due to the complexity of the law enforcement profession, current political and social climates, and emerging technology changes, it is difficult to determine what the top training priority should be. There is an increasing demand for LEOs to be experts in many different aspects, including managing competing technologies and interacting with a community that does not always support their efforts. While felonious deaths of LEOs during and after traffic stops are rare, training should be prioritized to increase safety, improve community relations, and reduce liability.

Traffic stops are considered a routine function within law enforcement, though academy and continuing training requirements do not place a notable focus on their importance. It is reasonable that traffic stop training should be revisited, even biannually, and added to requirements due to the potentially fatal consequences that can occur during traffic stops. Nearly half of all LEOs killed post-traffic stop involved suspects who had concealed firearms when taken into custody that were not recovered in a preliminary or secondary search of the suspect. While many factors affect safety during traffic stop encounters for both LEO and community members, education, training, and continuing education can increase safer outcomes for all.

Ideally, traffic stop-related training would be implemented bi-annually for all sworn LEOs who may complete a traffic stop in the course of their duties, no matter their current assignment. Due to the nature of traffic stops, in-person training with scenarios would be optimal, with feedback on tactics and safety. With a brief classroom-based overview of traffic stops, car positioning, and tactics, scenario-based training can last 2–3 h, totaling 3–4 h of training every two years. Adding traffic stop training to the normal training cycle can refresh the skills of those who may have transitioned away from patrol for a rotation, as well as for those who may have been on leave for an extended period of time. Recognizing the advancement of technology with online training, learning modules with traffic stop-related tactics and refresher information can be provided virtually in an interactive format. While in-person training is preferred, an online module can be accessed at any time and can still refresh the mechanics of a traffic stop that is not currently addressed by many states.

With states outlining the minimum requirements for training compliance and certification, local departments have the ability to expand traffic stop-specific training and education standards. A brief examination of local agencies within these states revealed many departments adhered to the minimum training and education hours for topics outlined by the state. It does generally appear that traffic stop training and continuing education are deprioritized at both the state and local levels.

This exploratory study thoroughly examined the states with the highest and lowest number of felonious fatal LEO deaths during a traffic stop. A cursory examination of other states showed similar results with limited traffic stop-related academy training and continuing education requirements. While training requirements were not vastly different in states with the highest and lowest number of fatalities, a future study about the implementation, content, and reception of required training would be beneficial for a greater understanding of training policy and practices. Likewise, other elements of roadway safety, including unrelated vehicles colliding with stopped vehicles, pursuits, and other roadway hazards that contribute to felonious and non-felonious deaths of LEOs in the course of traffic stops could also be evaluated to examine more safety issues. Increasing awareness and training in traffic stops, including roadway safety, can lead to fewer LEO injuries and deaths.

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