Undercounted is Underinvested:

HOW INCOMPLETE CRASH REPORTS IMPACT EFFORTS TO SAVE LIVES

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The National Safety Council reviewed 50 crash reports to assess the existence of fields and codes for leading crash factors: alcohol and other drug use, distraction, fatigue, speed, and teen and novice drivers. The Council also assessed the presence of fields to capture advanced driver assistance system technologies (ADAS) and whether the trip was work-related or personal.

EXECUTIVE **SUMMARY**

Preliminary National Safety Council (NSC) estimates show that 2016 may have been the deadliest year on the nation's roads since 2007. As many as 40,000 people may have died as a result of motor vehicle crashes, while an estimated 4.6 million additional roadway users were seriously injured. This marks a 6% increase over 2015 and a 14% increase over 2014. There is so much loss, but little is known about key driver behavior factors in these crashes, because critical data is under-reported.

Collecting data from a crash scene may be seen as merely "filling out accident reports" for violation and insurance purposes. Data collection efforts immediately following a crash provide a unique opportunity to help guide prevention strategies. Currently, some states are recording this type data and others are not. When data of this kind is requested to be reported on a crash report and is entered, prevention professionals will have the data to better understand driver and non-motorist behaviors. When this data is not recorded, prevention professionals are left guessing.

There are two areas of crash factor data in which under-counting can be a detriment to prevention efforts on a national level:

- Factors that are difficult to observe and measure, such as driver behavior.
- Factors involving fast emerging communications entertainment technologies, and advanced driver assistance systems.

The National Safety Council is calling for law enforcement and the traffic safety field to:

- Respond faster to rapidly emerging issues
- Move faster toward electronic data collection
- Encourage states to increase standardization with Model Minimum Uniform Crash Criteria (MMUCC)
- Shift from an accident report mentality to a crash investigation focus
- Train law enforcement on their role in collecting prevention data
- Invest in crash causation research projects to collect needed data
- Invest in local and state toxicology resources for drug testing
- Convene a multi-disciplinary expert panel to improve cell phone data
- Collect post-crash ADAS information through technology such as electronic data recorders (EDRs)
- Require ADAS fields in VIN reports
- Conduct local crash fatality reviews

Recommendations

> Respond faster to emerging issues.

Communications technology and safety technologies in vehicles, such as ADAS, are evolving quickly. Also, drug use patterns are changing among the U.S. population. Data and research must be more nimble to rapidly respond to these shifts and collect information about emerging safety issues that can affect driving safety.

> Move faster toward electronic data collection.

Electronic crash reports can be efficient, timely, accessible and shareable. Collecting data electronically can accelerate updates and responses to emerging issues.

> Encourage more standardization with MMUCC.

MMUCC Guidelines are developed through a partnership between the U.S. Department of Transportation agencies, the Governors Highway Safety Association and state and local traffic records and highway safety data system professionals. While states are encouraged to adopt MMUCC guidelines, they should be incentivized to do so. This would improve and speed up crash report standardization.

> Shift from an accident report mentality to a "crash investigation."

When collecting data from a crash scene is seen as merely "filling out accident reports" for violation and insurance purposes, data that can help guide prevention strategies may not be captured. The culture must change. A crash investigation must be conducted to determine and document the causal chain and all critical factors of the crash.

> Train law enforcement on how their role in collecting crash investigation data can help prevent future collisions.

Law enforcement has a unique opportunity to support prevention efforts. The data they record can help prevent crashes, deaths and injuries. Contributing factors, like driver and non-motorist behavioral data (even data for legal activities) are used to make decisions to allocate crash prevention resources at the local, state and national levels.

> Invest in crash causation research projects to collect needed data.

For some data elements such as ADAS, electronic distractions, and substance impairment, it might be difficult to significantly improve data collection. Crash causation research pilot projects may help collect needed data where nationwide intensive training would not be practical or would be too big a barrier for rapid data improvement – for example with training all law enforcement on ADAS technologies. Pilot projects could include more intensive crash investigation projects similar to the Motor Vehicle Crash Causation Study, including emerging communication and safety technologies that didn't exist in 2005 to 2007 when the study was conducted.

> Invest in local and state toxicology resources for drug testing.

Increased testing for drugs other than alcohol would require additional funding and staff for local and state toxicology labs. Investments should be prioritized to accommodate increased testing. With the emergence of new designer drugs, the complexity and expense of controlled substance testing has increased, as has the testing backlog. Publicly funded crime labs, particularly county and municipal labs will need more funding and resources as drug use becomes even more prevalent.

> Convene a multi-disciplinary expert panel to improve electronic device use data.

There are significant challenges to identifying and documenting electronic device use by drivers and non-motorists. Focused attention is needed to recommend improvements that may involve innovative technology, law enforcement training, crash report improvement, and examination of what can be accomplished to improve data within legal limits.

> Collect post-crash ADAS information through technology such as electronic data recorders (EDRs).

Lawmakers, law enforcement and automakers should work together to develop a system for collecting ADAS data. The importance of this data will only grow as vehicle automation advances and market penetration increases. Without access to this data, the promise of improved safety through advanced safety technology may not be fully realized. As part of ADAS data collection, NHTSA should consider standardizing ADAS nomenclature and/or taxonomy.

> Require ADAS fields in VIN reports.

Currently ADAS fields are not required to be provided by automakers to NHTSA for the VIN database. The VIN reporting requirement should be updated to include ADAS data fields.

> Conduct local crash fatality reviews.

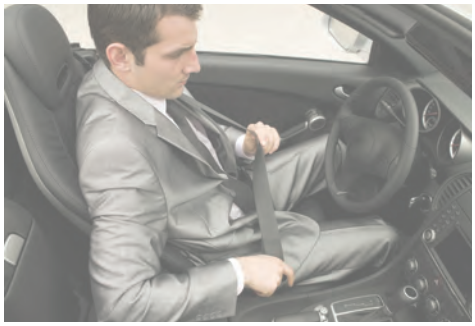
Conduct city or county level reviews of fatal crashes with multi-disciplinary teams, similar to a model used in Wisconsin.[1] The purpose of the reviews is to follow the causal chain of crashes in detail, and identify prevention opportunities that can be implemented locally.

Introduction

Preliminary estimates show that 2016 may have been the deadliest year on the nation's roads since 2007. As many as 40,000 people may have died as a result of motor vehicle crashes, while an estimated 4.6 million additional roadway users were seriously injured. That marks a 6% increase over 2015, and a 14% increase over 2014 – the most dramatic two-year escalation in traffic fatalities since 1964. Not only are we losing more lives, but motor vehicle crashes cost society approximately $432 billion in 2016.

There is so much loss, but so little information about key driver factors in these crashes, because critical data is under-reported. NSC strives to make decisions that are data-driven and seeks to create a sense of urgency to reduce the rising tide of crash fatalities. Without a complete picture of the crash factors, our efforts are stymied. More reliable data about crash factors are required, especially as more technology is integrated into millions of vehicles.

THE LACK OF A COMPLETE PICTURE OF CRASH FACTORS POSES A FUNDAMENTAL PROBLEM TO OUR PREVENTION PROGRESS.



MMUCC

The Model Minimum Uniform Crash Criteria Guideline (MMUCC)[2] provides suggested data elements that should be collected on crash reports and is developed by the National Highway Traffic Safety Administration (NHTSA) and the Governors Highway Safety Association (GHSA). MMUCC also provides a suggested crash report that states and municipalities can use. The intent is to standardize data collection nationally, so that crash data can be compared and used for developing crash prevention strategies.

While MMUCC is voluntary, many states work to achieve "MMUCC compliance," to ensure crash reports collect data suggested in MMUCC guidelines. The fifth edition of MMUCC will be released later this year. Some states have significant revisions to crash reports underway; however, they are awaiting release of the new version of MMUCC and new suggested data elements before finalizing those report updates.

There are two areas of crash factor data in which under-counting can be a detriment to prevention efforts on a national level:

1. Factors that are difficult to observe and measure such as low alcohol concentration, other drugs including prescription, illicit, and over-the-counter drugs, fatigue, and distraction.
2. Factors involving fast-emerging technologies, like ADAS and electronic communication devices. Consumer adoption of these technologies is moving faster than the ability to update crash reports.

DATA HELPS explain size and scope of a safety problem.

When crash factors are not represented, regulations, laws and policies are difficult to justify, and the reasons behind them aren't data-driven. Motor vehicle safety issues may not receive the attention and resources needed to reduce the risks if a clear picture of the issue cannot be painted. The result can be an under-investment in prevention resources or lack of realization about needed vehicle improvements. The presence of data helps explain the size and scope of a safety problem and may shine light on how to address the issues.

Background

NHTSA led the National Motor Vehicle Crash Causation Survey (NMVCCS) between 2005 and 2007. The study conducted in-depth investigations of 5,470 crashes and assigned critical reasons for why the crashes happened. [3]

The NMVCCS found the following:

> Vehicle component failure or degradation **– 2% of crashes.**

> Environment conditions such as weather or roadway **– 2% of crashes.**

> Unknown **– 2% of crashes.**

> Errors made by the drivers **– 94% of crashes.**

The vast majority of critical reasons for crashes involved drivers and the errors they make. These errors included:

> Recognition errors (driver inattention, internal and external distractions, and inadequate surveillance) **– 41% of crashes.**

> Decision errors (driving too fast for conditions, misjudgment of gap or others' speed) **– 33% of crashes.**

> Performance errors (overcompensation, poor directional control) **– 11% of crashes.**

We need a clear understanding of why drivers make these errors in order to significantly reduce crashes, fatalities and injuries. A 2017 National Safety Council survey[4] provides a glimpse into risky driver behaviors that may be the root causes of so many crashes. A startling number of individuals indicated comfort with speeding (64%), texting manually or through voice controls (47%), driving while impaired by marijuana (13%), or driving after they feel they had too much alcohol (10%).

One window into understanding driver errors comes from the investigation at the scene of the crash. Hundreds of factors may be collected on crash investigation reports. The majority of these factors address the vehicles, the roadway and the weather.

There are necessary reasons why crash reports focus on vehicle, roadway, weather, and the chain of events and damage caused. Crash investigation reports must serve multiple purposes.

They provide data for:

> Violations, citations

> Insurance claims

> Liability, criminal and civil cases

> Prevention efforts

While these factors are important, they do not completely address driver errors or the reasons behind them. More attention should be focused on investigating and documenting why drivers made recognition, decision and performance errors. These are the errors that lead to the vast majority of crash injuries and fatalities.

Get to the Root Cause

Many crash investigation reports provide fields and codes to describe the actions of drivers and non-motorists that contributed to a crash: failure to yield right-of-way, failure to obey traffic signs or signals, improper turn or merge, collision with fixed object, etc.

But, why did drivers or non-motorists take these actions? Why would a driver or non-motorist fail to yield right-of-way? If 94% of the time, these actions were due in part to human errors – recognition, decision, performance errors – why were these errors made?

In crash investigation reports, the driver and non-motorist contributing factors point to common behavioral problems that must be solved in order to prevent the crashes.

The action of a driver failing to yield right of way is not the root cause for a crash. A driver failing to yield right of way because he or she was not looking at the roadway gets closer to the answer, but is still not the root cause. A driver failing to yield right of way because he or she was looking at the passenger seat while reaching for a buzzing cell phone is the root cause. Even if using a handheld phone is legal in a state, the cell phone factor should be recorded so that data can better inform us of the scope of the cell phone distraction problem.

The data gathered from crash reports is used to inform prevention decisions and set resource allocation priorities at local, state and national levels. For example:

- **At the local level,** data from crash investigation reports may show a series of pedestrian injuries near a particular intersection. Local agencies can analyze the causal chain and solve problems at that intersection to reduce future incidents. The solutions may involve a combination of vehicle, roadway, driver and non-motorist factors.
- **At the state level,** crash report data supports traffic safety laws and regulations, and it informs decisions about state grants and other financial investments made to prevent crashes, injuries and deaths.
- **At the national level,** there is more attention on fatal crashes in total. Data about all fatal crashes nationwide are compiled into the U.S. Department of Transportation's Fatality Analysis Reporting System (FARS).[5] FARS data allows federal agencies and researchers to study fatal crashes and allocate prevention resources to reduce crashes and deaths.

Project Description and Process

Unfortunately, this data is not always recorded for several reasons:

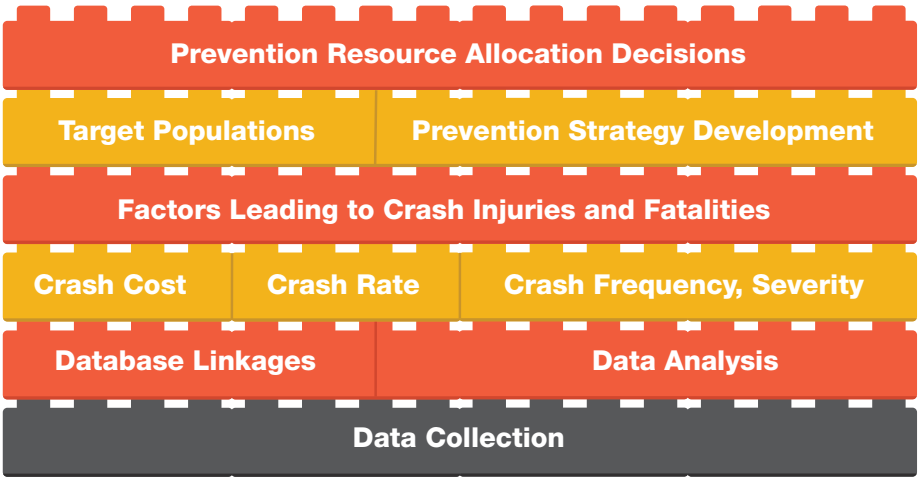
- Fields and numerical codes may not exist, particularly regarding emerging technologies such as smartphone features, in-vehicle "infotainment" systems and advanced driver assistance systems.
- Open-ended fields and narrative are common for some factors, such as drug type from drug test results, but data may be provided less often in narrative than if specific fields and codes existed.
- The contributing factor may be risky, but still legal to do. Police may be more likely to record illegal violations than legal behaviors that are nevertheless risky.
- The contributing factor may be difficult to observe, such as with impairment from low alcohol concentration and fatigue, thus investigators may not pursue documentation.
- The contributing factors may be difficult to support with evidence in a court case, such as with fatigue's involvement in crashes.

Project Description

One foundation for data collection is the availability of specific fields and codes on crash reports. These fields and codes can be used to identify crash factors when the police officer files the report following the motor vehicle crash. They can provide critical real-time data about the factors involved in a crash. If a field or code does not exist in a crash report, however, that data cannot be recorded as easily. Further, even when these fields and codes are available on crash reports, there are reasons why the data may still not be collected, as discussed above. But if we are able to look at all of the available data, the factors assessing driver error in addition to the traditional vehicle, roadway and weather data, it may start eliminating preventable injuries and death on the road.

The National Safety Council embarked on that path by reviewing crash reports, one crash report from each of 50 states. NSC focused on the existence of fields and codes for data where under-counting can be a detriment to prevention efforts on a national level:

- Factors that are difficult to observe and measure: Low alcohol concentration; other drugs including prescription, illicit, and over-the-counter drugs; fatigue; distraction
- Factors involving fast-emerging communications technologies and advanced driver assistance systems.
- Factors involving teen or novice driving
- Factors involving speed
- The purpose of the drive – whether it was work-related or a personal trip



Project Process

This project reviewed selected crash reports from each state as an advocacy communication effort to examine data collection. This project assesses what data fields exist so that the National Safety Council knows what could be recorded, and the project highlights the need to collect all necessary data in order to reduce motor vehicle crashes.

Data for this project was collected by obtaining a crash report for each state from the NHTSA website.[6] State traffic records officials were contacted to confirm whether the crash report sample obtained was current. If it was not the most current, NSC requested a current crash report. For crash reports that are electronic and dynamically-generated, the Council requested the data dictionary, data elements or database schema. NSC staff confirmed current reports or obtained additional data for 50 states. The District of Columbia did not submit a current crash report or data elements.

NSC staff reviewed crash reports to determine if fields or codes exist for specific factors that addressed the focus of this project. Reviewers recorded whether or not fields or codes existed on crash reports, with a "yes" or "no." When crash reports called for information to be recorded in a narrative field, a "no" was assigned.

In some cases, additional information was in the crash report user's manual or other state materials, most often in regards to driver license restrictions. Crash reports often instructed law enforcement to record the restriction code listed on drivers' licenses.

Many states do not have a single statewide crash report, and in those cases, NSC reviewed a crash report provided by a state agency. In some states, dozens of crash reports are used throughout the state. Thus, the crash reports NSC reviewed are a sample of all crash reports used nationwide. NSC believes the reviewed reports to be representative of the data collected on crash reports.

ONE FOUNDATION FOR DATA COLLECTION IS THE AVAILABILITY OF SPECIFIC FIELDS AND CODES ON CRASH REPORTS.

Because the factors NSC reviewed were intended to address passenger vehicle drivers and non-motorists, the Council did not review truck and bus supplements. In a few states NSC reviewed fatal crash supplements, when available. Some states use crash report supplements to collect additional information from crashes resulting in fatalities. Additional information that was captured only in fatal crash supplements was not reflected in the findings.

NSC REVIEWED ONE CRASH REPORT FROM EACH STATE. MANY STATES DO NOT HAVE A SINGLE STATEWIDE CRASH REPORT. THE CRASH REPORTS NSC REVIEWED ARE A SAMPLE OF ALL CRASH REPORTS USED NATIONWIDE.

Findings

TOPIC	DOES THE CRASH REPORT REVIEWED PROVIDE A SPECIFIC FIELD OR CODE TO RECORD:	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA
Alcohol	All BrAC and BAC values	✔	✔		✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	BrAC or BAC values from all drivers and all non-motorists	✔	✔		✔			✔	✔	✔	✔	✔	✔	✔		✔	✔		
Other Drugs	Oral fluid or saliva as drug test type																✔		
	Specific types of drugs identified by drug tests		✔		✔	✔			✔							✔			
Fatigue	Number of hours of sleep in previous 24 hours																		
	Number of hours since waking up																		
	General fatigue/drowsy/asleep	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Teen/Novice	Drivers with a learner's permit	✔		✔	✔	N/A	✔		N/A			✔	✔		✔	✔	✔		
	Novice drivers with a graduated driver licensing restricted license					N/A	✔		N/A							✔	✔		
Distraction	Information about electronic device distraction for non-motorists		✔	✔		✔		✔		✔				✔			✔		
	Handheld or any cell phone use	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	Hands-free cell phone use		✔	✔	✔			✔			✔					✔			
	Use of infotainment system features, voice recognition features integrated in vehicles																		
	Texting with cell phones		✔	✔	✔			✔		✔	✔			✔		✔	✔		
	Talking on cell phones		✔	✔				✔			✔					✔	✔		
	Other cell phone use like GPS navigation	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔		✔
	Non-technology distractions such as reaching, looking, passengers, etc.	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔		✔	✔	✔		✔
ADAS	Vehicle automation levels, or advanced driver assistance system technologies																		
Work-Related	Job-related trip																✔		✔
	Commuting to/from work																		
	Personal trip													✔					
Speed	Estimate miles per hour (MPH) traveled before crash	✔		✔		N/A	✔			✔								✔	✔
	Posted speed limit	✔	✔	✔	✔	N/A	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

✔ = YES BLANK = NO N/A = Not Available

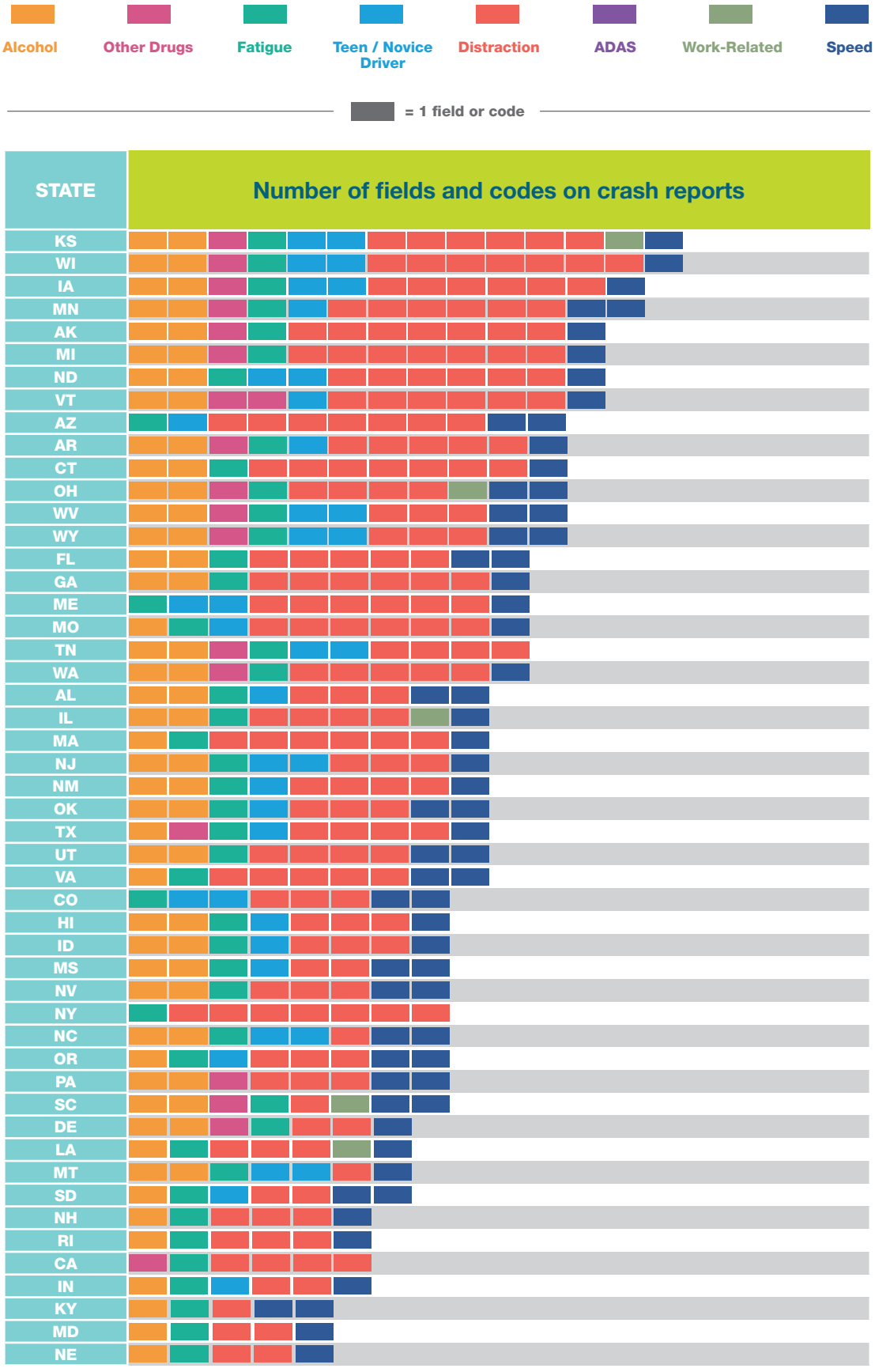
TOPIC	DOES THE CRASH REPORT REVIEWED PROVIDE A SPECIFIC FIELD OR CODE TO RECORD:	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK
Alcohol	All BrAC and BAC values		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔
	BrAC or BAC values from all drivers and all non-motorists				✔	✔	✔		✔		✔		✔	✔		✔	✔	✔	✔
Other Drugs	Oral fluid or saliva as drug test type								N/A										
	Specific types of drugs identified by drug tests				✔	✔			N/A									✔	
Fatigue	Number of hours of sleep in previous 24 hours																		
	Number of hours since waking up																		
	General fatigue/drowsy/asleep	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Teen/Novice	Drivers with a learner's permit	✔				✔	✔		✔				✔	✔		✔	✔		✔
	Novice drivers with a graduated driver licensing restricted license	✔						✔	✔				✔			✔	✔		
Distraction	Information about electronic device distraction for non-motorists				✔		✔	✔						✔	✔	✔			✔
	Handheld or any cell phone use	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔
	Hands-free cell phone use	✔		✔	✔	✔		✔					✔		✔		✔		
	Use of infotainment system features, voice recognition features integrated in vehicles														✔				
	Texting with cell phones	✔		✔	✔	✔		✔						✔	✔		✔	✔	
	Talking on cell phones	✔		✔	✔	✔											✔		
	Other cell phone use like GPS navigation	✔		✔	✔	✔		✔			✔	✔			✔		✔	✔	
	Non-technology distractions such as reaching, looking, passengers, etc.	✔	✔	✔	✔	✔		✔		✔	✔	✔	✔	✔	✔		✔	✔	✔
ADAS	Vehicle automation levels, or advanced driver assistance system technologies																		
Work-Related	Job-related trip																		
	Commuting to/from work																		
	Personal trip																	✔	
Speed	Estimate miles per hour (MPH) traveled before crash					✔	✔				✔					✔		✔	✔
	Posted speed limit	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔

✔ = YES BLANK = NO N/A = Not Available

TOPIC	DOES THE CRASH REPORT REVIEWED PROVIDE A SPECIFIC FIELD OR CODE TO RECORD:	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
Alcohol	All BrAC and BAC values	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔
	BrAC or BAC values from all drivers and all non-motorists		✔		✔		✔		✔	✔	✔	✔	✔	✔	✔
Other Drugs	Oral fluid or saliva as drug test type									✔					
	Specific types of drugs identified by drug tests		✔		✔		✔	✔		✔		✔	✔	✔	✔
Fatigue	Number of hours of sleep in previous 24 hours														
	Number of hours since waking up														
	General fatigue/drowsy/asleep	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Teen/Novice	Drivers with a learner's permit	✔				✔	✔	✔					✔	✔	✔
	Novice drivers with a graduated driver licensing restricted license						✔						✔	✔	✔
Distraction	Information about electronic device distraction for non-motorists	✔				✔		✔				✔			
	Handheld or any cell phone use	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔
	Hands-free cell phone use		✔							✔		✔		✔	
	Use of infotainment system features, voice recognition features integrated in vehicles										✔			✔	
	Texting with cell phones						✔	✔	✔	✔	✔			✔	
	Talking on cell phones							✔		✔				✔	
	Other cell phone use like GPS navigation			✔			✔		✔	✔	✔	✔	✔	✔	✔
	Non-technology distractions such as reaching, looking, passengers, etc.	✔	✔	✔		✔	✔		✔	✔	✔	✔	✔	✔	✔
ADAS	Vehicle automation levels, or advanced driver assistance system technologies														
Work-Related	Job-related trip														
	Commuting to/from work														
	Personal trip				✔										
Speed	Estimate miles per hour (MPH) traveled before crash	✔	✔		✔	✔			✔		✔		✔		✔
	Posted speed limit	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔

✔ = YES BLANK = NO N/A = Not Available

Fields and codes for leading crash factors: alcohol and other drug use, fatigue, teen and novice drivers, distraction, ADAS, work-related, and speed.



Driver Behavior and Data

Alcohol	State Totals		
Does crash report provide a field/code to record all BrAC or BAC values from 0.01+?	Yes 44	No 6	NA 0
Does crash report provide field/code to record BrAC or BAC values from all drivers and all non-motorists?	Yes 33	No 17	NA 0

For the past 20 years, drivers with alcohol concentrations of 0.08 and higher have been involved in approximately one-third of fatal crashes. If data included drivers with alcohol concentrations below 0.08, the involvement in fatal crashes would be an even higher percentage.[7] More alcohol data could be collected in crash investigation reports to address these issues:

- > **Not testing alcohol in combination with other drugs**
- > **Not assessing low alcohol concentration**
- > **Not testing all drivers and non-motorists involved in crashes, particularly fatal crashes**

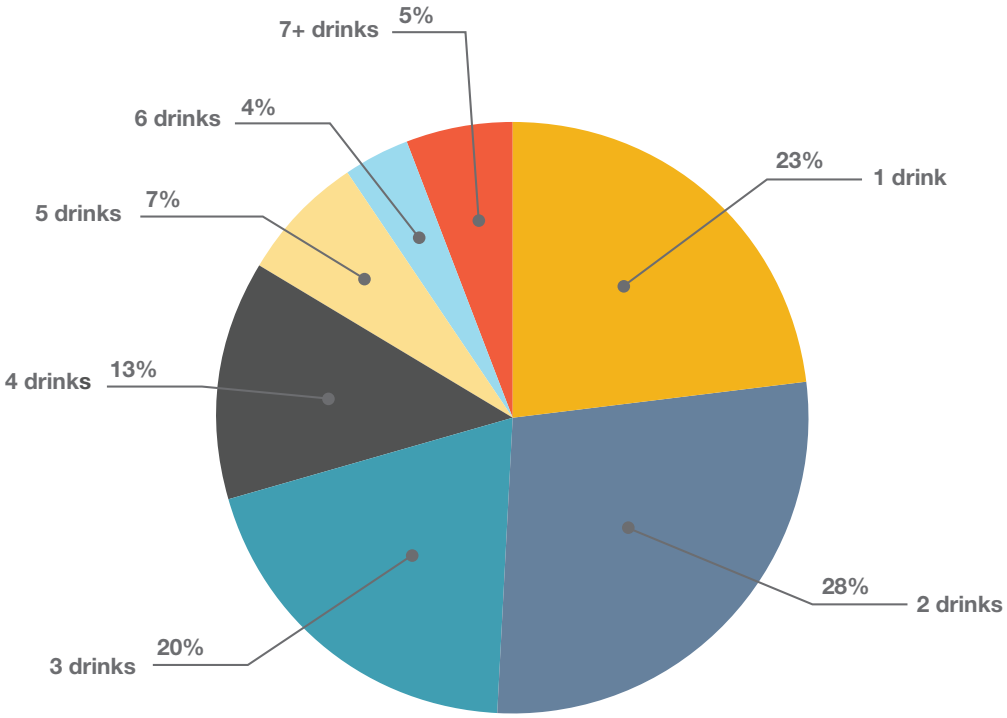
One area where more information is needed is polypharmacy – multiple medications and alcohol in combination with other drugs. Because alcohol may have greater impairment at lower alcohol concentrations when consumed in combination with other drugs that may also be impairing.[8] Unless drivers and non-motorists are tested for alcohol – including all breath and blood alcohol concentrations from 0.01 and higher – and also tested for other drugs, we will lack a better picture of multiple drug involvement in crashes.

While Utah recently passed legislation that lowers the impaired driving limit to 0.05, the law is not in effect yet. So currently, there are legal limits to testing drivers at lower alcohol concentrations below 0.08. The fact remains, however, that the driver was involved in a motor vehicle crash, and impairment can begin with the first drink.[9] Determining even low alcohol concentration levels is important in order to truly understand the total impact of alcohol on driving. Further, the driver may be using medications that could interact with the impairing effects of alcohol. Particularly for injury and fatal crashes, all drivers should be tested for alcohol and other drugs.

PARTICULARLY FOR INJURY AND FATAL CRASHES, ALL DRIVERS SHOULD BE TESTED FOR ALCOHOL AND OTHER DRUGS.

In addition to testing drivers, non-motorists should also be tested for alcohol and other drugs. However as with drivers, unless police believe the non-motorist is legally impaired at 0.08 or higher, they cannot be tested. Only 33 crash reports that NSC reviewed included a field to record alcohol concentration levels for pedestrians and pedalcyclists, in addition to vehicle drivers. This leaves out important data, because, according to NHTSA, alcohol is also a factor in pedestrian deaths.[10] Alcohol involvement for the driver or pedestrian was reported in nearly half of crashes that resulted in a pedestrian fatality. Where alcohol involvement was reported in fatal crashes with a pedestrian, in 34% of the cases the pedestrian who was killed had a BAC of 0.08 or greater, and in 15% of the cases the driver had a BAC of 0.08 or greater. This prevalence of alcohol in pedestrians who were killed warrants more attention to collecting alcohol data from non-motorists.

Willingness to Drink and Drive



How many drinks do you think you can typically have before you are not safe / too impaired to drive? Despite not being legally intoxicated, drivers report "feeling impaired" at low levels of alcohol consumption. In a February 2017 National Safety Council survey of adult drivers, 23% said that they can typically have one drink before they feel "not safe/too impaired to drive," and 28% reported they are "not safe/too impaired to drive" after only two drinks.

Other Drugs

	State Totals		
Does crash report provide a specific field/code for oral fluid or saliva as drug test type?	Yes 2	No 47	NA 1
Does crash report provide fields/codes listing specific types of drugs identified by drug tests?	Yes 17	No 32	NA 1

Nearly one in four drivers tested positive for at least one drug that could affect safety.[11] Further, a 2010 study showed that 11% of fatal crashes involved a drugged driver.[12]

Over half of all drivers admitted to a Maryland hospital's Level 1 trauma center for traffic crashes had drugs other than alcohol in their system; marijuana was present in nearly a quarter.[13] Unfortunately, an even higher prevalence is likely in crashes, because for non-injury crashes, additional drug testing usually is not conducted if the driver's alcohol level is above the legal limit.

Oral fluid collection devices are an easy, non-invasive method of collection. As no special blood collection or toilet facilities are required, collection kits can be transported to and used in a variety of settings and locations. Oral fluid samples have been successfully collected at roadside, most notably, during the NHTSA roadside surveys in 2007 and 2014, although these samples were all collected with the consent of the driver and no risk of incarceration.[14]

A careful evaluation of the science and evidence has proven that oral fluid testing provides the needed sensitivity and accuracy. Blood, oral fluid and urine test results are comparable in detecting drugs. In addition, testing and laboratory best practice standards and drug cutoff levels have been identified and established for the testing and analysis of oral fluid specimens.[15]

The cost for the laboratory analysis of oral fluid is essentially the same as the cost for blood analysis because similar instrumentation is used. An additional cost is for the oral fluid collection device itself, which generally contains a pad and liquid buffer to stabilize any drugs during storage and transportation. Medical personnel are

not necessary for the collection process, so the time and expense associated with blood collections are eliminated.[16]

It will be increasingly important to document the involvement of either alcohol, drugs or the co-occurrence of both alcohol and drugs in crashes. Currently, only two crash reports reviewed by NSC include a specific field or code for oral fluid test under drug test type. Many crash reports do, however, provide a generic "other" field. Providing the necessary fields and codes on crash reports and in citations will make it easier for researchers to analyze critical information to better understand the roles of drugs in impaired driving and the development of effective countermeasures.

According to NHTSA, the deficiencies in drugged driving data are such that users of FARS data must keep the limitations in mind when interpreting the data. For example, the data in FARS is insufficient to allow comparisons of drug use across years, or across states. It's also not possible to make inferences about impairment, crash causation, or comparisons to alcohol from the limited data. FARS data on drug-involved driving will be strengthened as more complete data becomes available.[17]

Only 18 states include marijuana, cannabinoids or cannabis fields under drug test results. Alaska, California, Colorado, Maine, Massachusetts, Nevada, Oregon, Washington have decriminalized recreational marijuana use. These laws are either in effect now or taking effect in the near future. Of these states, the crash reports that had specific fields and codes to record marijuana under drug test results were Alaska, California, Oregon and Washington. The crash reports we reviewed for Colorado, Maine, Massachusetts and Nevada did not have specific fields and codes to record positive marijuana results from drug tests.

Note that the District of Columbia also decriminalized recreational marijuana use; however the Council did not receive enough detail about Washington, D.C. crash reports to evaluate.

IT WILL BE INCREASINGLY IMPORTANT TO DOCUMENT THE INVOLVEMENT OF EITHER ALCOHOL, DRUGS OR THE CO-OCCURRENCE OF BOTH ALCOHOL AND DRUGS IN CRASHES. ADVANCEMENTS IN ORAL FLUID COLLECTION DEVICES PROVIDE A CONVENIENT TOOL FOR THIS PURPOSE.

Distractions

	State Totals		
Does crash report have fields/codes for handheld or any cell phone use?	Yes 48	No 2	NA 0
Does crash report have fields/codes for hands-free cell phone use?	Yes 18	No 32	NA 0
Does crash report have fields/codes specifically for texting?	Yes 24	No 26	NA 0
Does crash report have fields/codes specifically for talking on cell phones?	Yes 14	No 36	NA 0
Does crash report have fields/codes for other cell phone use like GPS/navigation?	Yes 35	No 15	NA 0
Does crash report have fields/codes to assess use of infotainment system features, voice recognition features integrated in vehicles?	Yes 3	No 47	NA 0
Does crash report collect information about electronic device distraction for non-motorists?	Yes 18	No 32	NA 0
Does crash report have fields/codes to assess non-technology distractions such as reaching, looking, passengers, etc.?	Yes 42	No 8	NA 0

Electronic communications use among drivers is prevalent. According to NHTSA, in 2015 about 7% of drivers were observed to be distracted by cell phones at any moment.[18] In addition, drivers use hands-free devices and voice features that are difficult to observe.

According to a 2016 NSC survey of more than 3,400 drivers nationwide, adult drivers were willing to engage in distracting behaviors often or occasionally:[19]

- **19% make or answer phone calls with handheld devices**
- **51% make or answer calls hands-free with headsets, speakerphones and in-vehicle systems**
- **32% review or send text messages**
- **23% review or send email**
- **23% glance at, read or post social media messages**
- **21% surf the internet**
- **19% look at, take or post photos or videos**
- **14% watch tv or a movie on the phone**
- **14% participate in a video chat**

Among teen drivers, the percentage willing to engage in some of these behaviors was similar to adult drivers or higher.

About one-third of the surveyed drivers told NSC that they use voice-activated controls by pairing their nomadic devices with their vehicle to review and send emails and text messages while driving. About 25% of drivers would be willing to use vehicle and phone voice features to read or post to social media while driving.

Despite the prevalence of communications technology use while driving, and public concern about the risks, one barrier to prevention progress has been disagreement about the risks of different communication technologies, and the varying results of different research methods used to study the problem. Despite more than 30 studies documented by NSC in 2010[20] that show no difference in distraction between handheld and hands-free phone use, questions remain about the actual crash risk of hands-free use.

In recent years, the rapid development of technology brought new hands-free voice recognition features into phones and dashboards. Texas A&M,[21] AAA Foundation for Traffic Safety and University of Utah,[22] and Massachusetts Institute of Technology[23] have studied these voice features and found that they can distract drivers. Yet questions remain about the involvement of these features in crashes. The uncertainty is compounded by a lack of comprehensive data from crash reports.

Smartphones are now woven into daily life as cameras, computers and constant communications link to family, friends and work. Drivers have access to all of this while on the road, both on nomadic devices brought into cars and through in-vehicle infotainment systems.

In order to understand what type of technology use is involved in crashes, there is a need to consistently document detailed technology use including:

- Texting
- Talking on a handheld and hands-free device
- Using apps, social media or cameras
- Use of the hands-free voice recognition features built into vehicle infotainment systems

A few states are providing codes for a wide variety of technology use, including Alaska, Connecticut, Iowa, Missouri and Wisconsin. While some states provide codes for distraction involving stereo and audio equipment, it's rare for codes to clearly represent voice recognition and hands-free features in infotainment systems.

When fields and codes are present, police often do not record cell phone use by drivers, even for fatal crashes, according to an analysis of 180 fatal crash reports conducted by the National Safety Council in 2013.[24] In that project, NSC found that driver cell phone use was recorded as a factor in fatal crashes only about half the time, even when drivers admitted phone use to police.

Many crash reports also do not collect distraction factors for non-motorists like pedestrians. Pedestrian fatalities are increasing and there is concern about pedestrian use of cell phones. According to a 2016 NHTSA report, there is limited data about pedestrian phone use and how that affects their risk and safety.[25]

UNFORTUNATELY, MANY CRASH REPORT UPDATES HAVE NOT KEPT PACE WITH THIS RAPID DEVELOPMENT OF TECHNOLOGY. THERE IS A LACK OF DETAILED FIELDS AND CODES ON MANY CRASH REPORTS.

Fatigue

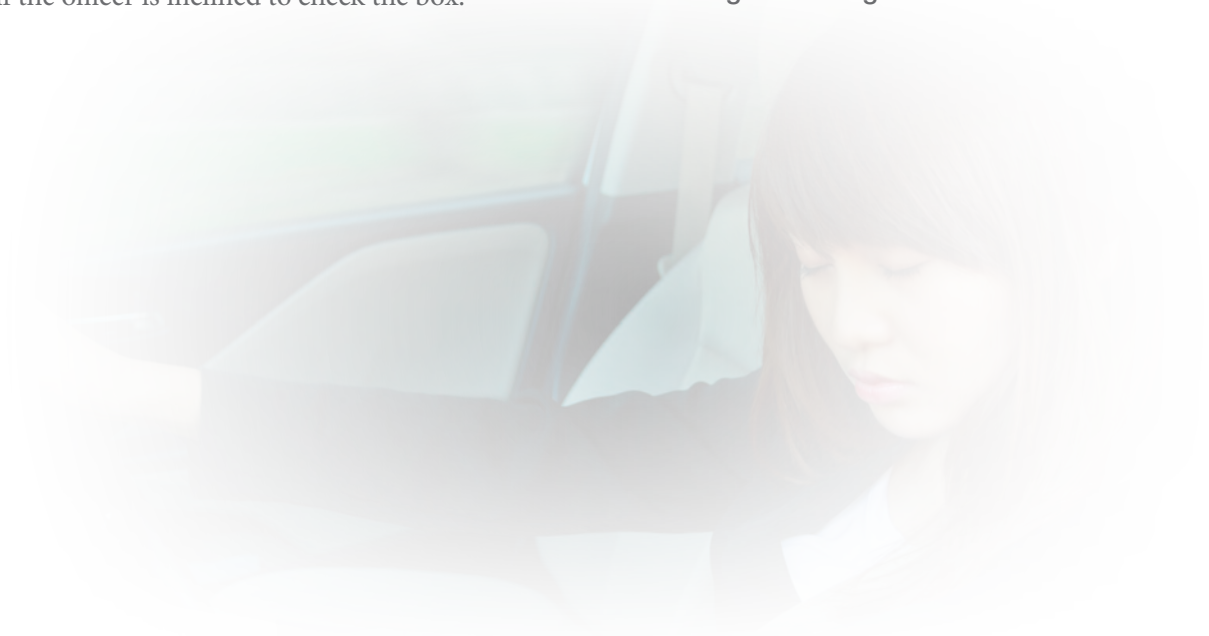
State Totals			
Does crash report provide fields/codes to assess number of hours of sleep in previous 24 hours?	Yes 0	No 50	NA 0
Does crash report provide fields/codes asking number of hours since waking up?	Yes 0	No 50	NA 0
Does crash report provide fields/codes for to capture general fatigue, drowsy, asleep?	Yes 49	No 1	NA 0

Fatigue is also a crash risk. The AAA Foundation for Traffic Safety estimates that as many as 7% of all crashes, 13% of crashes that result in hospital admission, and 21% of fatal crashes involve a fatigued driver.[26] Unfortunately, the prevalence of drowsy or fatigued driving crashes remains an estimate because the data is not being accurately or uniformly collected on crash reports.

Many states do, however, offer a field to indicate whether the driver was fatigued or drowsy. This often is an optional checkbox, available if an officer sees obvious evidence or receives an admission of guilt from a drowsy driver, and only if the officer is inclined to check the box.

There are two barriers with the current system:

- **An officer is not required to assess or question a driver on their risk of fatigue, nor are they trained to identify a fatigued driver. This means the fatigue field is often skipped or overlooked and widely unreported.**
- **An officer may rely on an admission of guilt from a fatigued driver; however, research consistently shows that people are not able to identify when fatigue is affecting their performance, meaning an individual will not always be able to self-report fatigued driving.[27]**



The American Academy of Sleep Medicine and National Sleep Foundation both recommend that adults get seven or more hours of sleep on a regular basis to promote optimal health.[28, 29] Any less than seven hours a night can lead to reduced cognitive performance, most notably significant decreases in vigilance, attention, and memory performance[30] – all cognitive processes that are essential to safe driving.

Sleep loss causing significant impairment to safe driving was recently supported by a AAA Foundation for Traffic Safety study, which found that drivers with reduced amounts of sleep – even one hour of sleep loss – have a significantly elevated crash risk. Drivers with 4-5 hours of sleep have a similar crash risk as a driver above a 0.08 blood alcohol level.[31]

Not only is sleep loss measured in the amount of sleep an individual gets in a 24-hour period, it is also measured by the amount of time they have been awake. As soon as an individual wakes up, his or her body begins building an increasing physiological need to sleep.[32] As the need for sleep accumulates, similar decreases in cognitive performance occur as if the individual had insufficient sleep. These decreases in cognitive performance begin at 16 hours of wakefulness.[33]

Accurately capturing the prevalence of fatigued driving requires the uniform collection of both hours of sleep in the past 24 hours and number of hours since waking. These two measures were used by the AAA Foundation to study acute driver fatigue and crash risk.[34] These measures were collected from drivers involved in crashes during NHTSA's Motor Vehicle Crash Causation Study.[35] However, currently zero states have either of these fields. Without these two dimensions on fatigue recorded in crash reports, we will continue to be limited in our ability to assess the extent of the drowsy driving epidemic and continue to be restricted in research and prevention efforts.

Speed

	State Totals		
Does crash report provide fields/codes to estimate miles per hour (MPH) traveled before crash?	Yes 20	No 29	NA 1
Does crash report provide fields/codes to record posted speed limit?	Yes 46	No 3	NA 1

Speed is a leading factor in fatal crashes, involved in 28% of crash fatalities in 2014 according to the Insurance Institute for Highway Safety (IIHS).[36]

Nearly all crash reports NSC reviewed have contributing circumstance or driver factor fields to record "excessive speed," "unsafe speed," "exceeding the speed limit" and "driving too fast for conditions." Only 20 crash reports quantified speed by recording the estimated miles per hour traveled before crashes. This is useful to better quantify the involvement of speed in crashes on various roadways. Crash energy increases exponentially, so each increase of 10 mph significantly increases the risk of crash, and the damage when crashes occur. According to NHTSA,[37] pedestrian, pedalcyclist and motorcyclist crash deaths have increased in the last decade, and speed is a particularly fatal factor for these vulnerable roadway users.

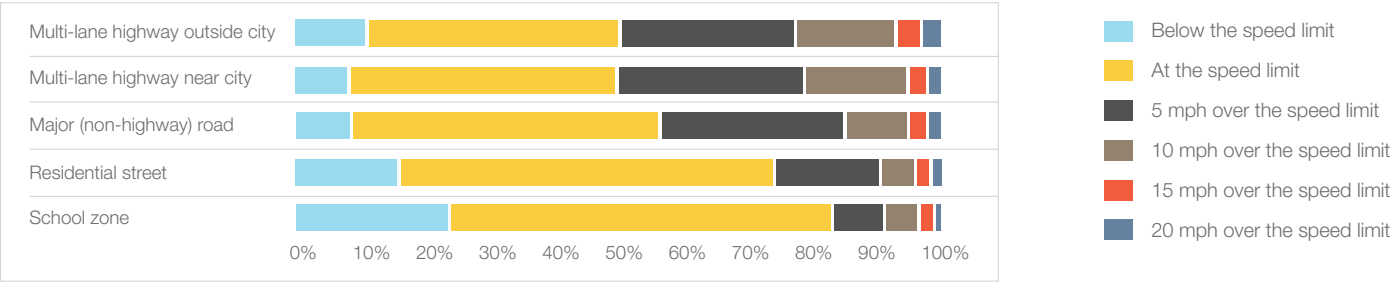
Unfortunately, speeding is prevalent, and it's been a difficult crash factor to effectively reduce. In a January 2017 National Safety Council survey of adult drivers, 18% of respondents reported that they were involved in a car crash in the past 3 years. Of those who crashed, 14% reported that they were speeding when the crash occurred.

NHTSA's 2011 National Survey of Speeding Attitudes and Behaviors identified categories of speeders:

> **Drivers who report often driving 15 mph over the speed limit on divided highways. They pass other cars more often than being passed, and they keep up with the fastest traffic. These drivers accounted for about 30% of U.S. drivers.**

> **Drivers who reported speeding sometimes. They pass other cars and are passed about equally, and they either keep up with the fast traffic or stay with slower traffic equally. These drivers comprise about 40% of U.S. drivers.**

Speeders were more likely to engage in other risky driving behaviors such as not wearing a seat belt, driving after drinking alcohol, or using a cell phone while driving. Improving the data on speed may help us to identify and target the riskiest drivers.[38]



According to a 2017 NSC survey, these speeds are what U.S. drivers consider to be the highest safe speeds on various road types.

Teen/Novice Driver	State Totals		
Does crash report provide fields/codes for drivers with a learner's permit?	Yes 25	No 23	NA 2
Does crash report provide fields/codes for novice teen drivers with a graduated driver licensing restricted license?	Yes 13	No 35	NA 2

Motor vehicle crashes remain the number one cause of death for teens. After years of significant declines,[39] fatal crashes among drivers age 15 to 20 increased 9.7% from 2014 to 2015.[40] One effective strategy is the implementation of interventions like Graduated Driver Licensing (GDL)[41] that effectively reduce those risky factors while teens are learning to drive.

One piece of information that is lacking is crashes by stage of licensure. Crash reports should specify whether the teen or novice driver was driving with a learner's permit, which allows teens to drive with a supervising parent or guardian present in the vehicle, or with a restricted license, which allows teens to drive alone without supervision. Age has been used as a proxy for license stage; however, many teens are now getting licensed at older ages. Crash risk may increase when novice teen drivers first drive alone under a restricted license, as they gain driving experience. For prevention purposes, it would be useful to know the various factors involved in crashes across the progression from learner's permit, restricted license and full driver's license. We would expect to see a significant increase in crashes when teens move from a learner's permit to driving with a restricted license, but data to quantify this expected increase has been limited.

Communications about increased crash risk during the restricted license stage could be useful to influence parents, who are intended to be the primary enforcers of GDL limits. Teen driving experts including the National Safety Council DriveitHOME program[42] recommend that parents continue riding with teen drivers regularly during the restricted license stage to decrease crash risk.

ADAS

Advanced Driver Assist Systems

State Totals

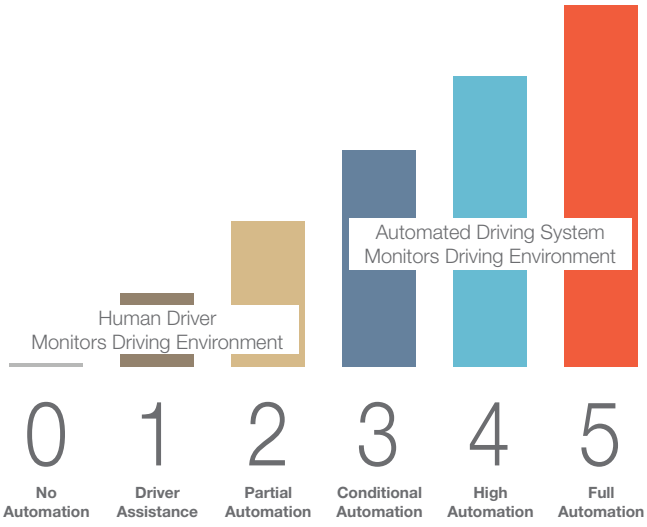
Does crash report have fields/codes to assess vehicle automation levels, or advanced driver assistance system technologies?	Yes 0	No 50	NA 0

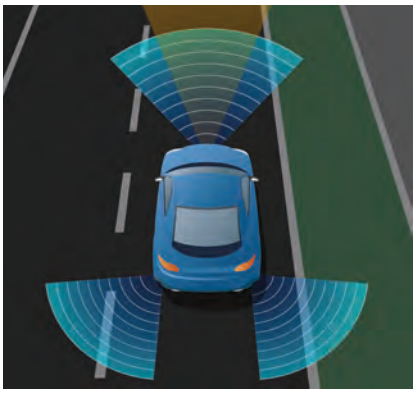
Advanced driver assist systems (ADAS) can bring significant crash reduction benefits. According to the IIHS, if four current technologies – forward collision warning/mitigation, lane departure warning/prevention, side view assist/blind spot monitoring and adaptive headlights – were deployed in all passenger vehicles, they could prevent or mitigate as many as 1.86 million crashes and save more than 10,000 lives per year.[43] A July 2016 Carnegie Mellon study found that forward collision warning, lane departure warning and blind spot monitoring could have prevented or reduced as many as 1.3 million crashes annually and as many as 10,000 fatal crashes.[44]

The development and deployment of these technologies in vehicles has created a fast paced environment where regulators, educators and drivers are racing to keep up. Drivers need an understanding of the new safety technologies so they know what to expect and how to best operate their vehicles. A University of Iowa survey found that 40% of drivers reported they had experienced a situation in which their vehicle acted in an unexpected way.[45] Further, some drivers report an annoyance with some ADAS technologies, as dealership service departments report disabling some features at the request of customers.[46]

If better data were collected about ADAS, however, researchers may have more ways to investigate the protective effects of ADAS in crashes, as well as potential unintended consequences that could affect safe driving. There should be an understanding of what happens when a system does and does not work or when a car with some ADAS features is involved in a crash. Post-crash information sharing would yield valuable information for manufacturers and prevention professionals.

There are several ways to collect data about ADAS, though each have significant barriers. One way is provide fields on crash reports that align with the SAE levels of automation with fields for 0 through 5.[47]





Nearly all vehicles on the roads today are Level 1 and 2. There are no vehicles at Levels 3 to 5 today, other than manufacturer test vehicles. This method would provide limited information about specific ADAS technologies in the vehicle and may not provide knowledge useful for crash prevention.

Another method is to list specific ADAS technologies, and whether they were engaged at the moment of a crash, disabled, or used improperly. This level of information would be more useful, but very difficult for law enforcement to learn about and collect in a valid way.

De-identified data sharing has been in existence in the aviation industry for many years, and proven highly successful. Collecting de-identified data could aggregate useful information for the automotive industry to allow the industry to take proactive steps to prevent future crashes, based on leading indicators. This data would also be useful to researchers and the safety community in analyzing the safety benefits – and potential drawbacks – of these technologies. EDRs can yield valuable data in crash reconstruction efforts to determine what happened. EDRs would also help provide a window into the driver's seat to gain a better understanding of how human operators engage with the ADAS technologies.

Information could be collected post-crash, and alternatives include EDRs. EDR data collection will not be possible without the automotive industry's commitment to assist law enforcement in determining how the ADAS technologies performed in a crash. Industry investigation would be critical to understanding any ADAS involvement in crashes. In addition EDR data collection will not be possible without changes in privacy laws and significant equipment and training for law enforcement.

Another option is potential data linking with the VIN which are collected on all crash reports. However, VIN databases provided by the automotive industry do not uniformly provide information about ADAS. The VIN databases also wouldn't give information about aftermarket additions or disablement of ADAS, nor would they shed light on driver interaction with ADAS before and during a crash.

One alternative to explore is crash causation pilot research studies that more intensively investigate crashes, vehicle technologies and driver interaction with ADAS.

Currently, none of the crash reports NSC reviewed collected any information about ADAS technologies. From a crash prevention perspective, we are operating in a data vacuum.

Work vs Personal Trips

	State Totals		
Does crash report have fields/codes for job-related trip?	Yes 2	No 48	NA 0
Does crash report have fields/codes for commuting to/from work?	Yes 0	No 50	NA 0
Does crash report have fields/codes for personal trip?	Yes 3	No 47	NA 0

The U.S. Department of Labor, Bureau of Labor Statistics (BLS)[48] collects occupational injury and fatality statistics including roadway incidents. The most recent BLS data[49] show that job-related crashes accounted for 26% of all fatal work injuries in 2015. Job-related crash fatalities were up 9% from 2014. Crashes were the number one cause of workplace death.

Less is known about crash involvement while commuting to and from work, which is not currently considered a job-related injury or death. Of the crash reports NSC reviewed, none collected data about whether the crash occurred while commuting. Commuting is considered personal time, but the need to commute on roadways to work exposes employees to crash risk.

In a February 2017 National Safety Council survey of adult drivers, 18% of respondents reported that they were involved in a car crash in the past three years. Of those who crashed, 18% reported the crash occurred while traveling for work, and 26% reported the crash occurred while commuting to or from work.

Employers may invest more in off-the-job traffic safety programs if they were aware of the extent that crashes may occur while their employees are traveling to and from work.

Note that because NSC did not review crash report supplements for trucks and buses, our review of fields and codes excludes commercial vehicle crashes. The Council's intent was to understand the collection of data about passenger vehicle drivers who are not professional drivers, but who may drive as part of their jobs to appointments, meetings and errands.

About NSC

Founded in 1913 and chartered by Congress, the National Safety Council, nsc.org, is a nonprofit organization whose mission is to save lives by preventing injuries and deaths at work, in homes and communities, and on the roads through leadership, research, education and advocacy. NSC advances this mission by partnering with businesses, government agencies, elected officials and the public in areas where we can make the most impact—distracted driving, teen driving, workplace safety, prescription drug overdoses and Safe Communities.

Visit **nsc.org** to learn more.

States are encouraged to contact NSC if there are any concerns. Please send comments to roadsafety@nsc.org.

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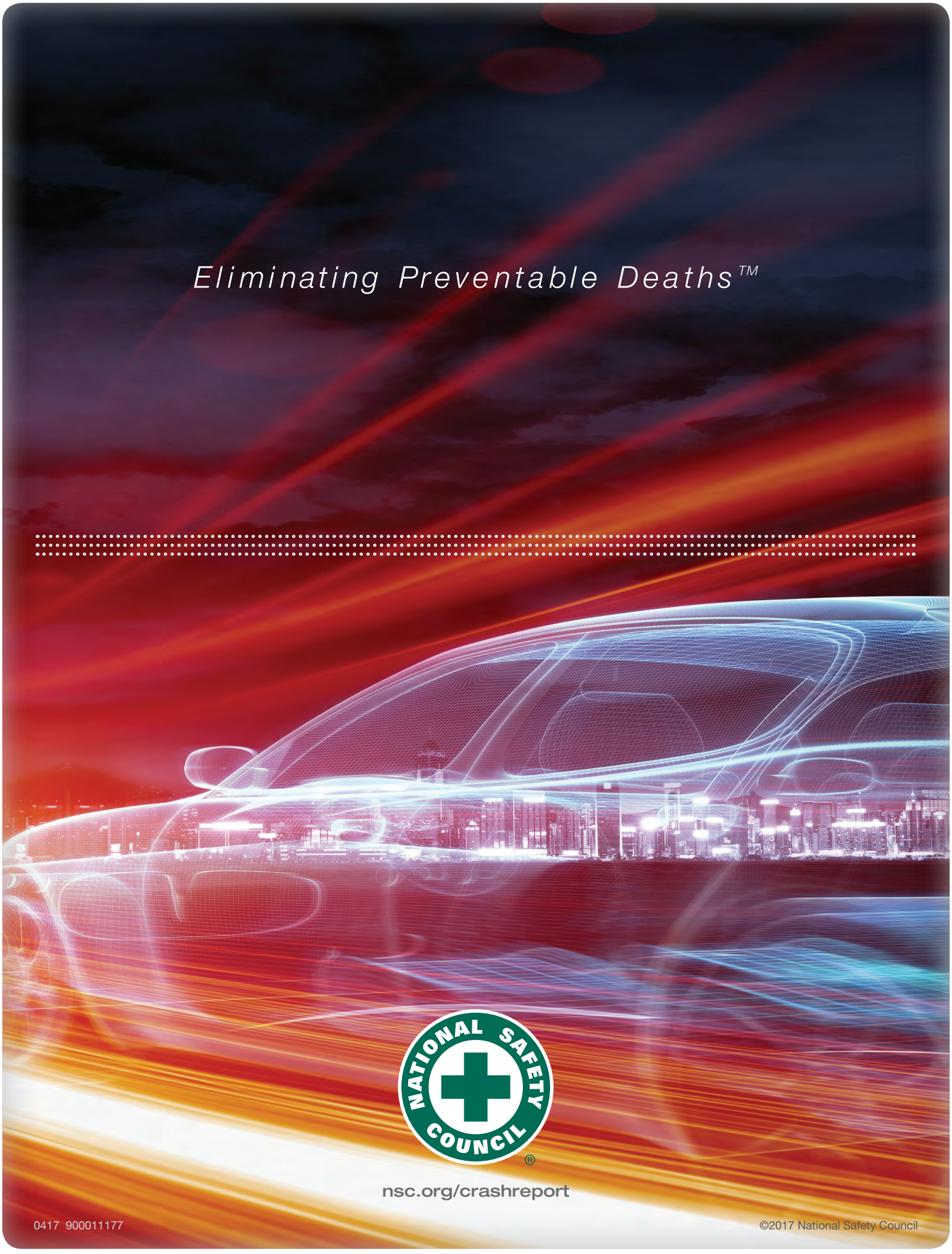

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