Reaching Zero: Actions to Eliminate Alcohol-Impaired Driving

Safety Report

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National Transportation Safety Board

490 L'Enfant Plaza, S.W.
Washington, D.C. 20594

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Abstract: This safety report represents the culmination of a year-long National Transportation Safety Board (NTSB) effort focused on the problem of substance-impaired driving. The report addresses the necessity of providing all the following elements to achieve meaningful reductions in alcohol-impaired driving crashes: stronger laws, improved enforcement strategies, innovative adjudication programs, and accelerated development of new in-vehicle alcohol detection technologies. Moreover, the report recognizes the need for states to identify specific and measurable goals for reducing impaired driving fatalities and injuries, and to evaluate the effectiveness of implemented countermeasures on an ongoing basis.

Specifically, in the report, the NTSB makes safety recommendations in the following safety issue areas: reducing the per se blood alcohol concentration limit for all drivers; conducting high-visibility enforcement of impaired driving laws and incorporating passive alcohol sensing technology into enforcement efforts; expanding the use of in-vehicle devices to prevent operation by an impaired driver; using driving while intoxicated (DWI) courts and other programs to reduce recidivism by repeat DWI offenders; and establishing measurable goals for reducing impaired driving and tracking progress toward those goals.

NOTE: This report was reissued on June 6, 2013, to include three Board Member statements, with the new material beginning at the bottom of page 44 and continuing through page 49.

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Abbreviations and Acronyms

AAA Foundation	AAA Foundation for Traffic Safety
AAAM	Association for the Advancement of Automotive Medicine
ACTS	Automotive Coalition for Traffic Safety, Inc.
ALS/ALR	administrative license suspension/revocation
AMA	American Medical Association
BAC	blood alcohol concentration
CDC	Centers for Disease Control and Prevention
CFR	*Code of Federal Regulations*
CMV	commercial motor vehicle
DADSS	Driver Alcohol Detection System for Safety
DOT	US Department of Transportation
DUI	driving under the influence of alcohol or drugs
DWI	driving while intoxicated (or impaired)
EU	European Union
FARS	Fatality Analysis Reporting System
FBI	Federal Bureau of Investigation
FHWA	Federal Highway Administration
FR	*Federal Register*
g/dL	grams per deciliter
GVWR	gross vehicle weight rating
HHS	US Department of Health and Human Services
HVE	high-visibility enforcement
ICAP	International Center for Alcohol Policies

interlock	alcohol ignition interlock
MADD	Mothers Against Drunk Driving
MAP-21	Moving Ahead for Progress in the 21st Century Act
NHTSA	National Highway Traffic Safety Administration
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NTSB	National Transportation Safety Board
OUI	operating under the influence of alcohol or drugs
POLD	place of last drink
REDDI	Report Every Drunk Driver Immediately
RID	Remove Intoxicated Drivers
TZD	Toward Zero Deaths
VA	US Department of Veterans Affairs
VMT	vehicle miles traveled
WHO	World Health Organization
WMA	World Medical Association

Executive Summary

The National Transportation Safety Board (NTSB) has long been concerned about alcohol-impaired driving, which accounts for approximately one-third of all US highway fatalities. In the past several decades, awareness of the dangers of alcohol-impaired driving has increased. Public and private entities focusing on this safety issue have changed social perceptions concerning alcohol-impaired driving; they have also achieved important legislative actions to help reduce it. Due to these efforts, the number of lives lost annually in alcohol-impaired-driver-related crashes declined 53 percent, from 21,113 in 1982 to 9,878 in 2011; and the percentage of highway fatalities resulting from alcohol-involved crashes is down from 48 percent in 1982 to about 31 percent today.

In recent years, however, US success in addressing this safety issue has plateaued. Since 1995, although the annual number of fatalities has declined, nearly one in three of all highway deaths still involves an alcohol-impaired driver. The cause of these deaths is well understood and preventable, yet even the most concerted efforts have not kept thousands of lives from being lost each year. If traditional methods are no longer reducing the problem, new—and possibly challenging—initiatives must be considered.

In this safety report, the NTSB—

- Describes the scope of the impaired driving problem;
- Summarizes the efforts of advocacy groups, researchers, law enforcement agencies, traffic safety groups, public health organizations, legislators, and motor vehicle agencies, as well as federal, state, and local governments, to reduce the number of crashes, injuries, and fatalities;
- Examines the effect of alcohol consumption on an individual's ability to operate a motor vehicle and on the risk of being involved in a crash; and
- Evaluates the effectiveness of current and emerging alcohol-impaired driving countermeasures and identifies new approaches and actions needed to reduce and ultimately eliminate alcohol-impaired driving.

The recommendations in this report represent the culmination of a year-long NTSB effort focused on the problem of substance-impaired driving. In May 2012, the NTSB held a forum, "Reaching Zero: Actions to Eliminate Substance-Impaired Driving," to identify the most effective, scientifically based actions needed to reach zero crashes associated with substance-impaired driving (NTSB 2012b, forum summary). Numerous impaired driving countermeasures were discussed at the forum, including laws, enforcement strategies, adjudication programs, substance treatment programs, alcohol ignition interlocks, passive alcohol detection systems, and educational campaigns. Forum presenters discussed the merits and drawbacks of these countermeasures, as well as challenges associated with reducing deaths

due to impaired driving. Following the forum, the NTSB issued a series of safety recommendations to address the need for improved data related to substance-impaired driving.[1] In December 2012, the NTSB adopted a special investigation report concerning wrong-way driving on limited access highways (NTSB 2012c, wrong-way driving report). Alcohol-impaired driving was identified as the leading cause of wrong-way crashes, and important safety recommendations related to alcohol ignition interlocks and Driver Alcohol Detection System for Safety (DADSS) technology were included in the special investigation report.

This safety report addresses the necessity of providing all the following elements to achieve meaningful reductions in alcohol-impaired driving crashes: stronger laws, improved enforcement strategies, innovative adjudication programs, and accelerated development of new in-vehicle alcohol detection technologies. Moreover, the report recognizes the need for states to identify specific and measurable goals for reducing impaired driving fatalities and injuries, and to evaluate the effectiveness of implemented countermeasures on an ongoing basis.

Specifically, the report makes recommendations to the states in the following safety issue areas:

- **Reducing the per se blood alcohol concentration (BAC) limit for all drivers,**
- **Conducting high-visibility enforcement of impaired driving laws and incorporating passive alcohol sensing technology into enforcement efforts,**
- **Expanding the use of in-vehicle devices to prevent operation by an impaired driver,**
- **Using driving while intoxicated (DWI) courts and other programs to reduce recidivism by repeat DWI offenders, and**
- **Establishing measurable goals for reducing impaired driving and tracking progress toward those goals.**

On the federal side, the report recommends that the National Highway Traffic Safety Administration (NHTSA) support state efforts by seeking authority to award incentive grants to states for establishing per se BAC limits of 0.05 or lower and by establishing best practices for alcohol ignition interlock programs and creating incentives to encourage states to adopt the best practices. It also recommends that NHTSA develop and disseminate to states best practices for DWI courts.

By taking these recommended comprehensive actions that have demonstrated their effectiveness, the United States can accelerate progress toward reaching zero alcohol-impaired driving crashes, injuries, and fatalities.

[1] These letters addressed data needs concerning both drug- and alcohol-impaired driving, as components of substance-impaired driving. Although the NTSB recognizes that drugged driving continues to be a serious safety threat, the current report focuses on alcohol-impaired driving.

Chapter 1. Introduction

Twenty-five years ago, on May 14, 1988, one of the deadliest highway accidents in US history took place in Carrollton, Kentucky, when the driver of a pickup truck traveling the wrong way on Interstate 71 drove his truck into a church activity bus (NTSB 1989). The bus was occupied by a driver, 3 adults, and 63 children, ranging in age from 10 to 18. The church bus's fuel tank was punctured during the collision sequence and a fire ensued, which engulfed the entire bus. The bus driver and 26 bus passengers died as a result of this accident, and 34 bus passengers sustained minor-to-critical injuries. Toxicology tests for the pickup truck driver, who survived the crash with serious injuries, showed that he was severely intoxicated at the time of the accident. Test results indicated that he had a blood alcohol concentration (BAC) of 0.26 about 1.5 hours after the collision, indicating that his BAC would have been even higher at the time of the accident.

Since the Carrollton accident, much progress has been made in reducing alcohol-impaired driving, but the problem remains. Thousands continue to die on US roads each year due to this single safety issue. When, in 2012, the National Transportation Safety Board (NTSB) began to evaluate the effectiveness of current and emerging alcohol-impaired driving countermeasures, and to identify possible new approaches and actions, it determined that the ultimate goal of the effort was to find a way to reach zero fatalities, injuries, and accidents involving alcohol-impaired driving.

This is an ambitious goal. But the NTSB believes that over time it can be achieved if federal and state authorities, as well as local communities, commit to the concept that reaching zero is both possible and necessary. In the European Union (EU), which has had such a commitment for more than 10 years, road deaths attributed to alcohol have declined by more than 50 percent (Podda 2012). The EU has renewed its commitment and has set the goal of again halving fatalities by 2020. US states that have enacted similar programs are experiencing greater reductions in fatality rates than those states that have not (Munnich and others 2012). Programs that achieve significant results are comprehensive efforts that set a high bar for reducing fatality rates, require interaction and cooperation among jurisdictions and authorities, and incorporate strategies that are data-driven and based on measurable results. Moreover, they demand constant review and reassessment to determine which efforts are most successful and then to target resources to expand and enhance those efforts.

Although major collisions caused by alcohol-impaired driving, such as the Carrollton accident, capture public attention, every day individuals die on US highways because of alcohol-impaired driving. Hundreds of thousands of people have died in the past 25 years due to this issue. Today, if localities, states, and federal entities dedicate their resources to developing comprehensive programs to eliminate highway accidents caused by alcohol, the goal of reaching zero deaths from alcohol-impaired driving in the United States is achievable. This report is intended to identify which efforts should be elements of such programs.

Chapter 2. Scope of the Impaired Driving Problem

2.1 Alcohol-Impaired Driving Fatalities

According to the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS), in 2011, there were 32,367 highway fatalities in the United States.[1] NHTSA defines an alcohol-impaired driving fatality as one that involves a driver with a BAC of 0.08 g/dL or higher.[2] According to FARS estimates, in 2011, there were 9,878 alcohol-impaired driving fatalities, which represented 31 percent of all highway fatalities. Although the FARS database has limitations, such as variability in how well states report their driver BAC levels, it is generally considered the most comprehensive source for national data on fatal traffic crashes.[3] NHTSA compiles traffic safety facts based on the FARS data for a number of highway safety issues. Appendix B contains NHTSA's 2011 data summary concerning alcohol-impaired driving (NHTSA 2012b).

The NTSB analyzed FARS data for 1982–2011. Figure 1 depicts the total number of impaired driving fatalities per year and the fatality rate (fatalities per 100 million vehicle miles traveled [VMT]). Between 1982 and 2011, annual impaired driving fatalities went from 21,113 to 9,878, a 53 percent reduction. During that same period, there was a 74 percent decline in the fatality rate.

[1] The NHTSA 2011 FARS data are the most current available.

[2] BAC is measured as a mass of alcohol per volume of blood. In the United States, the standard measurement is represented as grams per deciliter (g/dL).

[3] For example, in 2011, FARS reported that 39 percent of all drivers were not tested for BAC and that BAC test data were missing for an additional 10 percent of drivers. Since 1982, NHTSA has used a statistical procedure known as imputation to replace missing values. In 2012, the NTSB made several recommendations to NHTSA and the states to improve BAC reporting rates. A summary of all impairment-related NTSB recommendations is provided in appendix A.

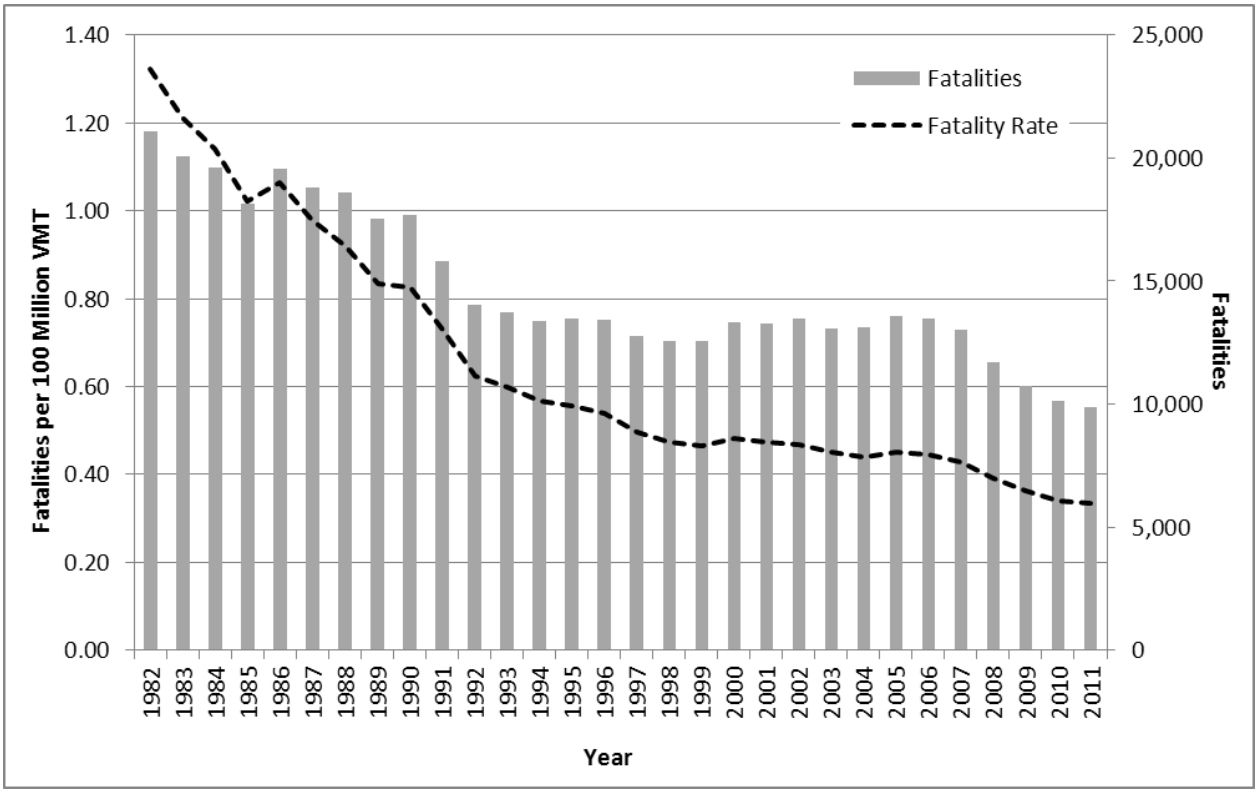


Figure 1. Impaired driving fatalities and fatality rate for 1982 through 2011.

Figure 2 illustrates the percentage of overall fatalities associated with impaired driving between 1982 and 2011. It shows a period of rapid decline in alcohol-impaired fatalities relative to non-alcohol-impaired fatalities between 1982 and 1994; however, since 1995, the proportion of fatalities associated with alcohol-impaired drivers has remained between 30 and 32 percent.

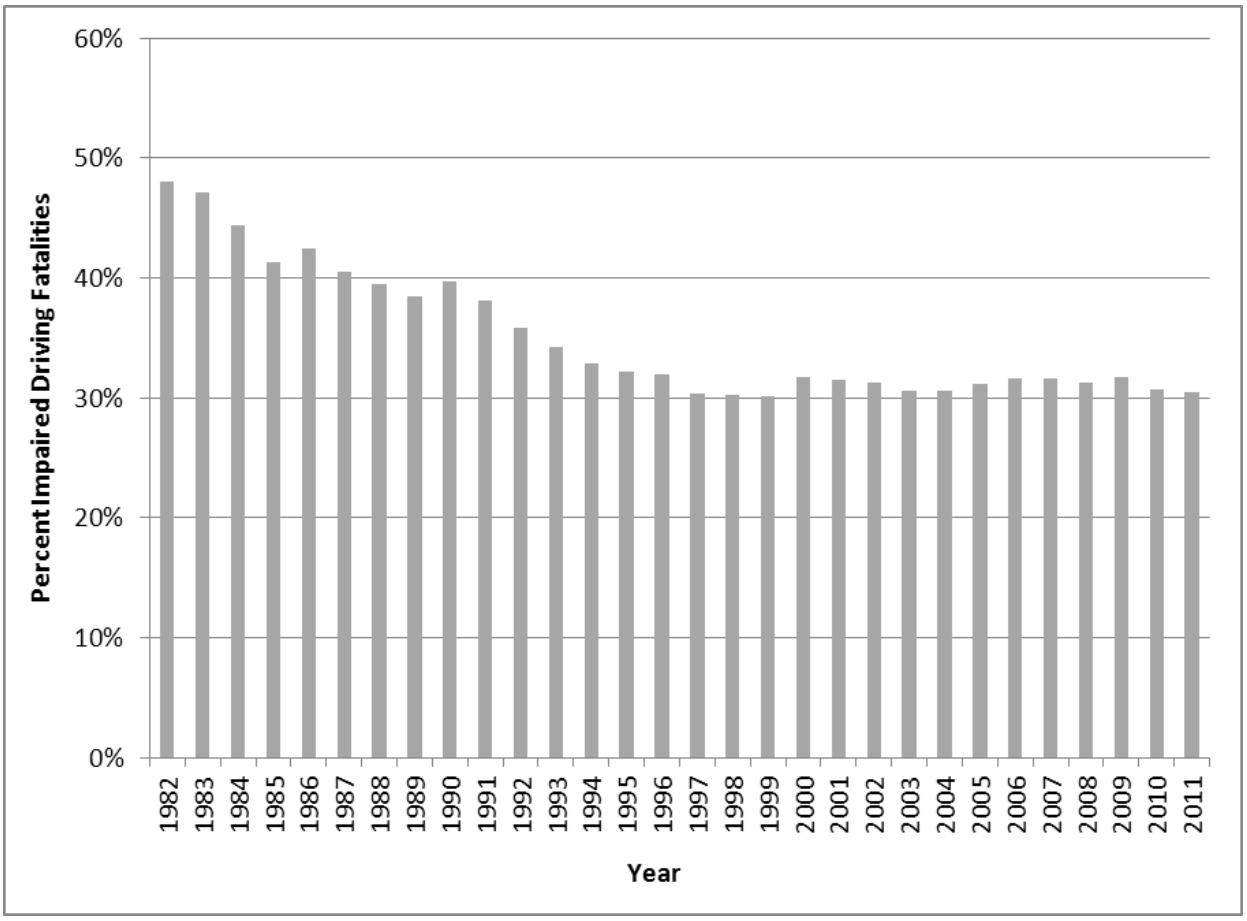


Figure 2. Percentage of highway fatalities associated with alcohol-impaired driving for 1982 through 2011.

2.2 Alcohol-Impaired Driving Injuries and Economic Cost

The contribution of alcohol-impaired driving to nonfatal crashes and the economic cost of those crashes is difficult to quantify for various reasons, including the non-reporting of crashes, the variability introduced by sampling error, and the relative lack of BAC- or alcohol-related information concerning these crashes. For example, a recent study compared police and hospital records for nonfatal crashes in seven states and found that both sets of records substantially underreported alcohol involvement (Miller and others 2012, 87–96).[4] Based on comparisons of the two datasets, the authors estimated that 12.9 percent of all nonfatal crashes involved alcohol. For the subset of nonfatal crashes that caused serious injury, the authors estimated that 22.6 percent of them involved alcohol. These estimates are considerably higher than, for instance, estimates based on police-reported data alone, which indicate that 4.4 percent of all

[4] The study defined "alcohol involvement" by one of several alcohol-related codes on drivers' hospital discharge records, by a positive BAC, by a check on a form box indicating that the driver had been drinking, or by a police report citation for driving under the influence. Police reports identified alcohol involvement in 44 percent of cases that hospitals identified as alcohol-involved, and hospitals reported alcohol involvement in 33 percent of cases police identified as alcohol-involved.

nonfatal crashes and 11.4 percent of the serious injury crash subset, respectively, involved alcohol. The NTSB conducted an analysis of injury data for the years 2000–2011 using the NHTSA General Estimates System database, which is a nationally representative sample of police-reported motor vehicle crashes. Although there was a 43 percent reduction in injuries from alcohol-involved crashes during this period, in 2011 alone, more than 173,000 people received nonfatal injuries in alcohol-involved crashes, including more than 27,000 who received incapacitating injuries.[5] The NTSB analysis also found that nearly twice as many people in alcohol-involved crashes are killed or injured (32 percent) compared to those in non-alcohol-involved crashes (17 percent).

With respect to the economic costs, a 2002 NHTSA report estimated that in 2000, alcohol-involved[6] traffic crashes cost the public $114.3 billion, comprising $51.1 billion in monetary costs and $63.2 billion in quality-of-life losses (Blincoe and others 2002). A more recent study using 2006 crash data estimated that the total cost of alcohol-involved crashes was $129.7 billion, comprising $66.4 billion in monetary costs and $63.3 billion in quality-of-life losses (Zaloshnja and Miller 2009, 141–53). Table 1 summarizes the economic costs estimated in the two reports.

Table 1. Estimates of economic costs associated with alcohol-involved traffic crashes.

Year	Monetary Costs	Quality-of-Life Losses	Total Cost
2000	$51.1 billion	$63.2 billion	$114.3 billion
2006	$66.4 billion	$63.3 billion	$129.7 billion

2.3 Incidence of Drinking and Driving

Despite decades of public campaigns and other efforts to discourage driving after drinking, survey and observational data show that many people continue to do so. In 2010, about 1.8 percent of respondents to the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System survey[7] reported one or more episodes of alcohol-impaired driving in the past 30 days.[8] By extrapolating those data to the general population, researchers estimated there were 4 million individuals who drove impaired and approximately 112 million alcohol-impaired driving episodes that year (Bergen, Shults, and Rudd 2011, 1351–56). Although this represented a decline since 2006, the numbers are still high. Rates of drinking and

[5] An estimated 72 percent of drivers involved in police-reported crashes in the United States during 2011 were not tested for alcohol. Consequently, it is likely that the involvement of impaired drivers in nonfatal crashes is underestimated.

[6] In this case, "alcohol-involved" was defined as a crash involving a driver with a BAC greater than 0.01.

[7] The CDC Behavioral Risk Factor Surveillance System completes more than 400,000 adult interviews each year. It is the largest continuously conducted multi-mode (mail and telephone) health survey system in the world.

[8] This is based on the response to the survey question, "During the past 30 days, how many times have you driven when you've had perhaps too much to drink?"

driving were disproportionately high among young men, binge drinkers,[9] and individuals who do not regularly wear seat belts. A 2007 NHTSA study of randomly stopped nighttime drivers at 300 locations across the 48 contiguous states found that 12.7 percent of all drivers had a positive BAC and that 4.5 percent, or nearly 1 in 20 drivers, had a BAC of 0.05 or higher (Lacey and others 2009). Like the survey data, the observational results showed a decline from prior years; however, the proportion of drivers choosing to drive after drinking continues to be high.

The Federal Bureau of Investigation (FBI) estimated that 1.2 million driving while intoxicated (DWI)[10] arrests took place in 2011 (FBI 2013). It has been estimated that only 1 of 80 impaired driving trips results in the driver's being arrested (Ferguson 2012, 427–41).

2.4 Beliefs about Drinking and Driving

The 2012 *Traffic Safety Culture Index* suggests a general public consensus on the abstract danger of driving after drinking but some inconsistency in how this belief is reflected in personal drinking and driving behavior (AAA Foundation 2013). According to the AAA Foundation index, more than 91 percent of respondents perceived drinking and driving as a somewhat or very serious threat to their personal safety, and 97 percent considered it unacceptable to drive when they think they may have had too much to drink. However, despite the nearly unanimous rejection of driving after drinking too much, about 14 percent of respondents age 16 and over still reported having driven a motor vehicle when they thought they were close to or possibly over the legal BAC limit in the past year.

With respect to countermeasures, the AAA Foundation report showed that about 81 percent of respondents strongly (53 percent) or somewhat (28 percent) supported a law requiring all drivers convicted of DWI to have an alcohol ignition interlock (interlock) installed that will keep their car from starting if they have been drinking, even if it is the driver's first DWI conviction. An interlock is a piece of equipment connected to the ignition circuit of a vehicle that prevents the engine from starting until a breath sample has been provided, analyzed for ethanol content, and determined to be lower than prescribed limits.[11]

Seventy-one percent of respondents supported requiring all new cars to have built-in technology that would prevent the vehicle from starting if the driver's alcohol level is over the legal limit. Nearly 44 percent strongly supported such a requirement.

[9] "Binge drinking" was defined by the authors as four or more drinks on one occasion for women and five or more for men.

[10] The specific criminal offenses pertaining to driving while impaired by alcohol vary across jurisdictions and can include such terms as "driving under the influence of alcohol or drugs (DUI)," "operating under the influence of alcohol or drugs (OUI)," or "driving while intoxicated." In so far as possible, in this report, the term "driving while intoxicated (DWI)" is used to capture all types of alcohol-impaired offenses.

[11] NHTSA model specifications recommend that the vehicle should not start if the driver's BAC is 0.025 or higher. Many systems require additional breath samples at intervals during the driving task (running retests) and have other anti-circumvention features to prevent misuse.

2.5 Summary

Based on its review of impaired driving fatality and injury data, the NTSB concludes that although impaired driving injuries, fatalities, and fatality rates in the United States have significantly decreased over the past several decades, the pace of these reductions has slowed since the mid-1990s; and alcohol-impaired driving continues to contribute to thousands of fatalities and tens of thousands of serious injuries each year. Based on its review of research tracking impaired driving behaviors and attitudes, the NTSB concludes that the public generally believes that driving after drinking alcohol poses a significant threat to safety; however, many people continue to drive after drinking.

Chapter 3. History of Efforts to Reduce Alcohol-Impaired Driving

3.1 Efforts Undertaken Since the 1980s

During the 1980s and 1990s, considerable effort was dedicated to addressing alcohol-impaired driving. Advocacy groups like Remove Intoxicated Drivers (RID), established in 1978, and Mothers Against Drunk Driving (MADD),[12] established in 1980, took lead roles in changing American perceptions about the acceptability of driving after drinking and in advocating meaningful legislative changes to keep drunk drivers off the road. In 1982, federal drunk driving legislation was enacted that provided incentives to states based on the establishment of a legal per se BAC of 0.10 (HR 6170, PL 97–364).[13] This law also called for administrative license suspension/revocation (ALS/ALR)[14] for drivers arrested for DWI, mandatory jail time or community service for repeat offenders, and better enforcement of drunk driving laws. Two years later, the National Minimum Drinking Age Act of 1984 (HR 4616, PL 98-363), which mandated that states would receive reduced federal highway funds if they did not raise the minimum legal drinking age to 21, went into effect. Between 1981 and 1986, a total of 729 new state laws addressing drunk driving were enacted (Lerner 2011, 88–90).

Numerous additional efforts have been undertaken since the 1980s to address alcohol-impaired driving and reduce the incidence of alcohol-impaired fatalities. Those efforts include, but are not limited to, the following:

- Nationwide "zero-tolerance laws" that set per se BAC levels between 0.00 and 0.02 for drivers under age 21;
- Nationwide per se BAC limit of 0.08 for drivers age 21 and over;
- Nationwide per se BAC limit of 0.04 and random drug and alcohol testing for commercial drivers;
- NHTSA establishment of a national standardized field sobriety test training program;
- Increased numbers of states with ALS/ALR laws and increased penalties for repeat DWI offenders and drivers with high-BAC levels;
- Increased use of high-visibility enforcement, including media campaigns and sobriety checkpoints;

[12] The organization was originally known as Mothers Against Drunk Drivers.

[13] Per se BAC laws establish the BAC level at which it is illegal per se (in itself) for a driver to operate a vehicle, regardless of the driver's apparent condition or actions.

[14] ALS/ALR laws allow a police officer to confiscate and suspend a driver's license at the time of arrest if the driver refuses to take an alcohol test or if the driver's test result exceeds the per se BAC limit. ALS/ALR laws are discussed in chapter 5.

- Alcohol screening, intervention, and treatment programs for DWI offenders and for individuals with alcohol use problems;

- Laws holding alcohol servers and providers liable for serving underage or obviously intoxicated individuals (dram shop laws), and responsible beverage service practices to prevent over-service or service to underage persons;

- Social host liability laws that impose civil liability on individuals in a noncommercial setting who serve alcohol to underage and intoxicated adults if the individual subsequently is involved in an alcohol-related accident;

- Vehicle sanctions for DWI offenders, such as vehicle or license plate impoundment;

- Institution of DWI courts, which are designed to address the alcohol problems of repeat offenders and take a comprehensive approach to change offender behavior;

- 24/7 sobriety programs that use technologies to routinely or continuously monitor offender sobriety;

- NHTSA development of model specifications for evidentiary breath testing devices and ignition interlocks; and

- Increased use of interlocks.

As described in chapter 2, over the past three decades, the number of lives lost per year in alcohol-related traffic crashes has dropped substantially. However, most of this reduction took place during the 1980s and early 1990s; since then, progress in this safety area has been relatively slow. Since 2000, nearly 150,000 people have lost their lives in crashes involving alcohol-impaired drivers, and these crashes continue to account for over 30 percent of all traffic fatalities. In addition to the statistical evidence, through its highway accident investigations, the NTSB has continued to witness firsthand the effects of alcohol-impaired driving. (For example, see NTSB 2002a, NTSB 2002b, NTSB 2006, and the numerous investigations cited in NTSB 2012c [wrong-way driving report].) Although progress has been made in reducing alcohol-related traffic crashes and fatalities, additional efforts are needed.

3.2 Moving Ahead for Progress in the 21st Century Act

The Moving Ahead for Progress in the 21st Century Act (MAP-21), which reauthorized surface transportation programs for fiscal years 2013 and 2014, took effect on October 1, 2012. The act includes several sections that address impaired driving.

3.2.1 National Priority Safety Programs

In section 31105 of MAP-21, "Impaired Driving Countermeasures" is identified as one of several national priority safety programs (Pub. L. No. 112-141, 126 STAT. 741 [2012]).

According to the section, grants will be awarded to states that adopt interlock laws or other effective programs to reduce driving under the influence of alcohol and/or drugs.

3.2.2 Grant Eligibility

State eligibility for certain MAP-21 grant funds for impaired driving countermeasures depends on the state's average impaired driving fatality rate, defined as the number of fatalities, as recorded in FARS, from crashes involving impaired drivers (defined in MAP-21 as drivers with BACs ≥ 0.08) for every 100 million VMT based on the 3 most current years for which FARS data are available. States are grouped into three ranges based on their average impaired driving fatality rate—low (0.30 deaths or less per 100 million VMT), mid (higher than 0.30 and lower than 0.60 deaths per 100 million VMT), and high (0.60 deaths per 100 million VMT or higher).

Table 2 lists average alcohol-impaired driving fatality rates and fatalities by state, and figure 3 provides a US map that depicts high-, mid-, and low-range states.

Table 2. States' 3-year (2008–2010) average impaired driving fatality rates per 100 million VMT and total 2010 fatalities due to impaired driving, sorted from lowest to highest fatality rate. (Based on data obtained from the NHTSA National Center for Statistics and Analysis.)

States and DC	3-year average rate	2010 fatalities
Low-Range		
Utah	0.17	46
New Jersey	0.20	160
Massachusetts	0.21	122
Minnesota	0.21	128
Dist. of Columbia	0.24	7
Vermont	0.24	18
Michigan	0.25	236
New York	0.25	360
Indiana	0.26	194
California	0.27	774
Maryland	0.27	154
Iowa	0.29	85
Maine	0.29	40
Nebraska	0.29	50
Virginia	0.29	207
Illinois	0.30	292
New Hampshire	0.30	45
Ohio	0.30	335

Mid-Range		
Georgia	0.31	299
Oregon	0.31	70
Colorado	0.32	120
Connecticut	0.32	119
Rhode Island	0.33	27
Washington	0.33	169
Wisconsin	0.35	203
Arizona	0.37	206
Kentucky	0.38	168
Nevada	0.38	69
North Carolina	0.38	389
Florida	0.39	678
Alaska	0.40	16
Missouri	0.42	257
Pennsylvania	0.42	424
Tennessee	0.42	288
New Mexico	0.43	119
Kansas	0.44	134
Hawaii	0.45	43
Idaho	0.45	72
Alabama	0.46	264
Delaware	0.46	37
South Dakota	0.47	37
Oklahoma	0.48	218
Arkansas	0.52	178
Mississippi	0.52	174
Texas	0.54	1270
West Virginia	0.54	87
Wyoming	0.58	53
High-Range		
North Dakota	0.60	46
Louisiana	0.63	226
Montana	0.73	72
South Carolina	0.76	353

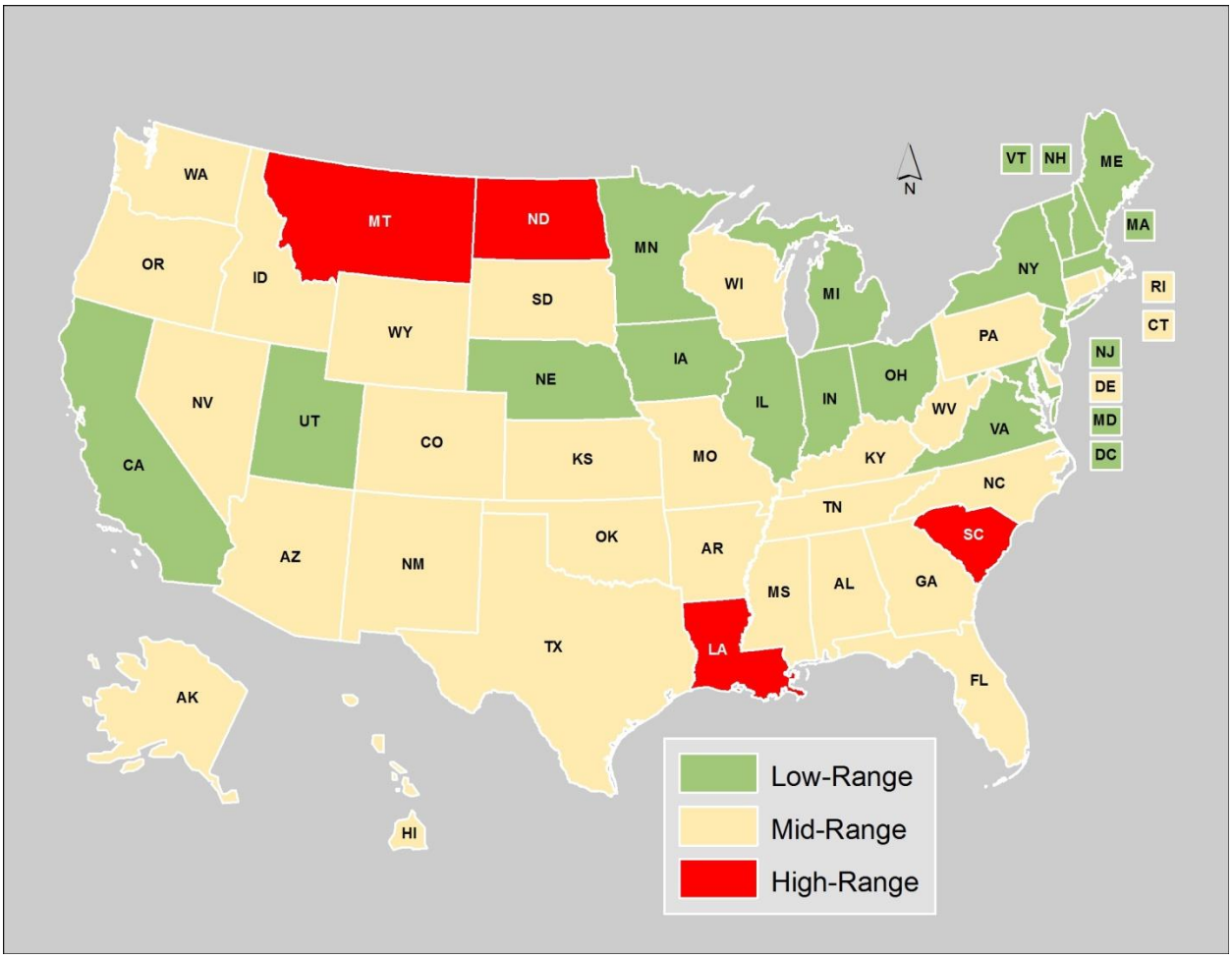


Figure 3. Low-, mid-, and high-range states based on average impaired driving fatality rates. (Based on data obtained from the NHTSA National Center for Statistics and Analysis.)

The higher the state's fatality range, the more restrictions are placed on its eligibility for MAP-21 funds and on how it may use grant funds. For example, low-range states are automatically eligible for funds and may use those funds for nearly any impaired driving program they choose. To be eligible for funds, mid-range states must have had, or must plan to convene within 1 year of the grant, an impaired driving task force to develop a statewide impaired driving prevention plan. Mid-range states may then use the funds for any of the following efforts without additional approval:

- Providing high-visibility enforcement (HVE) programs;
- Hiring an impaired driving program coordinator;
- Providing support for HVE efforts (court support, and training and education of criminal justice professionals [law enforcement, prosecutors, judges, probation officers]);
- Establishing DWI courts;

- Implementing interlock programs;
- Improving BAC testing and reporting;
- Providing media for HVE and conducting standardized field sobriety training, advanced roadside impaired driving evaluation training, and training or equipment for drug recognition experts;
- Providing training on the use of alcohol screening and brief intervention;
- Developing impaired driving information systems; and
- Defraying costs associated with 24/7 sobriety programs.

High-range states (those with impaired driving fatality rates averaging 0.60 deaths per 100 million VMT or higher) must undergo within 3 years, or plan to undergo within the first year of the grant, an assessment of their impaired driving program. Each high-range state must also convene an impaired driving task force to develop a statewide impaired driving prevention plan that addresses recommendations from the assessment and includes a detailed grant spending plan. The plan must be submitted to NHTSA for approval, and the state must submit updates to NHTSA each year for approval. In addition, the high-range states may use the MAP-21 grants to implement HVE programs. They may also engage in the programs listed above for mid-range states, if it is so provided in their state safety plan and has been approved by the US Secretary of Transportation.

3.2.3 Mandatory Interlock Laws, Open Container Requirements, and Minimum Penalties for Repeat Offenders

MAP-21 also specifies that states may receive a separate grant by adopting and enforcing mandatory interlock laws for all individuals convicted of DWI (Pub. L. No. 112-141, 126 STAT. 748 [2012]). MAP-21 notes that state highway funds will be withheld from states that do not have open container requirements or minimum penalties for repeat offenders. Open container requirements are described in 23 *United States Code* 154 laws that prohibit the possession of any open alcoholic beverage container or the consumption of any alcoholic beverage in the driver or passenger areas of motor vehicles. The specific minimum penalties for repeat DWI offenders listed in MAP-21 (Pub. L. No. 112-141, 126 STAT. 556 [2012]) are as follows:

> (1) a suspension of all driving privileges for not less than 1 year, or (2) a suspension of unlimited driving privileges for 1 year, allowing for the reinstatement of limited driving privileges subject to restrictions and limited exemptions as established by state law, if an ignition interlock device is installed for not less than 1 year on each of the motor vehicles owned or operated, or both, by the individual.

3.3 NTSB 2012 Forum "Reaching Zero: Actions to Eliminate Substance-Impaired Driving" and Toward Zero Death Efforts

In May 2012, the NTSB held the "Reaching Zero: Actions to Eliminate Substance-Impaired Driving" forum. The objective of the forum was to identify the most effective data-driven, science-based actions needed to eliminate crashes resulting from substance-impaired driving. Expert panelists included representatives of federal, state, and local governments, as well as leading researchers, law enforcement officers, members of the judiciary, industry representatives, treatment experts, and advocates. During the 2-day forum, participants discussed the nature and scope of substance-impaired driving and various countermeasures, including education and outreach, enforcement, judicial approaches, screening and treatment programs, responsible beverage service, and international approaches. A summary of the forum is available on the NTSB website (NTSB 2012b, forum summary).[15]

The NTSB is not alone in focusing on the goal of reaching zero deaths and serious injuries from substance-impaired driving. The concept of envisioning and working toward eliminating *all* traffic deaths and serious injuries originated in Sweden in the mid-1990s and has grown into a worldwide movement (Tingvall 1997, 37–57). In the United States, since 2001, approximately 30 states have adopted missions, goals, or programs designed to eliminate fatal traffic crashes (Munnich and others 2012). In 2009, a national effort known as "Toward Zero Deaths (TZD): A National Strategy on Highway Safety" was launched by multiple stakeholder groups and facilitated by the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (FHWA 2013). A 2012 study examined four states with established TZD programs—Utah, Minnesota, Oregon, and Washington—and found that implementing the programs had accelerated the reduction of fatality rates compared to states without such programs (Munnich and others 2012). For example, in its strategic highway safety plan,[16] Utah has committed to a goal of zero fatalities on Utah's roads (Utah 2013). Its plan includes impaired driving among 10 programs that are designated as "emphasis safety areas," and it lists several strategies to achieve this goal, including law enforcement and education campaigns, enhanced DWI court participation, promoting a zero tolerance law for drivers under age 21, and encouraging law enforcement to test driver BAC in all fatal crashes. According to its 2012 highway safety plan, since the Utah Zero Fatalities program began in 2006, traffic fatalities declined from 287 to 236 in 2011 (18 percent), and impaired driving fatalities declined from 39 to 24 (38 percent) (Utah 2012). Utah provides an example of a state that has articulated specific performance goals and measures that it will use (for example, number of impaired driving fatalities, numbers of DWI arrests and

[15] Also in May 2012, Canada held a Drinking and Driving Symposium to articulate its impaired driving framework. Recommendations from that meeting are in concert with many of the countermeasures recommended in this report, including increased enforcement, expanded education, a combination of administrative and criminal approaches, and the use of technologies to balance penalty and rehabilitation (Robertson and Vanlaar 2012).

[16] A strategic highway safety plan is a statewide-coordinated effort developed by a state department of transportation in cooperation with local, state, federal, and private sector stakeholders. Its purpose is to provide a framework for reducing highway fatalities and serious injuries on public roads. State highway safety offices also develop annual highway safety plans that describe their ongoing highway safety efforts and serve as an application for federal highway safety funds available to states. Both plans are required to be submitted to the US Secretary of Transportation under MAP-21.

checkpoints, and percentage of students who report using alcohol) to determine if those goals have been met.

3.4 NTSB Actions Since the 2012 Forum

Since the 2012 forum, the NTSB has taken additional steps to address the problem of impaired driving. In November 2012, the NTSB identified eliminating substance-impaired driving as one of 10 transportation safety areas on its Most Wanted List. By expanding the safety area from alcohol-impaired driving to substance-impaired driving, the NTSB recognized the need to address the growing problem of drug-impaired driving, of which alcohol-impaired driving is a substantial component. Although this report is focused on reducing alcohol-impaired driving, the NTSB has made numerous recommendations to address drug-impaired driving, and it continues to seek means of addressing this problem.[17]

Also in November 2012, as one outcome of the May 2012 forum, the NTSB made six recommendations calling for improvements to BAC testing and reporting in crashes, common standards for postcrash drug tests, and better tracking of place of last drink (POLD) data (NTSB 2012a, standalone recommendation letter). These recommendations recognize the criticality of obtaining robust data to determine the scope of safety issues, track changes over time, and assess the effectiveness of countermeasures.

Specifically, the NTSB recommended that NHTSA take the following actions:

H-12-32

Develop and disseminate to the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia blood alcohol concentration (BAC) testing and reporting guidelines based on the 2012 report *State Blood Alcohol Concentration Testing and Reporting for Drivers Involved in Fatal Crashes: Current Practices, Results, and Strategies, 1997–2009*.

H-12-33

Develop and disseminate to appropriate state officials a common standard of practice for drug toxicology testing, including (1) the circumstances under which tests should be conducted, (2) a minimum set of drugs for which to test, and (3) cutoff values for reporting the results.

[17] A summary of all NTSB recommendations concerning substance-impaired driving, including drug-impaired driving, may be found in appendix A.

The NTSB also made the following recommendations to the 45 states that have low reporting rates for BAC testing,[18] the Commonwealth of Puerto Rico, and the District of Columbia:

> H-12-34
>
> Increase your collection, documentation, and reporting of blood alcohol concentration (BAC) test results by taking the following actions, as needed, to improve testing and reporting rates: (1) enact legislation, (2) issue regulations, and (3) improve procedures used by law enforcement agencies or testing facilities.
>
> H-12-35
>
> Once the National Highway Traffic Safety Administration has developed the blood alcohol concentration (BAC) testing and reporting guidelines recommended in Safety Recommendation H-12-32, incorporate the guidelines into a statewide action plan to achieve BAC reporting rates of at least 80 percent of fatally injured drivers and at least 60 percent of surviving drivers involved in fatal crashes.

To the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia, the NTSB recommended the following action:

> H-12-36
>
> Require law enforcement agencies to collect place of last drink (POLD) data as part of any arrest or accident investigation involving an alcohol-impaired driver.

To the International Association of Chiefs of Police and the National Sheriffs' Association, the NTSB recommended the following action:

> H-12-37
>
> Inform your members of the value of collecting place of last drink (POLD) data as part of any arrest or accident investigation involving an alcohol-impaired driver.

Safety Recommendations H-12-32 and -33 are in "Open—Acceptable Response" status, and Safety Recommendations H-12-34 through -36 are in "Open—Await Response" status. Safety Recommendation H-12-37 is in "Open—Acceptable Response" status to the International Association of Chiefs of Police and in "Open—Await Response" status to the National Sheriffs' Association. Because the NTSB continues to consider that improvements to BAC testing and reporting following accidents, common standards for postaccident drug tests, and better tracking of POLD data are necessary, it reiterates Safety Recommendations H-12-32 through -37.

In December 2012, the NTSB held a Board Meeting on wrong-way driving collisions, during which the Board called on NHTSA and the Automotive Coalition for Traffic Safety, Inc.,

[18] The recommendation excluded Alaska, Maine, Montana, Nebraska, and New Mexico because, as of 2012, those states had BAC test result reporting rates that exceeded NHTSA's suggested target of 80 percent for fatally injured drivers and 60 percent for surviving drivers involved in fatal crashes.

(ACTS)[19] to accelerate implementation of the Driver Alcohol Detection System for Safety (DADSS). DADSS refers to passive vehicle-based systems that would identify driver alcohol use by touch or by measuring a driver's exhaled breath; they then would prevent vehicle operation by drivers above the legal limit (NTSB 2012c, wrong-way report).

Specifically, the NTSB recommended that NHTSA take the following action:

H-12-43

Work with the Automotive Coalition for Traffic Safety, Inc., to accelerate widespread implementation of Driver Alcohol Detection System for Safety (DADSS) technology by (1) defining usability testing that will guide driver interface design and (2) implementing a communication program that will direct driver education and promote public acceptance.[20]

The NTSB also recommended that the 33 states that do not mandate the use of interlocks for all DWI offenders, the Commonwealth of Puerto Rico, and the District of Columbia take the following action:

H-12-45

Enact laws to require the use of alcohol ignition interlock devices for all individuals convicted of driving while intoxicated (DWI) offenses.

Chapter 5 discusses these recommendations concerning technologies that prevent a person from driving a vehicle while impaired.

[19] ACTS is a nonprofit organization that is funded by a number of motor vehicle manufacturers (BMW, Chrysler, Ford, General Motors, Honda, Hyundai, Jaguar, Kia, Land Rover, Mazda, Mercedes-Benz, Mitsubishi, Nissan, Porsche, Toyota, Volkswagen, and Volvo).

[20] A companion recommendation, Safety Recommendation H-12-48, was made to ACTS.

Chapter 4. Alcohol Impairment and Its Risks

Alcohol is a drug that depresses the central nervous system and affects cognitive performance, mood, and behavior. A variety of factors can influence the relationship between the consumption of alcohol and the resulting BAC level,[21] but in general, alcohol's effects are dose-dependent, meaning that its impact changes or becomes more severe as more alcohol is consumed. Health risks have been associated with drinking too much alcohol (NIAAA 2013);[22] however, this report focuses on alcohol's adverse effects on tasks related to the safe operation of vehicles and on the relationship between alcohol consumption and elevated crash risk.

4.1 BAC Effects on Performance

BAC represents a mass of alcohol per volume of blood. An individual's BAC may be determined by analyzing a blood sample directly, or it may be estimated using other biological specimens, such as urine or exhaled breath.

A review of research findings from laboratory and driving simulator studies concerning the effects of alcohol on driving-related skills, such as divided attention, vigilance, tracking, perception, and reaction time, found that several types of performance are affected by BAC levels as low as 0.01 (Moskowitz and Fiorentino 2000). As shown in table 3, most of the studies found performance decrements at levels well below 0.08 BAC.

Another more recent study found significant cognitive decrements in speed of information processing, reductions in working memory, and increases in errors of commission at 0.048 BAC (Dry and others 2012). Beyond impairing driving-related performance, alcohol use is associated with reduced seat belt use, which increases injury severity in the case of a crash (Kweon and Kockelman 2006, 39–56; Tison, Williams, and Chaudhary 2010).

[21] Such factors may include the individual's sex and weight, the concentration of alcohol in the consumed beverage, and the rate at which the beverage is consumed.

[22] For example, excessive alcohol consumption is associated with weakened immune systems; increased risk of cancer; and higher risk of heart, liver, and pancreatic diseases.

Table 3. BAC and impairment by behavioral area. (Adapted from Moskowitz and Fiorentino 2000.)

	Type of Impairment	
BAC (g/dL)	**By Lowest BAC at Which Impairment Was Found**	**By First BAC at Which 50% or More of Behavioral Tests Indicated Consistent Impairment**
0.001–0.009	Driving Simulator Lane Deviations, Divided Attention	Driving Simulator Lane Deviations, Divided Attention
0.010–0.019	Drowsiness, Psychomotor Skills, Cognitive Tasks, Tracking	Drowsiness
0.020–0.029	Choice Reaction Time, Visual Functions	
0.030–0.039	Vigilance, Perception	Vigilance
0.040–0.049	Simple Reaction Time	Perception, Visual Functions
0.050–0.059		Tracking
0.060–0.069		Cognitive Tasks, Psychomotor Skills, Choice Reaction Time
0.070–0.079		
0.080–0.089		
0.090–0.099		
≥0.100	Critical Flicker Fusion[a]	Simple Reaction Time, Critical Flicker Fusion

[a] Determination of the lowest frequency at which a flickering on-off light appears to be constant.

4.2 BAC Effects on Crash Risk

The laboratory and driving simulator research described above provides insights into alcohol's effects on general performance; however, with respect to safety, studies that consider the relationship between BAC and crash risk can provide useful information to guide policy. One of the earliest and best known studies of the effects of BAC on crash risk was the Borkenstein Grand Rapids study, a case-control study conducted in the early 1960s (Borkenstein and others 1964). The Borkenstein study showed an increased risk of crashes beginning at a BAC of 0.04. At a BAC of 0.08, risk was nearly doubled, and at 0.10, it had increased six fold. The Borkenstein study also found a "dip" in risk at very low BAC levels;[23] however, subsequent replications have indicated that the dip was a statistical anomaly (Hurst, Harte, and Frith 1994, 647–54) and that risk increases continuously beginning at a BAC of 0.01.

More recent studies have shown that risk is significantly higher when a driver's BAC is ≥ 0.05, and that crash risk climbs rapidly at BAC levels that exceed 0.08. One study found that the risk of fatal crash involvement at BACs between 0.050 and 0.079 ranged from about 3 to 17 times greater, depending on the age of the driver and the type of fatal crash (single-vehicle versus all crashes) (Zador, Krawchuk, and Voas 2000, 387–95). Another study found that at a BAC of 0.05, drivers are 1.38 times more likely to be in a crash than are sober drivers. At a BAC of 0.08, crash risk is 2.69 times higher (Compton and others 2002; Blomberg and others 2005). These elevated risks grow even higher as BACs increase, with the risk of being in a crash rising to nearly 5 times higher by a BAC of 0.10. Figure 4 depicts relative crash risk by BAC level from this study.

[23] That is, crash risk lower than observed at 0.00 BAC.

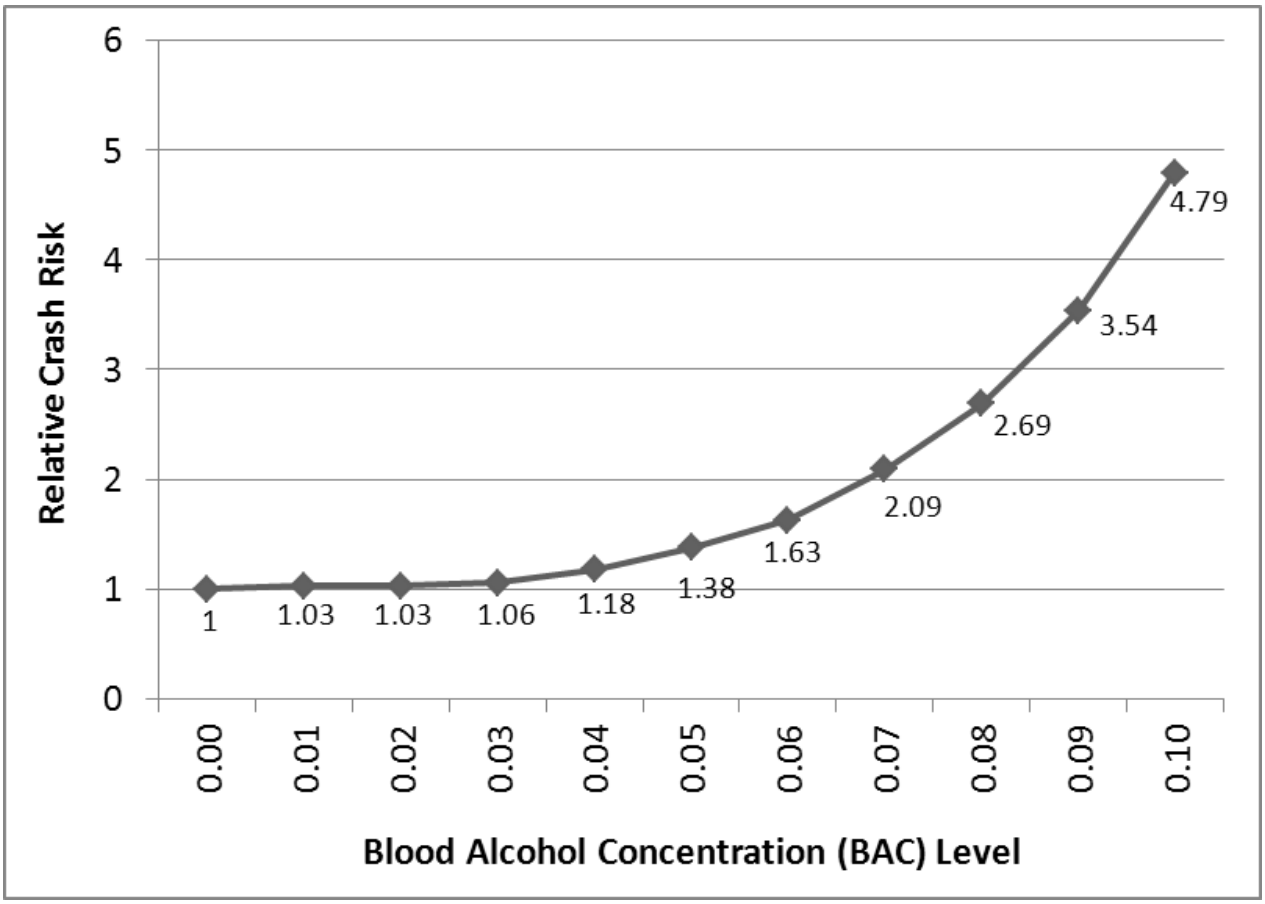


Figure 4. Relative crash risk by driver BAC level. (Based on data from Compton and others 2002.)

In sum, the NTSB concludes that BAC levels as low as 0.01 have been associated with driving-related performance impairment, and BAC levels as low as 0.05 have been associated with significantly increased risk of fatal crashes.

This finding indicates that a major shift in public perception with respect to alcohol impairment is needed. Many people believe that if a driver's BAC is under the legal limit of 0.08, the driver is safe to drive. In reality, by the time a driver's BAC reaches 0.08, his or her fatal crash risk has at least doubled, and some studies indicate it may be many times higher.

Chapter 5. Countermeasures to Reduce Alcohol-Impaired Driving

5.1 Reducing the Per Se BAC Limit

Since 2004, all states have had a per se BAC limit of 0.08 for noncommercial drivers age 21 and over.[24] Since 1988, federal regulations have set a 0.04 per se BAC limit for commercial drivers (49 *Code of Federal Regulations* [CFR] 382.201),[25] and all states have "zero tolerance" laws that specify per se BAC limits between 0.00 and 0.02 for drivers under 21. In a few states, different per se BAC limits apply to school bus drivers or convicted DWI offenders (NHTSA 2012a).[26]

As described in chapter 4, laboratory studies have shown that driving-related performance is degraded at BAC levels as low as 0.01, and epidemiological studies employing crash data have shown significantly elevated crash risk at BAC levels near 0.05. Lowering per se BAC limits has been associated with reductions in impaired driving crashes and fatalities. For example, 14 independent studies conducted in the United States found that lowering the BAC limit from 0.10 to 0.08 resulted in reductions in alcohol-related crashes, fatalities, or injuries of 5–16 percent (Fell and Voas 2006, 233–43). Other studies have found similar results (for example, Dee 2001, 111–28; Shults and others 2001, 66–88; Voas, Tippetts, and Fell 2000, 483–92). In 2012, the CDC listed 0.08 per se BAC laws among the "top 20 violence and injury practice innovations since 1992" (Kress and others 2012, 257–63).[27]

Several studies have also demonstrated the effectiveness of setting per se BAC limits below 0.08 for novice drivers, commercial drivers, or all drivers. For example, six studies that examined the effectiveness of low-BAC laws for young or novice drivers found reductions in injuries or crashes after enactment of the laws, and in three of the studies, the reductions were statistically significant (Zwerling and Jones 1999, 76–80). A study of commercial drivers found that changes to commercial driving laws,[28] including the per se BAC reduction to 0.04, were associated with a 23 percent reduction in risk of alcohol involvement in fatal crashes by motor

[24] Utah passed the first 0.08 BAC law in 1983, and several additional states lowered their per se BAC thresholds to 0.08 during the 1980s and 1990s. In the late 1990s, grant funds were made available to states that enacted 0.08 per se laws, and in 2000, the US Department of Transportation (DOT) Appropriations Act included a provision that states must enact 0.08 per se BAC laws by 2004 or begin losing federal highway construction funds. At the time, 19 states, the Commonwealth of Puerto Rico, and the District of Columbia already had 0.08 per se BAC laws. By 2004, all states had set their per se BAC limit at 0.08.

[25] This rule, "Blood Alcohol Concentration Level for Commercial Motor Vehicle (CMV) Drivers," enacted October 4, 1988, established 0.04 as the BAC level at or above which a CMV operator would be disqualified from operating a CMV. Before this rule went into effect, the per se BAC limit for CMV drivers was 0.10.

[26] For example, in Alabama and Pennsylvania, school bus drivers have a 0.02 per se BAC limit, and in Wisconsin and Connecticut, there are lower BAC limits for repeat DWI offenders. For a summary of state laws, see NHTSA's 2012 *Digest of Impaired Driving and Selected Beverage Control Laws*, DOT HS 811 673.

[27] Also listed were sobriety checkpoints and interlocks.

[28] In 1995, motor carrier drivers were required to be subject to preemployment, random, reasonable-suspicion, and postaccident testing.

carrier drivers (Brady and others 2009, 775–82). A study of per se BAC reductions in several European countries (Albalate 2008, 20–39) found that the change from a 0.08 to a 0.05 per se BAC limit reduced traffic fatalities by 8–12 percent among people aged 18–49. Finally, in Australia, fatal crashes decreased significantly in two states (by 18 percent in Queensland and by 8 percent in New South Wales) after those states lowered their per se BAC limits from 0.08 to 0.05 (Henstridge, Homel, and Mackay 1997).[29]

National and international traffic safety and public health organizations, including the American Medical Association (AMA 2013), the World Health Organization (WHO 2013a), the World Medical Association (WMA 2013), and the Association for the Advancement of Automotive Medicine (AAAM 2009) have advocated setting BAC limits at 0.05 or lower. The AMA, as part of its "Alcohol and the Driver" policy, has called for a per se BAC limit of 0.04 for more than two decades. The AAAM policy, established in 2009, included the following statement:

> Because alcohol has been shown to have a wide variation of effect from subject to subject, special attention needs to be given to the selection of a BAC level in which the vast majority of drinking drivers are likely to be affected. This level appears to be .05 g/dL BAC. When all of the international evidence on lowering BAC limits is assembled, reviewed, and summarized, it is concluded that lowering the illegal BAC limit to .05 g/dL (or lower for countries that have had .05 g/dL limits for several years) is an effective strategy in reducing impaired driving. (AAAM 2009, 7)

According to information derived from the International Center for Alcohol Policies (ICAP) and the WHO, internationally, more than 100 countries have established maximum per se BAC limits at or below 0.05 (ICAP 2013 and WHO 2013b): these include 25 of the 27 EU member countries. The NTSB concludes that BAC levels higher than 0.05 are viewed by respected traffic safety and public health organizations around the world as posing unacceptable risk for driving, and more than 100 countries have already established per se BAC limits at or below 0.05.

Some countries have maintained a 0.08 per se BAC limit for criminal sanction but have recognized the driver-impairing effects of lower BAC levels by establishing lower BAC limits to be addressed by administrative sanction. For example, although Canada has set a 0.08 per se BAC level for DWI arrest, many Canadian provinces and territories provide for ALS for drivers beginning at BAC levels between 0.04 and 0.06 (Chamberlain and Solomon 2002, iii1–iii17). In Ontario, Canada, since May 2009, drivers with BACs between 0.05 and 0.08 face immediate license suspension and an administrative monetary penalty of C$150. Subsequent violations within a 5-year period lead to increasingly severe penalties, and drivers with more than three violations within 5 years are required to install an interlock on their vehicles for a 6-month period (Ontario Ministry of Transportation 2013).

[29] The authors noted that for some Australian states (for example, Western Australia), it was not possible to study the unique effects of reducing the per se BAC limit to 0.05 because the change coincided with the introduction of random (also termed "compulsory") breath testing laws, thereby limiting researchers' ability to distinguish the effects of the two interventions.

Although lowering the per se BAC threshold may seem counterintuitive when the majority of alcohol-impaired drivers in fatal crashes have BAC levels well over 0.08, research on the effectiveness of laws limiting BAC levels (Hingson, Heeren, and Winter 1996; Wagenaar and others 2007) has found that lowering the per se BAC limit changes the drink-driving behavior of drivers at all BAC levels. Consequently, reducing the per se BAC limit could reasonably be expected to have a broad deterrent effect, thereby reducing the risk of injuries and fatalities from crashes associated with impaired driving.

The NTSB concludes that changing legal per se BAC limits from 0.08 to 0.05 or lower would lead to meaningful reductions in crashes, injuries, and fatalities caused by alcohol-impaired driving. Therefore, the NTSB recommends that the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia establish a per se BAC limit of 0.05 or lower for all drivers who are not already required to adhere to lower BAC limits. To further encourage states to implement this recommendation, the NTSB recommends that NHTSA seek legislative authority to award incentive grants for states to establish a per se BAC limit of 0.05 or lower for all drivers who are not already required to adhere to lower BAC limits. Similar incentive grants were used in the early 1980s to encourage states to establish 0.10 per se laws and to promote ALS/ALR for drivers arrested for DWI, and in the late 1990s to encourage states to establish 0.08 per se laws. In the most recent surface transportation reauthorization (MAP-21), grant funds are made available to states that adopt and enforce mandatory interlock laws for all convicted DWI offenders. Such grants can provide states with additional resources to raise awareness of new laws and to enforce them effectively.

5.2 Providing High-Visibility Enforcement of DWI Laws

Law enforcement influences driver behavior through both specific and general deterrence. Specific deterrence refers to the effects of the legal consequences experienced by drivers who are apprehended for breaking a law. General deterrence refers to countermeasures that discourage unlawful behaviors. Based on arrest data, as well as drivers' self-reports of driving after drinking, it has been estimated that alcohol-impaired drivers make an average of 80 impaired driving trips before being detected and arrested (Ferguson 2012, 427–41). Because such a small proportion of impaired driving trips results in detection and arrest, countermeasures that foster general deterrence of impaired driving are likely to have a positive safety impact.

HVE is one well-established countermeasure that has been associated with both general and specific deterrence. HVE is designed to increase drivers' perception of the presence of law enforcement and their awareness that they will experience negative consequences if caught while driving impaired. HVE integrates the following elements: (1) well-publicized media campaigns; (2) enforcement efforts, such as saturation patrols and sobriety checkpoints, that incorporate visibility elements, including electronic message boards and road signs; and (3) swift and certain penalties for drivers arrested for DWI. HVE programs targeting impaired driving have been employed in numerous communities across the United States (Stuster 2006), and they have been effective in deterring individuals from drinking and driving. For example, one study compared two counties that conducted weekly sobriety checkpoints for 1 year to two counties that did not undertake additional checkpoints; the study found that the proportions of drivers with BACs greater than 0.05 in the counties with additional checkpoints was 70 percent lower than those in

the comparison counties (Lacey and others 2006, 213–18). Additionally, a review of 12 studies evaluating the effectiveness of sobriety checkpoints found that well-implemented and publicized checkpoint programs reduce alcohol-related fatal and injury crashes by about 20 percent[30] (Shults and others 2001, 66–88).

HVE has been successful not only in reducing the incidence of crashes and fatalities related to alcohol-impaired driving but also in other safety efforts, such as encouraging seat belt use and discouraging distracted driving (Solomon, Ulmer, and Preusser 2002; Cosgrove, Chaudhary and Reagan 2011). The NTSB has historically supported elements of impaired driving HVE. For example, in 1968, the NTSB asked the FHWA to develop a program incorporating media to support law enforcement efforts targeting impaired drivers.[31] In the 1980s and 1990s, the NTSB recommended that states develop coordinated statewide programs for selective alcohol enforcement operations[32] and include sobriety checkpoints as a part of their comprehensive alcohol and highway safety programs.[33] In 2000, the NTSB called on states to establish a comprehensive program to address hard core drinking driving that included several components consistent with HVE.[34] The NTSB concludes that HVE is an effective countermeasure to deter alcohol-impaired driving.

Despite its successes, HVE has some limitations. For example, sobriety checkpoints have been criticized as being too heavy a draw on police resources, and they are prohibited in some states (Fell and others 2003, 897–902). Some research has shown that sobriety checkpoints conducted by as few as three to five officers can be effective and serve as a more economical alternative to larger efforts (Lacey and others 2006, 213–18). Another factor that has limited enforcement is the lack of tools to assist law enforcement in detecting, during the initial phase of a traffic stop, whether a driver has been consuming alcohol. Traditional enforcement of impaired driving laws begins when a police officer either observes signs of unsafe driving and conducts a traffic stop or stops a driver during a routine sobriety checkpoint. During the stop, the officer conducts an interview and subjectively assesses the driver for signs of impairment; these signs may include slurred speech, lack of coordination, and the odor of alcohol. If the officer suspects that the driver is impaired, the officer may request that the driver undergo a field sobriety test. If the driver's performance on the test indicates impairment, the officer may request a preliminary breath test (breathalyzer) to confirm the presence of alcohol.

Many alcohol-impaired drivers are able to conceal their most obvious signs of impairment; consequently, they may pass through checkpoints or traffic stops with little scrutiny and remain undetected. For example, studies have shown that officers employing traditional methods of determining driver impairment at a sobriety checkpoint identify less than half of all drivers with BACs above the legal per se limit (Jones and Lund 1986, 153–60; Wells and others 1997, 513–17).

[30] Reductions ranged from 5 percent to 26 percent, with a median decrease of 20 percent.

[31] Safety Recommendation H-68-27.

[32] Safety Recommendation H-90-51.

[33] Safety Recommendation H-84-02.

[34] Safety Recommendation H-00-26.

One highly effective way to improve detection rates is to use compulsory breath testing,[35] in which all drivers stopped are required to provide breath samples without the requirement to establish reasonable suspicion of impairment (Peek-Asa 1999, 57–67). Compulsory breath testing is routinely employed in Australia, New Zealand, and several European countries, but it has not been used in the United States due to possible issues arising concerning suspicionless searches. (See generally *Michigan State Police v. Sitz* [496 US 444 (1990)]. Also see generally *Skinner v. Railway Labor Executives' Assn.* [489 US 602 (1989)]).

Another way to improve detection rates is the use of passive alcohol sensors. These are noninvasive devices that may be used to detect alcohol vapor in the ambient environment. The sensors are housed in a hand-held device, which is often combined with a flashlight. When a police officer holds the device in a driver's vicinity, it samples the driver's exhaled breath, analyzes the sample for ethanol concentration, and provides qualitative information about the amount of alcohol detected.[36]

Passive alcohol sensors may be able to provide law enforcement with the means of conducting breath screening during the early stages of a traffic stop or sobriety checkpoint stop (Voas, Lacey, and Fell 2003, 45–53).[37] When police officers use hand-held passive alcohol sensors at sobriety checkpoints, they identify significantly more drivers with elevated BAC levels than they do without the sensors. For example, one study found that by using standard sobriety checkpoint protocols, police officers were able to identify 55 percent of drivers with BACs of 0.10 or higher and 26 percent of drivers with BACs between 0.05 and 0.10. By incorporating passive alcohol sensors, the officers' detection rates increased to 71 and 39 percent, respectively (Ferguson, Wells, and Lund 1995, 23–30). Another study found that the DWI arrest rate for officers using passive sensors at sobriety checkpoints was more than double that of officers at checkpoints that did not employ passive sensors (Voas, Rhodenizer, and Lynn 1985).

An evaluation of the effectiveness of passive alcohol sensors for routine youth alcohol enforcement found that, although officers viewed the sensors as somewhat useful, they considered their value offset by perceived drawbacks; for instance, they believed that the sensors had heavy, bulky designs and could be distracting, due to device-caused noises and lights (Leaf and Preusser 1996). Since the late 1990s, sensors have undergone design changes that address many of these concerns; however, despite their effectiveness and improved designs, police departments continue to make only limited use of passive alcohol sensors (Fell, Compton, and Voas 2008, 534–38).

The NTSB concludes that passive alcohol sensors are an effective yet under-utilized technology for making an initial determination of the presence of alcohol during traffic stops or at sobriety checkpoints. Therefore, the NTSB recommends that the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia include in their impaired driving prevention plan or

[35] Compulsory breath testing is also known as random breath testing.

[36] The passive sensor does not provide a BAC estimate but instead gives color-coded feedback to represent the relative level of alcohol detected in the exhaled breath.

[37] The scope of acceptable activities associated with the use of passive alcohol sensors has been discussed by legal scholars for a number of years (Hartunian 2002).

highway safety plan provisions for conducting HVE of impaired driving laws using passive alcohol-sensing technology during law enforcement contacts, such as routine traffic stops, saturation patrols, sobriety checkpoints, and accident scene responses.

The increased use of passive alcohol sensors during HVE will not only increase the likelihood that drivers using alcohol will be detected by law enforcement; it may also act as a deterrent by increasing the perception that drivers risk arrest and swift and certain consequences if they choose to drive after drinking. With respect to swift and certain consequences, most states have ALS/ALR laws in addition to their criminal laws. ALS/ALR laws allow police to confiscate a driver's license at the time of an arrest if the driver exceeds the per se BAC limit or refuses to take a chemical test. The driver is given a suspension notice that serves as a temporary permit to drive and, if the driver does not challenge the suspension or the challenge is not successful, the suspension is upheld.

The NTSB has a long history of recommending ALS/ALR. In a 1984 safety study, the NTSB recommended that sobriety checkpoints and ALRs become a part of a state's comprehensive alcohol and highway safety program (NTSB 1984); and, in 2000, the NTSB called for ALR for BAC test failure and refusal as part of a model plan to reduce hard core drinking driving (NTSB 2000). Overall, research has shown that ALS/ALR laws are more effective than post-conviction license suspension or revocation (Ferguson 2012) and that they are associated with reducing alcohol-related fatal crash involvement by 5–9 percent, representing at least 800 lives saved per year in the United States (Wagenaar and Maldonado-Molina 2007, 1399–1406; Zador, Lund, and Weinberg 1989, 467–85).

Although ALS/ALR laws have been generally successful, studies have shown that confiscating driver's licenses reduces, but does not eliminate, driving by the suspended population (Ross and Gonzales 1988, 379–91; McCartt, Geary, and Berning 2003, 133–37). If suspended drivers continue to drive after drinking, they continue to pose a crash risk to others on the road. For this reason, more should be done to ensure that drivers whose licenses have been suspended under ALS/ALR laws do not continue to drive impaired.

One alternative would be for states to incorporate into their ALS/ALR laws provisions requiring drivers to install interlocks prior to license reinstatement. As will be described in the next section, interlocks have been employed successfully to prevent the use of a vehicle by a driver who has been drinking. A study conducted in Maryland found that, among repeat offenders, adding a license restriction period requiring administrative interlock use following the license suspension period was associated with lower recidivism for the interlock restriction group (2.4 percent) compared to the control group (6.7 percent), during the year following the suspension period (Beck and others 1999). A follow-up study that employed a 2-year interlock restriction found significant reductions in the risk of recidivism among subjects assigned interlocks during the restriction period and during the 2 years after the interlocks were removed (Rauch and others 2011, 127–48). The NTSB concludes that ALS/ALR laws are an effective means of reducing alcohol-impaired traffic fatalities, and such laws could be strengthened by requiring that individuals arrested for DWI install an interlock as a condition of license reinstatement. Therefore, the NTSB recommends that those states that have ALS/ALR laws and the District of Columbia incorporate into their ALS/ALR laws a requirement that drivers arrested for DWI use an interlock on their vehicle for a period of time before obtaining full license

reinstatement. The NTSB also recommends that those states that do not have ALS/ALR laws and the Commonwealth of Puerto Rico establish ALS/ALR laws that require drivers arrested for DWI to use an interlock on their vehicle for a period of time before obtaining full license reinstatement.

5.3 Installing In-Vehicle Devices to Prevent Operation by an Impaired Driver

In its 2012 report on wrong-way driving, the NTSB concluded that driver alcohol impairment is the primary cause of wrong-way driving collisions and that the installation of interlocks on the vehicles of all convicted DWI offenders would reduce crashes caused by alcohol-impaired drivers (NTSB 2012c, wrong-way report). Numerous studies have shown that interlocks are effective in reducing recidivism among DWI offenders while the device is installed (Coben and Larkin 1999, 81–87; Tippetts and Voas 1998, 19–24; Willis, Lybrand, and Bellamy 2004; and Vezina 2002, 97–104). According to one estimate from the Insurance Institute for Highway Safety, if all drivers with at least one alcohol-impaired driving conviction within the previous 3 years had used zero-BAC interlocks, approximately 1,100 deaths, or about 10 percent of fatalities associated with alcohol-impaired drivers, could have been prevented in 1 year (Lund, McCartt, and Farmer 2007). As noted earlier, in MAP-21, Congress acknowledged the effectiveness of interlocks by providing funding incentives for states to implement laws requiring interlocks for all convicted DWI offenders. However, relatively few driver DWI arrests ultimately result in the installation of interlocks. In 2011, more than 1.2 million arrests were made for DWI (FBI 2013); yet, as of 2012, fewer than 280,000 interlocks were in use in the United States (Roth 2012).

Given the effectiveness of interlocks in reducing the likelihood that offenders will drive impaired, in its 2012 report on wrong-way driving, the NTSB made the following recommendation to the 33 states that do not mandate interlocks for all DWI offenders, the Commonwealth of Puerto Rico, and the District of Columbia:

> H-12-45
>
> Enact laws to require the use of alcohol ignition interlock devices for all individuals convicted of DWI offenses.

Aside from the lack of a universal mandate for interlock use among all convicted DWI offenders, one of the most significant challenges to the potential success of interlocks is the low rate of compliance[38] among those offenders required to use them (DeYoung, Tashima, and Masten 2004). For example, one recent study found that within the subset of offenders who were ordered by judges to install interlocks, only about 24 percent ultimately did so (McCartt and others 2013, 215–29). In many states, offenders may avoid installing interlocks by stating that they will not drive during their license suspension period or by claiming that they do not own a vehicle.

[38] For the purposes of this report, interlock compliance is considered to be installing an interlock on one's vehicle when ordered to do so and adhering fully to the restrictions imposed by the installed device.

Two NHTSA-sponsored reports provide suggested best practices for establishing and improving interlock programs (Sprattler 2009; Marques and Voas 2010). To improve offender compliance and program success, the reports advocated the following practices:

- Present the interlock as an alternative to a more restrictive penalty, such as house arrest or transdermal monitoring;[39]
- Provide financial assistance to individuals who cannot afford interlocks using fees from other offenders, arrangements with interlock providers, or alcohol tax revenues;
- Document interlock status on driver's licenses so the information will be available to law enforcement officers during traffic stops;
- Establish a protocol for interlock-equipped vehicle usage; for example, track odometer readings or the number of BAC tests per month to ensure that the equipped vehicle is being used;
- Penalize drivers who are caught using non-interlocked vehicles with sanctions that are equal to or greater than those associated with driving-after-suspension/revocation charges;
- Establish an offender-monitoring program, with preestablished consequences for skipped or failed tests; and
- Set criteria for interlock removal based on a period of alcohol-free driving.

Some states have adopted some of these strategies to varying degrees. For example, Sprattler (2009) reported that 13 states and the District of Columbia had established indigent funds for offenders who could not afford interlocks. Marques and Voas (2010) reported that five states have provisions for extending interlock periods in response to repeated BAC lockouts, and since 2011, DWI offenders in Washington State may not reinstate their driver's licenses until their installed interlocks are violation-free for not less than the last 4 months of their suspension period.

Additionally, studies that have tracked the implementation of some of the above-listed practices have documented improvements in interlock compliance. For example, a pilot program in one New Mexico county found that mandating house arrest as an alternate sanction to interlock installation led to 70 percent installation rates, compared to 17 percent rates in counties that did not adopt the house-arrest alternative (Roth, Marques, and Voas 2009, 437–41). Another study, conducted in Maryland, found that close monitoring of DWI offenders with installed interlocks resulted in significantly fewer attempts to start the vehicle by drivers with a positive BAC compared to offenders in a traditionally monitored control group (Zador and others 2011, 1960–67).

[39] Transdermal monitoring refers to testing for alcohol that is excreted through the skin; such monitoring is typically accomplished using a bracelet or anklet.

Existing NHTSA publications provide numerous potentially useful suggestions for states that are developing interlock programs; however, the NTSB is concerned that in the absence of more explicit information about which program elements lead to increased compliance, state interlock programs may suffer from low compliance rates and will not achieve their potential.

NHTSA's *Uniform Procedures for State Highway Safety Grant Programs* (78 *Federal Register* [FR] 4986, 2013) have established few criteria for states to meet to obtain grant funding for their interlock programs. For example, states with a minimum interlock period as short as 30 days' duration may still be eligible for grant funding, and no compliance goals or program elements are required to obtain funding. Because NHTSA has the duty to distribute federal grant funds in such a way as to support the establishment of state interlock programs, it has the opportunity to foster the development of highly successful state programs. The NTSB concludes that states would increase the effectiveness of interlock programs by employing those practices that have been shown to increase interlock compliance. Therefore, the NTSB recommends that NHTSA develop and disseminate to the states best practices for increasing interlock installation and compliance that are based on recent NHTSA research. To encourage states to implement these best practices, the NTSB further recommends that NHTSA create incentives for states to adopt the interlock best practices developed in response to Safety Recommendation H-13-02 (above). This recommendation is consistent with the comments the NTSB made to NHTSA concerning state interlock programs on April 24, 2013, in response to the Interim Final Rule on Uniform Procedures for State Highway Safety Grant Programs. (See 78 FR 15, published January 23, 2013.)

Additionally, because it continues to believe in the necessity of all-offender interlock laws, the NTSB reiterates Safety Recommendation H-12-45[40] from its wrong-way driving report (NTSB 2012c), which calls on the 33 states that do not mandate the use of interlocks for all DWI offenders, the Commonwealth of Puerto Rico, and the District of Columbia to enact laws to require the use of interlock devices for all individuals convicted of DWI offenses.

Although interlocks traditionally have been used as a means of sanction for DWI offenders, they are increasingly being employed by others who recognize their benefits. For example, in Finland, Sweden, and France, interlocks are required on school buses, and in some European countries, commercial transport operators have installed them voluntarily (Daoud 2012). Several highway vehicle manufacturers have developed interlock systems (Griemel 2009 and Jurnecka 2007), and one manufacturer currently offers a wireless interlock system as an optional accessory for its passenger vehicles (Volvo 2013). Additionally, NHTSA is sponsoring research to examine the feasibility of an interlock program for teenage drivers. The NTSB supports this research and similar efforts to encourage voluntary use of interlocks, especially by high-risk drivers, such as teenage drivers and drivers with alcohol use problems, and by drivers whose impairment could result in particularly high numbers of deaths and injuries, such as commercial drivers.

Researchers and automobile manufacturers recognize that, to be acceptable to the broader driving public and encourage voluntary use, in-vehicle alcohol detection technologies must be

[40] The status of Safety Recommendation H-12-45 is "Open—Await Response."

unobtrusive, valid, reliable, and durable; must require only minimal maintenance; and must not interfere with the driving task (Ferguson and others 2009). In February 2008, a group of motor vehicle manufacturers affiliated with ACTS entered into a 5-year cooperative agreement with NHTSA to explore the feasibility, potential benefits, and public policy challenges associated with widespread use of in-vehicle technology for preventing alcohol-impaired driving. A promising technology, DADSS, is being developed under this agreement.

The DADSS program has resulted in two working prototypes that allow for the passive measurement of driver BAC. One system is touch-based and uses tissue spectroscopy to estimate driver BAC from the skin's infrared light absorption; the other system uses multiple sensors inside the vehicle to estimate BAC through the driver's exhaled breath. By mid-2013, the technologies are expected to be installed in demonstration vehicles for use in continued research and evaluation. For this program to be successful, it must not only address the myriad technical and engineering challenges posed by system development but also issues of usability, driver education, and public acceptance. In its 2012 report on wrong-way driving, the NTSB concluded that the DADSS program is working to solve both technical and practical challenges to make it an acceptable detection system for widespread implementation in the US vehicle fleet. In its Safety Recommendations H-12-43 and -48 from this report, the NTSB recommended that NHTSA and ACTS work together to accelerate widespread implementation of DADSS technology by (1) defining usability testing that will guide driver interface design and (2) implementing a communication program that will direct driver education and promote public acceptance.[41]

Because the NTSB continues to see a need for addressing the usability and public acceptance of the DADSS technology, it reiterates Safety Recommendations H-12-43 and -48.

5.4 Addressing Repeat Offenders

Many of the countermeasures discussed in this report are designed to affect a broad population—that is, all motorists who drive while impaired by alcohol. Countermeasures such as reducing per se BAC limits and conducting HVE activities can be expected to substantially reduce impaired driving and impaired driving fatalities and injuries. Other countermeasures, such as ALS at the time of a DWI arrest and requiring interlocks for all DWI offenders, have the potential both to deter impaired driving by all drivers and to reduce recidivism by DWI offenders (while the sanction is in place). For many drivers, these countermeasures are effective. However, it must be recognized that for some DWI drivers, traditional countermeasures have limited effect, and these individuals may persist in choosing to drive while impaired even after multiple DWI convictions.

In 2011, repeat offenders[42] comprised 7 percent of all alcohol-impaired drivers in fatal crashes. Although they represent a small minority of drivers with a BAC level of 0.08 or greater in fatal crashes, repeat offenders are disproportionately represented in the fatal crash population.

[41] The current status of the two recommendations is "Open—Await Response."

[42] NHTSA defines repeat offenders as those drivers with one or more known DWI convictions within the 3 years prior to the date of the crash.

For example, in 2011, NHTSA estimated that drivers in fatal crashes with BACs of 0.08 or higher were seven times more likely to have a prior DWI conviction than those with no alcohol in their systems. The NTSB has published a safety study identifying repeat offenders as a serious problem (NTSB 1984) and has also issued a safety report on "hard core" drinking drivers (NTSB 2000).[43] In the 2000 safety report, the NTSB made the following recommendation to the 50 states and the District of Columbia:

> H-00-26
>
> Establish a comprehensive program that is designed to reduce the incidence of alcohol-related crashes and fatalities caused by hard core drinking drivers and that includes elements such as those suggested in the National Transportation Safety Board's model program.

The status of this recommendation is "Open—Acceptable Response." The model program to reduce hard core drinking driving includes 11 different elements concerning laws, enforcement, vehicle sanctions, and adjudication. (See appendix C.) Since 2000, some states have made progress in the following areas applicable to the model program described in Safety Recommendation H-00-26:

- 24 states have enacted high-BAC laws (0.15 BAC) that require additional sanctions for drivers arrested with such elevated BAC levels,
- 2 states have enacted laws that restrict DWI offenders to 0.00 BAC while driving for a period of time after their conviction,
- 9 states have expanded their repeat offender definition/look-back period to 10 years, and
- At least 4 states have convened high-level task forces to review state impaired driving laws and programs. (The reports/products from these task forces led to significant legislative action within a year.)

The NTSB acknowledges the many and various efforts that states have taken over the last decade to address problems associated with DWI repeat offenders and the headway they have made toward adopting many of the elements in the NTSB model program to reduce hard core drinking driving. However, despite some progress, the NTSB concludes that DWI repeat offenders continue to pose an undue risk, and effective new approaches are needed to address the problem of DWI recidivism.

[43] "Hard core" is a term that has been used to describe both repeat offenders and high-BAC offenders for the purpose of targeting these groups for special safety interventions. In recent years, the term has been criticized as creating a false distinction among the public, which may perceive hard core drinking drivers as "problem drinkers" while conceptually separating them from "social drinkers" (Chamberlain and Solomon 2001, 272–75). However, research has shown that about a third of high-BAC drivers in fatal crashes do not have distinguishing characteristics for problem drinking or alcoholism (Baker and others 2002, 221–26).

In addition to interlocks, several specific countermeasures have been used to address repeat offender populations. These countermeasures include, for example, vehicle sanctions that impound, incapacitate, or label offenders' vehicles or license plates (Voas and DeYoung 2002, 263–70); treatment programs for offenders with alcohol use problems (Wells-Parker and others 1995, 907–26); and 24/7 sobriety programs that employ technologies such as breathalyzers or transdermal alcohol monitoring to provide frequent or continuous checking of an offender's alcohol use (Kilmer and others 2012, e1–e7). These countermeasures have all been associated with reductions in DWI recidivism.

Repeat DWI offenders do not constitute a homogenous group. They are likely to have different types of alcohol and/or drug problems, as well as different levels of motivation to change their behaviors. For this reason, a countermeasure effective with one repeat offender may be ineffective with another. DWI courts represent one approach that communities have taken to foster a comprehensive yet tailored approach to addressing repeat and other high-risk DWI offenders. DWI courts are designed to hold offenders accountable through intensive monitoring while simultaneously providing treatment for any underlying addiction or mental health condition. Judges, prosecutors, treatment professionals, community service providers, and law enforcement officers work together to tailor a program that may include use of intensive treatment, alcohol/drug testing, and graduated sanctions. Because these courts are designed specifically to address DWI offenders, they may allow more efficient sanctioning and tracking of the offender population. According to the National Association of Drug Court Professionals, as of June 2012, the United States had 208 designated DWI courts and 401 additional hybrid DWI/drug courts (drug courts that also serve DWI offenders).[44]

Studies of the effectiveness of DWI courts have typically focused on reductions in recidivism as a measure of success. Some studies have demonstrated reductions in recidivism among offenders who complete DWI court programs (for example, Fell, Tippetts, and Langston 2011; and Carey, Fuller, and Kissick 2008), while others have not shown significant differences in recidivism between DWI court participants and a control group (for example, Bouffard, Richardson, and Franklin 2010, 25–35). A recent meta-analysis[45] of drug courts and DWI courts found overall significant reductions in recidivism among DWI court participants compared to their respective control groups (Mitchell and others 2012, 60–71). The relative recidivism rate was estimated as 37.7 percent for DWI court participants, compared to 50 percent for non-participants. MAP-21 includes DWI courts as an approved impaired driving program.

In 2012, NHTSA announced that it would collect information from DWI and hybrid DWI/drug courts using an online survey (77 FR 48608). The survey is intended to be an initial step in a program that NHTSA is developing to evaluate the effectiveness of DWI courts. By creating an inventory of current operational practices used by DWI courts, NHTSA is laying the groundwork for a comprehensive evaluation of the relative effectiveness of the various programs used by DWI courts to reduce impaired driving.

[44] Per NTSB telephone interview with the senior director of the National Association of Drug Court Professionals, March 4, 2013.

[45] Meta-analysis is a statistical method that combines results from multiple independent studies with the goal of identifying patterns of results and creating a more powerful estimate of the true effect size.

The NTSB concludes that DWI courts, with their emphasis on ensuring offender accountability and changing offender behaviors, represent a useful approach to rehabilitating drivers for whom traditional countermeasures are not effective. Initial data have shown reductions in recidivism, and the planned NHTSA survey and evaluation will facilitate a better understanding of the relationship between DWI court elements and crash outcomes. As more states establish DWI courts as a means of addressing the problem of repeat and high-risk DWI offenders, NHTSA should continue to assist them with guidance on how to maximize the effectiveness of DWI courts. Therefore, the NTSB recommends that NHTSA develop and disseminate to the states best practices for DWI courts.

DWI courts integrate numerous successful countermeasures into one program, and many states have chosen to establish DWI courts to deal with repeat offenders. Other states have taken the initiative to address the problem of repeat offenders through other means. For example, in 2004, South Dakota conducted a pilot program on 24/7 sobriety programs for repeat offenders that required daily breath tests or continuous transdermal alcohol monitoring; based on the success of the pilot program, it has been expanded statewide (Kilmer and others 2012, e1–e7). Other states could take the lead in developing new strategies to address this persistent safety issue.

Emerging scientific findings concerning impaired driving countermeasures point toward new approaches to address impaired driving by DWI repeat offenders. Given the challenging nature of the repeat offender population, the NTSB reclassifies Safety Recommendation H-00-26 "Closed—Superseded" and recommends that the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia include in their impaired driving prevention plan or highway safety plan elements to target repeat offenders and reduce DWI recidivism; such elements should include measures to improve compliance with interlock requirements; the plan should also provide a mechanism for regularly assessing the success of these efforts.

Chapter 6. Reaching Zero

Although there has been substantial progress in reducing crashes due to alcohol impairment since the 1980s, impaired driving continues to represent one of the largest and most persistent sources of traffic injuries and fatalities. Over the years, numerous approaches have been taken around the world to reduce the toll taken by impaired driving, with varying levels of success. In preparing this report, NTSB staff reviewed hundreds of peer-reviewed research reports, meta-analyses, and systematic reviews that evaluated the effectiveness of impaired driving countermeasures to identify those most likely to result in significant reductions of impaired driving injuries and fatalities.

The best hope for meeting the goal of eliminating alcohol-impaired driving will come when states and communities adopt those practices that have been empirically demonstrated to be effective. In this report, the NTSB has described several countermeasures that meet this standard, including the following:

- Reducing per se BAC limits,
- Conducting HVE that incorporates passive alcohol sensing,
- Increasing use of ALS/ALR laws and providing for use of interlocks in conjunction with license suspensions,
- Requiring interlocks for all DWI offenders, accompanied by consistent and effective programs to ensure compliance, and
- Continuing efforts to reduce recidivism among DWI repeat offenders.

Figure 5 depicts the interrelationship of multiple impaired driving countermeasures. Countermeasures such as reducing per se BAC limits, providing HVE, and (eventually) implementing DADSS are general deterrents designed primarily to discourage individuals from driving when impaired. For drivers who elect to drive impaired in spite of those deterrent measures and are arrested for DWI, revoking or suspending a driver's license at arrest and requiring ignition interlocks upon conviction will reduce the likelihood that people caught driving impaired once will do so again. For the relatively small population for whom these countermeasures are not effective, DWI courts and other countermeasures targeted to addressing repeat offenders have shown success in reducing the likelihood of recidivism. As general deterrent measures become more effective and widely implemented, we can reasonably expect that there will be fewer impaired drivers and so less need for additional countermeasures. However, specific deterrents like ALS/ALR, ignition interlocks, and DWI courts provide a safety net to ensure that impaired drivers who are caught will not repeat their risky behaviors.

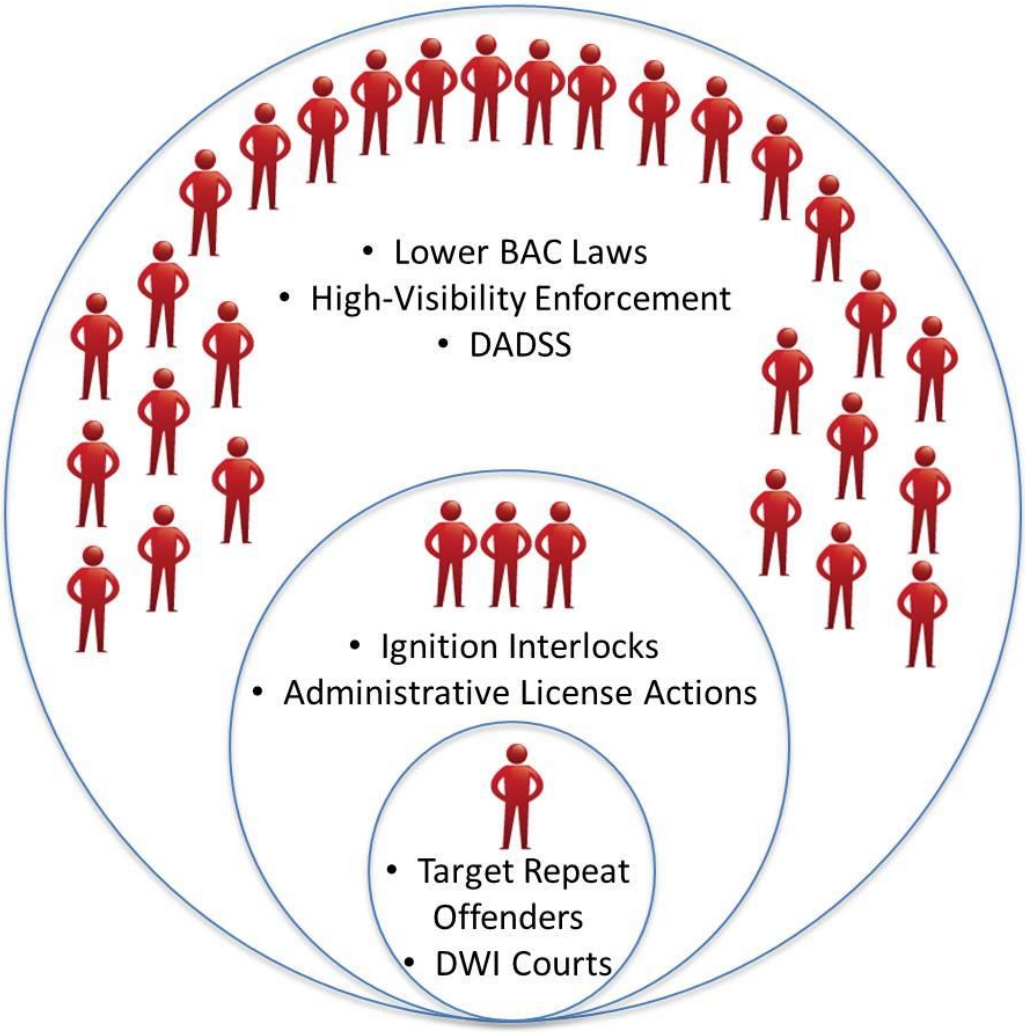


Figure 5. Interrelationship of multiple impaired driving countermeasures.

As new countermeasures continue to evolve, government officials, policymakers, and advocates can benefit from robust scientific evaluations of their efficacy. NHTSA has a long tradition of sponsoring such research, and of providing information about effective countermeasures to states through its publication series titled *Countermeasures That Work* (NHTSA 2011).[46] Currently in its sixth edition, *Countermeasures That Work* is designed to be a reference guide to assist state highway safety offices. It summarizes the use, effectiveness, costs, and implementation times of countermeasures in several traffic safety areas.[47] Congress has taken a similar approach in MAP-21 by ranking states based on their average impaired driving fatality rates. For those states with higher rates, the law is more prescriptive about how grant

[46] The series summarizes countermeasures in numerous categories, including alcohol-impaired and drugged driving. The publications provide countermeasure summaries, as well as information about the countermeasure's effectiveness, its current levels of use, and the time and costs associated with its implementation.

[47] The traffic safety areas discussed in the sixth edition of *Countermeasures That Work* are alcohol-impaired and drugged driving, seat belt use and child restraints, aggressive driving and speeding, distracted and drowsy driving, motorcycle safety, young drivers, older drivers, pedestrians, and bicycles.

money can be spent and limits such states to specific countermeasures that have extensive scientific support demonstrating their effectiveness.

As noted in section 3.3 of this report, in recent years, some states have adopted TZD programs that are based on a traffic fatality reduction program established in Sweden in the 1990s. One study found that four states with established TZD programs had accelerated the reduction of fatality rates compared to states without such programs (Munnich and others 2012). The study concluded that successful TZD programs have the following five characteristics: (1) an ambitious goal of eliminating traffic fatalities and serious injuries; (2) high levels of interagency cooperation in pursuit of the TZD goal; (3) a comprehensive strategy addressing engineering, enforcement, education, and emergency medical service in traffic safety; (4) a performance-based, data-driven system of targeting resources and strategies to reduce traffic fatalities; and (5) support from state leadership.

In Europe, where TZD approaches have been employed for more than a decade, EU countries saw a 53 percent decrease in road deaths attributed to alcohol between 2001 and 2010, and a decrease in non-alcohol-related road deaths of 47 percent (Podda 2012). By contrast, the reductions in fatalities involving alcohol-impaired drivers and non-alcohol-impaired drivers in the United States during the same period were 24 percent and 19 percent, respectively.[48] The striking reductions observed in the EU may be attributable to many factors, including low per se BAC levels (the majority of European countries have per se levels of 0.05 or lower) and the frequent use of compulsory breath testing. Notably, alcohol consumption across Europe has not decreased markedly as road deaths have dropped, suggesting that the EU approach has successfully separated drinking from driving behaviors. In 2010, the European Commission renewed its target and called on its states to again reduce by half the number of road deaths in the EU between 2010 and 2020.

Based on the European experience, the NTSB concludes that a data-driven approach that incorporates specific, ambitious, and measureable goals, as well as continuous monitoring of the effectiveness of countermeasures, is a practical model for moving toward zero deaths from impaired driving. Therefore, the NTSB recommends that the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia take the following steps to move toward zero deaths from impaired driving: (1) set specific and measurable targets for reducing impaired driving fatalities and injuries, (2) list these targets in their impaired driving prevention plan or highway safety plan, and (3) provide a mechanism for regularly assessing the success of implemented countermeasures and determining whether the targets have been met.

Finally, although this report has focused on countermeasures to address the nexus of drinking and driving, the NTSB recognizes that there may be alternative approaches to the problem that involve addressing drinking-related risk and driving-related risk separately. For example, it is well established that raising the cost of alcohol through taxes or other pricing strategies has a robust and marked effect on reducing alcohol consumption, alcohol-related mortality, and traffic deaths (Wagenaar, Salois, and Komro 2009, 179–90; Wagenaar, Tobler,

[48] This is based on a reduction in fatalities involving drivers with BACs of 0.08 or higher from 13,324 in 2001 to 10,136 in 2010, and a reduction in fatalities involving drivers with BACs of 0.00 from 26,199 in 2001 to 21,093 in 2010.

and Komro 2010, 2270–78). Additionally, alcohol screening, intervention, and treatment programs to detect and treat alcohol use problems have shown promise in reducing harmful alcohol use and risky behaviors (Kaner and others 2009; Wells-Parker and others 1995, 907–26). Finally, although they are not designed specifically to reduce alcohol-impaired driving crashes, vehicle-based collision avoidance technologies and improvements to vehicle crashworthiness and roadway design should help to reduce crashes and crash-related injury of all kinds, including those caused by impaired drivers.

In summary, there is no simple, single solution to reaching zero traffic deaths from alcohol-involved crashes. Many factors are crucial, including new laws on BAC levels, better enforcement of laws, more extensive and progressive use of available and developing technologies to prevent an impaired driver from operating a vehicle, and increased efforts to identify and implement those new programs that are most effective in decreasing alcohol-impaired crashes. The task will be complex and difficult. But evidence shows that when federal, state, and local authorities commit to reaching zero deaths, meaningful reductions in fatalities and injuries can be achieved.

Chapter 7. Conclusions

7.1 Findings

1. Although impaired driving injuries, fatalities, and fatality rates in the United States have significantly decreased over the past several decades, the pace of these reductions has slowed since the mid-1990s; and alcohol-impaired driving continues to contribute to thousands of fatalities and tens of thousands of serious injuries each year.

2. The public generally believes that driving after drinking alcohol poses a significant threat to safety; however, many people continue to drive after drinking.

3. Blood alcohol concentration (BAC) levels as low as 0.01 have been associated with driving-related performance impairment, and BAC levels as low as 0.05 have been associated with significantly increased risk of fatal crashes.

4. Blood alcohol concentration (BAC) levels higher than 0.05 are viewed by respected traffic safety and public health organizations around the world as posing unacceptable risk for driving, and more than 100 countries have already established per se BAC limits at or below 0.05.

5. Changing legal per se blood alcohol concentration (BAC) limits from 0.08 to 0.05 or lower would lead to meaningful reductions in crashes, injuries, and fatalities caused by alcohol-impaired driving.

6. High-visibility enforcement is an effective countermeasure to deter alcohol-impaired driving.

7. Passive alcohol sensors are an effective yet under-utilized technology for making an initial determination of the presence of alcohol during traffic stops or at sobriety checkpoints.

8. Administrative license suspension or revocation laws are an effective means of reducing alcohol-impaired traffic fatalities, and such laws could be strengthened by requiring that individuals arrested for driving while intoxicated (DWI) install an alcohol ignition interlock as a condition of license reinstatement.

9. States would increase the effectiveness of alcohol ignition interlock programs by employing those practices that have been shown to increase interlock compliance.

10. Driving while intoxicated (DWI) repeat offenders continue to pose an undue risk, and effective new approaches are needed to address the problem of DWI recidivism.

11. Driving while intoxicated (DWI) courts, with their emphasis on ensuring offender accountability and changing offender behaviors, represent a useful approach to rehabilitating drivers for whom traditional countermeasures are not effective.

12. A data-driven approach that incorporates specific, ambitious, and measureable goals, as well as continuous monitoring of the effectiveness of countermeasures, is a practical model for moving toward zero deaths from impaired driving.

Chapter 8. Recommendations

8.1 New Recommendations

As a result of this safety report, the National Transportation Safety Board makes the following safety recommendations:

To the National Highway Traffic Safety Administration:

Seek legislative authority to award incentive grants for states to establish a per se blood alcohol concentration (BAC) limit of 0.05 or lower for all drivers who are not already required to adhere to lower BAC limits. (H-13-01)

Develop and disseminate to the states best practices for increasing alcohol ignition interlock installation and compliance that are based on recent National Highway Traffic Safety Administration research. (H-13-02)

Create incentives for states to adopt the alcohol ignition interlock best practices developed in response to Safety Recommendation H-13-02. (H-13-03)

Develop and disseminate to the states best practices for driving while intoxicated (DWI) courts. (H-13-04)

To the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia:

Establish a per se blood alcohol concentration (BAC) limit of 0.05 or lower for all drivers who are not already required to adhere to lower BAC limits. (H-13-05)

Include in your impaired driving prevention plan or highway safety plan provisions for conducting high-visibility enforcement of impaired driving laws using passive alcohol-sensing technology during law enforcement contacts, such as routine traffic stops, saturation patrols, sobriety checkpoints, and accident scene responses. (H-13-06)

Include in your impaired driving prevention plan or highway safety plan elements to target repeat offenders and reduce driving while intoxicated (DWI) recidivism; such elements should include measures to improve compliance with alcohol ignition interlock requirements; the plan should also provide a mechanism for regularly assessing the success of these efforts. (H-13-07) [*This recommendation supersedes Safety Recommendation H-00-26.*]

Take the following steps to move toward zero deaths from impaired driving: (1) set specific and measurable targets for reducing impaired driving fatalities and injuries, (2) list these targets in your impaired driving prevention plan or highway safety plan, and (3) provide a mechanism for regularly assessing the success of

implemented countermeasures and determining whether the targets have been met. (H-13-08)

To those states that have administrative license suspension or revocation laws and the District of Columbia:

Incorporate into your administrative license suspension or revocation laws a requirement that drivers arrested for driving while intoxicated (DWI) use an alcohol ignition interlock on their vehicle for a period of time before obtaining full license reinstatement. (H-13-09)

To those states that do not have administrative license suspension or revocation laws and the Commonwealth of Puerto Rico:

Establish administrative license suspension or revocation laws that require drivers arrested for driving while intoxicated (DWI) to use an alcohol ignition interlock on their vehicle for a period of time before obtaining full license reinstatement. (H-13-10)

8.2 Previously Issued Recommendations Reiterated in This Report

As a result of this safety report, the National Transportation Safety Board reiterates the following safety recommendations:

To the National Highway Traffic Safety Administration:

H-12-32

Develop and disseminate to the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia blood alcohol concentration (BAC) testing and reporting guidelines based on the 2012 report *State Blood Alcohol Concentration Testing and Reporting for Drivers Involved in Fatal Crashes: Current Practices, Results, and Strategies, 1997–2009.*

H-12-33

Develop and disseminate to appropriate state officials a common standard of practice for drug toxicology testing, including (1) the circumstances under which tests should be conducted, (2) a minimum set of drugs for which to test, and (3) cutoff values for reporting the results.

H-12-43

Work with the Automotive Coalition for Traffic Safety, Inc., to accelerate widespread implementation of Driver Alcohol Detection System for Safety (DADSS) technology by (1) defining usability testing that will guide driver interface design and (2) implementing a communication program that will direct driver education and promote public acceptance.

To the 45 states that have low reporting rates for BAC testing, the Commonwealth of Puerto Rico, and the District of Columbia:

H-12-34

Increase your collection, documentation, and reporting of blood alcohol concentration (BAC) test results by taking the following actions, as needed, to improve testing and reporting rates: (1) enact legislation, (2) issue regulations, and (3) improve procedures used by law enforcement agencies or testing facilities.

H-12-35

Once the National Highway Traffic Safety Administration has developed the blood alcohol concentration (BAC) testing and reporting guidelines recommended in Safety Recommendation H-12-32, incorporate the guidelines into a statewide action plan to achieve BAC reporting rates of at least 80 percent of fatally injured drivers and at least 60 percent of surviving drivers involved in fatal crashes.

To the 50 states, the Commonwealth of Puerto Rico, and the District of Columbia:

H-12-36

Require law enforcement agencies to collect place of last drink (POLD) data as part of any arrest or accident investigation involving an alcohol-impaired driver.

To the 33 states that do not mandate the use of alcohol ignition interlock devices for all DWI offenders, the Commonwealth of Puerto Rico, and the District of Columbia:

H-12-45

Enact laws to require the use of alcohol ignition interlock devices for all individuals convicted of driving while intoxicated (DWI) offenses.

To the International Association of Chiefs of Police and the National Sheriffs' Association:

H-12-37

Inform your members of the value of collecting place of last drink (POLD) data as part of any arrest or accident investigation involving an alcohol-impaired driver.

To the Automotive Coalition for Traffic Safety, Inc.:

H-12-48

Work with the National Highway Traffic Safety Administration to accelerate widespread implementation of Driver Alcohol Detection System for Safety (DADSS) technology by (1) defining usability testing that will guide driver interface design and (2) implementing a communication program that will direct driver education and promote public acceptance.

8.3 Previously Issued Recommendation Reclassified in This Report

As a result of this safety report, the National Transportation Safety Board reclassifies the following safety recommendation:

To the 50 states and the District of Columbia:

H-00-26

Establish a comprehensive program that is designed to reduce the incidence of alcohol-related crashes and fatalities caused by hard core drinking drivers and that includes elements such as those suggested in the National Transportation Safety Board's model program.

Safety Recommendation H-00-26 is reclassified "Closed—Superseded" (superseded by Safety Recommendation H-13-07).

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

DEBORAH A.P. HERSMAN
Chairman

ROBERT L. SUMWALT
Member

CHRISTOPHER A. HART
Vice Chairman

MARK R. ROSEKIND
Member

EARL F. WEENER
Member

Adopted: May 14, 2013

Chairman Hersman filed the following concurring statement on May 30, 2013; Member Rosekind filed the following concurring statement on May 21, 2013; and Member Weener filed the following concurring statement on May 16, 2013.

Board Member Statements

Chairman Deborah A.P. Hersman, concurring:

On May 14, 2013, the Board adopted a set of targeted interventions that, if followed, will drive down the number of deaths and injuries involving impaired drivers. Further action is critical: impaired driving is a national epidemic. Each year nearly 10,000 people are killed, and 173,000 others are injured, including 27,000 with debilitating injuries. That's nearly 10,000 deaths every year—and 10,000 reasons to take action.

Twenty-five years ago, our nation saw the deadliest alcohol-impaired driving crash in U.S. history. A drunk driver drove his pickup the wrong way on Interstate 71 near Carrollton, Kentucky, hit a school bus and killed 24 children and 3 adults and injured 34 others. That same year, impaired drivers killed thousands more.

As a nation, we've made progress since that deadly night in Kentucky, but not nearly enough. In 1982, the first year of the National Highway Traffic Safety Administration's FARS tracking system, 21,113 people died in U.S. crashes involving alcohol-impaired driving, representing nearly one-half of all highway deaths. Today, the percentage of deaths due to alcohol-impaired driving is about one-third of all highway fatalities.

Moving the percentage from one-half to one-third of highway fatalities took great effort by thousands of dedicated people in many organizations. Significant progress started in the 1980s and continued into the 1990s, and much of the credit goes to groups like Remove Intoxicated Drivers and Mothers Against Drunk Driving, who put a face on the problem. Tragically, it would be the face of a loved one, like 13-year-old Cari Lightner, killed in 1980 by a drunk driver, and five-month-old Laura Lamb, who in 1979 became the nation's youngest quadriplegic after her mother's vehicle was struck by a drunk driver.

Progress attacking this problem has taken leadership from law enforcement and government at all levels, from a host of advocacy groups, as well as from industry and motivated citizens. And, it's been a multi-pronged approach encompassing laws and enforcement, penalties and sanctions, and technology, as well as education and outreach.

These efforts have led to a change in social norms and cultural acceptance. When Cari Lightner was killed, drunk drivers frequently got away with murder. And, they still do today. However, as a society, we are more aware of the risks of drinking and driving. Today, the term "designated driver" is in our vernacular.

Yet, since 1995, the percentage of alcohol-related fatalities has been stuck at about one-third of annual highway deaths. Today, on average, every hour, one person is killed in a crash involving an alcohol-impaired driver. Every hour, 20 more people are injured, and of those 20, three will live with debilitating injuries.

It is frustrating that with all the education and advocacy, with all the laws and enforcement, and with the many processes set up to deal with the problem of drinking and

driving, we are still seeing so many lives lost. The human cost is much too high. And, what about the economic costs? One recent study puts the annual cost of impaired driving crashes at nearly $130 billion. One hundred and thirty billion dollars: That's more than the state budgets of Maryland, Massachusetts, and Michigan, combined.

If the numbers have been resistant to change over a generation, we must ask, "What more can be done?" To make a bold difference requires bold action. It can be done. Our nation took initial and bold steps in the 1980s and 1990s, when impaired driving fatalities were brought down and thousands of lives were saved each year.

It's being done elsewhere. Other nations are taking firm steps and saving lives. The European Union, in 2000, set a goal to cut alcohol-related roadway fatalities in half by 2010. They achieved the goal, with a 53 percent decrease in road deaths attributed to drinking and driving. And, the EU renewed the challenge, to cut the number of fatalities in half again—by 2020.

The United States prides itself on being a leader in transportation safety, but, when it comes to alcohol-impaired driving, our nation is woefully behind many of our international counterparts.

That is why, this past year, the NTSB sharpened its focus on impaired driving. Last May, the NTSB held a two-day forum on impaired driving with participants from across the research, medical, law enforcement, and highway safety communities to address the status and effectiveness of existing and potential interventions. We followed the forum by issuing safety recommendations calling for better testing protocols and data collection. Then, in December 2012, the Board completed a special investigation report on wrong-way driving. We found that alcohol-impaired driving is the leading cause of wrong-way crashes. We called for using alcohol-ignition interlocks for all DWI offenders and for the expeditious development of in-vehicle alcohol-detection systems.

This is why the Board unveiled 10 new safety recommendations and reiterated 9 others in this safety report. Our recommendations call for stronger laws, swifter enforcement, expanded use of technology, and for setting goals and measuring results. One of these recommendations calls for lowering the BAC limit to 0.05 or lower. Research shows that impairment begins with the first drink and, that by 0.05 BAC, most drivers experience a decline in both cognitive and visual functions, which significantly increases the risk of a serious crash. Currently, over 100 countries on six continents have BAC limits set at 0.05 or lower. The Board has asked all 50 states to do the same.

Our goal is to get to zero deaths because each alcohol-impaired crash is preventable. Alcohol-impaired crashes are not accidents. They are crimes that can—and should—be prevented. The tools exist. What is needed is the will.

In the last 30 years, more than 440,000 people have perished in this country due to alcohol-impaired driving. What will be our legacy 30 years from now? Will policymakers have made the hard choices or will there be 300,000 more lives senselessly cut short and 5 million more people needlessly injured? And, if we don't tackle alcohol-impaired driving now, when

will we find the will to do so? We can choose to accept senseless and needless losses, or we can choose to act.

Reaching zero deaths and injuries from alcohol-impaired driving will be challenging. But, the solution can be disarmingly simple. Buzzed or blitzed, it doesn't matter what you call it—if you're drinking, don't drive.

Vice Chairman Hart and Members Sumwalt and Rosekind joined in this statement.

Member Mark R. Rosekind, concurring:

Over the past year, the NTSB has undertaken tremendous actions to move our nation toward zero deaths related to substance-impaired driving. A leading cause of death on America's roadways, alcohol-impaired driving is an epidemic that has cost 440,000 lives over the last 30 years. While the situation has improved, overall the numbers remain staggering, even numbing. Each year 10,000 lives are lost and there are 173,000 injuries with 27,000 of these debilitating and life-altering. Now the NTSB is advancing an effort to reengage the nation and promote effective actions to prevent crashes, reduce injuries, and save lives.

Action is long overdue. For over 15 years impaired driving deaths remain about one-third of the fatalities on our roadways. The NTSB has now issued 19 safety recommendations that call for stronger laws, swifter enforcement, and expanded use of technology, all with tangible goals than can be measured. The process leading toward these safety recommendations has been steady, deliberate, and informed by the most solid scientific sources. It began on May 15 and 16, 2012, with our Forum–Reaching Zero: Actions to Eliminate Substance-Impaired Driving, that identified the most effective, science-based actions needed to "reach zero" crashes, injuries, and fatalities from substance-impaired driving. On November 14, 2012, the NTSB issued its Most Wanted List, our top ten transportation safety issues, that included substance-impaired driving. Then, on November 23, 2012, the NTSB issued six recommendations arising from the May Forum that focused primarily on improving data collection about the problem.

On December 11, 2012, the NTSB issued a Special Investigation Report on "Wrong-Way Driving" with over 60 percent of crashes found to be caused by alcohol-impaired drivers. Based on the findings, three more safety recommendations were issued, emphasizing current and future technology. This all leads to today's Board consideration and the Safety Report on Reaching Zero. Ten more safety recommendations were issued addressing stronger laws, swift and certain enforcement, and expanding the use of technology. There are now a total of 19 safety recommendations issued including near-term interventions that can reduce the staggering casualties today, while some long-term strategies will require sustained effort and bold change.

The hard work of many NTSB staff have brought this past year's efforts to fruition, especially those in the Office of Highway Safety, the Office of Research and Engineering, and the Office of Communications. As the NTSB Board Member working on the substance-impaired driving advocacy area, I have watched the NTSB admirably push this issue forward to address this safety problem aggressively.

Every hour one life is lost and 20 people are injured in a substance-impaired crash. The NTSB's goal is to get to zero deaths and injuries from substance-impaired driving. It is time to end our national complacency because every substance-impaired crash is preventable. The NTSB has provided a science-based roadmap with a set of targeted, effective interventions that can measurably reduce deaths and injuries. Following the NTSB roadmap means that we will all be safer on our nation's roadways. We have no more excuses, injuries will be prevented and every hour lives are waiting to be saved.

Chairman Hersman and Member Sumwalt joined in this statement.

Member Earl F. Weener, concurring:

I appreciate the staff interest in and pursuit of progress to reduce alcohol-impaired driving. More can and should be done; the number of lives affected by impaired driving remains too high—particularly when it is a preventable event. Summarizing the data concerning alcohol-impairment and its relation to driving activities is a positive step and a worthwhile exercise. Yet, to reach the intended goal of reducing alcohol-impaired crashes active measures need to be taken, as we recommend. Realistically, though, no jurisdiction is in a position to act on all the recommendations issued in the study, and this is where the report falters. Although it is rich in data, the report lacks the necessary analysis to assist state and local jurisdictions in making educated decisions when developing and pursuing effective deterrence strategies.

We are not fulfilling our mission to enhance transportation safety by simply summarizing the results of studies and issuing a broad range of recommendations requiring significant investment of time and resources, as well as political will, with nothing more. In short, we may be setting the states up for failure and rendering the recommendations meaningless. Alternatively, a report providing sufficient analysis of the summarized data along with recommendations allowing sufficient flexibility to enable states and local jurisdictions to evaluate their respective circumstances and determine appropriate mitigations to best meet their needs and resources, would provide a more valuable tool.

Development of comprehensive programs to address alcohol-impaired driving does require resources. But rather than question the commitment of our states and local jurisdictions to the cause, considering their operating environment of scarce resources, we should be making every effort to assist them in making good decisions in support of effective deterrence strategies.

References

AAA Foundation (AAA Foundation for Traffic Safety). 2013. *2012 Traffic Safety Culture Index*. Washington, DC: AAA Foundation for Traffic Safety. Accessed March 2013. https://www.aaafoundation.org/sites/default/files/2012TrafficSafetyCultureIndex.pdf.

AAAM (Association for the Advancement of Automotive Medicine). 2009. *Blood Alcohol Concentration Limit for Driving: Policy Statement*. Accessed November 2012. http://www.aaam.org/BAC.pdf.

Albalate, D. 2008. "Lowering Blood Alcohol Content Levels to Save Lives: The European Experience." *Journal of Policy Analysis and Management* 27(1): 20–39.

AMA (American Medical Association). 2013. *Policy H-30.986 Alcohol and the Driver*. Accessed March 25, 2013. https://ssl3.ama-assn.org/apps/ecomm/PolicyFinderForm.pl?site=www.ama-assn.org&uri=%2fresources%2fdoc%2fPolicyFinder%2fpolicyfiles%2fHnE%2fH-30.986.HTM.

Baker, S.P., E.R. Braver, L.H. Chen, G. Li, and A.F. Williams. 2002. "Drinking Histories of Fatally Injured Drivers." *Injury Prevention* 8(3): 221–26.

Bergen, G., R.A. Shults, and R.A. Rudd. 2011. "Vital Signs: Alcohol-Impaired Driving Among Adults–United States, 2010." *Morbidity and Mortality Weekly Report* 60(39): 1351-56.

Beck, Kenneth H., William J. Rauch, Elizabeth A. Baker, and Allan F. Williams. 1999. "Effects of Ignition Interlock License Restrictions on Drivers with Multiple Alcohol Offenses: A Randomized Trial in Maryland." *American Journal of Public Health* 89(11): 1696-1700.

Blincoe, L., A.G. Seay, E. Zaloshnja, T.R. Miller, E.O. Romano, S. Luchter, and R.S. Spicer. 2002. *The Economic Impact of Motor Vehicle Crashes, 2000*. DOT-HS-809-446. Washington DC: National Highway Traffic Safety Administration.

Blomberg, Richard D., Raymond C. Peck, Herbert Moskowitz, Marcelline Burns, and Dary Fiorentino. 2005. *Crash Risk of Alcohol Involved Driving: A Case-Control Study*. Stamford, CT: Dunlap and Associates, Inc.

Borkenstein, R.F., R.F. Crowther, R.P. Shumate, W.W. Zeil, and R. Zylman. 1964. *The Role of the Drinking Driver in Traffic Accidents*. Bloomington, IN: Department of Police Administration, Indiana University.

Bouffard, J.A., K.A. Richardson, and T. Franklin. 2010. "Drug Courts for DWI Offenders? The Effectiveness of Two Hybrid Drug Courts on DWI Offenders." *Journal of Criminal Justice* 38(1): 25–35.

Brady, Joanne E., Susan P. Baker, C. DiMaggio, Melissa L. McCarthy, George W. Rebok, and Guohua Li. 2009. "Effectiveness of Mandatory Alcohol Testing Programs in Reducing Alcohol Involvement in Fatal Motor Carrier Crashes." *American Journal of Epidemiology* 170(6): 775–82.

Carey, S.M., B. Fuller, and K. Kissick. 2008. *Michigan DUI Courts Outcome Evaluation: Final Report*. Portland, OR: NPC Research.

Chamberlain, E., and R. Solomon. 2001. "The Tooth Fairy, Santa Claus, and the Hard Core Drinking Driver." *Injury Prevention* 7: 272–75.

----. 2002. "The Case for a 0.05% Criminal Law Blood Alcohol Concentration Limit for Driving." *Injury Prevention* 8(SIII): iii1–iii17.

Coben, J.H., and G.L. Larkin. 1999. "Effectiveness of Ignition Interlock Devices in Reducing Drunk Driving Recidivism." *American Journal of Preventive Medicine* 16(1S): 81–87.

Compton, R.P., R.D. Blomberg, H. Moskowitz, M. Burns, R.C. Peck, and D. Fiorentino. 2002. "Crash Risk of Alcohol-Impaired Driving." *Alcohol, Drugs and Traffic Safety–T2002. Proceedings of the 16th International Conference on Alcohol, Drugs and Traffic Safety (August 4–9, 2002).* Montreal, Canada: International Council on Alcohol, Drugs and Traffic Safety.

Cosgrove, Linda, Neil Chaudhary, and Ian Reagan. 2011. *Four High-Visibility Enforcement Demonstration Waves in Connecticut and New York Reduce Hand-Held Phone Use*. DOT HS 811 845. Washington DC: National Highway Traffic Safety Administration.

Daoud, I. 2012. "Overview of the European Interlock Use." User Seminar on Alcohol Interlocks, Helsinki, Finland, May 8, 2012. Accessed January 24, 2013. http://www.trafi.fi/filebank/a/1336735301/d92067c0e9432c4f60fc9204796003e2/9659-Ilyas_Daoud.pdf.

Dee, T.S. 2001. "Does Setting Limits Save Lives? The Case of 0.08 BAC Laws." *Journal of Policy Analysis and Management* 20(1): 111–28.

DeYoung, David J., Helen N. Tashima, and Scott V. Masten. 2004. *An Evaluation of the Effectiveness of Ignition Interlocks in California*. CAL-DMV-RSS-04-210. Sacramento, CA: California Department of Motor Vehicles.

Dry, Matthew J., Nicholas R. Burns, Ted Nettelbeck, Aaron L. Farquharson, and Jason M. White. 2012. "Dose-Related Effects of Alcohol on Cognitive Functioning." *PLoS ONE* 7(11): e50977.

FBI (Federal Bureau of Investigation). *Crime in the United States 2011*. 2013. Accessed January 29, 2013. http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2011/crime-in-the-u.s.-2011.

Federal Register. 2013. Vol. 78, no. 15 (January 23).

Fell, J.C., S.A. Ferguson, A.F. Williams, and M. Fields. 2003. "Why are Sobriety Checkpoints Not Widely Adopted as an Enforcement Strategy in the United States?" *Accident Analysis and Prevention* 35(6): 897–902.

Fell, J.C., and R.B. Voas. 2006. "The Effectiveness of Reducing Illegal Blood Alcohol Concentration (BAC) Limits for Driving: Evidence for Lowering the Limit to .05 BAC." *Journal of Safety Research* 37(3): 233–43.

Fell, J.C., C. Compton, and R.B. Voas. 2008. "A Note on the Use of Passive Alcohol Sensors During Routine Traffic Stops." *Traffic Injury Prevention* 9(6): 534–38.

Fell, J.C., A.S. Tippetts, and E.A. Langston. 2011. *An Evaluation of the Three Georgia DUI Courts*. DOT HS 811 450. Washington DC: National Highway Traffic Safety Administration.

Ferguson, S.A. 2012. "Alcohol-Impaired Driving in the United States: Contributors to the Problem and Effective Countermeasures." *Traffic Injury Prevention* 13(5): 427–41.

Ferguson, S.A, and others. 2009. "Driver Alcohol Detection System for Safety (DADSS)–A Non-Regulatory Approach in the Development and Deployment of Vehicle Safety Technology to Reduce Alcohol-Impaired Driving." Paper 09-0464, 21st International Technical Conference on the Enhanced Safety of Vehicles. Stuttgart, Germany.

Ferguson, S.A., J.K. Wells, and A.K. Lund. 1995. "Role of Passive Alcohol Sensors in Detecting Alcohol-Impaired Drivers at Sobriety Checkpoints." *Alcohol, Drugs and Driving* 11(1): 23–30.

FHWA (Federal Highway Administration). 2013. *Toward Zero Deaths: A National Strategy on Highway Safety*. Washington, DC: FHWA. Accessed January 22, 2013. http://safety.fhwa.dot.gov/tzd.

Griemel, Hans. 2009. "Toyota Testing Breathalyzer Unit on 30 Commercial Vehicles." *Autoweek*. Accessed January 25, 2013. http://www.autoweek.com/article/20090908/CARNEWS/909089998.

Hartunian, Jennifer. 2002. "To Breathe, or Not to Breathe: Passive Alcohol Sensors and the Fourth Amendment." *San Diego Law Review* 563.

Henstridge, J., R. Homel, and P. Mackay. 1997. *The Long-Term Effects of Random Breath Testing in Four Australian States: A Time Series Analysis*. Canberra: Federal Office of Road Safety.

Hingson, Ralph, Timothy Heeren, and Michael Winter. 1996. "Lowering State Legal Blood Alcohol Limits to 0.08%: The Effect on Fatal Motor Vehicle Crashes." *American Journal of Public Health* 86(9): 1297–99.

Hurst, R.M., D. Harte, and W.J. Frith. 1994. "The Grand Rapids Dip Revisited." *Accident Analysis and Prevention* 26(5): 647–54.

ICAP (International Center for Alcohol Policies). 2013. *Blood Alcohol Concentration (BAC) Limits Worldwide*. Accessed May 6, 2013. http://www.icap.org/table/BACLimitsWorldwide.

Jones, I.S., and A.K. Lund. 1986. "Detection of Alcohol-Impaired Drivers Using a Passive Alcohol Sensor." *Journal of Police Science and Administration* 14: 153–60.

Jurnecka, R. 2007. *Nissan Developing Built-In Breathalyzer System*. Accessed January 25, 2013. http://blogs.motortrend.com/nissan-developing-builtin-breathalyzer-system-929.html#axzz2NGJP1WZi.

Kaner, E.F., H.O. Dickinson, F.R. Beyer, F. Campbell, C. Schlesinger, N. Heather, J.B. Saunders, B. Burnand, and E.D. Pienaar. 2009. "Effectiveness of Brief Alcohol Interventions in Primary Care Populations (Review)." *Cochrane Database of Systematic Reviews*, Issue 2, Art. No. CD004148. DOI: 10.1002/14651858.CD004148.pub3.

Kilmer, Beau, Nancy Nicosia, Paul Heaton, and Greg Midgette. 2012. "Efficacy of Frequent Monitoring With Swift, Certain, and Modest Sanctions for Violations: Insights From South Dakota's 24/7 Sobriety Project." *American Journal of Public Health*. doi:10.2105/AJPH.2012.300989: e1–e7.

Kress, H.C., R. Noonan, K. Freire, A. Marr, and A. Olson. 2012. "Top 20 Violence and Injury Practice Innovations Since 1992." *Journal of Safety Research* 43(4): 257–63.

Kweon, Young-Jun, and Kara M. Kockelman, 2006. "Driver Attitudes and Choices: Speed Limits, Seat Belt Use, and Drinking-and-Driving." *Journal of the Transportation Research Forum* 45(3): 39–56.

Lacey, John H., Susan A. Ferguson, Tara Kelley-Baker, and Raamses P. Rider. 2006. "Low-Manpower Checkpoints: Can They Provide Effective DUI Enforcement in Small Communities?" *Traffic Injury Prevention* 7(3): 213–18.

Lacey, John H., Tara Kelley-Baker, Debra Furr-Holden, Robert B. Voas, Eduardo Romano, Pedro Torres, A. Scott Tippetts, Anthony Ramirez, Katherine Brainard, and Amy Berning. 2009. *2007 National Roadside Survey of Alcohol and Drug Use by Drivers: Alcohol Results*, DOT HS 811 248.

Leaf, William A., and David F. Preusser. 1996. *Effectiveness of Passive Alcohol Sensors*. DOT-HS-808-381. Washington DC: National Highway Traffic Safety Administration.

Lerner, B.H. 2011. *One For the Road: Drunk Driving Since 1900*. Baltimore, MD: Johns Hopkins University Press. 88–90.

Lund, Adrian K., Anne T. McCartt, and Charles M. Farmer. 2007. *Contribution of Alcohol-Impaired Driving to Motor Vehicle Crash Deaths in 2005*. Seattle, WA: 8th Ignition Interlock Symposium.

Marques, Paul R., and Robert B. Voas. 2010. *Key Features for Ignition Interlock Programs*. DOT-HS-811-262. Washington, DC: National Highway Traffic Safety Administration.

McCartt, A.T., L.L. Geary, and A. Berning. 2003. "Observational Study of the Extent of Driving While Suspended for Alcohol Impaired Driving." *Injury Prevention* 9: 133–37.

McCartt, Anne T., William A. Leaf, Charles M. Farmer, and Angela H. Eichelberger. 2013. "Washington State's Alcohol Ignition Interlock Law: Effects on Recidivism Among First-Time DUI Offenders." *Traffic Injury Prevention* 14(3): 215–29.

Miller, T.R., R. Gibson, E. Zaloshnja, L.J. Blincoe, J. Kindelberger, A. Strashny, A. Thomas, S. Ho, M. Bauer, S. Sperry, J. Peng, M. Singleton, T.J. Smith, and Y. Zhang. 2012. "Underreporting of Driver Alcohol Involvement in United States Police and Hospital Records: Capture-Recapture Estimates." *Annals of Advances in Automotive Medicine* 56: 87–96.

Mitchell, O., and others. 2012. "Assessing the Effectiveness of Drug Courts on Recidivism: A Meta-Analytic Review of Traditional and Non-Traditional Drug Courts." *Journal of Criminal Justice* 40(1): 60–71.

Moskowitz, H., and D. Fiorentino. 2000. *A Review of the Literature on the Effects of Low Doses of Alcohol on Driving-Related Skills*. DOT HS 809 028. Washington, DC: National Highway Traffic Safety Administration.

Munnich, Lee W., Frank Douma, Xiao Qin, J. David Thorpe, and Kai Wang. 2012. *Evaluating Effectiveness of States' Toward-Zero-Deaths Programs*. CTS 12-39T. Minneapolis, MN: Center for Transportation Studies.

NHTSA (National Highway Traffic Safety Administration). 2011. *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Sixth Edition*. DOT HS 811 444. Washington, DC: NHTSA.

----. 2012a. *Digest of Impaired Driving and Selected Beverage Control Laws, 26th Edition*. DOT HS 811 673. Washington, DC: NHTSA.

----. 2012b. *Traffic Safety Facts, Alcohol-Impaired Driving: 2011 Data*. DOT HS 811 700. Washington, DC: NHTSA.

NIAAA (National Institute on Alcohol Abuse and Alcoholism). 2013. *Alcohol's Effects on the Body*. Accessed February 4, 2013. http://www.niaaa.nih.gov/alcohol-health/alcohols-effects-body.

NTSB (National Transportation Safety Board). 1984. *Safety Study–Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers.* NTSB/SS-84/04. Washington, DC: NTSB.

----. 1989. *Pickup Truck/Church Activity Bus Head-On Collision and Fire Near Carrollton, Kentucky, May 14, 1988*. NTSB/HAR-89/01. Washington, DC: NTSB.

----. 2000. *Actions to Reduce Fatalities, Injuries, and Crashes Involving the Hard Core Drinking Driver*. NTSB/SR-00/01. Washington, DC: NTSB.

----. 2002a. *Loss of Control on Downgrade; Collision of Load With School Bus, Franklin, North Carolina, October 16, 1997*. NTSB/HAB-02/08. Washington, DC: NTSB.

----. 2002b. *Head-on Collision, Killeen, Texas, January 10, 1998*. NTSB/HAB-02/13. Washington, DC: NTSB.

----. 2006. *Passenger Vehicle Median Crossover and Head-On Collision With Another Passenger Vehicle, Linden, New Jersey, May 1, 2003*. NTSB/HAR-06/02. Washington, DC: NTSB.

----. 2012a. Standalone recommendation letters resulting from 2012 NTSB forum "Reaching Zero: Actions to Eliminate Substance-Impaired Driving." Washington, DC: NTSB. Accessed March 13, 2013. http://www.ntsb.gov/news/2012/121123.html, http://www.ntsb.gov/doclib/recletters/2012/H-12-032-033.pdf. http://www.ntsb.gov/doclib/recletters/2012/H-12-034-036.pdf. http://www.ntsb.gov/doclib/recletters/2012/H-12-036.pdf. http://www.ntsb.gov/doclib/recletters/2012/H-12-037.pdf

----. 2012b. *Reaching Zero: Actions to Eliminate Substance-Impaired Driving* (forum summary). Washington, DC: NTSB. Accessed December 11, 2012. http://www.ntsb.gov/news/events/2012/Substance_Impaired_Driving/Reaching_Zero_Forum_Summary.pdf.

----. 2012c. *Wrong-Way Driving*. NTSB/SIR-12/01, Washington, DC: NTSB.

Ontario Ministry of Transportation. 2013. Impaired driving consequences of drinking and driving table. Accessed January 22, 2013. http://www.mto.gov.on.ca/english/safety/impaired/penalties.shtml.

Peek-Asa, C. 1999. "The Effect of Random Alcohol Screening in Reducing Motor Vehicle Crash Injuries." *American Journal of Preventative Medicine* 16(1S): 57–67.

Podda, F. 2012. *Drink Driving: Towards Zero Tolerance*. Brussels: European Transport Safety Council. Accessed January 23, 2013. http://www.etsc.eu/documents/Drink_Driving_Towards_Zero_Tolerance.pdf.

Rauch, William J., Eileen M. Ahlin, Paul L. Zador, Jan M. Howard, and G. Doug Duncan. 2011. "Effects of Administrative Ignition Interlock License Restrictions on Drivers with Multiple Alcohol Offenses." *Journal of Experimental Criminology* 7: 127–48.

Robertson, Robyn, D., and Ward G.M. Vanlaar. 2012. *Canada's Impaired Driving Framework: The Way Forward. Proceedings of the Drinking and Driving* Symposium. Ottawa, Ontario: Traffic Injury Research Foundation.

Ross, H. Laurence and Phillip Gonzales. 1988. "Effects of License Revocation on Drunk-Driving Offenders." *Accident Analysis and Prevention* 20(5): 379–91.

Roth, R. 2012. *Survey of Currently-Installed Interlocks in the U.S*. Accessed January 29, 2013. http://www.rothinterlock.org/2012surveyofcurrentlyinstalledinterlocksintheus.pdf.

Roth, Richard, Paul R. Marques, and Robert B. Voas. 2009. "A Note on the Effectiveness of the House-Arrest Alternative for Motivating DWI Offenders to Install Ignition Interlocks." *Journal of Safety Research* 40(6): 437–41.

Shults, R.A., R.W. Elder, D.A. Sleet, and J.L. Nichols. 2001. "Reviews of Evidence Regarding Interventions to Reduce Alcohol-Impaired Driving." *American Journal of Preventive Medicine* 21(4S): 66–88.

Solomon, Mark G., Robert G. Ulmer, and David F. Preusser. 2002. *Evaluation of Click It or Ticket Model Programs.* DOT HS 809 498. Washington DC: National Highway Traffic Safety Administration.

Sprattler, K. 2009. *Ignition Interlocks–What You Need to Know: A Toolkit for Policymakers, Highway Safety Professionals, and Advocates*. Washington, DC: National Highway Traffic Safety Administration.

Stuster, J. 2006. *Creating Impaired Driving General Deterrence: Eight Case Studies of Sustained, High-Visibility, Impaired-Driving Enforcement*. DOT HS 809 950. Washington DC: National Highway Traffic Safety Administration.

Tingvall, C. 1997. "The Zero Vision. A Road Transport System Free From Serious Health Losses." *Transportation, Traffic Safety and Health*. Edited by H. von Holst, A. Nygren, and R. Thord. Berlin: Springer Verlag: 37–57.

Tippetts, A.S., and R.B. Voas. 1998. "The Effectiveness of the West Virginia Interlock Program." *Journal of Traffic Medicine* 26: 19–24.

Tison, J., A.F. Williams, and N.K. Chaudhary. 2010. *Daytime and Nighttime Seat Belt Use by Fatally Injured Passenger Vehicle Occupants.* DOT HS 811 281. Washington DC: National Highway Traffic Safety Administration.

Utah Highway Safety Plan, Federal Fiscal Year 2012. Accessed April 18, 2013. http://www.nhtsa.gov/nhtsa/whatsup/safeteaweb/FY12/FY12HSPS/UT_FY12HSP.pdf.

Utah Strategic Highway Safety Plan, version 3.0. 2013. Accessed March 13, 2013. http://ut.zerofatalities.com/downloads/Zero%20Fatalities%20SHSP.pdf.

Vezina, L. 2002. "The Quebec Alcohol Interlock Program: Impact on Recidivism and Crashes." *Alcohol, Drugs and Traffic Safety–T2002. Proceedings of the 16th International Conference on Alcohol, Drugs and Traffic Safety (August 4–9, 2002).* Edited by D.R. Mayhew and C. Dussault. Quebec City, Montreal: Societe de l'Assurance Automobile du Quebec: 97–104.

Voas, R.B., A.E. Rhodenizer, and C. Lynn. 1985. *Evaluation of Charlottesville Checkpoint Operations*. DOT-HS-806-989. Washington, DC: National Highway Traffic Safety Administration.

Voas, R.B., A.S. Tippetts, and J.C. Fell. 2000. "The Relationship of Alcohol Safety Laws to Drinking Drivers in Fatal Crashes." *Accident Analysis and Prevention* 32(4): 483–92.

Voas, R.B., and D.J. DeYoung. 2002. "Vehicle Action: Effective Policy for Controlling Drunk and Other High-Risk Drivers?" *Accident Analysis and Prevention* 34(3): 263–70.

Voas, R.B., J.H. Lacey, and J.C. Fell. 2003. "The Passpoint System-Passive Sensors at Minicheckpoints: Bringing Australia's Random Breath Test System to the United States." *Implementing Impaired Driving Countermeasures: Putting Research Into Action Symposium*. Irvine, CA: Transportation Research Board: 45–53.

Volvo Corporation. 2013. *The Volvo Alcoguard*. Accessed January 25, 2013. http://accessories.volvocars.com/AccessoriesWeb/Accessories.mvc/en-US/US/S60(11-)/2013/T5%20AWD/Automatic/L.H.D/ShowDocument/VCC-449888.

Wagenaar, A.C., and M.M. Maldonado-Molina. 2007. "Effects of Drivers' License Suspension Policies on Alcohol-Related Crash Involvement: Long-Term Follow-Up in Forty-Six States." *Alcoholism: Clinical and Experimental Research* 31: 1399–1406.

Wagenaar, Alexander C., Mildred M. Maldonado-Molina, Linan Ma, Amy L. Tobler, Kelli A. Komro. 2007. "Effects of Legal BAC Limits on Fatal Crash Involvement: Analyses of 28 States from 1976 through 2002." *Journal of Safety Research* 38: 493–99.

Wagenaar, A.C., M.J. Salois, and K.A. Komro. 2009. "Effects of Beverage Alcohol Price and Tax Levels on Drinking: A Meta-Analysis of 1003 Estimates from 112 Studies." *Addiction* 104(2): 179–90.

Wagenaar, A.C., A.L Tobler and K.A. Komro. 2010. "Effects of Alcohol Tax and Price Policies on Morbidity and Mortality: A Systematic Review." *American Journal of Public Health* 100(11): 2270–78.

Wells, J.K., M.A. Greene, R.D. Foss, S.A. Ferguson, and A.F. Williams. 1997. "Drinking Drivers Missed at Sobriety Checkpoints." *Journal of Studies on Alcohol* 58(5): 513–17.

Wells-Parker, E., R. Bangert-Drowns, R. McMillen, and M. Williams. 1995. "Final Results from a Meta-Analysis of Remedial Interventions with Drink/Drive Offenders." *Addiction* 90(7): 907–26.

Willis, C., S. Lybrand, and N. Bellamy. 2004. "Alcohol Ignition Interlock Programmes for Reducing Drink Driving Recidivism." Issue 3. *Cochrane Database of Systematic Reviews*.

WHO (World Health Organization). 2013a. *Global Health Observatory—Interventions to reduce road traffic injuries: reducing drink-driving*. Accessed May 6, 2013. http://www.who.int/gho/road_safety/legislation/alcohol_text/en/index.html.

----. 2013b. *Global Health Observatory Data Repository—Drink Driving: Legal BAC limits by country*. Accessed May 6, 2013. http://apps.who.int/gho/data/node.main.A1147?lang=en.

WMA (World Medical Association). 2013. *Statement on Alcohol and Road Safety*. Accessed January 17, 2013. http://www.wma.net/en/30publications/10policies/a17/.

Zador, P., A. Lund, and K. Weinberg. 1989. "Fatal Crash Involvement and Laws Against Alcohol-Impaired Driving." *Journal of Public Health Policy* 10: 467–85.

Zador, P.L., S.A. Krawchuk, and R.B. Voas. 2000. "Alcohol-Related Relative Risk of Driver Fatalities and Driver Involvement in Fatal Crashes in Relation to Driver Age and Gender: An Update Using 1996 Data." *Journal of Studies on Alcohol* 61(3): 387–95.

Zador, Paul L., Eileen M. Ahlin, William J. Rauch, Jan M. Howard, and G. Doug Duncan. 2011. "The Effects of Closer Monitoring on Driver Compliance with Interlock Restrictions." *Accident Analysis and Prevention* 43(6): 1960–67.

Zaloshnja, Eduard, and Ted R. Miller. 2009. "Cost of Crashes Related to Road Conditions, United States, 2006." *Annals of Advances in Automotive Medicine* 53: 141–53.

Zwerling, C., and M.P. Jones. 1999. "Evaluation of the Effectiveness of Low Blood Alcohol Concentration Laws for Younger Drivers." *American Journal of Preventive Medicine* 16(1S): 76–80.

Appendixes

Appendix A. NTSB Highway Recommendation History on Impaired Driving

Rec#	Report	Recipient	Recommendation	Status*
H-12-48	NTSB/SIR-12/01: Wrong-Way Driving	Automotive Coalition for Traffic Safety	Work with NHTSA to accelerate widespread implementation of DADSS technology by (1) defining usability testing that will guide driver interface design and (2) implementing a communication program that will direct driver education and promote public acceptance.	OAR
H-12-45	NTSB/SIR-12/01: Wrong-Way Driving	33 states, Puerto Rico, and DC	Enact laws to require the use of alcohol ignition interlock devices for all individuals convicted of DWI offenses.	OAR
H-12-43	NTSB/SIR-12/01: Wrong-Way Driving	NHTSA	Work with the Automotive Coalition for Traffic Safety, Inc., to accelerate widespread implementation of DADSS technology by (1) defining usability testing that will guide driver interface design and (2) implementing a communication program that will direct driver education and promote public acceptance.	OAR
H-12-37	Standalone: 2012 Forum—Reaching Zero: Actions to Eliminate Substance-Impaired Driving	International Association of Chiefs of Police, National Sheriffs' Association	Inform your members of the value of collecting POLD data as part of any arrest or accident investigation involving an alcohol-impaired driver.	OAA
H-12-36	Standalone: 2012 Forum—Reaching Zero: Actions to Eliminate Substance-Impaired Driving	50 states, Puerto Rico, and DC	Require law enforcement agencies to collect POLD data as part of any arrest or accident investigation involving an alcohol-impaired driver.	OAR

Rec#	Report	Recipient	Recommendation	Status*
H-12-35	Standalone: 2012 Forum—Reaching Zero: Actions to Eliminate Substance-Impaired Driving	45 states that have low reporting rates for BAC testing, Puerto Rico, and DC	Once NHTSA has developed the BAC testing and reporting guidelines recommended in H-12-32, incorporate the guidelines into a statewide action plan to achieve BAC reporting rates of at least 80 percent of fatally injured drivers and at least 60 percent of surviving drivers involved in fatal crashes.	OAR
H-12-34	Standalone: 2012 Forum—Reaching Zero: Actions to Eliminate Substance-Impaired Driving	45 states that have low reporting rates for BAC testing, Puerto Rico, and DC	Increase your collection, documentation, and reporting of BAC test results by taking the following actions, as needed, to improve testing and reporting rates: (1) enact legislation, (2) issue regulations, and (3) improve procedures used by law enforcement agencies or testing facilities.	OAR
H-12-33	Standalone: 2012 Forum—Reaching Zero: Actions to Eliminate Substance-Impaired Driving	NHTSA	Develop and disseminate to appropriate state officials a common standard of practice for drug toxicology testing, including (1) the circumstances under which tests should be conducted, (2) a minimum set of drugs for which to test, and (3) cutoff values for reporting the results.	OAA
H-12-32	Standalone: 2012 Forum—Reaching Zero: Actions to Eliminate Substance-Impaired Driving	NHTSA	Develop and disseminate to the 50 states, Puerto Rico, and the District of Columbia BAC testing and reporting guidelines based on the 2012 report *State Blood Alcohol Concentration Testing and Reporting for Drivers Involved in Fatal Crashes: Current Practices, Results, and Strategies, 1997–2009.*	OAA
H-09-18	NTSB/HAR-09/02: Motorcoach Run-Off-the-Bridge and Rollover, Sherman, Texas, August 8, 2008	FMCSA	Establish a regulatory requirement within 49 CFR 382.405 that provides the NTSB, in the exercise of its statutory authority, access to all positive drug and alcohol test results and refusal determinations that are conducted under the DOT testing requirements.	OAA
H-04-48	NTSB/SIR-04/01: Medical Oversight of Noncommercial Drivers	Federation of State Medical Boards	Work with your member organizations to ensure that continuing medical education requirements in all states include a course addressing the driving risks associated with certain medical conditions and medications, as well as the existence and function of state reporting laws and procedures regarding medically impaired drivers.	CAAA

Rec#	Report	Recipient	Recommendation	Status*
H-04-47	NTSB/SIR-04/01: Medical Oversight of Noncommercial Drivers	Medical education groups	Require medical schools to teach students about the driving risks associated with certain medical conditions and medications, the existence and function of state reporting laws regarding medically high-risk drivers, and the methods and resources for counseling such drivers.	OAA
H-04-41	NTSB/SIR-04/01: Medical Oversight of Noncommercial Drivers	NHTSA	Once the most effective reporting methods and licensing countermeasures have been determined, develop a model comprehensive medical oversight program for states to use to oversee medically impaired drivers. Such a program should include, as a minimum: (a) Methods to provide information to the public on resource availability and on the medical oversight laws and procedures to assist medically high-risk drivers; (b) Plans and strategies to simplify and maximize reporting of potential drivers' medical impairment to medical evaluation units of state driver licensing organizations by law enforcement officers, healthcare providers, emergency services providers, and the public; (c) Methods to capture all cases of motor vehicle incidents or accidents potentially related to driver medical impairment; (d) Standardized methods of driver evaluation for potentially medically impaired drivers incorporating medical records review, systematic testing, and on-road appraisals, as needed; and (e) Methods for timely and appropriate restriction of driving privileges for drivers found to have medical conditions or treatments that impair their ability to safely operate a motor vehicle.	OAA
H-04-16	NTSB/HAR-04/02: 15-Passenger Child Care Van Run-Off-Road Accident, Memphis, Tennesse, April 4, 2002	National Association for the Education of Young Children	As part of your accreditation program, establish a transportation safety accreditation that requires applicants to implement the following elements: use of vehicles built to school bus standards or multifunction school activity buses; a regular vehicle maintenance and inspection program; a requirement that occupants wear age-appropriate restraints at all times; a requirement that drivers receive criminal background checks and have a medical examination to determine fitness to drive; preemployment, random, postaccident, and "for cause" drug testing for all child care transportation providers and the prohibition of anyone who tests positive for drugs from transporting children; review by an oversight agency of periodic background checks, medical examinations, and drug test results; and a requirement that child care vehicles be labeled with the child care center's and oversight agency's names and phone numbers.	OAA

Rec#	Report	Recipient	Recommendation	Status*
H-04-13	NTSB/HAR-04/02: 15-Passenger Child Care Van Run-Off-Road Accident, Memphis, Tennesse, April 4, 2002	States and DC child care transportation oversight agencies	Implement an oversight program for child care transportation that includes the following elements: Review by an oversight agency of periodic driver background checks, medical examinations, and drug test results.	OUA
H-04-12	NTSB/HAR-04/02: 15-Passenger Child Care Van Run-Off-Road Accident, Memphis, Tennesse, April 4, 2002	States and DC child care transportation oversight agencies	Implement an oversight program for child care transportation that includes the following elements: Preemployment, random, postaccident, and “for cause” drug testing for all child care center transportation providers and the prohibition of anyone who tests positive for drugs from transporting children.	OUA
H-01-27	NTSB/HAR-01/01: Motorcoach Run-Off-The-Road Accident, New Orleans, Louisiana,May 9, 1999	National Conference of State Legislatures	Inform state legislatures about this accident and make them aware of the importance of establishing immunity laws for the good-faith reporting of potentially impaired commercial drivers by all individuals and of ensuring that the medical community and the commercial transportation industry are familiar with these laws.	CAA
H-01-25	NTSB/HAR-01/01: Motorcoach Run-Off-The-Road Accident, New Orleans, Louisiana,May 9, 1999	FMCSA	Develop a system that records all positive drug and alcohol test results and refusal determinations that are conducted under the DOT testing requirements, require prospective employers to query the system before making a hiring decision, and require certifying authorities to query the system before making a certification decision.	OUA

Rec#	Report	Recipient	Recommendation	Status*
H-00-27	NTSB/SR-00/01: Actions to Reduce Fatalities, Injuries, and Crashes Involving the Hard Core Drinking Driver	DOT	Evaluate modifications to the provisions of the Transportation Equity Act for the 21st Century so that it can be more effective in assisting the states to reduce the hard core drinking driver problem. Recommend changes to Congress as appropriate. Considerations should include (a) a revised definition of "repeat offender" to include administrative actions on driving-while-impaired offenses; (b) mandatory treatment for hard core offenders; (c) a minimum period of 10 years for records retention and driving-while-impaired offense enhancement; (d) administratively imposed vehicle sanctions for hard core drinking drivers; (e) elimination of community service as an alternative to incarceration; and (f) inclusion of home detention with electronic monitoring as an alternative to incarceration.	CAAA
H-00-26	NTSB/SR-00/01: Actions to Reduce Fatalities, Injuries, and Crashes Involving the Hard Core Drinking Driver	50 states and DC	Establish a comprehensive program that is designed to reduce the incidence of alcohol-related crashes and fatalities caused by hard core drinking drivers and that includes elements such as those suggested in the NTSB's model program.	OAA
H-00-15	Standalone: Medication Use letter	FMCSA	Establish, in coordination with the DOT, the Federal Railroad Administration, the Federal Transit Administration, and the US Coast Guard, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to ensure the identification of the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.	CUA
H-00-14	Standalone: Medication Use letter	FMCSA	Establish and implement an educational program targeting highway vehicle operators that, at a minimum, ensures that all operators are aware of the source of information described in H-00-13 regarding the hazards of using specific medications when driving.	CUA
H-00-13	Standalone: Medication Use letter	FMCSA	Develop, then periodically publish, an easy-to-understand source of information for highway vehicle operators on the hazards of using specific medications when driving.	CUA
H-00-12	Standalone: Medication Use letter	FMCSA	Establish, with assistance from experts on the effects of pharmacological agents on human performance and alertness, procedures or criteria by which highway vehicle operators who medically require substances not on the DOT's list of approved medications may be allowed, when appropriate, to use those medications when driving.	CUA

Rec#	Report	Recipient	Recommendation	Status*
H-93-7	NTSB/SS-93/01: Youth Accident Experience letter	50 states, DC, Puerto Rico, US Territories	Enact comprehensive laws that prohibit drivers under the age of 21 from driving with any measurable BAC (any level above 0.00 BAC), to include public information programs targeted to youth to enhance the effect of the new law.	CAA
H-93-6	NTSB/SS-93/01: Youth Accident Experience letter	50 states, DC, Puerto Rico, US Territories	Enact comprehensive laws that prohibit drivers under the age of 21 from driving with any measurable BAC (any level above 0.00 BAC), to include a period of extended license suspension/revocation (including a period of loss of driving privileges without exemption) for underage offenders in addition to any criminal sanctions that may be specified.	CAA
H-93-5	NTSB/SS-93/01: Youth Accident Experience letter	50 states, DC, Puerto Rico, US Territories	Enact comprehensive laws that prohibit drivers under the age of 21 from driving with any measurable BAC (any level above 0.00 BAC), to include provisions for administrative license revocation.	CAA
H-93-4	NTSB/SS-93/01: Youth Accident Experience letter	50 states, DC, Puerto Rico, US Territories	Vigorously enforce the minimum drinking age laws by taking driver license action against underage purchasers and vendor license action against those who sell to persons under the minimum purchase age.	CAA
H-93-3	NTSB/SS-93/01: Youth Accident Experience letter	50 states, DC, Puerto Rico, US Territories	Vigorously enforce youth drinking and driving laws to increase the percentage of alcohol-impaired young drivers who are arrested.	CAA
H-93-2	NTSB/SS-93/01: Youth Accident Experience letter	50 states, DC, Puerto Rico, US Territories	Vigorously enforce the minimum drinking age laws to achieve a significant reduction in the rate of alcohol purchase by underage persons.	CAA
H-93-1	NTSB/SS-93/01: Youth Accident Experience letter	50 states, DC, Puerto Rico, US Territories	Review your drinking age (age 21) laws to determine if they prohibit persons under the age of 21 from attempting to purchase, purchasing, publicly possessing, or consuming alcoholic beverages, and prohibit the sale of alcoholic beverages to persons under the age of 21. Enact laws to include these provisions and to eliminate deficiencies that may exist.	CAA
H-92-41	NTSB/SS-92/02: Highway Work Zone Safety	FHWA	Conduct research to identify design changes in work zones that will aid drivers with degraded sensory perceptions resulting from aging, inattentiveness, or impairment. Use the results of this research to design better and more meaningful work zone traffic advisories and safety features.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-91-37	NTSB/HZM-91/01: Overturn of a Tractor-Semitrailer with the Release of Automotive Gasoline and Fire, Carmichael, Texas, February 13, 1991	50 states, DC, Puerto Rico, Virgin Islands, US Territories	Require postaccident toxicological testing for alcohol and drug impairment of commercial vehicle operators involved with the intrastate transportation of hazardous materials in bulk.	CAA
H-91-32	NTSB/HZM-91/01: Overturn of a Tractor-Semitrailer with the Release of Automotive Gasoline and Fire, Carmichael, Texas, February 13, 1991	FHWA	Require postaccident toxicological testing for alcohol and drug impairment of commercial vehicle operators involved with the intrastate transportation of hazardous materials in bulk.	CAA
H-91-29	NTSB/HAR-91/01: Multiple Vehicle Collision and Fire in a Work Zone on Interstate Highway 79 Near Sutton, West Virginia, July 26, 1990	FHWA	Encourage the use of the "design driver" concept, which assumes that some drivers are impaired or inattentive, in designing work zone safety features and signing. (Superseded by H-92-41)	CS
H-90-55	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	Trucking education groups	Encourage your membership to disseminate information to the commercial trucking industry and commercial vehicle operators regarding: the effects of fatigue, alcohol and other drug use; the interaction of alcohol, drugs, and fatigue; the differences between truck driver perception of fatigue and the actual onset of fatigue; methods of minimizing conditions which lead to commercial vehicle operators driving while fatigued.	CR

Rec#	Report	Recipient	Recommendation	Status*
H-90-54	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Enact legislation to establish 0.01 percent (the practical scientific level which allows for instrument sensitivity and individual differences) as the per se offense BAC for operators of commercial vehicles in your state.	CAA
H-90-53	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Enact legislation or adopt regulations, as appropriate, to define the alcohol concentration level that constitutes driving a commercial motor vehicle “under the influence” at the lowest possible level consistent with the capability of testing equipment to measure any ingested alcohol.	CAA
H-90-51	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Develop a coordinated statewide program to conduct selective alcohol and other drug enforcement operations at times and locations of high levels of truck accidents—specifically at times of high incidence of commercial truck accidents involving alcohol and/or other drugs.	CNLA
H-90-50	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Provide drug recognition expert training to personnel in state and local police agencies and in other public safety/law enforcement agencies who have commercial truck and truck driver enforcement and oversight responsibilities.	CNLA
H-90-49	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Disseminate safety information to commercial truck drivers in your state regarding the effects of fatigue, alcohol, and other drug use, and the interaction of drugs and fatigue.	CNLA

Rec#	Report	Recipient	Recommendation	Status*
H-90-47	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Require intrastate motor carriers in your state to: require close supervision, including frequent unannounced drug testing, for an appropriate period, of commercial truck drivers with an identified alcohol or other drug abuse problem. Such testing should be sufficiently frequent to create the likelihood of detection if the person uses drugs of abuse.	CNLA
H-90-46	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Require intrastate motor carriers in your state to: obtain proof that applicants seeking work as commercial truck drivers, who have had a history of alcohol/drug abuse, have successfully completed a certified treatment program and obtained a physician's evaluation of substance abuse and dependency.	CNLA
H-90-45	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Require intrastate motor carriers in your state to: review the alcohol/drug abuse treatment history of all applicants seeking work as commercial truck drivers.	CNLA
H-90-44	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Require intrastate motor carriers in your state to: perform preemployment alcohol and other drug tests for all applicants seeking to work as drivers of commercial trucks weighing over 10,000 pounds gross vehicle weight rating (GVWR).	CNLA
H-90-43	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Report alcohol and other drug toxicological tests requested and results obtained in fatal accidents to the FARS operated by NHTSA.	CUAN

Rec#	Report	Recipient	Recommendation	Status*
H-90-42	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	50 states, Puerto Rico, Virgin Islands, US Territories	Enact legislation or issue regulations to require the collection of blood samples for alcohol and other drug toxicological testing from all vehicle operators involved in fatal commercial truck accidents.	CUA
H-90-41	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	National Governors Association	Develop a program for the reporting of all accident toxicological results to the national commercial truck database.	CUAN
H-90-40	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	National Governors Association	Coordinate development of national programs for state implementation of standardized testing for alcohol and other drugs.	CUAN
H-90-39	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	International Association of Chiefs of Police, Commercial Vehicle Safety Alliance, International Association of Directors of Law Enforcement Standards and Training	Encourage your members to provide training in drug recognition for those personnel with commercial truck and truck driver enforcement and oversight responsibilities.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-90-38	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	International Association of Chiefs of Police, Commercial Vehicle Safety Alliance, International Association of Directors of Law Enforcement Standards and Training	Disseminate to your members information regarding the prevalence of alcohol and other drug use/abuse and fatigue among professional commercial truck drivers.	CAA
H-90-37	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	Trucking industry assocations	Encourage your membership to participate in education and public information programs regarding: scheduling and its impact on driver fatigue; the effects of alcohol and other drug use; and, the interaction of drugs and fatigue.	CNLA
H-90-36	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	Trucking industry assocations	Encourage your membership to participate in alcohol and other drug education and information programs aimed at commercial drivers.	CNLA
H-90-35	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	Trucking industry assocations	Actively promote and encourage your members to use or support: preemployment tests for alcohol and other drugs; driver violation history checks; and alcohol or other drug abuse treatment history checks.	CNLA

Rec#	Report	Recipient	Recommendation	Status*
H-90-34	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	US Department of Health and Human Services (HHS)	Establish, with the DOT and other organizations as appropriate, a postaccident alcohol and other drug analytic test plan for tests to be conducted on a wide range of impairing drugs with results reported at state-of-the-art sensitivity levels.	CNLA
H-90-33	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	HHS	Assist the DOT, states, American Academy of Forensic Sciences, National Safety Council Committee on Alcohol and Drugs, and other organizations as appropriate, in standardizing procedures for postaccident toxicological specimen collection, chain of custody, testing, and reporting among the states for accidents involving medium and heavy trucks.	CAA
H-90-31	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Revise 49 CFR Parts 391 and 392 to establish violation of the commercial vehicle operation alcohol offense (49 CFR 302.4, 392.5) as a reasonable cause requiring a drug test of the driver. Amend the regulations and provide notice to drivers of these revised regulations.	CUA
H-90-30	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Revise 49 CFR Parts 391 and 395 to establish driver hours-of-service violations, logbook irregularities, or the presence of multiple logbooks as a reasonable cause requiring a drug test of the driver. Amend the regulations and provide notice to drivers of these revised regulations.	CUA
H-90-29	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	As part of the FHWA on-going study of fatigue and loss of alertness among commercial vehicle operators, investigate interactions of fatigue and drug usage.	CUA

Rec#	Report	Recipient	Recommendation	Status*
H-90-23	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Establish and fund a program to train instructors to provide drug recognition expert training to federal agency inspectors/investigators, police, and other public service personnel with commercial truck and truck driver oversight responsibilities.	CAAA
H-90-22	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Establish a demonstration project(s) to deter the use of alcohol and other drugs by drivers of medium and heavy trucks that includes alcohol and other drug testing at special roadside sobriety checkpoints, truck inspection lanes, and truck weigh stations.	CAA
H-90-21	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Disseminate safety information to national, state, and local police agencies; public service and safety agencies; professional truck driver groups and individual truck drivers regarding: the effects of fatigue, alcohol, and other drug use; the interaction of alcohol, drugs, and fatigue; the prevalence of drug and alcohol abuse among commercial vehicle operators; and methods of minimizing conditions which lead to commercial operators driving while fatigued.	CAA
H-90-20	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Require close supervision, including frequent, unannounced drug testing for an appropriate period, of commercial truck drivers with an identified alcohol or other drug abuse problem. Such testing should be sufficiently frequent to create the likelihood of detection if the person uses drugs of abuse.	CAA
H-90-19	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Require commercial truck driver applicants with a prior history of drug and/or alcohol abuse to complete a certified treatment program and obtain a physician's evaluation of substance abuse and dependency.	CAAA

Rec#	Report	Recipient	Recommendation	Status*
H-90-18	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Amend 49 CFR 391.21 “Application for employment” and 391.23 “Investigations and inquiries” to include a complete review of alcohol and other drug abuse treatment history prior to employment as a commercial truck driver.	CAA
H-90-17	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	FHWA	Require preemployment alcohol and other drug tests on all drivers of commercial trucks with a GVWR of 10,000 pounds and above as a condition of employment.	CAAA
H-90-16	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	NHTSA	Revise the FARS to include standardized drug toxicological tests requested in each fatal accident and results, both single and multiple drug, which would include an estimating system similar to that now used to estimate national alcohol involvement in fatal accidents.	CAA
H-90-15	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	DOT	Provide funding incentives, guidance, and assistance to the states to obtain complete toxicological tests and report results (including drug tests requested) to the DOT on all vehicle operators involved in fatal commercial vehicle accidents.	CUA
H-90-14	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	DOT	Establish, with the HHS and other organizations as appropriate, a postaccident alcohol and other drug analytic test plan for tests to be conducted on a wide range of impairing drugs with results reported at state-of-the-art sensitivity levels.	CUA

Rec#	Report	Recipient	Recommendation	Status*
H-90-13	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	DOT	With the assistance of the HHS, the states, the American Academy of Forensic Sciences, the National Safety Council Committee on Alcohol and Other Drugs, and other organizations as appropriate, standardize procedures for postaccident toxicological specimen collection, chain of custody, testing, and reporting among the states for accidents involving medium and heavy trucks.	CAA
H-90-12	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	DOT	Develop a program to merge elements concerning commercial vehicle operations of the separate DOT-operated and -supported highway accident databases. These elements should include, but not be limited to, driver history, carrier, vehicle and roadway characteristics, hazardous materials transportation, and alcohol and other drug involvement.	CAA
H-90-11	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	DOT	Assess and revise, as appropriate, the reporting and accuracy of existing database elements for toxicological tests for DOT-operated and -supported highway accident and trucking operations databases to provide complete and accurate reporting of toxicological tests requested and results obtained.	CUA
H-90-10	NTSB/SS-90/01: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes	DOT	With the assistance of the Department of Labor, the Occupational Safety and Health Administration, and the Interstate Commerce Commission, conduct a detailed review of, and report on, trucking industry structure, operations, and conditions, especially shipping, dispatching, and receiving requirements, shipment broker operations, just-in-time shipments, and truckload/less-than-truckload operations which may create incentives for drivers to violate hours-of-service regulations and to use drugs of abuse.	CAAA
H-89-14	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	Kentucky	Expand efforts to make the public aware of increased emphasis on deterring impaired driving.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-89-13	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	Kentucky	Renew state efforts to publicize and encourage citizens to participate in the “Report a Problem Intoxicated Driver” program.	CAA
H-89-12	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	Kentucky	Expand the use of sobriety checkpoints by the Kentucky state police, and encourage and assist local law enforcement agencies to do the same.	CAA
H-89-11	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	Kentucky	Expand the use by the Kentucky state police of preliminary breath test devices and the three-part field sobriety test recommended by NHTSA, including the horizontal gaze nystagmus test, and urge and assist all other traffic law enforcement agencies in Kentucky to do the same.	CAA
H-89-10	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	Kentucky	Review all aspects of the plea bargaining prohibitions of the 1984 DWI law to determine if persons charged with alcohol-related offenses are being allowed to plea bargain the charge to a non-alcohol-related offense, and if so, take administrative or legislative action to correct the situation.	CAA
H-89-9	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	Kentucky	Amend the current DWI laws to prohibit the reduction or elimination of a licensing penalty if a convicted offender enrolls in an education or treatment program. Participation in these programs should be required in addition to appropriate licensing or other penalties.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-89-8	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	Kentucky	Enact the recommendations made by the DWI committee formed by the governor to assess the current DWI laws. These recommendations cover administrative license revocation, illegal per se, implied consent and testing, chemical analysis, suspended licenses, and alcohol driver education.	CAA
H-89-2	NTSB/HAR-89/01: Pickup Truck/Church Activity Bus Head-on Collision and Fire Near Carrollton, Kentucky, May 14, 1988	49 states and DC	Convene or reconvene a committee or task force to review your state's DWI legislation and its implementation, in light of the problems discussed in the Carrollton, Kentucky, accident report. Particular attention should be paid to implementation of administrative license revocation programs, elimination of plea bargaining to a non-alcohol-related offense, reduction of licensing penalties for enrolling in alcohol education or treatment programs, improved evaluations of convicted DWI offenders, and enhanced public awareness and enforcement programs. Based on this review, take appropriate action to improve your state's DWI prevention program.	CAA
H-85-50	Standalone: Alcohol Testing letter	50 states, DC, and Puerto Rico	Establish formal procedures to ensure that quantitative tests of the BAC of all drivers involved in fatal highway crashes are performed and reported to the state agency responsible for maintaining such records.	CAA
H-85-49	Standalone: Alcohol Testing letter	50 states, DC,and Puerto Rico	Initiate legislation or take the necessary administrative action to require alcohol testing of all drivers involved in fatal highway crashes.	CAA
H-85-48	Standalone: Alcohol Testing letter	NHTSA	Urge states with deficient programs to increase the allocation of highway safety grant program funds and state matching funds to improve the measurement and reporting of alcohol involvement in fatal highway crashes.	CAA
H-85-47	Standalone: Alcohol Testing letter	NHTSA	Undertake a more extensive and aggressive program to provide direct technical support to states to improve alcohol testing and reporting of all drivers involved in fatal highway crashes.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-84-94	NTSB/HAR-84/07: Collision of DeQueen, Arkansas, Police Department Patrol Car and Terrell Trucking, Inc., Tractor-Semitrailer, US Route 7, Ashdown, Arkansas, July 5, 1984	Arkansas State Police and Crime Laboratory	Instruct state police officers to request that two separate vials of blood containing 5 ML each be collected for alcohol and drug analysis in serious and fatal accident investigations and that the samples be refrigerated until they can be transported to a laboratory for analysis and not be held in an officer's possession except for direct transportation to the laboratory.	CAA
H-84-92	NTSB/HAR-84/07: Collision of DeQueen, Arkansas, Police Department Patrol Car and Terrell Trucking, Inc., Tractor-Semitrailer, US Route 7, Ashdown, Arkansas, July 5, 1984	International Association of Chiefs of Police	Develop a recommended policy to the states which will prompt law enforcement personnel to request medical testing for the presence of alcohol in the blood of all truck drivers involved in serious accidents.	CR
H-84-90	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	Jurisprudence associations	Work with state governments, state judicial organizations, and NHTSA to vigorously promote initial and recurrent training for judges in alcohol issues and DWI case adjudication and to develop more sources of funds for this training.	CAA
H-84-89	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	US Department of Veterans Affairs (VA)	Develop and implement a national policy making VA hospital alcohol dependence treatment programs more consistently available to local traffic court rehabilitation programs for convicted DWI defendants who are veterans.	CUA

Rec#	Report	Recipient	Recommendation	Status*
H-84-88	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	NHTSA	Incorporate the salient features of such court records systems as the Court Reporting Network in Pennsylvania and the PROMIS System in Colorado in the model Case Management Information System; ensure that the model system incorporates motor vehicle licensing records and court records of drunk driving-related violations and convictions.	CAAA
H-84-87	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	NHTSA	Evaluate the effectiveness of license actions against juveniles who violate alcohol laws, such as the laws recently enacted in Oregon, Washington, North Carolina, Maryland, and Maine.	CAA
H-84-86	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Take action to increase the availability and quality of alcohol treatment services designed specifically for juvenile alcohol abusers, especially to provide services at low cost to the user.	CAA
H-84-85	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Take steps to ensure that no diversion or supervision program in your state is used in place of license revocation/suspension and that court and department of motor vehicle records reflect participation in diversion/supervision programs.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-84-84	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Require that appropriate alcohol problem evaluations of persons charged with alcohol-related traffic offenses be conducted and made available to judges hearing these cases.	CNLA
H-84-83	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Take steps to require that law enforcement and judicial records systems in your state include complete records of DWI defendants' previous alcohol-related traffic offenses, including those committed as a juvenile, and that they are available to judges prior to sentencing.	CAA
H-84-82	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Take steps to develop a records system that preserves records of alcohol-related traffic offenses committed by a juvenile after the offender reaches adulthood.	CAA
H-84-81	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Encourage and support initial and recurrent training on alcohol, problem drinking, and drunk driving case adjudication for all judges hearing DWI cases.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-84-80	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Take steps to preclude reduction of an alcohol-related charge to a non-alcohol-related charge and to require in all cases that the defendant's driving record reflect the original charge.	CUA
H-84-79	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Encourage detention agencies in your state to adopt DWI holding and release policies that do not permit the release of alcohol offenders until after their BAC has dropped below the lowest level specified in state law as indicating alcohol impairment.	CUA
H-84-78	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Propose legislation, if necessary, and/or take other appropriate action to facilitate the collection of DWI evidence based on the drawing of blood for BAC test purposes.	CAA
H-84-77	NTSB/SS-84/04: Deficiencies in Enforcement, Judicial, and Treatment Programs Related to Repeat Offender Drunk Drivers	50 states and DC	Encourage the use, by all traffic law enforcement agencies in your state, of preliminary breath test devices and the NHTSA-recommended 3-part field sobriety test, including the horizontal gaze nystagmus test.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-84-27	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	Mayor of DC	Evaluate the effectiveness of the sobriety checkpoints and administrative license revocation procedures implemented.	CAAA
H-84-26	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	Mayor of DC	Continue and expand the use of sobriety checkpoints on a periodic and continuing basis by the appropriate enforcement agencies under your jurisdiction as part of a comprehensive DWI enforcement program. Checkpoints should be conducted according to accepted procedures and constitutional safeguards.	CAA
H-84-25	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	NHTSA	Evaluate the effectiveness of sobriety checkpoints and administrative revocation procedures.	CAAA
H-84-24	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	13 states	Evaluate the effectiveness of sobriety checkpoints and administrative license revocation procedures implemented.	CAAA
H-84-23	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	13 states	Encourage local law enforcement agencies within your state to institute sobriety checkpoints on a similar basis.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-84-22	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	13 states	Institute the use of sobriety checkpoints on a periodic and continuing basis by the appropriate enforcement agencies under your jurisdiction as part of a comprehensive DWI enforcement program. These checkpoints should be conducted according to accepted procedures and constitutional safeguards.	CAA
H-84-21	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	7 states	Evaluate the effectiveness of sobriety checkpoints and administrative license revocation procedures implemented.	CAAA
H-84-20	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	7 states	Encourage local law enforcement agencies within your state to institute sobriety checkpoints on a similar basis.	CAA
H-84-19	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	7 states	Continue and expand the use of sobriety checkpoints on a periodic and continuing basis by the appropriate enforcement agencies under your jurisdiction as part of a comprehensive DWI enforcement program. Checkpoints should be conducted according to accepted procedures and constitutional safeguards.	CAA
H-84-18	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	13 states	Evaluate the effectiveness of sobriety checkpoints and administrative license revocation procedures implemented.	CAAA

Rec#	Report	Recipient	Recommendation	Status*
H-84-17	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	13 states	Enact legislation or utilize existing authority to provide for administrative revocation of the licenses of drivers who refuse a chemical test for alcohol or who provide a result at or above the state presumptive limit.	CAA
H-84-16	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	13 states	Encourage local law enforcement agencies within your state to institute sobriety checkpoints on a similar basis.	CAA
H-84-15	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	13 states	Continue and expand the use of sobriety checkpoints on a periodic and continuing basis by the appropriate enforcement agencies under your jurisdiction as part of a comprehensive DWI enforcement program. Checkpoints should be conducted according to accepted procedures and constitutional safeguards.	CAA
H-84-14	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	17 states, Guam, Puerto Rico, and the Virgin Islands	Evaluate the effectiveness of sobriety checkpoints and administrative license revocation procedures implemented.	CAAA
H-84-13	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	17 states, Guam, Puerto Rico, and the Virgin Islands	Enact legislation or utilize existing authority to provide for administrative revocation of the licenses of drivers who refuse a chemical test for alcohol or who provide a result at or above the state presumptive limit.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-84-12	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	17 states, Guam, Puerto Rico, and the Virgin Islands	Encourage local law enforcement agencies to institute sobriety checkpoints on a similar basis.	CAA
H-84-11	NTSB/SS-84/01: Deterrence of Drunk Driving: The Role of Sobriety Checkpoints and Administrative License Revocations	17 states, Guam, Puerto Rico, and the Virgin Islands	Institute the use of sobriety checkpoints on a periodic and continuing basis by the appropriate enforcement agencies under your jurisdiction as part of a comprehensive DWI enforcement program. These checkpoints should be conducted according to accepted procedures and constitutional safeguards.	CAA
H-82-36	Special Study: Reducing Drinking and Driving Through Public Awareness	International Association of Chiefs of Police and the National Safety Council	Collaborate and act as focal points for gathering information on Report Every Drunk Driver Immediately (REDDI)-type programs and provide information and assistance to the interested states and local communities.	CAA
H-82-35	Special Study: Reducing Drinking and Driving Through Public Awareness	45 states and DC	Implement a citizen awareness and citizen drunk driver reporting program such as the REDDI-type programs now used by Colorado, Maryland, Nebraska, Utah, and Washington.	CAA
H-82-18	Mineola, Nassau County, New York	35 states and DC	Raise the minimum legal age for drinking or purchasing all alcoholic beverages to 21 years of age.	CAA
H-80-49	NTSB/HAR-80/4: Head-on Collision of Automobile and Pickup Truck US Route 64, Near Perry, Oklahoma, February 23, 1980	Oklahoma DOT	Seek the funds necessary to enable a renewed emphasis on alcohol safety, especially in the rural areas and the less populated communities of the state.	CAAA

Rec#	Report	Recipient	Recommendation	Status*
H-80-47	NTSB/HAR-80/4: Head-on Collision of Automobile and Pickup Truck, US Route 64, Near Perry, Oklahoma, February 23, 1980	NHTSA	Evaluate the effectiveness of current dram-shop-type laws in reducing the number of highway accidents involving drivers under the influence of alcohol in states having such laws. If the evaluations prove positive, then incorporate the concepts of these laws into the existing *Highway Safety Program Standard No. 8, Alcohol in Relation to Highway Safety*.	CAA
H-80-27	NTSB/HAR-80/3: Two-Vehicle Collision and Fire, US Route 422, Indiana, Pennsylvania, September 22, 1979	Pennsylvania	Provide increased emphasis on your statewide enforcement program directed toward reducing the number of persons driving on public roads while under the influence of alcohol.	CAAA
H-80-1	NTSB/HAR-79/6: Ford Courier Pickup Truck Fixed-Object Collision, Patuxent Road Near Crofton, Maryland, April 23, 1979	Governor of Maryland	Refer the following recommendation to the appropriate legislative committees: Enact legislation that will redefine the terms “intoxicated” and “impaired by alcohol” to fit current nationally accepted standard definitions.	CUA
H-78-76	NTSB/RHR-78/2: Seaboard Coast Line/Amtrak Passenger Train/Pickup Truck Collision, Plant City, Florida, October 2, 1977	NHTSA	Evaluate and report to the NTSB those alcohol countermeasures found to be practical and effective for the reduction in the number of alcohol-involved drivers.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-78-75	NTSB/RHR-78/2: Seaboard Coast Line/Amtrak Passenger Train/Pickup Truck Collision, Plant City, Florida, October 2, 1977	Plant City, Florida	As part of its Operation Lifesaver Program, emphasize in its selective traffic law enforcement program grade crossing warning signal violators and those who drive while under the influence of alcohol or drugs.	CAAA
H-76-3	NTSB/RHR-76/01: Southern Pacific Transportation Co. Freight Train/Automobile Grade Crossing Collision, Tracy, Califoria, March 9, 1975	NHTSA	Develop and report more effective systems and standards for conveying traffic information to impaired drivers at temporary traffic control sites (e.g., railroad crossings, construction sites) and protecting those persons controlling traffic.	CAA
H-76-2	NTSB/RHR-76/01: Southern Pacific Transportation Co. Freight Train/Automobile Grade Crossing Collision, Tracy, Califoria, March 9, 1975	NHTSA	Determine and report the effectiveness of traffic information and control systems currently in use at railroad crossings, considering in particular their ability to warn and achieve an appropriate reaction from impaired drivers.	CAA
H-71-58	NTSB/STS-71/03: Youth and Traffic Safety Education Special Study	NHTSA	Develop new and/or supplemental efforts in alcohol safety action programs specifically designed for the young drinking driver, beyond those now contemplated or in use.	CAA

Rec#	Report	Recipient	Recommendation	Status*
H-71-57	NTSB/STS-71/03: Youth and Traffic Safety Education Special Study	NHTSA	Reexamine its highway safety program efforts with a view to focusing certain programs more sharply on the 15- to 24-year-old group of drivers as a means of reducing excess losses in this group. This would pertain especially to driver licensing, driver education, driver improvement, alcohol safety action programs, and vehicle inspection. A much more thorough set of examinations for initial licensing of young drivers appears highly desirable. A diagnostic approach to driver preparation, licensing, and improvement programs designed primarily for the new young driver appears highly justified by the disproportionate involvement and rate of this age group.	CAA
H-69-5	Special Study: Alcohol Use in Transportation	DOT	Alcohol problems in the different modes of transportation should be coordinated by the DOT. Such coordination would (a) give increased emphasis to study and program action with respect to the role of alcohol, extending coverage of the problem to all transportation modes, (b) coordinate the DOT efforts with those of the health-oriented agencies and organizations, the various state and local transportation authorities, and the other federal efforts at public education and program action regarding alcohol problems, and (c) provide a national focal point for information on alcohol in transportation safety. Coordination should be especially responsive to the large number of alcohol fatalities in highway transportation, the research capability in the FHWA, and the need for transfer of techniques between the highway field, general aviation, and other modes. The vigorous educational effort with general aviation is worthy of careful study.	CAA
H-68-27	NTSB/SS-H/3: Interstate Bus-Automobile Collision, Interstate Route 15, Baker, California, March 7, 1968	FHWA	Develop a program designed to produce a sense of individual responsibility in the general public to protect the nation's highways from drinking drivers, enlisting in such a program the aid of the news media, the producers of alcoholic beverages, private and public agencies concerned with highway safety, as well as religious, educational, and civic groups to (a) support law enforcement officers against and the prosecution of drinking drivers; (b) impress upon the public individually, each person's serious social duty not to drive while under the influence of alcohol; and (c) individually to accept the responsibility of preventing other persons from driving while under the influence of alcohol.	CAA

Rec#	Report	Recipient	Recommendation	Status*

***The status codes for NTSB recommendations are as follows:**

CEX: Closed—Exceeds Recommended Action: Response by recipient indicates action on the safety recommendation has been completed. The action taken surpasses what the NTSB envisioned.

CAA: Closed—Acceptable Action: Response by recipient indicates action on the safety recommendation has been completed. The action complies with the safety recommendation.

CAAA: Closed—Acceptable Alternate Action: Response by recipient indicates an alternate course of action has been completed that meets the objective of the safety recommendation.

CUA: Closed—Unacceptable Action: Response by recipient expresses disagreement with the need outlined in the recommendation. There is no further evidence to offer, and the NTSB concludes that further correspondence on, or discussion of, the matter would not change the recipient's position. This status can also be used when the timeframe goals outlined have not been met.

CUAN: Closed—Unacceptable Action/No Response Received: No response to the recommendation was ever received.

CR: Closed—Reconsidered: Recipient rejects the safety recommendation and supports this rejection with a rationale with which the Board concurs. Reasons for the "Reconsidered" status would include situations where the recipient is able to convince the Board that the proposed action would not be effective or that it might create other problems. This status is also assigned when the recipient of a recommendation was in compliance before the recommendation was issued or when the recipient was incorrectly chosen and cannot perform the recommended action.

CNLA: Closed—No Longer Applicable: The recommended action has been overtaken by events. For example, if technology and/or regulatory action has eliminated the reason for the recommendation or if a company has gone out of business.

CS: Closed—Superseded: Applied to recommendations held in an open status when a new, more appropriate safety recommendation is issued that includes the necessary elements of the recommendation to be closed.

CAAS, CAAAS, CUAS:Closed—Acceptable/Acceptable Alternate/Unacceptable Action Superseded: Applied to recommendations held in an open status when a new, more appropriate safety recommendation is issued that includes the necessary elements of the recommendation to be closed. The Board determines the Acceptable/Acceptable Alternate/Unacceptable status based on the criteria defined above prior to superseding the recommendation.

OAA: Open—Acceptable Response: Response by recipient indicates a planned action that would comply with the safety recommendation when completed.

OAAR: Open—Acceptable Alternate Response: Response by recipient indicates an alternate plan or implementation program that would satisfy the objective of the safety recommendation when implemented.

OUA: Open—Unacceptable Response: Response by recipient expresses disagreement with the need outlined in the recommendation or attempts to convince the Board (unsuccessfully) that an alternative course of action is acceptable. The Board believes, however, that there is enough supporting evidence to ask the recipient to reconsider its position. This status can also be used when the Board believes that action is not being taken in a timely manner.

ORR: Open—Response Received: Response has been received from recipient, but staff evaluation of the response has not been approved by the Board Members.

OAR: Open—Await Response: When a safety recommendation is issued, the status "Open—Await Response" is automatically assigned.

Appendix B. NHTSA 2011 Data on Alcohol-Impaired Driving

DOT HS 811 700 December 2012

Alcohol-Impaired Driving

Drivers are considered to be alcohol-impaired when their blood alcohol concentration (BAC) is .08 grams per deciliter (g/dL) or higher. Thus, any fatal crash involving a driver with a BAC of .08 or higher is considered to be an alcohol- impaired-driving crash, and fatalities occurring in those crashes are considered to be alcohol-impaired-driving fatalities. The term "driver" refers to the operator of any motor vehicle, including a motorcycle.

In 2011, there were 9,878 fatalities in crashes involving a driver with a BAC of .08 or higher – 31 percent of total traffic fatalities for the year.

Estimates of alcohol-impaired driving are generated using BAC values reported to the Fatality Analysis Reporting System (FARS) and imputed BAC values when they are not reported. The term "alcohol-impaired" does not indicate that a crash or a fatality was caused by alcohol impairment.

In 2011, 9,878 people were killed in alcohol-impaired-driving crashes. These alcohol-impaired-driving fatalities accounted for 31 percent of the total motor vehicle traffic fatalities in the United States.

Traffic fatalities in alcohol-impaired-driving crashes decreased by 2.5 percent from 10,136 in 2010 to 9,878 in 2011. The alcohol-impaired-driving fatality rate per 100 million vehicle miles traveled (VMT) remained at 0.34 in 2011 (same as in 2010) (see Figure 1).

An average of one alcohol-impaired-driving fatality occurred every 53 minutes in 2011.

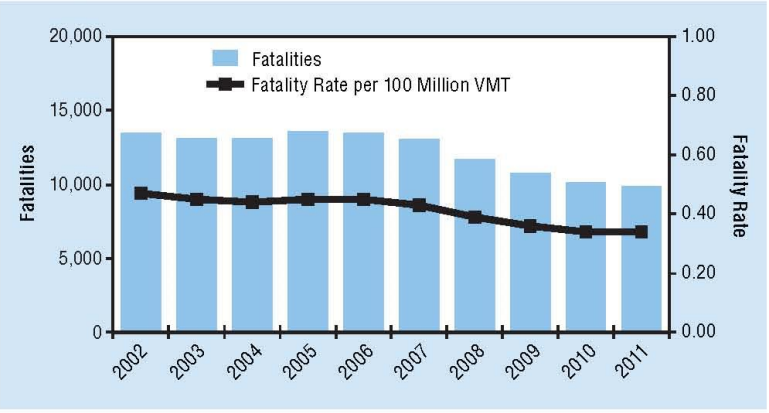
In 2011, all 50 States, the District of Columbia, and Puerto Rico had by law created a threshold making it illegal per se to drive with a BAC of .08 or higher. Of the 9,878 people who died in alcohol-impaired-driving crashes in 2011, 6,507 (66%) were drivers with a BAC of .08 or higher. The remaining fatalities consisted of 2,661 (27%) motor vehicle occupants and 710 (7%) nonoccupants.

Table 1
Fatalities, by Role, in Crashes Involving at Least One Driver With a BAC of .08 Or Higher, 2011

Role	Number	Percent of Total
Driver With BAC=.08+	6,507	66%
Passenger Riding w/Driver With BAC=.08+	1,612	16%
Subtotal	*8,119*	*82%*
Occupants of Other Vehicles	1,049	11%
Nonoccupants	710	7%
Total Fatalities	**9,878**	**100%**

NHTSA's National Center for Statistics and Analysis 1200 New Jersey Avenue SE., Washington, DC 20590

Figure 1
Fatalities and Fatality Rate per 100 Million VMT in Alcohol-Impaired-Driving Crashes, 2002–2011



In 2011, of the fatalities among children ages 14 and younger, 16 percent occurred in alcohol-impaired-driving crashes.

Alcohol-impaired-driving fatalities in the past 10 years have declined by 27 percent from 13,472 in 2002 to 9,878 in 2011. The national rate of alcohol-impaired-driving fatalities in motor vehicle crashes in 2011 was 0.34 per 100 million VMT. The alcohol-impaired-driving fatality rate in the past 10 years has declined by 28 percent from 0.47 in 2002 to 0.34 in 2011.

Children

In 2011, a total of 1,140 children age 14 and younger were killed in motor vehicle traffic crashes. Of those 1,140 fatalities, 181 (16%) occurred in alcohol-impaired- driving crashes. Out of those 181 deaths, 91 (50%) were occupants of a vehicle with a driver who had a BAC level of .08 or higher, and another 25 children (14%) were pedestrians or pedalcyclists struck by drivers with a BAC of .08 or higher.

For more information:

Information on traffic fatalities is available from the National Center for Statistics and Analysis (NCSA), NVS-424, 1200 New Jersey Avenue SE., Washington, DC 20590. NCSA can be contacted at 800-934-8517 or via the following e-mail address: ncsaweb@dot.gov. General information on highway traffic safety can be accessed by Internet users at www.nhtsa.gov/NCSA. To report a safety-related problem or to inquire about motor vehicle safety information, contact the Vehicle Safety Hotline at 888-327-4236.

Other fact sheets available from the National Center for Statistics and Analysis are *Bicyclists and Other Cyclists, Children, Large Trucks, Motorcycles, Occupant Protection, Older Population, Overview, Passenger Vehicles, Pedestrians, Race and Ethnicity, Rural/Urban Comparisons, School Transportation-Related Crashes, Speeding, State Alcohol Estimates, State Traffic Data,* and *Young Drivers.* Detailed data on motor vehicle traffic crashes are published annually in *Traffic Safety Facts: A Compilation of Motor Vehicle Crash Data from the Fatality Analysis Reporting System and the General Estimates System.* The fact sheets and annual Traffic Safety Facts report can be accessed online at www-nrd.nhtsa.dot.gov/CATS/index.aspx.

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

Time of Day and Day of Week

The rate of alcohol impairment among drivers involved in fatal crashes in 2011 was 4.5 times higher at night than during the day (36% versus 8%).

In 2011, 15 percent of all drivers involved in fatal crashes during the week were alcohol-impaired, compared to 31 percent on weekends.

Table 2

Drivers Involved in Fatal Crashes With a BAC of .08 or Higher, by Crash Type, Time of Day and Day of Week, 2002 and 2011

Total Drivers							
	2002			2011			Change in Percentage With BAC=.08+ 2002–2011
Drivers Involved In Fatal Crashes	Total Number of Drivers	BAC=.08+ Number	BAC=.08+ Percent of Total	Total Number of Drivers	BAC=.08+ Number	BAC=.08+ Percent of Total	
Total	58,113	12,405	21%	43,668	9,296	21%	0
Drivers by Crash Type and Time of Day							
Single-Vehicle Crash							
Total*	22,057	8,058	37%	17,901	6,316	35%	-2
Daytime	8,447	1,391	16%	7,179	1,198	17%	+1
Nighttime	13,301	6,487	49%	10,537	5,030	48%	-1
Multiple-Vehicle Crash							
Total*	36,056	4,347	12%	25,767	2,980	12%	0
Daytime	22,688	1,189	5%	16,198	782	5%	0
Nighttime	13,352	3,153	24%	9,546	2,193	23%	-1
Drivers by Time of Day							
Daytime	31,135	2,580	8%	23,377	1,979	8%	0
Nighttime	26,653	9,640	36%	20,083	7,224	36%	0
Drivers by Day of Week and Time of Day							
Weekday*	35,101	5,286	15%	26,478	3,962	15%	0
Daytime	22,758	1,471	6%	17,106	1,148	7%	+1
Nighttime	12,250	3,770	31%	9,308	2,793	30%	-1
Weekend*	22,939	7,081	31%	17,132	5,307	31%	0
Daytime	8,377	1,110	13%	6,271	831	13%	0
Nighttime	14,403	5,870	41%	10,775	4,431	41%	0

Daytime – 6 a.m. to 5:59 p.m. Weekday – Monday 6 a.m. to Friday 5:59 p.m.
Nighttime – 6 p.m. to 5:59 a.m. Weekend – Friday 6 p.m. to Monday 5:59 a.m.
*Includes drivers involved in fatal crashes when time of day was unknown.

"The rate of alcohol impairment among drivers involved in fatal crashes in 2011 was 4.5 times higher at night than during the day."

Drivers

In fatal crashes in 2011 the highest percentage of drivers with a BAC level of .08 or higher was for drivers ages 21 to 24 (32%), followed by ages 25 to 34 (30%) and 35 to 44 (24%).

In 2011, the 21- to 24-year-old age group had the highest percentage of drivers in fatal crashes with BAC levels of .08 or higher – 32 percent.

The proportion of drivers involved in fatal crashes with BAC levels of .08 or higher was 24 percent among males and 14 percent among females.

The percentages of drivers involved in fatal crashes with a BAC level of .08 or higher in 2011 were 29 percent for motorcycles, 24 percent for passenger cars, and 21 percent for light trucks. The percentage of drivers with BAC levels of .08 or higher in fatal crashes was the lowest for large trucks (1%).

In 2011, the percentage of drivers with BAC of .08 or above in fatal crashes was highest for motorcycles (29%).

Table 3

Drivers With a BAC of .08 or Higher Involved in Fatal Crashes, by Age, Gender, And Vehicle Type, 2002 and 2011

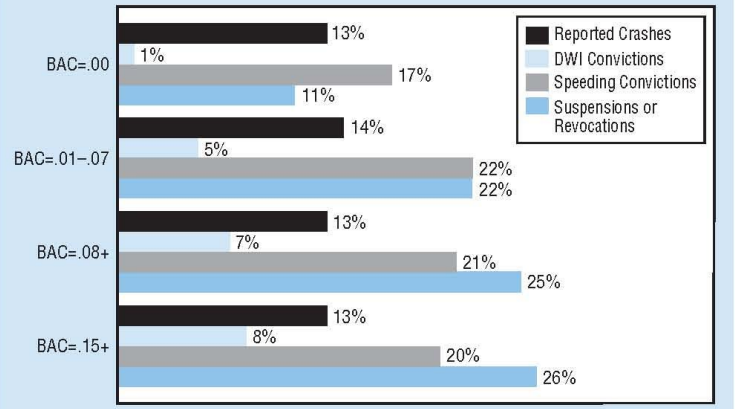
Total Drivers							
	2002			2011			Change in Percentage With BAC=.08+ 2002–2011
Drivers Involved In Fatal Crashes	Total Number of Drivers	BAC=.08+ Number	BAC=.08+ Percent of Total	Total Number of Drivers	BAC=.08+ Number	BAC=.08+ Percent of Total	
Total	58,113	12,405	21%	43,668	9,296	21%	0
Drivers by Age Group (Years)							
16–20	8,128	1,442	18%	4,292	846	20%	+2
21–24	6,316	2,080	33%	4,465	1,450	32%	-1
25–34	11,483	3,274	29%	8,517	2,549	30%	+1
35–44	10,973	2,808	26%	7,058	1,694	24%	-2
45–54	8,558	1,639	19%	7,493	1,568	21%	+2
55–64	5,093	614	12%	5,542	767	14%	+2
65–74	3,100	207	7%	2,947	228	8%	+1
75+	3,223	133	4%	2,522	120	5%	+1
Drivers by Gender							
Male	42,377	10,455	25%	31,809	7,678	24%	-1
Female	14,999	1,817	12%	11,209	1,567	14%	+2
Drivers by Vehicle Type							
Passenger Cars	27,236	6,097	22%	17,335	4,114	24%	+2
Light Trucks	21,562	4,973	23%	16,643	3,551	21%	-2
Large Trucks	4,550	78	2%	3,568	43	1%	-1
Motorcycles	3,363	1,038	31%	4,741	1,390	29%	-2

Numbers shown for groups of drivers do not add to the total number of drivers due to unknown/not reported or other data not included.

In 2011, 5,034 passenger vehicle (includes passenger cars and light trucks [vans, SUVs, pickups, and other light trucks]) drivers killed had a BAC of .08 or higher. Out of those driver fatalities for which restraint use was known, 70 percent were unrestrained. Among passenger vehicle drivers killed who had a BAC of .01 to .07 g/dL the percent of unrestrained was 58 percent and for passenger vehicle drivers killed who had no alcohol (BAC=.00) the percent of unrestrained was 41 percent.

Drivers with a BAC of .08 or higher involved in fatal crashes were seven times more likely to have a prior conviction for driving while impaired (DWI) than were drivers with no alcohol (7% and 1%, respectively) (see Figure 2). Note: FARS records previous DWI convictions of drivers, which occurred up to three years prior to the date of the crash.

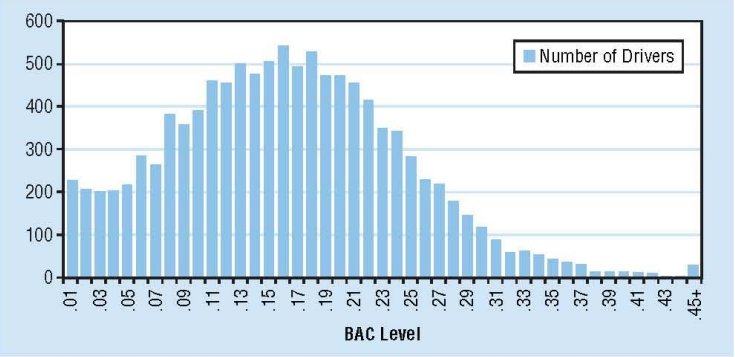
Figure 2
Previous Driving Records of Drivers Involved in Fatal Crashes, by BAC, 2011



Drivers with a BAC level of .08 or higher in fatal crashes in 2011 were seven times more likely to have a prior conviction for driving while impaired than were drivers with no alcohol.

In 2011, 85 percent (9,296) of the 10,910 drivers with a BAC of .01 or higher who were involved in fatal crashes had BAC levels at or above .08, and 57 percent (6,266) had BAC levels at or above .15. The most frequently recorded BAC level among drinking drivers in fatal crashes was .16.

Figure 3
Distribution of BAC Levels for Drivers With a BAC of .01 or Higher Involved in Fatal Crashes, 2011



In 2011, 6,266 (57%) of the drivers involved in fatal crashes who had been drinking had a BAC of .15 or greater.

Table 4 shows traffic fatalities by State and the highest driver BAC in the crash in 2011. Among all alcohol-impaired-driving fatalities (9,878) in 2011, 68 percent (6,753) were in crashes in which at least one driver in the crash had a BAC of .15 g/dL or higher. Among all States, fatalities in motor vehicle traffic crashes in 2011 ranged from 3,016 (highest) to 27 (lowest) depending on the size and population of the State. Alcohol-impaired-driving fatalities were highest in Texas (1,213), followed by California (774), and Florida (716), and lowest in the District of Columbia (8). The proportion of alcohol-impaired-driving fatalities among total fatalities in States ranged from a high of 44 percent (Hawaii) to a low of 17 percent (Maine). The proportion of fatalities in crashes involving a driver with a BAC of .15 g/dL or higher, ranged from a high of 36 percent (North Dakota) to a low of 12 percent (Maine).

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Table 4
Traffic Fatalities by State and Highest Driver BAC in the Crash, 2011

State	Total Fatalities*	BAC=.00		BAC=.01–.07		BAC=.08+		BAC=.15+		BAC=.01+	
	Number	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Alabama	894	586	65%	50	6%	259	29%	173	19%	309	35%
Alaska	72	47	66%	3	5%	21	28%	12	17%	24	33%
Arizona	825	536	65%	48	6%	215	26%	146	18%	263	32%
Arkansas	549	350	64%	39	7%	156	28%	113	21%	194	35%
California	2,791	1,896	68%	112	4%	774	28%	528	19%	886	32%
Colorado	447	274	61%	13	3%	161	36%	110	25%	173	39%
Connecticut	220	121	55%	7	3%	92	42%	63	29%	99	45%
Delaware	99	56	56%	3	3%	41	41%	31	31%	43	44%
Dist of Columbia	27	14	50%	5	20%	8	30%	4	15%	13	50%
Florida	2,398	1,532	64%	137	6%	716	30%	503	21%	854	36%
Georgia	1,223	900	74%	46	4%	277	23%	189	15%	323	26%
Hawaii	100	50	50%	6	6%	44	44%	24	24%	50	50%
Idaho	167	112	67%	5	3%	50	30%	30	18%	55	33%
Illinois	918	593	65%	44	5%	278	30%	175	19%	323	35%
Indiana	750	506	67%	36	5%	207	28%	141	19%	243	32%
Iowa	360	264	73%	14	4%	83	23%	56	16%	96	27%
Kansas	386	253	66%	23	6%	108	28%	69	18%	131	34%
Kentucky	721	517	72%	30	4%	171	24%	110	15%	201	28%
Louisiana	675	420	62%	30	4%	226	33%	146	22%	255	38%
Maine	136	97	71%	16	12%	23	17%	16	12%	39	29%
Maryland	485	293	60%	30	6%	162	33%	98	20%	192	40%
Massachusetts	337	204	61%	15	5%	114	34%	76	23%	130	39%
Michigan	889	593	67%	39	4%	255	29%	170	19%	294	33%
Minnesota	368	233	63%	22	6%	109	30%	77	21%	131	36%
Mississippi	630	467	74%	14	2%	149	24%	105	17%	163	26%
Missouri	784	479	61%	40	5%	258	33%	174	22%	299	38%
Montana	209	119	57%	8	4%	81	39%	59	28%	88	42%
Nebraska	181	127	70%	8	5%	45	25%	36	20%	54	30%
Nevada	246	155	63%	21	9%	70	28%	41	17%	91	37%
New Hampshire	90	61	68%	2	2%	27	30%	23	26%	29	32%
New Jersey	627	398	63%	34	5%	193	31%	121	19%	227	36%
New Mexico	353	233	66%	14	4%	105	30%	72	20%	119	34%
New York	1,169	781	67%	72	6%	315	27%	209	18%	387	33%
North Carolina	1,227	807	66%	52	4%	365	30%	252	21%	417	34%
North Dakota	148	81	55%	3	2%	64	43%	53	36%	67	45%
Ohio	1,016	654	64%	42	4%	316	31%	228	22%	358	35%
Oklahoma	696	448	64%	29	4%	220	32%	155	22%	249	36%
Oregon	331	215	65%	18	5%	97	29%	75	23%	116	35%
Pennsylvania	1,286	819	64%	58	4%	407	32%	301	23%	464	36%
Rhode Island	66	39	59%	3	4%	24	37%	16	24%	27	41%
South Carolina	828	448	54%	65	8%	315	38%	210	25%	379	46%
South Dakota	111	74	66%	5	4%	33	29%	26	24%	37	34%
Tennessee	946	639	68%	50	5%	257	27%	165	17%	307	32%
Texas	3,016	1,614	54%	184	6%	1,213	40%	831	28%	1,397	46%
Utah	240	177	74%	10	4%	53	22%	32	13%	63	26%
Vermont	55	31	56%	5	9%	18	33%	12	22%	23	42%
Virginia	764	488	64%	50	7%	224	29%	151	20%	274	36%
Washington	457	275	60%	26	6%	156	34%	114	25%	182	40%
West Virginia	337	229	68%	16	5%	90	27%	64	19%	106	32%
Wisconsin	582	354	61%	31	5%	196	34%	144	25%	227	39%
Wyoming	135	94	69%	3	2%	38	28%	25	18%	41	31%
National	**32,367**	**20,752**	**64%**	**1,633**	**5%**	**9,878**	**31%**	**6,753**	**21%**	**11,510**	**36%**
Puerto Rico	359	231	64%	27	8%	101	28%	62	17%	128	36%

*Total includes fatalities in crashes in which there was no driver present.

Appendix C. Elements of the 2000 NTSB Model Program

[Note: The NTSB Model Program was referred to in NTSB Safety Recommendation H-00-26 (NTSB 2000).]

- Frequent and well-publicized statewide sobriety checkpoints that include checking for valid driver's licenses. Checkpoints should not be limited to holiday periods.

- Vehicle sanctions to restrict or separate hard core drinking drivers from their vehicles, including license plate actions (impoundment, confiscation, or other actions); vehicle immobilization, impoundment, and forfeiture; and interlocks for high-BAC first offenders and repeat offenders.

- State and community cooperative programs involving driver licensing agencies, law enforcement officers, judges, and probation officers to enforce DWI suspension and revocation.

- Legislation to require that DWI offenders who have been convicted or administratively adjudicated maintain a zero BAC while operating a motor vehicle.

- Legislation that defines a high BAC (0.15 percent or greater) as an "aggravated" DWI offense that requires strong intervention similar to that ordinarily prescribed for repeat DWI offenders.

- As alternatives to confinement, programs to reduce hard core drinking driver recidivism that include home detention with electronic monitoring and/or intensive supervision probation programs.

- Legislation that restricts the plea bargaining of a DWI offense to a lesser, non-alcohol-related offense, and that requires the reasons for DWI charge reductions be entered into the public record.

- Elimination of diversion programs that permit erasing, deferring, or otherwise purging the DWI offense record or that allow the offender to avoid license suspension.

- Administrative license revocation for BAC test failure and refusal.

- A DWI record retention and DWI offense enhancement look-back period of at least 10 years.

- Individualized sanction programs for hard core DWI offenders that rely on effective countermeasures for use by courts that hear DWI cases.