Drug-Impaired Driving: Understanding the Problem & Ways to Reduce It

A Report to Congress

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16. Abstract

This report was prepared in accordance with Section 2013 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The report summarizes a series of studies undertaken by the National Highway Traffic Safety Administration to acquire the information needed to address the general problem of drug-impaired driving.

The report describes the research conducted on prevention, detection, and prosecution of driving under the influence of drugs; issues associated with determining what drugs impair driving; difficulties in relating blood levels of drugs and impairment; lack of information about what drugs are frequently used by drivers and what drugs elevate crash risk; problems in obtaining representative data about current enforcement, prosecution, and adjudication of drug-impaired driving; training for law enforcement officers in recognizing drug-impaired drivers; review of drug-impaired driving laws; and what is known about the role of drugs as causal factors in traffic crashes. It highlights the need for further research and concludes with recommendations to better address the problem of drug-impaired driving.

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INTRODUCTION

Section 2013 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), enacted on August 10, 2005, directs the Secretary of Transportation to advise and coordinate with other Federal agencies on how to address the problem of driving under the influence of an illegal drug; to conduct research on the prevention, detection, and prosecution of driving under the influence of an illegal drug; and to submit to Congress a report on the problem of drug-impaired driving.

SEC. 2013. DRUG-IMPAIRED DRIVING ENFORCEMENT.

(a) ILLICIT DRUG.—In this section, the term ''illicit drug'' includes substances listed in schedules I through V of section 112(e) of the Controlled Substances Act (21 U.S.C. 812) not obtained by a legal and valid prescription.

(b) DUTIES. — The Secretary shall—
(1) advise and coordinate with other Federal agencies on how to address the problem of driving under the influence of an illegal drug; and
(2) conduct research on the prevention, detection, and prosecution of driving under the influence of an illegal drug.

(c) REPORT.—
(1) IN GENERAL. — Not later than 18 months after the date of enactment of this Act, the Secretary, in cooperation with the National Institutes of Health, shall submit to Congress a report on the problem of drug-impaired driving.
(2) CONTENTS. — The report shall include, at a minimum, the following:
(A) An assessment of methodologies and technologies for measuring driver impairment resulting from use of the most common illicit drugs (including the use of such drugs in combination with alcohol).
(B) Effective and efficient methods for training law enforcement personnel, including drug recognition experts, to detect or measure the level of impairment of a driver who is under the influence of an illicit drug by the use of technology or otherwise.
(C) A description of the role of drugs as causal factor in traffic crashes and the extent of the problem of drug impaired driving.
(D) A description and assessment of current State and Federal laws relating to drug-impaired driving.
(E) Recommendations for addressing the problem of drug-impaired driving, including recommendations on levels of impairment.
(F) Recommendations for developing a model statute relating to drug-impaired driving.

(d) MODEL STATUTE.—
(1) IN GENERAL.—The Secretary shall develop a model statute for States relating to drug-impaired driving.
(2) CONTENTS. — Based on recommendations and findings contained in the report submitted under subsection (c), the model statute may include—
(A) threshold levels of impairment for illicit drugs;
(B) practicable methods for detecting the presence of illicit drugs; and
(C) penalties for drug impaired driving.
(3) DATE. — The model statute shall be provided to States not later than 1 year after date of submission of the report under subsection (c).

(e) RESEARCH AND DEVELOPMENT. — Section 403(b) of title 23, United States Code, is amended by adding at the end the following:

"(5) Technology to detect drug use and enable States to efficiently process toxicology evidence.

"(6) Research on the effects of illicit drugs and the compound effects of alcohol and illicit drugs on impairment.".

(f) FUNDING. — Out of amounts made available to carry out section 403 of title 23, United States Code, for each of fiscal years 2006 through 2009, the Secretary shall make available $1,200,000 for such fiscal year to carry out this section.

This report documents the progress and the available results of the research conducted on the problem of drug-impaired driving, and recommends further steps for addressing the problem.

BACKGROUND

Drug-impaired driving is a complex problem due to the large number of substances with the potential to impair driving and increase crash risk, the variations in the ways different drugs can impair driving, the lack of basic information about many potentially impairing drugs, and the differences in the ways that drugs can affect the body and behavior. Other critical factors include the poorly understood pharmacokinetics and pharmacodynamics of many psychoactive drugs, in addition to the problems presented by individual differences, sensitivity, and tolerance, and the myriad of ways that various substances interact. A discussion of some of these issues is useful to appreciate the difficulties that must be overcome in addressing the drug-impaired driving problem.

Since the effects of alcohol on driving performance are relatively well understood, it is useful to review and contrast what is known about alcohol with what is known and not known about other drugs. Ethyl alcohol is a simple molecule that is readily and fairly rapidly absorbed into the body, typically through the stomach and large intestine. Alcohol passes easily through the blood-brain barrier. It is distributed by the circulatory system throughout the body and is metabolized primarily in the liver.

The processes of absorption, distribution, and metabolism of alcohol occur at the same time. The concentration of alcohol in the body can be measured in the blood (also in the breath and in other bodily substances) and a single dose will result in a rapid increase in blood concentration, reaching a peak, and then diminishing over a period of hours. Repeated dosing will raise the peak blood alcohol concentration (BAC) and prolong the time elevated levels are present in the body. The time course during which the effects of alcohol on the body and behavior can be measured parallels the time course during which BAC is elevated in the body. There is a close relationship between BAC level and impairment. Some effects are detectable at very low BACs (e.g., .02 grams per deciliter, or g/dL) and as BAC rises, the types and severity of impairment increase.

Unfortunately, the behavioral effects of other drugs are not as well understood as the behavioral effects of alcohol. Certain generalizations can be made: high doses generally have a larger effect than small doses; well-learned tasks are less affected than novel tasks; and certain variables, such as prior exposure to a drug, can either reduce or accentuate expected effects, depending on circumstances. The ability to predict an individual's performance at a specific dosage of drugs other than alcohol is limited.

Most psychoactive drugs are chemically complex molecules whose absorption, action, and elimination from the body are difficult to predict. Further, there are considerable differences between individuals with regard to the rates with which these processes occur. Alcohol, in comparison, is more predictable. A strong relationship between BAC level and impairment has been established, as has the correlation between BAC level and crash risk.

Factors that make similar prediction difficult for most other psychoactive drugs include:

- The large number of different drugs that would need to be tested (extensive testing of alcohol has been undertaken over many decades; whereas relatively little similar testing has occurred for most other drugs);

- Poor correlation between the effects on psychomotor, behavioral, and/or executive functions, and blood or plasma levels (peak psychomotor, behavioral, and executive function effects do not necessarily correspond to peak blood levels; detectable blood levels may persist beyond the impairing effects or the impairing effects may be measurable when the drug cannot be detected in the blood);

- Sensitivity and tolerance (accentuation and diminution of the impairing effects with repeated exposure);

- Individual differences in absorption, distribution, action, and metabolism (some individuals will show evidence of impairment at drug concentrations that are not associated with impairment in others; wide ranges of drug concentrations in different individuals have been associated with equivalent levels of impairment);

- Accumulation (blood levels of some drugs or their metabolites may accumulate with repeated administrations if the time-course of elimination is insufficient); and

- Acute versus chronic administration (it is not unusual to observe much larger impairment during initial administrations of drugs than is observed when the drug is administered over a long period of time).

The result of these factors is that, at the current time, specific drug concentration levels cannot be reliably equated with effects on driver performance.

REPORT OVERVIEW

In response to the direction provided by the Congress to the Secretary of Transportation, the National Highway Traffic Safety Administration undertook a series of studies to address issues raised in Section 2013 of SAFETEA-LU. These studies were designed to acquire information necessary to address the general problem of drug-impaired driving and the specific issues requested.

This report follows the order of the issues raised in Section 2013. While that section specifically mentions illegal drugs, many prescription drugs and some over-the-counter medications have similar potential to impair driving. Consequently, some of the research covers these drug types as well.

ADVISE AND COORDINATE WITH OTHER FEDERAL AGENCIES

The NHTSA has established a working group on driving under the influence of drugs with representatives from the National Institute on Drug Abuse, the National Institute on Alcoholism and Alcohol Abuse, the Substance Abuse and Mental Health Services Administration, the National Transportation Safety Board, and the National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. This working group meets on an ad hoc basis and has discussed the problem of drug-impaired driving and ways to address the problem.

The working group assisted in the planning and conducting of two expert panel meetings to discuss the feasibility of establishing a methodology for identifying drugs that impair driving. The working group helped ensure that relevant disciplines and expertise were represented on the expert panel and suggested leading experts in these fields. Members of the working group were also invited to participate in a discussion on the methodology for conducting a case-control study on drug-impaired driving.

RESEARCH ON THE PREVENTION, DETECTION, AND PROSECUTION OF DRIVING UNDER THE INFLUENCE OF DRUGS (DUID)

The NHTSA has conducted research on drug-impaired driving for several decades. The agency periodically updates the literature on this topic through publication of state-of-the-knowledge reports on driving under the influence of drugs (DUID), the latest being issued in 2003 (Jones, Shinar, & Walsh, 2003). This research has taken the form of laboratory studies (Bigelow, Bickel, Liebson, & Nowowieski, 1985), driving simulator studies (Friedel et al., 1990, 1991; Moskowitz, & Wilkinson, 2004; Moskowitz, Ziedman, & Sharma, 1976), on-the-road studies of the effects of selected drugs on driving-related skills (Riedel, Quasten, Hausen, & O'Hanlon, 1988; Robbe & O'Hanlon, 1993, 1999), and literature reviews of selected research on drugs and driving (Dobbs, 2005; Moskowitz & Wilkinson, 2004; Robbe & O'Hanlon, 1993). Research has also been conducted into methods to aid law enforcement to recognize drug-impaired drivers (Bigelow et al., 1985; Compton, 1986, 1988; Compton, Preusser, Ulmer, & Preusser, 1997; Preusser, Ulmer, & Preusser, 1992; Shinar & Compton, 2002); the development of training

courses for judges and prosecutors (National Highway Traffic Safety Administration [NHTSA], 2007b), and research into the accuracy of drug testing technology for law enforcement use (Crouch, Walsh, Cangianelli, & Quintela, 2008; Hersch, Crouch, & Cook, 2000; Walsh & Cangianelli, 2009). The NHTSA has also developed educational material for consumers on the dangers of using certain drugs and driving (NHTSA, 2004) and information for physicians on the potentially impairing effects of medications (Loccoco & Tyree, 2007; Wang, Kosinski, Schwartzberg, & Shanklin, 2003).

Recent research on these topics includes assembling a panel of experts to examine a variety of issues associated with the prosecution of drug-impaired drivers and the quality of supporting toxicology evidence (Logan, 2007). The NHTSA also funded the development of Drug Fact Sheets for the use of toxicologists and prosecutors, which contain information on the effects of a variety of frequently used substances that impair driving ability (Couper & Logan, 2004).

To better understand the current situation regarding drug-impaired driving enforcement, the NHTSA recently conducted a study to collect information on the enforcement, prosecution, and adjudication of drug-impaired driving in the States (Moulden, Cangianelli, Walsh, & Atkins, 2009). Also, the NHTSA conducted a research study to examine whether the adoption of drug per se laws produced a noticeable difference in the prosecution and conviction of drug-impaired driving (Lacey, Brainard, & Snitow, 2009). Fifteen States have enacted some version of drug per se statutes for selected illegal drugs (controlled substances). These laws make it illegal to drive with any amount of these drugs in the body. Some States set threshold levels above which the driver is presumed to be positive for the presence of the drug. These types of laws do not make specific reference to driver impairment as a result of drug use.

A further complication for understanding drug-impaired driving is the use of multiple potentially impairing substances. It is not uncommon for drivers to take two or three potentially impairing drugs at the same time. Drivers frequently combine use of drugs with alcohol. While many individual substances taken by themselves, at normal doses, may not impair driving sufficiently to raise crash risk, when taken together the effects may be synergistic and produce an increased risk of crash involvement. Limited research on the combined effects of substances has shown this to be the case. The NHTSA has recently conducted a number of studies designed to explore the potential risk of multiple medication use by drivers (LeRoy & Morse, 2008; Lococo & Staplin, 2006; Staplin, Lococo, Gish, & Martell, 2008).

MEASURING DRIVER IMPAIRMENT

Congress requested that an assessment of methodologies and technologies for measuring driver impairment resulting from use of the most common illicit drugs (including the use of such drugs in combination with alcohol) be conducted. The measurement of driver impairment is challenging since driver performance is a product of manual, cognitive, and perceptive skills and the range of performance reflected in the normal driver population is large.

Current knowledge about the effects of drugs other than alcohol is insufficient to allow the identification of dosage limits that are related to elevated crash risk. However, it is likely that better methods and technology to detect drug use by drivers would greatly facilitate the

enforcement, prosecution, and adjudication of existing drug-impaired-driving laws. With this in mind, the NHTSA conducted a study to look at current methods and technologies to detect drug use by drivers (Walden & the Texas Transportation Institute, 2008).

The Impaired-Driving-Detection Process
The detection of driver drug impairment typically takes place as a result of a law enforcement officer observing inappropriate driving behavior. The officer will stop the vehicle and engage the driver in conversation while the driver is inside the vehicle. The officer at this time may form a suspicion that the driver is impaired. This suspicion can be based on observations of driving behavior, the appearance of the driver, the behavior of the driver, and any statements the driver has made about alcohol or drug use. If the officer suspects that the driver is impaired, the officer will request that the driver exit the vehicle, and the officer will proceed to conduct pre-arrest screening tests. This phase can include the use of the Standardized Field Sobriety Tests (SFSTs) that helps the officer determine whether the driver is impaired by alcohol and if the driver's BAC is likely to be above the legal limit.

Based on this information, the officer may place the driver under arrest for suspicion of impaired driving. At this point, the officer will request a BAC sample, typically a breath sample, but a blood or urine sample could be requested in lieu of breath. The officer may also take the offender to a booking location where a sample (of blood, breath, or urine) will be requested, or, in many instances, the officer may obtain a sample at the roadside in the patrol vehicle or in a mobile testing van or similar setting, if an evidential breath test device is available.

Since most driver impairment is from alcohol, an officer will typically begin by testing this possibility. Only when the BAC test results are incompatible with the observed impairment would an officer consider drugs other than alcohol (unless the driver exhibits signs and symptoms not indicative of alcohol use). Typically, if the suspect is found to be under the influence of alcohol, especially when the BAC is at or above the legal limit, the investigation stops, even if the officer has reason to suspect use of other drugs are contributing to the suspect's impairment.

There are several disincentives for investigating potential impairment due to drugs other than alcohol when BAC evidence clearly shows an illegal alcohol level. Generally, the alcohol charge meets the burden of proof, and State laws typically do not have additional penalties for multiple substance impairment.

However, if impairment is observed and BAC tests are negative, officers can seek additional evidence to support a drug-impaired driving charge. In jurisdictions that participate in the Drug Evaluation and Classification (DEC) Program, the arresting officer may request an evaluation by a Drug Recognition Expert (DRE). This program, originally developed by the Los Angeles Police Department in the 1970s, trains officers to recognize the signs and symptoms of drug use as an aid to investigating suspected drug-impaired-driving cases. The DRE performs a drug influence evaluation on the suspected impaired driver in order to determine whether the observed impairment is likely to be due to drug use (and if so, what specific type of drugs) or whether the observed impairment is due to neurological conditions, illness, or disease. The DRE, or arresting officer in cases where no DRE is available, gathers a biological sample (blood or urine) to be analyzed by a toxicology lab to confirm the suspect had used a drug or drugs. Currently, there are about 6,000 DREs in the 46 States that participate in the DEC program.

Laboratory Testing

Because conviction for drug-impaired driving may depend on evidence of drug use through laboratory testing, the accuracy and reliability of the toxicology results is important. Unfortunately, there are no national standards for conducting these types of toxicology tests and considerable variation exists among laboratories in terms of equipment, procedures, and training of personnel conducting the tests.

In 2004, the NHTSA held an expert panel meeting with toxicologists, DREs, and prosecutors to discuss and identify potential issues associated with conducting toxicology tests for impaired-driving cases and to identify ways to improve the process (Logan, 2007). The meeting resulted in a report that described three steps to improve toxicology testing in impaired-driving cases: (1) survey labs about current practices; (2) establish a Web site with current information on alcohol, drugs, and impairment and toxicological resources; and (3) develop recommendations to standardize methods used in laboratories supporting the DEC programs. Thus far, three surveys tracking current and needed resources have been conducted, the recommendations have been published, and the Web site will soon be operational (Farrell, Kerrigan, & Logan, 2007).

Specimen Collection

To determine whether a suspected impaired driver has actually used a drug requires evidence that it is present in a biological specimen. Typically, urine or blood specimens are taken for this purpose and then sent to a laboratory for analysis. There may be a delay of days, weeks, or months before the results are known. Thus, an officer will not know the test results prior to the time the suspect is charged. Different biological specimens have advantages and disadvantages, depending on the purpose of the testing. Biological specimens for drug testing include:

- Oral Fluid Testing — The collection of oral fluid is minimally invasive and effective in detecting many types of drugs. The technology to rapidly, accurately, and reliably collect oral fluid at the point of arrest is quickly evolving. Devices that collect oral fluid for laboratory testing appear to be a reliable means of testing for recent drug use. Some companies market self-contained test kits that can be used by law enforcement; however, these point-of-arrest screening devices have not been proven to be accurate and reliable.

- Sweat Testing — The collection of sweat over time can produce a cumulative record of prior drug use. However, a positive sweat test result cannot be regarded as evidence of impairment at the time of an arrest or crash. Sweat testing has no advantages over oral fluid testing and is susceptible to contamination.

- Hair Testing — Although it is possible to test samples of hair for drug usage, the results are of limited utility for drug-impaired-driving cases. Positive hair test results cannot be used to demonstrate drug use at the time of driving. In addition, variations in hair growth and the addition of substances to the hair, such as coloring products, make it difficult to extrapolate when drug usage occurred and may also affect the results.

- Urine Testing — The drug testing methodology for urinalysis is well established. Drugs and drug metabolites are detectable in urine for several days (sometimes weeks) after the drug has been used. As a result, unless extremely high levels of a drug or metabolite are found,

which would indicate recent use, urine test results generally cannot prove that a driver was under the influence of the drug at the time of arrest or testing.

- <u>Blood Testing</u> — Blood testing is considered the "gold standard" for testing for the presence of drugs in impaired driving cases. However, as described in the background section to this report, currently there is limited ability to relate the amount of a drug or metabolite in blood to the presence and amount of impairment. Collecting a blood sample is an invasive procedure requiring a nurse or licensed phlebotomist.

Summary
The development of a method of measuring driver impairment due to the use of drugs would greatly enhance the ability of law enforcement to investigate suspected drug-impaired driving cases. However, there is currently no accurate and reliable way to measure the level or degree of driving impairment associated with the use of drugs.

DUID LAW ENFORCEMENT AND ADJUDICATION

In order to understand the current status of DUID enforcement and prosecution in the United States, the NHTSA conducted a study to collect nationally representative data regarding the number of drivers arrested, prosecuted, and convicted of DUID in all 50 States. The study was also designed to compare States with and without the DEC program to determine whether the presence of Drug Recognition Experts affect the DUID arrest rate and to compare States with and without drug per se laws to determine whether these laws were associated with higher conviction rates (Moulden et al., 2009).

A lack of law enforcement, prosecution, and adjudication records posed a major challenge to the successful conduct of this research. While considerable effort was made to obtain the necessary arrest and disposition records for Driving While Intoxicated (DWI) by alcohol and DUID, this was not entirely successful. Chief among the difficulties were: the lack of statewide record systems for either arrest or disposition data and the inability to distinguish between DWI and DUID offenses. In those jurisdictions where samples of DUID arrest data could be obtained, the number of DUID arrests comprised a relatively small percentage of all impaired driving arrests, ranging from 2% to 16%. The State with the highest DUID arrest rate of 16%, Mississippi, has neither a DEC program nor a drug per se law. However, the lack of complete data does not allow conclusions to be drawn about the contribution of either the DEC program or the drug per se statute to enforcing drug-impaired driving.

It is likely that the lack of incentives for investigating drug impairment when alcohol is detected at BACs above .08 g/dL has led to fewer impaired drivers being arrested and prosecuted for drug-impaired driving than were encountered by law enforcement.

Methods for Training Law Enforcement Personnel

Training on drug-impaired driving is available to law enforcement officers in three increasingly detailed levels. Officers at the highest level of training are capable of making determinations about which drug category (or categories) may be contributing to a driver's inability to operate a vehicle. Depending on the individual State requirements, officers may or may not receive training in DUID prior to completing their basic training requirements.

To improve consistency in training, the NHTSA developed an 8-hour course, *Drugs That Impair Driving,* which can be used in conjunction with the SFST training. The NHTSA considers SFST training the foundation for all impaired driving detection training. The *Drugs That Impair Driving* course was developed to provide a general description of drugs, signs that may indicate drug use, and medical conditions that show signs similar to drug use. The course was also developed to acquaint officers with the most common types of drugs that impair driving.

A second level course, the 16-hour *Advanced Roadside Impaired Driving Enforcement Program*, is designed to give officers the ability to apply information they have learned about DUID to make effective arrests based on probable cause that provides the necessary evidence for prosecution. In order to accomplish this goal, the program seeks to increase the officer's overall knowledge of the general manifestations of alcohol and drug impairment and to increase their ability to recognize these indicators in the drivers they encounter during their enforcement duties. If these drivers are suspected to be impaired, then officers will be better informed in the arrest decision.

The highest level of training comes in the form of the DEC program (NHTSA, 2007a). In the early 1980s the NHTSA developed the DEC program based on the Los Angeles Police Department's DRE program. The DEC program trains officers to identify the signs and symptoms of drug use that could be used to determine whether a suspected impaired driver was impaired by drugs and to rule out other possible causes such as neurological deficits, diseases, and illness. The procedure was designed to aid the officer in determining what specific type of drug was the likely cause of the observed impairment. The program was intended to help develop evidence of impairment and guide the analyses of biological specimens when looking for the presence of drugs other than alcohol in impaired drivers. The DEC training requires 9 days in the classroom and additional days of field certification testing. The program is designed to provide a limited number of DREs in a jurisdiction. It is not designed for the routine patrol officer.

THE ROLE OF DRUGS IN CAUSING TRAFFIC CRASHES AND THE EXTENT OF THE PROBLEM OF DRUG-IMPAIRED DRIVING

The scope and magnitude of the drug-impaired driving problem in this country cannot be clearly specified at this time. However, a number of factors suggest that a problem exists, including the widespread use of drugs; the number of controlled substances, psychoactive prescription drugs, and over-the-counter medications that have the potential to impair driving; and specific studies indicating that many crash-involved drivers have used these drugs.

A better understanding of the drug-impaired-driving problem will require that several necessary types of information be obtained. These include:

- Which drugs impair driving ability;
- What drug dose levels are associated with impaired driving;
- How frequently drugs that impair driving are being used by drivers; and
- Which drugs are associated with higher crash rates.

As noted previously, it is important to know which drugs and dosage levels impair driving-related skills. This is a large undertaking, given the number of drugs with the potential to impair driving. Some laboratory research has been conducted on a number of high-priority drugs that measure the effects of drug usage on driving-related skills (e.g., divided attention, visual tracking, reaction time to sudden events). While the necessary connection to actual driving performance has not been established, laboratory tests have been useful to separate potentially hazardous drugs from those that do not produce performance impairment (such as non-narcotic analgesics like aspirin and ibuprofen). Thus, laboratory data can be used to focus attention on the drugs most likely to be highway safety problems.

Once it has been shown that a drug produces driving-related performance impairment in the laboratory, it becomes important to know the frequency with which people drive after having consumed that drug, and the extent to which crash risk is increased. Determining the frequency with which people drive after having consumed drugs may be approached in several different ways. These include questionnaires to obtain self-reported data on drug use and driving and roadside surveys of a representative sample of drivers that involve the collection and analysis of body fluids (e.g., blood or saliva) for the presence and amount of drugs.

Self-report data can be affected by biases. Respondents can be subject to pressure to give socially responsible answers, distrust that responses will be anonymous, or give misleading or inaccurate information. A more accurate determination of drug use by drivers can be made by collecting and analyzing body fluids.

Estimating the crash risk caused by drug use is important to verify that drugs that are known to impair performance on laboratory tasks have a measurable effect on actual crash risk.
One method to estimate the crash risk associated with drug use involves a comparison of the frequency of drug use by crash- and non-crash-involved drivers. Finding that the incidence of drug use in crash-involved drivers is higher than in non-crash involved drivers strongly suggests that the drugs may have contributed to the occurrence of the crashes. If use of a drug is unrelated

to crash risk, there should be no difference in the number of crash-involved and non-crash-involved drivers using the drug.

Knowing only the frequency with which crash-involved drivers use drugs does not directly indicate the crash risk of drug use, since drug use rates for crash-involved drivers may simply reflect the drug use pattern in the general driving public. For example, finding a certain use rate of nicotine or caffeine in crash-involved drivers may simply reflect the use pattern for these drugs in the general driving population and does not imply they played a role in the occurrence of the crashes. Only finding that a drug was overrepresented in crash-involved drivers in comparison to non-crash-involved drivers would indicate that drug use is associated with crash risk.

The NHTSA has recently undertaken new research to identify drugs that may affect driving and to assess their association with crash risk.

Expert Panel to Develop a Protocol for Determining Whether a Drug Is Likely to Impair Driving
Better information about which drugs have the potential to impair driving would be helpful in several respects. Not only would it focus further research attention on relevant drugs, it would also assist physicians and pharmacists in providing patient warnings and education. In addition, it would allow consumers to be educated on the potential dangers of combining use of specific drugs and driving. In order to facilitate research to identify drugs with the potential to impair driving, the NHTSA recently convened an expert panel to determine the feasibility of developing a method or protocol that would be generally accepted for establishing whether a particular drug (over-the-counter, prescription, or illegal) is likely to impair driving, and if so, how such a protocol would be established. The panel was composed of behavioral scientists, epidemiologists, toxicologists and traffic safety professionals to provide a broad based perspective on the issue.

The panel determined that while it is not currently possible to produce a list of drugs that impair driving, it is feasible to determine the likely effects of drugs on driving and laid out a general process to be followed to evaluate any specific drug for the potential likelihood to impair driving. A tiered approach to assessing drugs was suggested that would start with an evaluation of the basic pharmacological data on a drug to determine whether it was psychoactive or otherwise likely to produce effects that might impair driving.

The next step would be to test the drug for its effects on critical driving-related skills or functions. These would take the form of testing for impairment on such functions as simple and complex reaction time, alertness/arousal, sensory/perceptual functioning, attention/information processing demand, and executive functions (e.g., planning, decision-making, monitoring/vigilance). The panel proposed a process to develop and validate a test battery for this purpose and specified criteria that acceptable tests would have to meet that include accuracy, reliability, sensitivity, and validity.

The next level of testing would involve the use of driving simulators and over-the-road testing employing approaches such as the Standardized Driving Test. Finally, additional data could be obtained by using instrumented vehicles. The panel recognized that each of these levels of assessment provides incremental evidence as to the impairing nature of drugs and can be used

together to reach a more complete understanding of the risks associated with a particular drug. A final level of evidence would be an indication that the drug is overrepresented in crashes.

A summary report on the expert panel's recommended approach to determining whether a drug is likely to impair driving is expected in 2010.

2007 National Roadside Survey of Alcohol and Drug Use by Drivers

The NHTSA recently conducted the first nationally representative roadside survey of alcohol and drug use by drivers. The 2007 National Roadside Survey (NRS) involved random stops of drivers at 300 locations across the contiguous United States. Data were primarily collected on weekend nights (10 p.m. to midnight on Fridays and Saturdays and 1 a.m. to 3 a.m. on Saturdays and Sundays), but also included weekday daytime data collection (Fridays 9:30 a.m. to 11:30 a.m. or 1:30 p.m. to 3:30 p.m.).

Participation in the survey was voluntary and anonymous. Whereas prior alcohol roadside surveys excluded commercial vehicles and motorcycles, the 2007 NRS included motorcycles. Almost 11,000 eligible drivers entered the survey sites. Biological measures included breath-alcohol measurements on 9,413 drivers (86%), oral fluid samples from 7,719 drivers (71%), and blood samples from 3,276 nighttime drivers (39%). The study will identify use of a variety of drugs including over-the-counter medications, prescription, and illegal drugs. Drug categories included in the tests are stimulants, sedatives, antidepressants, marijuana, and narcotic analgesics. The study is examining drug use by driver age, gender, income, employment status, education, vehicle type, alcohol and drug abuse syndromes, and other socio-demographic variables.

The results of this study are expected to be released soon. The 2007 NRS will, for the first time, provide national prevalence rates for drug use by drivers. As discussed earlier in this report, drug use by drivers does not necessarily imply impairment. For many drug types, drug presence can be detected long after any impairment that might affect driving has passed. For example, traces of marijuana can be detected in blood samples several weeks after ingestion.

Crash Risk of Driving After Using Drugs

The NHTSA has another large-scale study under way to estimate the crash risk of drug use by drivers. This case–control study will compare the incidence of drug use by crash-involved drivers to similarly exposed non-crash-involved drivers. Data collection started in 2009 and will extend for at least one year in a large metropolitan area. A random sample of at least 2,500 crashes reported to the police will be included, along with 5,000 control subjects stopped at the same locations, same day of week, time of day, and direction of travel, one week later.

This study will allow for an estimation of the risk of crash involvement associated with drug use. Due to the complexity, difficulty, and expense of conducting this type of research, it is likely that only a few drugs other than alcohol will be detected with sufficient frequency to allow for crash risk estimation. Data collection and analysis will take approximately 2 years to complete.

CURRENT STATE LAWS RELATING TO DRUG-IMPAIRED DRIVING

The NHTSA commissioned a review of each State statute regarding drug-impaired driving as of December 2008 (Walsh, 2009). The DUID statutes are generally found in the State Transportation Code or Title, or Motor Vehicle Code or Title. In only two States (Idaho and Texas) can the State's DUID statutes be found in the penal or criminal codes.

There is a high degree of variability across the States in the way they approach drug-impaired driving. Current laws in many States contain provisions making it difficult to identify, prosecute, or convict drug-impaired drivers.

State laws commonly identify drug-impaired driving in one of the following three ways:

1. The presence of drugs renders a driver incapable of driving safely;
2. The driver is under the influence or affected by an intoxicating drug; or
3. A per se statue that makes it a criminal offense for a driver to have a drug or metabolite in his/her body while operating a motor vehicle.

The first two types of laws are most prevalent. In such cases a State must prove that the drug "caused" the impaired driving (i.e., a prosecutor must show a connection between drug ingestion and the incapacity or impairment of the driver). Fifteen States have drug per se statutes (which are actually zero tolerance statutes since they typically make it illegal to drive with any amount of specified illegal drugs in the driver's body). In seven States (Arizona, Delaware, Georgia, Indiana, Minnesota, Pennsylvania and Utah) it is illegal to have any amount of a drug or its metabolite in the body while operating a motor vehicle (note: the Minnesota law exempts marijuana). In five States (Illinois, Iowa, Michigan, Rhode Island and Wisconsin) it is illegal to have any amount of a prohibited drug in the body while operating a motor vehicle. Three States (Nevada, Ohio and Virginia) it is illegal to have specific amounts of specified prohibited substances in the body while operating a motor vehicle. Two States (North Carolina and South Dakota) make it illegal for people under age 21 to drive with any amount of a prohibited drug or substance in their bodies. Five States (California, Colorado, Idaho, Kansas and West Virginia) make it illegal for any drug addict or habitual user of drugs to drive a vehicle.

Only two States (Hawaii and New York) have DUID statutes separate from their alcohol DUI laws. In all other States, a driver violates a DUI statute if the driver drives under the influence of alcohol, drugs, or a combination of alcohol and drugs. The violation is the same, as are the penalties. The one exception is the State of Washington, in which there are different penalties for drug use only, as opposed to alcohol use or a combination of alcohol and drug use.

Twenty States (Alabama, Arizona, Arkansas, Delaware, Georgia, Idaho, Illinois, Kansas, Kentucky, Montana, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Vermont, Washington, and West Virginia) and Puerto Rico specifically disallow legal entitlement to use the drug as a defense to a DUID charge. Use of a drug pursuant to a valid prescription and/or according to directions is a defense to a DUID charge in several States.

All but five States (Alabama, Alaska, Massachusetts, New Jersey and West Virginia) extend their implied consent laws (i.e., to provide a specimen if requested by law enforcement) to DUID. However, both Alabama and Alaska make a provision for compulsory testing in cases involving serious injury or fatal crashes. Of the remaining 45 States (plus the District of Columbia and Puerto Rico) that extend their implied consent laws to drug-impaired driving, nine States (Arizona, Indiana, Louisiana, Maryland, Minnesota, Nebraska, New Mexico, Ohio and Rhode Island) provide criminal penalties for a refusal to take a test under the implied consent law. Twenty-eight States and the District of Columbia and Puerto Rico allow for a forced taking of a specimen over the objection of the driver, but this is generally in cases of a serious injury or fatal crash, and there is probable cause that the driver was under the influence of a drug.

Under implied consent provisions, most State laws stipulate the type of specimen that police officers are authorized to collect. Thirty-four States permit blood and/or urine; eight States allow for blood collection only; six States permit saliva; and eight States plus Puerto Rico permit "other bodily substances."

With respect to sanctions, some States have relatively light sentences for first offenders, while others are more severe in their handling of first offenders. Some States have made a second or third offense a felony, whereas in other States felony status is not reached until the fourth or subsequent offense. Penalties including fines and incarceration differ from State to State. Many States use community service, house arrest, electronic monitoring, work release, restitution, and assessment of cost and fees to supplement the court's ability to sanction offenders. Approximately 35 States provide for court-ordered substance abuse treatment and/or education for offenders. A growing number of States require participation in a program or treatment as a condition of probation or as a prerequisite to reinstatement of driving privileges.

Clearly, there is great variability among the States in how they approach driving under the influence of drugs. Having no separate offense for driving under the influence of drugs makes it difficult to distinguish between DUID and DWI-alcohol arrest and disposition. A recent attempt to investigate the effectiveness of drug per se laws was unable to draw conclusions due to the paucity of objective data and the inability of State data systems to distinguish between DUID and DWI-alcohol arrests and convictions (Lacey, Brainard, & Snitow, 2009). In addition, in cases where a driver shows evidence of impairment by multiple substances, the lack of difference in sanctions between drug-impaired and alcohol-impaired driving provides little incentive for criminal justice officials to pursue a drug-impaired driving charge in addition to an alcohol offense.

RECOMMENDATIONS FOR ADDRESSING THE PROBLEM OF DRUG-IMPAIRED DRIVING

This report has reviewed a variety of information pertaining to drug-impaired driving, including issues associated with determining which drugs impair driving, the difficulties that exist in relating blood levels of drugs to degree of impairment, the lack of information about which drugs are frequently used by drivers and which drugs elevate crash risk, the problems in obtaining representative data about current enforcement, prosecution, and adjudication of drug-impaired driving. The report also described three levels of training for law enforcement officers for

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recognizing drug-impaired drivers, reviews drug-impaired driving laws, and discusses what is known about the role of drugs as causal factors in traffic crashes.

The report highlights the need for further research and specifically points to the need for better data and information systems to allow continued progress in understanding and addressing the drug-impaired driving problem.

In particular, a lack of statewide arrest or disposition data distinguishing drug-impaired from alcohol-impaired driving arrests significantly impedes the States' ability to assess the extent of drug-impaired driving and evaluate the impact of countermeasures. Similarly, the lack of standardized and complete State record systems limits the NHTSA's ability to make clear inferences about the scope of the national drug-impaired-driving problem.

Better records would allow States to evaluate the impact of the DEC program on DUID arrest rates and convictions. Similarly, accurate and complete data about arrests and convictions for drug-impaired driving would allow documentation of the effects of drug per se statutes on arrest and convictions.

The NHTSA recommends the following data and record system improvements:

- States should develop record systems that distinguish among alcohol, drugs, or both for impaired driving cases. These records should be integrated into computerized data systems of law enforcement agencies, the court record systems, and motor vehicle records. One way to accomplish this would be to have separate offenses for driving impaired by alcohol and driving impaired by drugs.

- State records systems should document which drugs drug-impaired drivers are using. This information would be helpful for law enforcement, toxicologists, and prosecutors.

- Standard screening methodologies should be developed for drug testing laboratories to use in identifying drugs that impair driving. These methodologies should include standard analytic procedures and minimum detection thresholds. There also should be training requirements for the personnel operating these tests.

In addition to these data and record system needs, the NHTSA recommends the following change in State statutes:

- State statutes should be amended to provide separate and distinct sanctions for alcohol- and drug-impaired driving that could be applied individually or in combination to a single case. This would provide an incentive for law enforcement officers to pursue a possible drug-impaired driving charge even when a BAC equal to or above the limit of .08 g/dL has already been established.

Adoption of these recommendations would lead to a greater understanding of the drug-impaired-driving problem and ways to effectively reduce drug-impaired-driving crashes.

RECOMMENDATIONS FOR DEVELOPING A MODEL STATUTE RELATING TO DRUG-IMPAIRED DRIVING

The NHTSA, working with the National Traffic Law Center at the American Prosecutors Research Institute, National District Attorneys Association, has drafted a model drug-impaired driving law:

Model Drug-Impaired Driving Statute

Offenses —

A. It shall be unlawful for a person to drive or be in actual physical control of a vehicle in this State under any of the following circumstances:
    1. While under the influence of any controlled substance, drug or any other substance which renders him or her incapable of safely driving; or
    2. While under the influence of any combination of alcohol, controlled substance, drug or any other substance which renders him or her incapable of safely driving.

B. It is not a defense to a charge of a violation of subsection A, paragraphs 1 or 2 of this section if the person is or has been entitled to use the controlled substance, drug or other substance under the laws of this State.

Definitions —
The following definitions shall apply to this section:

A. "Controlled substance," for the purposes of this section, shall have the meaning ascribed to it by [insert specific State reference under Uniform Controlled Substances Act].

B. "Drug" shall include any substance, when taken into the human body, which can impair the ability of the person to operate a vehicle safely.

OFFICIAL REMARKS:

The model statute does not contain any provisions for a per se (either specific level or zero-tolerance) prohibition because of the lack of a clear correlation between blood drug concentrations and impairment for many drugs.

It is strongly recommended that there be an enhanced or greater penalty for multiple (or poly-) drug use (including alcohol) compared to situations in which the driver is under the influence of only one substance. However, specific recommendations for sentencing have been excluded due to the variety of State-specific methodology and mechanisms for imposing sanctions (Logan, 2007).[1,2]

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[1] See also, *Transportation Research E-Circular: Issues and Methods in the Detection of Alcohol and Other Drugs* (Number E-C020), September 2000.

[2] The Walsh Group. (2002). *The feasibility of per se drugged driving legislation consensus report 2002* (Robert Wood Johnson Foundation Substance Abuse Policy Research Program, Grant ID No. 040023). Princeton, NJ: Robert Wood Johnson Foundation.

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