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IMPLEMENTATION STATEMENT

The implementation of the findings of this research consists of several components.

- (1) Utilize laboratory instrumentation that can test for and quantify levels of drugs that lead to impairment. The LA crime lab is in the process of purchasing new instrumentation that will be capable of quantifying levels of drugs. Training of forensic toxicologists that can serve as expert witnesses for prosecutors is also essential.
- (2) The Louisiana Highway Safety Commission and DOTD should work with the LA Coroner Association to have blood samples in fatal crashes submitted to the LA crime lab. Funding for conducting this service should be explored.
- (3) The training of additional drug recognition experts (DREs) in Louisiana will improve the identification of drug-impaired drivers, provide testing and other documentation, and promote effective prosecution of offenders. Thus more officers should be trained in drug recognition.
- (4) A best practices manual should be developed that includes policies that increase the testing of drivers arrested for impaired driving using blood. This best practices manual should be used throughout Louisiana to work toward a consistent application of existing impaired driving laws.
- (5) The researchers will work with the Louisiana Highway Safety Commission, DOTD, and the appropriate Safety Coalitions to develop policies and programs to increase awareness and understanding of drugged driving.

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INTRODUCTION

Drug-impaired driving, also referred to as “drugged driving” or driving under the influence of drugs (DUID), has been characterized as a growing public health issue in the US and abroad. Wide-scale research studies such as the Driving under the Influence of Drugs, Alcohol and Medicines (DRUID) project in Europe and the National Highway Traffic Safety Administration’s (NHTSA) National Roadside Survey (NRS) of Alcohol and Drug Use by Drivers in the US, have been conducted in recent years to examine the prevalence of drug use among drivers [1]. In 2007, the percentage of nighttime weekend drivers testing positive for at least one drug (i.e., illicit, prescription or over-the-counter drugs with potential for impairment) was 16.3%. In 2013/2014, the NRS estimates the percentage of drivers testing positive for at least one drug increased to 20%. Other possible emerging trends suggest drugs other than alcohol are increasingly detected in the blood of fatally injured drivers [2]. Also, the prevalence of drugs in drivers stopped for impaired driving is generally higher than drug prevalence in the general population [3].

One reaction to these trends is to pass zero tolerance (ZT) per se drug-impaired driving laws that make it illegal for individuals to operate a motor vehicle with positive levels of drugs in their system. Even though driving while impaired by drugs is already considered a crime in all 50 states, the Office of National Drug Control Policy (ONDCP) has urged all states to pass additional per se laws as part of their National Drug Control Strategy. Globally, Australia and European countries such as Belgium, Sweden, and France have passed such laws. And as of May 2015, 21 states have passed some form of a per se law. Anecdotal evidence suggests the per se laws make a difference; however, the degree to which per se laws are instrumental in reducing drugged driving or improving public health is not yet clear [4], [5]. Others claim the value of ZT per se laws is in increasing drugged driving convictions, but there has not been any data collection to empirically examine this either.

It is important to understand the nature of the problem ZT/per se laws are purported to address in order to evaluate their efficacy. Compared to alcohol’s relatively universal effects on driving, the relationship between consumption of any given drug and driver impairment is very complicated. Empirical research testing the effects of common drugs on individuals’ driving skills is generally inconclusive due to a number of mediating and moderating factors. Drugs affect individuals differently. Moreover, studies comparing crash risk associated with alcohol and drug use generally indicate alcohol (alone or in combination with other drugs) tends to be associated with greater crash risk than drugs alone. A review of scientific literature conducted by the International Traffic Forum concludes that, despite the “growing volume of literature on the topic, current methodological difficulties limit the pace at which

knowledge and understanding in this area accumulates” [6]. Hence, the “contribution of drugs to motor vehicle crashes, injuries, and deaths continues to be a subject of considerable interest and debate” [6].

The enforcement of DUID laws requires appropriate testing equipment and the implementation of procedures requires training for officers, prosecutors, judges, lab technicians—anyone involved with the process of identifying, investigating, and adjudicating drivers charged with DUID. Therefore, it is important to examine the procedures and practices associated with data collection, investigation, and prosecution of drug-impaired driving. Also, before new legislation is introduced, it is important to assess and quantify the impact of drugged driving on public health. Specifically, the goals of this research are (1) to use Louisiana as a case study in evaluating laws and policies about drugged driving to identify obstacles to a per se, or ZT, law for drugged driving and (2) to collect data on drugged driving and analyze its frequency in Louisiana and other states where data is publically available and to identify ways to improve data collection in Louisiana.

OBJECTIVE

The primary objective for this research study is to (1) evaluate laws and policies about drugged driving in Louisiana and other states and identify obstacles to a per se law for drugged driving; and (2) collect data on drugged driving and analyze its frequency in Louisiana and other states where data is publically available to develop specific recommendations for improved data collection on drugged driving.

SCOPE

The purpose of this project is to: evaluate per se laws for drugged driving in other states; present an overview of the literature; provide highway safety stakeholders, law enforcement, and prosecutors with information to guide strategies to reduce drug impaired-driving through detection, enforcement actions, and more successful prosecution; identify training and other resource needs for law enforcement and prosecutors; provide initial baseline information of drug-impaired driving in Louisiana to inform public health community, enforcement community and other stakeholders that make strategic decisions regarding resource allocation; identify opportunities to collect data needed for adequate characterization of drug impaired driving; and develop recommendations for data collection in the future.

METHODOLOGY

Overview of DUID Research

Before it is possible to evaluate the laws and policies about drugged driving, it is important to understand the complexity of the issue. A considerable amount of research has been published on the subject drug-impaired driving. A search on Google Scholar, which is not limited to articles published in peer reviewed journals, returns a list of about 1,200 articles containing the keywords ‘drugged driving’ as of this writing; over 629 of these articles have been published since 2011 [7]. Despite the substantial number of studies published on drugged driving, there is no clear evidence on the impact of drugs—illicit or prescription and over-the-counter medications—on driving abilities or crash risk. This poses a challenge to approach the potential danger from public health standpoint, where increased crash risk is ultimately a key indicator.

In order to demonstrate scientific proof of a drug’s contribution to crash risk, Shinar states the following three conditions must be met: (1) there is experimental verification causally linking the drug to impairment and that the magnitude of impairment is related to the dose and the concentration of the drug in critical parts of the brain; (2) there are reliable measurements of the drug in both the general and crash populations; (3) and the drug is verifiably associated with crash involvement; that is, that the prevalence of a drug is higher in crash-involved drivers than in the general population, or that the drug’s prevalence is higher in culpable drivers than non-culpable drivers in crashes [3]. Multiple research methods are needed to establish the relationship. The only way to legitimately establish a verifiable causal link from the drug dose/concentration to impaired behavior or brain activity is by conducting controlled experiments. The second and third conditions are similarly related and are satisfied by conducting observational studies. To ensure reliability and validity, studies must be replicated and the accumulation of findings must withstand scrutiny of the scientific community and the peer-review process. This is an ongoing process that is dependent on the existence of quality data.

Evaluating Research Studies

All research studies are not designed equally. Research examining the impact of drugs on traffic safety tends to fall into one of two categories: epidemiological observational studies and controlled experiments. The latter tends to primarily focus on measuring effects of various drugs on a number of factors relevant to driving, whereas the former considers a wider range of implications such as drug use among the driving population, drug involvement in crashes, and crash risk.

All research methodologies have limitations that must be taken into consideration when evaluating findings. In general, epidemiological studies are hampered by the lack of consistent drug testing data in fatal and injury crashes. Incomplete or unavailable data is a particularly significant limitation in drugged driving research. Because of the nature of illicit drugs (illegal to use), controlled experiments also have several unique limitations, such as the sampling technique employed and selection bias for recruitment, as well as unnatural environmental testing conditions that limit the degree to which findings may be generalized to the general population. Street drugs (e.g., cocaine, methamphetamine, etc.) are hardly consistent in quality or potency in “real life.” Pharmaceutical drugs may have consistent quality but are available in different formulations that may or may not produce the same effects.

There are a range of known and unknown confounding factors that can mediate or moderate the effect of a given drug on individuals and influence the strength of relationship on the outcome variable of interest. This has clear implications for external validity. Though researchers may control for many factors, this obviously depends on the nature of the study, the source of data, and the manner in which data are collected.

Commonly Used Drugs and Their Effects on Driving

The term “drugs” generally refers to any chemical substance that has some physiological effect upon entrance to the body. In the context of traffic safety, “drugs” refers to any chemical that acts upon the central nervous system and the brain, which controls necessary functions like coordination, performance, and reaction time, to name a few. Many drugs, regardless of whether or not they are medications or street drugs, have the potential to impair functions necessary for safe driving. Of known impairing substances, alcohol and cannabis are the most frequently used in the population and thus are the most commonly detected substances among drivers in roadside surveys. Other drugs that are commonly detected include prescription and over-the-counter (OTC) medications and illicit drugs such as cocaine.

With the exception of alcohol, many of the drugs detected in roadside surveys have legitimate recognized medical uses and have been prescribed by doctors to treat acute and chronic conditions. The Centers for Disease Control (CDC) estimates that in 2010, about 48% of the population took at least one prescription drug in the past month [8]. Even though not all prescription or OTC drugs have potential for impairment, many do. OTC drugs like antihistamines for allergy symptoms, sleep-aids, and cold and flu medications are used

commonly in the US. And then there are illicit or illegal drugs, which also include the use of prescription drugs without a lawful prescription. As far as the potential for impairment is concerned, there is very little difference between illegal drugs and medications. There are, however, very important differences in the state of knowledge about how each “kind” of drug affects people, for various reasons. Before discussing these differences further, a brief overview on how drugs are classified at the federal level and how drugs are categorized according to their effects as controlled substances.

Drug Classification

A drug’s status as “licit” or “illicit” is determined by the federal government’s drug control policy. The Controlled Substances Act of 1970 established the five drug schedules under which all drugs with a potential for abuse are classified. Even though alcohol and tobacco are associated with high rates of abuse, they are excluded from the drug schedules. Schedule I drugs are those that are deemed to have no medicinal value. In order for a drug to fall under Schedule I, the following criteria must be met:

- The drug or other substance has a high potential for abuse
- The drug or other substance has no currently accepted medical use in treatment in the United States.
- There is a lack of accepted safety for use of the drug or other substance under medical supervision.

Examples of Schedule I drugs are heroin, LSD, natural hallucinogens like mescaline and psilocybin, MDMA (i.e., Ecstasy), and marijuana. Efforts to have marijuana rescheduled to a Schedule II or III drug have been unsuccessful, despite evidence supporting marijuana’s medicinal value. Marijuana policy in many states is at odds with the Schedule I classification. As of June 2015, 23 states as well as the District of Columbia have legalized marijuana for medicinal purposes (and/or recreational use) and it is expected that more states will follow [9]. Louisiana’s legislature recently passed a bill to provide access for a limited set of terminally ill conditions. In states with medical marijuana laws, cannabis is prescribed just like doctors prescribe other legal controlled substances such as opioids, amphetamines, and central nervous system depressants (e.g., anti-anxiety medications) to treat a range of physical and mental health conditions. There are “illegal” drugs that fall lower down on the drug schedules, such as Schedule II drugs cocaine and methamphetamine, because they are deemed to have medicinal value. Cocaine is sometimes used as a topical anesthetic (not unlike lidocaine). Methamphetamine is sometimes prescribed as a treatment for obesity or Attention Deficit Hyperactivity Disorder (ADHD) under the name Desoxyn. A synthesized form of delta-9-tetrahydrocannabinol (THC), the primary psychoactive component in

cannabis is a Schedule III drug for AIDS patients or people suffering from anorexia under the name Marinol.

The use of any controlled substance recreationally and/or without a valid prescription is illegal. In law enforcement, it is more useful to classify drugs by their effects. Table 1 summarizes the US Drug Enforcement Agency's (DEA) seven drug classes [10]. The drug classes combine prescription and illicit drugs because they share similar chemical profiles and effects. For example, opioid pain relievers, which are the most commonly abused prescription drugs, are classified along with heroin as narcotics [11]. Besides having similar molecular properties and effects, both are highly addicting substances. Despite whatever similarities exist between the two drugs, heroin clearly has no recognized medicinal value.

Table 1
DEA drug classes

DEA Drug Classes	Drugs Included
Narcotics	heroin, oxycodone, codeine
Stimulants	cocaine, amphetamines, methamphetamine
Depressants	benzodiazepines, barbiturates, valium
Hallucinogens	MDMA, LSD, psilocybin
Marijuana/Cannabis	marijuana, hashish
Steroids	testosterone, nandrolone
Inhalants	invisible volatile compounds, e.g., butane

Determining when and how much certain drugs have the potential to impair a person's driving ability is not a straightforward process. Some drugs, such as prescription amphetamine for treatment of ADHD or narcolepsy, may actually help improve a person's driving and thus increase public safety [12]. Other drugs like hydrocodone, a narcotic opioid pain reliever, may be deemed medically necessary to manage chronic severe pain. The pain symptoms alone may cause an individual to experience cognitive or psychomotor impairment [13]. Depending on a patient's condition, it may be unbearable for them to work a full-time job or manage daily life tasks without the aid of a prescription pain reliever. Research has tended to find that long-term opioid use at stable doses does not cause impairment [13].

When used responsibly in accordance to the direction of a licensed physician, drugs may present minimal threats to public safety. Prescription drugs and OTC medications typically provide benefits to a person that outweigh potential harms. The same drugs can easily become problematic when abused, and even dangerous when combined with alcohol and/or other drugs. Ideally, patients are counseled on potential interactions with other substances they should avoid when taking their prescriptions. In general, when prescription drugs are misused or abused, they are often obtained unlawfully; that is, without a prescription in their name. They are also typically consumed in amounts that clearly exceed therapeutic doses as determined by clinical trials. For example, researchers in Sweden examined the concentration of commonly used prescription drugs in the blood of drivers suspected of driving under the influence of drugs and found the concentrations of certain sedatives and hypnotics (primarily benzodiazepines and opioids) were in excess of acceptable therapeutic limits [14].

Therapeutic limits are determined by the level at which toxicity occurs and adverse reactions are experienced divided by the smallest effective amount to produce the desired effect and avoid unintended side effects. Another term for therapeutic limits is a "safety window." In general, an effective dose is the minimum amount necessary to receive therapeutic benefits

within this window. Due to the illicit status of some drugs, there is less known about the safety window.

Clinical trials for prescription drugs are double-blind randomized experiments. Participants for these studies are patients that may benefit from the prescription drug usage and they are randomly assigned to a treatment group (receives test drug) or the control group. Neither the doctor nor the patient know if they received the drug or a placebo. This is an optimal design to test the true effects of a drug on numerous outcomes of interest, but this design is difficult if not impossible to replicate with illicit drugs for several reasons. First, volunteers are usually recruited for such experiments and cannot be considered representative of the population. Second, prescription drugs are manufactured under tightly controlled conditions so that they do not vary in chemical composition or quality. There is no quality control for illicit drugs, particularly street drugs, which vary in potency, consistency, and quality/purity per milligram and may be laced or cut with other substances. So, while internal validity may be high in the controlled experiment, external validity, or the degree to which drawn conclusions may be extrapolated to the “real world,” is not. And third, measuring drug impairment with objective tools is a very difficult task [15]. To begin, the pharmacokinetics and pharmacodynamics of psychoactive drugs are not well understood [16]. The large number of unique drugs in existence with potentially psychoactive components is only one part of the problem: drugs do not affect people uniformly. Individual differences in absorption and metabolism rates plus other mediating and moderating factors unique to human beings (e.g., psychological and physiological factors, dose-response, tolerance/experience, acute vs. chronic usage, etc.) make it impossible to determine the point at which most people may reach impairment.

Researchers did not have difficulty establishing the causal link of alcohol consumption to driver impairment. Alcohol is a relatively “simple” drug that spreads evenly and quickly throughout a person’s body [3]. The relationship of alcohol consumption to blood alcohol concentration (BAC) to impairment across individuals is fairly straight forward and reliable [3], [17]. As alcohol consumption rises, BAC commensurately rises, and the level of impairment also rises. The signs of alcohol impairment are generally evident and easily recognizable. Researchers have been able to successfully predict behavioral impairments based on measures of BAC. Thus, compared to drugs, alcohol’s effects on behavior and driving performance are, for the most part, well understood [16]. A great deal of experimental research is necessary to determine the level at which most people would be impaired by various drugs, with illicit drugs, again, being the most difficult to assess. Despite the variability in individuals, experimental research has generally demonstrated larger doses

of certain drugs are more likely to cause impairment than smaller doses, and less-familiar driving tasks are more likely to be affected than familiar ones [16].

Another finding consistent in the research has to do with effects of alcohol consumption in combination with drugs. Many people use drugs and alcohol together [3]. Drivers with positive BACs $> .00$ are more likely to also have drugs in their system than drivers without positive BACs [18]. Combining drugs with other drugs and/or alcohol usually exacerbates impairment effects on driving performance. Controlled experiments examining drug and alcohol combinations generally find support for this. Kunsman et al. studied the effects of temazepam, a benzodiazepine used to treat short-term insomnia, and ethanol on computer-based performance tasks and found that the combination of temazepam and ethanol was associated with impairment on the tasks where impairment may not occur with the single drug [19]. Brookhuis et al. examined the effects of MDMA (3,4-methylenedioxy-N-methylamphetamine, also known as Ecstasy) alone and in combination with other drugs on simulated driving performance before and after subjects attended an electronic dance music event [20]. The researchers concluded that MDMA alone had minimal effects on lateral and longitudinal vehicle control but not after consuming MDMA along with other drugs. Ramaekers et al. studied the effects of THC and alcohol on actual driving performance and found moderate impairment associated with low doses of THC but severe impairment on driving performance when combined with a low dose of alcohol (BAC $< .05$) [21]. There were no interaction effects between cannabis and alcohol, indicating that the effects are additive rather than synergistic [21].

Controlled experimental research on the effects of cannabis use alone on driving performance is also inconclusive [22]. Impairment effects, which are difficult to generalize across individuals, of acute cannabis use is sometimes—but not always—shown to impair drivers. Driving and simulator studies have found that cannabis increases reaction time and affects decision making at higher doses; however, the same is not necessarily observed in experienced users, who are likely to develop tolerance to the effects on psychomotor or cognitive performance [22-27]. A common finding in experimental studies is that cannabis users are typically conscious of their impairment and take compensatory measures, such as lowering their speed and increasing distance between their car and the vehicle in front of them.

Cannabis may be most likely to cause impairment among inexperienced or occasional users. Ramaekers et al. conducted a double-blind, placebo controlled, two-way mixed model experimental design where occasional and heavy users of cannabis were provided a high dose of THC (500 $\mu\text{g}/\text{kg}$ THC) before completing a variety of performance tasks [27]. In

occasional users, THC impaired performance at low and high concentrations on a number of the tasks. Heavy users appeared to be affected only at high concentrations by increasing stop reaction time. The researchers conclude that a person's cannabis use background "strongly determines the behavioral [sic] response to single doses of THC" [27]. THC levels will actually vary according to the frequency of use—for the occasional or novice user, smoking one joint is more likely to lead to acute intoxication and higher levels of THC than the same dose would for daily or regular users [28]. For less experienced users, effects are usually more pronounced with highly automatic driving tasks than they are with complex functions requiring conscious attention and control, which, as Sewell et al. point out, "is the opposite pattern from that seen with alcohol" [23]. In contrast, experienced cannabis users demonstrate little to no functional impairment under the influence of marijuana, unless they are also consuming alcohol [23].

Other researchers have studied the regular use of prescription drugs on driving performance. A structured evidence-based review of research on patients being treated with opioids for a medical condition suggests patients may drive safely while taking the prescription drugs [29]. Wilhelmi and Cohen reviewed 23 epidemiological studies on opioid use and abuse, 3 studies on acute psychomotor effects and 32 on chronic psychomotor effects and note the consistency in the findings that chronic users develop tolerance to opioids that does not present as impairment [13]. Lenné et al. examined the effects of new (LAAM and buprenorphine) and existing (methadone) opioid pharmacotherapies for treating heroin addiction on simulated driving performance [30]. They compared a treatment group to a non-drug using group, with and without a BAC of about .05. They found no difference between non-drug users and the treatment group receiving either of the pharmacotherapies; however, they found alcohol impaired all measures of driving across all of the groups.

In 2014, Gobbo and Louza conducted a systematic review of 15 randomized control trials testing the influence of stimulant and non-stimulant drugs on driving performance for individuals with ADHD [31]. Driving performance was measured in actual cars and driving simulators across a range of outcomes. In general, there was no evidence of psychostimulant drugs having a negative effect on individual performance. In most of the studies, findings indicate significantly improved driving performance with stimulant drugs in ADHD patients. Illicit stimulants have also been studied among recreational users. Silber et al. studied the effect of *d,l*-methamphetamine on simulated driving performance using a repeated-measures, counterbalanced, double-blind, placebo-controlled experimental design [32]. Unlike stimulant drugs that are most commonly prescribed for ADHD, methamphetamine is most often used illicitly. The procedure was separated by a two-week period. Subjects consented not to use any other illicit drugs seven days before each session and to refrain from alcohol

for 24 hours before testing. Though this was a driving simulator study, the design was very carefully controlled. The results indicate no statistically significant differences in driving ability between those who received the placebo or a “single, acute, therapeutic dose” of methamphetamine [32].

Prevalence of Drugs Detected in Driving Population

The unsettled findings linking drug use to driver impairment is not the only area of uncertainty in research. According to Shinar, “perhaps the biggest controversy surrounding drugs and driving is not one about their effects, but about their actual prevalence in the driving population” [3]. Estimates regarding the prevalence of drug-impaired driving vary considerably. On the higher end, driver roadside surveys such as the 2007 NRS probably overestimate the prevalence, whereas the arrest rates of DUID relative to the number of alcohol impaired driving arrests likely underestimate the prevalence [3]. Under-estimates are primarily due to incomplete data and/or inconsistent drug screening of DUID suspects. Roadside surveys base prevalence estimates on both self-reports and chemical tests which depend on volunteer participation. Self-reported information, while insightful, cannot be reliably verified, and chemical tests, while indicative of recent drug use, cannot demonstrate impairment.

The 2007 NRS prevalence estimates increased concerns about drug-impaired driving. A summary of the findings from the 2013/2014 NRS were released to media early February 2015 [33]. The full report is not yet available, but the summary statistics suggest total drug-positive estimates for nighttime weekend drivers increased from 16.3 percent in 2007 to 20 percent in 2013/2014. Detection of THC increased from 8.6 percent in 2007 to 12.6 percent in 2013/2014. Because THC also had the greatest increase in use, the overall increase in drug-positive drivers is probably a reflection of this. The changing policies in states regarding marijuana including increased provisions for medical use, legalization and decriminalization may also have something to do with the increase.

Second to alcohol, the most easily detected drug is cannabis, primarily because of how cannabinoids are distributed and absorbed in the human body. Cannabinoids are fat soluble and accumulate in the fatty tissues. As a result, the tissue elimination half-life of a single dose of THC is about seven days and complete elimination may take up to 30 days [34], [35]. Carboxy THC (THC-COOH) is detectible in the urine for as long as it remains in the body. So, unlike alcohol and other drugs, the detection period for THC and cannabis metabolites is much longer. Also, THC does not distribute evenly throughout the body and rates of absorption and elimination differs between experienced and inexperienced users [3].

Due to this extended and highly unpredictable detection window, it is difficult to determine correlation of detection to impairment for cannabis. THC has the longest detection window, but other drugs may be detected days after use as well. Table 2 below displays estimated detection windows for commonly used drugs [36].

Table 2
Estimates of drug detection windows

Alcohol – 1 oz. for 1.5 hours
Amphetamines – 48 hours
Barbiturates – 2-10 days
Benzodiazepines – 2-3 weeks
Cocaine – 2-10 days
Heroin Metabolite – less than 1 day
Morphine – 2-3 days
LSD – 8 hours
Marijuana – casual use, 3-4 days; chronic use, several weeks to 1 month
Methamphetamine – 2-3 days
Methadone – 2-3 days
Phencyclidine (PCP) – 1 week

There are several critical factors related to drug testing procedures that complicate data interpretation, reporting, and analysis [37]. Beyond the obvious problems extrapolating impairment from drug presence, the manner in which data are collected and reported differs considerably from state to state and even within states. The lack of consistent policy and procedures over who is tested, what fluids (i.e., blood, urine, or saliva), what drugs are tested for, type of tests, cut-off levels, and testing equipment all impact the quality of data available for analysis and interpretation [37].

Drug testing data is typically not consistently collected by law enforcement agencies. Often, alcohol positive drivers are not tested further unless there is reason to suspect drug involvement. Drug testing for fluids like urine, blood, plasma, etc., must be sent out to a forensic lab for analysis. For officers in the field, there are relatively few on-site, simplified testing equipment options with high reliability. Due to advancements in technology, this appears to be changing. There are now several on-site screening devices that can detect the presence of drugs using oral fluids. Wille, et al. conducted an evaluation of the reliability for three on-site screening devices: Mavand RapidSTAT®, Securetec Drugwipe-5+® and Dräger DrugTest 5000® [38]. The researchers compared the results of the on-site oral fluid

testing with a confirmatory plasma analysis. All three devices demonstrated a sensitivity of 93%, 100%, and 92% (respectively) for amphetamine and MDMA, 75%, 78%, and 67% (respectively) for cocaine and all three devices were able to detect cannabis about 70% on-site.

The researchers note that a newer version of the Dräger model, a test cassette that uses the newest generation of oral fluid testing at lowered cut-off points, has a sensitivity of 93%. Accuracy rates for each of the testing devices varies slightly from the sensitivity percentages but are generally around the same percentage for each device. None of the oral fluid testing devices examined can insure against false positives or false negatives, making these devices more suitable for screening rather than providing evidence to be used in court. However, these oral fluid testing devices may be more efficient for law enforcement in the screening process, due to portability and ease of use. The oral fluid testing detection window depends on the drug, but ranges from several hours up to 1-2 days [38], [39]. Compared to urine analysis, oral fluids are less invasive and provide a better indication of recent use. Also, oral fluids tend to better correlate serum concentrations and observed indications of impairment [38], [40].

Drug tests—regardless of type—are useful to determine whether or not a person has used drugs recently, but they are still not able to tell when the person last took the drug(s) or exactly how much of the drug they consumed. They also cannot “prove” impairment as there is no empirically validated objective level of impairment. There is no way to determine from chemical tests alone whether or not someone is impaired; the only exception being Breathalyzer tests for alcohol. The cut-off levels used in testing are relatively arbitrary, driven primarily by the minimum levels (or sensitivity) for a device or chemical test to pick up the presence of drug or any of its inactive metabolites. Furthermore, the amount of time a drug may be detectable in a person’s system since last use varies person to person, drug to drug, and dosage to dosage. The lack of clearly defined standardized procedures presents major obstacles for analyzing prevalence of drug-impaired driving or crash causation.

Drugs and Crash Risk

The crash risk associated with drug use and driving is not as clear as the crash risk associated with alcohol use. There is a long-established positive relationship between driver BAC and crash risk. Several research studies have demonstrated that crash risk rises rapidly with driver BAC, however, there is no standard relationship between blood levels of a drug (or drug metabolites) and impairment in drugged driving [41-46]. To understand the relationship of

drugs to crash risk, research typically compares the number of crashes where drugs were detected in the driver's system to crashes where drugs were not detected. This approach has limitations. Since a true cause and effect relationship can only be discovered through randomized controlled studies, this approach does not establish the causal factors. At a minimum, culpability and exposure need to be considered when analyzing crash data [3].

Several recent studies have considered the risk of fatal crash involvement associated with drugs and/or alcohol [47-50]. One such study, a case-control analysis using drug testing data from FARS and the 2007 NRS, suggests an increased crash risk associated with drugs and alcohol individually, and higher when drugs and alcohol are combined [51]. While these two databases represent very different populations, this study suggests that the use of any drug doubles the risk of fatal crash involvement; however, the heightened risk varies according to the type of drug used. Of the drugs examined, the estimated odds of crash risk was highest for depressants (4.8) and stimulants (3.6), followed by poly drug use, i.e., 2 or more drugs (3.4) and narcotics (3.0), and lowest for marijuana (1.8). Alcohol alone was associated with a heightened fatal crash risk of 13.6 and substantially increased risk of fatal crash when combined with drugs, a 23.2 increase in estimated odds [48].

Although these studies indicate increasing odds in crash risk with use of drugs, it should be kept in mind that the FARS data are incomplete with respect to drug testing and the population is different from the population in the 2007 NRS survey. Although, the researchers tried to match some of the characteristics in the two databases, this is not comparable to results that could be obtained through a randomized design.

A 2015 NHTSA study examined the crash risk associated with alcohol and drugs among drivers using case-control methodology [52]. The study was conducted in Virginia Beach, VA, and data were collected over the course of 20 months. There were over 3,000 crash-involved drivers included as cases in this study. For every crash-involved case, researchers randomly selected two other drivers from traffic by returning to the same location, day of week, time of day, and from the same direction as the crash-involved case subject. The primary findings were clear in respect to alcohol—that drivers with .08 BrAC to .15 BrAC had (respectively) 4-12 times the crash risk than sober drivers; BrACs in excess of .20 was associated with over 23 times the crash risk—which were statistically significant before and after adjusting for demographic factors. The researchers tested drivers for various classes and types of drugs. Crash-involved drivers were more likely to test positive for THC and sedatives than non-crash involved drivers, as well as illegal drugs and/or poly drug use. Unadjusted odds ratios indicate a statistically significant increase in risk by about 1.25 times

for THC, 1.21 for illegal drugs, however, once other factors such as age, sex, and race/ethnicity were controlled for, adjusted odds ratios were not statistically significant. In other words, the demographic factors “may have co-varied with drug use and accounted for most of the increased crash risk” [52].

Romano and colleagues calculated the relative crash risk associated with drugged driving in states where drug testing is reported in at least 80% of crashes with fatally injured drivers [47]. Similar to Li, et al.’s findings, the researchers found drugs other than alcohol do contribute to fatal crash risk, however, alcohol’s contribution to crash risk was substantially higher than drugs [47, 48]. Testing positive for any drugs significantly increased fatal crash risk, but odds vary by drug type and this was only true for drugs other than marijuana. Controlling for the effects of the presence of alcohol and demographics, marijuana was not a statistically significant contributor to fatal crash risk [47]. Asbridge, Hayden, and Cartwright conducted a meta-analysis of observational epidemiology studies examining acute consumption of cannabis with crash risk and concluded that cannabis is associated with a nearly double severe or fatal crash risk [35]. Placed in context, however, the risk is “less robust” than the relative risk observed with alcohol at the illegal limit (0.08g/dL) threshold [28].

Aside from having a significantly higher crash risk, the drugs-and-alcohol combination appears to be more common among drivers than those just using one drug. Using the 2007 NRS data, Voas et al. calculated the percentage of weekend nighttime drivers also using drugs. They determined 29.4% of drivers with BACs > .08 were also using illegal drugs [18]. The percentage of drivers with positive BACs <.08 also testing positive for illegal drugs was 26%. Only 10.4% of non-drinking drivers tested positive for illegal drugs. These data suggest that drivers drinking alcohol are more likely to also use drugs than drivers who are not drinking alcohol at all and so increasing the testing rate among alcohol-positive BACs < .08 could increase the rate of drugged driving convictions [18].

Cannabis’ primary psychoactive component, THC, as well as its metabolite THC-COOH are increasingly detected in the blood and/or urine of fatally injured drivers but this could be due to an increase in cannabis use rather than cannabis playing a causal role in these crashes [22], [2]. Shinar examined four separate case control studies comparing the odds ratios of crash risk between drivers with positive cannabis detection and drivers with no drugs in their systems and concluded, “THC, to the extent that it is associated with increased crash risk, is probably not the cause of crashes, but a correlate of other risk-taking factors that go hand in hand with smoking marijuana” [3], [51], [53-55].

Cannabis use alone has not been shown to be associated with fault in culpability studies [49]. Epidemiological studies, for example, often find a correlation between cannabis detection and a significantly elevated crash risk but the significance of the correlation tends to be contingent on the extent to which other confounding factors are taken into consideration [56]. For example, in a meta-analysis, Penning et al. found the relationship between cannabis use and crash involvement tends to be non-significant whenever the positive presence of alcohol was factored into analysis [49]. In studies examining the relative crash risk of cannabis compared to other drugs or drug-combos, cannabis is often not associated with a statistically significant crash risk [55].

Anderson, Hanson, and Rees examined the effects of medical marijuana laws (MMLs) in 19 states and the District of Columbia and found support that marijuana and alcohol are likely substitutes [9]. MMLs are associated with a decrease in the probability of consuming alcohol and binge drinking as well as an 8-11% decrease in roadway fatalities. This effect is larger on fatalities involving alcohol than those not involving alcohol. The researchers concluded that “alcohol is the likely mechanism through which the legalization of marijuana reduces traffic fatalities” [9]. Since marijuana is typically used at home or in other private locations, they reasoned, “marijuana users are less likely to drive while impaired” [9].

Impaired Driving and Per Se/ ZT Laws

All 50 states and the District of Columbia have impaired driving laws that make it illegal to operate a motor vehicle while impaired by alcohol and/or drugs. While these laws vary in language, they all make impaired driving regardless of substance a crime and they all stipulate that a BAC of .08 or greater is alcohol impairment per se. A driver is generally suspected of being “under the influence” if they are observably exhibiting classic signs of impairment (e.g., running red lights, swerving, etc.). Existing impaired driving laws are built on behavioral evidence obtained by law enforcement via standardized field sobriety tests (SFSTs) or other means, e.g., video documentation. States are able to use these existing laws to prosecute drivers in cases where a BAC is not available (e.g., no BAC test performed, refusals, etc.) or the BAC is below the .08 per se limit. Likewise, states may also prosecute a driver of DUID if it can be shown, beyond a reasonable doubt, that the driver was observably impaired, that the drug was in the driver’s system and that there is a connection between the drug(s) detected and the observed impairment.

Supporters of per se laws for drugs argue the state’s burden of demonstrating the causal link between the detected drug and impairment is a “technically complicated and difficult task,”

and that such a “complex approach” to enforcement prevents the identification and prosecution of drugged drivers [57], [58]. Another claim is that per se laws for drugs make enforcing impaired driving laws more effective because they make prosecution easier [58], [59]. Like the per se alcohol laws for drivers under the age of 21, or the per se illegal limit law for drivers with BACs above .08, per se drugged driving laws make it illegal for individuals to operate a motor vehicle while having positive levels of impairing drugs or metabolites in the driver’s system.

As discussed throughout this literature review, there is no level at which most people are impaired by drugs. To get around this technicality, proponents of per se laws contend a zero-tolerance (ZT) approach is needed to control the problem [59-62]. In a recent commentary, Voas et al. argue that setting “thresholds for prosecution would send the nonsensical message that it is acceptable for a person to drive with certain amounts of illegal drugs in a person’s system” [60]. A majority of the states with per se drugged driving laws are of the ZT type. Under the more common ZT per se law, positive detection of any drug(s) or drug metabolites in a driver’s system—irrespective of actual impairment—is sufficient for conviction. Dupont et al. explain, “such laws are based entirely on chemical test results and do not require evidence of driver impairment” [59]. By relieving the state of proving a causal relationship, ZT per se laws “dramatically simplify the proof of a violation” [60]. Despite this assumption, there is no published research that provides evidence that ZT per se laws dramatically increase convictions.

In states with per se laws for drugs, a person may be prosecuted for criminal DUID without the state having to provide evidence of acute drug use or demonstrating proof of causality. The primary difference between the per se limit laws and the ZT variety is how trace amounts of active or inactive metabolites are effectively an admission of guilt. In states with cut-off points to establish limits, trace amounts would not meet the per se DUID standard. Some drugs and drug metabolites, particularly cannabis are detectable in a person’s system long after acute effects have worn off [3], [22], [63], [64]. In heavy users, some inactive metabolites such as Carboxy THC can remain present in the body for days or weeks after last use [64]. Even under the limits version of the per se law (such as e.g., Pennsylvania,) as little as 1ng/dL of cannabinoids detected in the blood could potentially result in a drugged driving conviction regardless of proof of impairment. Given the length of time drugs like cannabis may be detected in a person’s system following use and the variability of elimination time across individuals, Armentano states “the imposition of such limits may, in some instances, inadvertently criminalize behavior that poses no threat to public safety” [65].

Despite proponents' strong support for the ZT per se laws, there have been no empirical studies to date demonstrating their effectiveness, therefore these laws cannot be considered "evidence based" [58]. The lack of reliable longitudinal data on drugs and driving is a major impediment to evaluating drugged driving laws [66]. Ample research provides evidence supporting the efficacy of the 0.08 g/dL illegal alcohol limit, the ZT alcohol law, and the minimum legal drinking age law [67]. Very little is known about the efficacy of per se drugged driving laws.

Recent research finds no difference in fatality rates between states with per se drugged driving laws and states without per se laws [5]. There is also a lack of scientific evidence that the laws effectively increase arrest and prosecution rates relative to states without them [4]. Furthermore, the per se laws may not deter heavy drug users, who are more likely to pose the greatest threat to roadway safety. Heavy users may be more likely to be convicted of impaired driving in the first place, with or without per se drugged driving laws [5].

Compounding the lack solid scientific evidence regarding the efficacy of per se laws is the lack of uniformity in the legal language and enforcement practices across states. To date, 21 states have passed some form of a per se law. Thirteen of these states (Arizona, Delaware, Georgia, Illinois, Indiana, Iowa, Michigan, Minnesota, North Carolina, Oklahoma, Rhode Island, Utah, and Wisconsin) have ZT per se laws. North Carolina and South Dakota have ZT per se laws for drivers under 21. The remaining seven states (i.e., Colorado, Montana, Nevada, Ohio, Pennsylvania, Virginia, and Washington) impose quantitative limits on the amount of drugs that can be in the system before the driver is considered legally DUID. Some of them include metabolites, while others do not. A few of them (e.g., Minnesota) exclude cannabis, a number of them exclude cannabis metabolites but in most states with per se laws, even the metabolites in trace amounts would result in a no-contest criminal charge.

Table 3 displays a basic comparison of states with per se laws. As Table 3 illustrates, states have different versions of drugged driving laws. The language used to describe prohibited drugs varies considerably. Additional aspects about these laws (e.g., penalties, affirmative defenses, etc.) are presented in Appendix A but are referred to here. Across states with per se laws, the punishments associated with a first time drugged driving conviction range from the inconvenience of a license suspension and/or a fairly nominal \$150-\$300 fine (e.g., Wisconsin) to a life-changing mandatory prison sentence and fines up to \$5,000 (e.g., Pennsylvania).

In at least 11 states with per se laws, holding a prescription does not entitle one to an affirmative defense against the per se charge. Arizona and Delaware, two states with medical marijuana laws, allow prescriptions as an affirmative defense but not for prescribed marijuana. Even in states without per se laws, there are provisions in impaired driving laws that state having a prescription does not count as a defense to the DUID charge. In some states, e.g., Oklahoma, the law states that it is illegal for a person to operate a motor vehicle in the state with “any amount of a Schedule 1 chemical or controlled substance... or one of its metabolites or analogs” in their bodily fluids,” or if they are “under the influence of any intoxicating substance other than alcohol” [68].

Table 3
States with per se laws

State	Effective	Type of Law	Specifics
Arizona	Jun-90	ZT	Any controlled substances or their metabolites
Delaware	Jul-07	ZT	Illegal controlled substances and cannabis metabolites detectible within four hours of driving
Georgia	Jul-01	ZT	Any controlled substances including metabolites
Illinois	Aug-97	ZT	Intoxicating compounds, cannabis, any controlled substances and their metabolites
Indiana	Jul-01	ZT	Any controlled substances or their metabolites
Iowa	Jul-98	ZT	Any controlled substances (excluding metabolites except for Carboxy THC metabolites in urine above 50 ng/ml)
Michigan	Sep-03	ZT	Any schedule I controlled substances (excluding metabolites)
Minnesota	Aug-06	ZT	Any Schedule I & II controlled substance or their metabolites (excluding marijuana and tetrahydrocannabinols)
Oklahoma	Oct-13	ZT	Any intoxicating substance other than alcohol including THC and/or its inactive metabolites
Rhode Island	Jul-06	ZT	Any scheduled controlled substance (excluding THC metabolites in blood or urine)
Utah	May-94	ZT	Any amount of controlled substances or their metabolites
Wisconsin	Dec-03	ZT	Any detectable amount of a restricted controlled substance in the person’s blood (cannabis metabolites are excluded)
North Carolina	Dec-05	ZT/ ZT*	Any Schedule I controlled substances and their metabolites, not including cannabis (schedule VI) / For those under 21, any controlled substance or metabolites
South Dakota	2010	ZT*	Any detectible cannabis, cannabis metabolites, and other controlled substances for persons under age 21
Virginia	Jul-05	Per se limits	Any illegal substance (not including marijuana or metabolites) Limits for cocaine, methamphetamine, phencyclidine, & MDMA
Washington	Dec-12	Per se limits	THC in blood 5 ng/ml
Montana	Oct-13	Limits THC	THC in blood 5 ng/ml
Nevada	Sep-03	Per se limits	THC limits 10ng/ml in urine, 2ng/ml in blood; THC metabolites 15ng/ml in urine, 5ng/ml in blood

Ohio	Aug-06	Per se limits	THC limits 10 ng/ml in urine, 2 ng/ml in blood; THC metabolites 35 ng/ml in urine, 50 ng/ml in blood; THC metabolites in combination with alcohol or another drug 15 ng/ml in urine, 5 ng/ml in blood
Pennsylvania	Feb-04	Per se limits	Any Schedule I drug, THC limit is 1 ng/ml (metabolites only require proof of impairment)
Colorado	Jul-13	Limits THC	THC in blood 5ng/ml
*ZT for drivers under 21 years of age			

Summary of Conclusions Drawn from Literature

At this point, extensive inconsistent findings and a relative lack of clarity regarding the effects of various drugs on driving abilities and crash risk across individuals in the population are a major limitation for setting sound policy about drug-impaired driving. More research is needed to fully understand the extent of the drugged driving problem in terms of its prevalence and crash risk. More research examining the role of drugs in fatal crashes as well as the impact drugs have on crash risk, particularly when alcohol is also a factor, is necessary to fully understand the magnitude and extent to which drug-impaired driving should be treated as a special case of impaired driving.

Data Collection

In this section, the data collection sources, processes, and methodologies used in analysis for this project are briefly described. One of the objectives of this study is to assess the availability of data from drug tests from various sources of data such as the Louisiana State Police crime lab and the trauma centers, and to develop a strategy for improving data collection of drugged drivers. Another objective is to study impediments to a ZT/per se law in Louisiana, which can be identified by conducting interviews with prosecutors, law enforcement, defense attorneys and the general public. The first section focuses on methods tied to the former, the second explains methods for the latter.

Due to underreporting of drug involvement in existing data, there is very little known about the frequency of drugged driving and how it affects public safety. The majority of the data collected for this study consisted of secondary sources; however, primary data via interviews using survey research methods are also collected. First, the secondary sources of data are discussed and the data sets analyzed are describe. Second, the survey research methods and the sampling procedures and questionnaire construction for the target populations are discussed.

Secondary Data Analysis

In general, drugged driving data are not systematically collected, which presents clear limitations to analysis. The ordering of additional drug tests is not standard protocol in most jurisdictions, particularly when alcohol is detected; therefore there are no sources of complete data. A variety of secondary sources of data for analysis to examine the frequency and risk associated with drug-impaired driving was collected. The sources of data and the potential insight they may provide are briefly described:

FARS. The Fatality Analysis Reporting System (FARS) collects information about all crashes on US public roads resulting in one or more fatalities within 30 days of the crash. While a high proportion of fatally injured drivers are tested for alcohol as required by state law, drug tests are administered much less frequently, resulting in underreporting of drug involvement in fatal crashes [58]. Currently there are ten states in FARS that report that a drug test was performed on 80% or more of their fatally injured drivers [69]. An analysis of these data will be used to develop a model to estimate the current drugged driving level in the US. The data used for this analysis includes the years 2001 to 2013.

Louisiana State Crime Lab. The Louisiana State Crime Lab data consists of two years (2013-2014) of blood and urine samples taken in some DWI arrests, crashes, or fatality crashes in Louisiana. The crime lab does not currently quantify the levels of drugs in drivers' systems. Toxicology screens (usually on urine) are primarily confirmatory tests for determining the presence of any substance or its metabolites. Thus, there is no way to determine when the driver took the drug from a toxicology screen.

COBRA. The Louisiana Computerized Online BReath Archiving system (COBRA) data monitors Intoxilyzers out in the field. Data are gathered from the instruments throughout the state of Louisiana and downloaded into a central archive. The Louisiana COBRA data provide information on drivers that failed the SFST and were subsequently arrested and tested for alcohol using the Intoxilyzers. The instruments report the BAC at increments of 0.001. Since about 14% of the drivers who failed a SFST and were subsequently arrested test BAC=0, these drivers may have used drugs instead of alcohol. Initial inspection of the frequency distribution of zero BAC by age shows a bathtub curve indicating that youths and seniors have a higher frequency of zero tests. Different frequencies of this occurrence for age and gender and region will be used to develop profiles for drugged drivers due to drugs detected. The COBRA data will also be matched with conviction records on the driver license file to assess conviction frequencies of impaired drivers with zero BAC, low BAC, or BAC above the legal limit.

Louisiana Crash Data. The crash data are a census of all crashes occurring in Louisiana. The data used for this study span over the time period 1990 to 2014. The data are collected by the Highway Safety Research Group (HSRG) at LSU.

Interim LSU Level 1 Trauma Center Data. The hospital data from the Interim LSU Level 1 Trauma Center Data consists of 3,615 drug tests performed on individuals in motor vehicle crashes that were treated at the LSU Trauma Center between 2005 and 2014.

My Student Body. LSU requires each year's entering class and transfer students to complete an online health education course called *MyStudentBody Essentials*. The course is structured around a self-assessment survey. MyStudentBody is a nationwide subscription-based program for college students that was developed with tested with over \$9.7 million in grant funding from the National Institutes of Health. The MyStudentBody website describes the *Essentials* course as "a prevention education course intended for incoming students... [covering] the three most significant behavioral risks new college students face: alcohol, illicit and prescription drugs, and sexual violence" [70]. One module of the survey includes drug use of freshmen. The data analyzed here include surveys from 2010-2014.

Survey Analysis

Another objective of this study is to identify obstacles to a ZT/per se law for drugged driving in Louisiana. The researchers developed series of survey instruments based on the literature to gain insight into the perspectives of district attorneys, defense attorneys, law enforcement personnel, and the general public. The self-administered questionnaires were programmed using Qualtrics data collection software and featured a combination of open and closed-ended items about legal and implementation issues that were uniquely tailored to the target populations. All of the survey instruments were approved by LSU's institutional review board in advance of data collection (see Appendix B for details). The data collection period lasted from late December 2014 until mid-March 2015.

Sampling Procedures and Data Collection

There were a number of factors that affected sampling procedures in this study. First, while it would have been ideal to obtain representative samples of all the target populations, it was not realistic. Random sampling was not a viable option for the target populations in this study. This was especially true for reaching the prosecutors, defense attorneys, or law enforcement personnel, where it was not possible to obtain an up-to-date contact list of all practicing attorneys or law enforcement officers with experience dealing with drug-impaired driving cases. Thus, the population parameters for the target populations are unknown and findings cannot be generalized. Second, even though it is possible to estimate the population

parameters of the general public, attaining a fully representative sample for the online survey was not feasible given available resources in relation to the study objectives. All sampling procedures and distribution techniques for each of the target groups are explained in further detail below.

District Attorneys. The Louisiana District Attorney Association (LDAA) agreed to distribute the link to the online questionnaire to its members. The sample consists of prosecutors and assistant prosecutors.

Defense Attorneys. There are no lists or distribution options readily available through which defense attorneys could be reached. With the assistance of a graduate student, the researchers employed a multi-step process to construct a contact list using publicly available information. Justia.com offers a “lawyer directory” where attorneys are provided free profiles so that they may be looked up by practice area and by parish or city location. The most applicable practice area was “DWI.” From there, all of the attorneys who specialize in DWI law appeared for the state. The contact information in the profiles did not contain email addresses, but did contain full address and telephone information. Also, it cannot be assumed that all information on Justia was up-to-date or accurate. It was necessary to confirm this information with the Louisiana State Bar Association (LSBA). In accordance with Louisiana Supreme Court Rule XIX, the LSBA maintains an online membership directory containing current contact information for active members of the Louisiana State Bar Association and e-mail addresses for many of the attorneys listed in Justia’s lawyer directory. The attorney contact information was confirmed to ensure it matched the LSBA record and the data entered into an Excel spreadsheet. As a matter of professional courtesy, printed letters were mailed to each attorney to notify them in advance that they would receive an email with a link to the study.

Police. The HSRG maintains a listserv email contact list for individuals in law enforcement agencies throughout Louisiana using LACRASH electronic motor vehicle crash reporting software. The listserv contains email addresses for officers of all ranks as well as administrative personnel including information technology staff in roughly 190 different agencies. The researchers included in the email a request to all non-officer personnel to please forward the survey to officers in their agency.

General Public. The researchers obtained a sample of the general public through Qualtrics Panels. Due to the opt-in nature of Internet survey panels, it is not possible to obtain a truly random, representative sample. Even though Qualtrics made an attempt to obtain a sample as representative as possible, their ability to do so is limited to those who

have opted-in to participate. Thus, individuals were self-selected. There was no financial or material incentive offered in exchange for participating in this study.

Questionnaire Construction

In the early stages of questionnaire construction, a set of criteria that each questionnaire needed to address was developed. For attorneys, this primarily consisted of gathering insight into their experience with existing laws and their perceptions of the frequency of drugged driving cases today, relative to their past experience. The researchers needed to obtain insight into their beliefs and opinions about per se laws and the efficacy of per se laws across a number of outcomes they are presumed to affect. The researchers also needed to have an understanding of the obstacles they currently face in defending and prosecuting drugged driving cases under existing laws, and their beliefs about how a per se law might impact case outcomes. Because the prosecution and defense represent opposing positions in and of themselves, the researchers asked a series of agree/disagree Likert scale items to compare and contrast responses. For police, the interest was in understanding how often they encounter drivers they suspect might be driving under the influence of alcohol and/or drugs, how often they make impaired driving arrests and the percentage of those where the driver has a BAC above the .08 per se level, when and under what conditions they are most likely to seek chemical testing for drugs other than alcohol, and what issues they experience in investigating drugged driving cases.

The researchers had to contend with a couple of factors when creating the questionnaire for the general public. First, unlike attorneys and police, it could not be assumed that the public has any knowledge about per se drugged driving laws, or even Louisiana's existing impaired driving law. It has been well established in the social sciences and public opinion research that the average citizen tends to be relatively uninformed about government and political affairs. Second, the reality that respondents may not put forth sufficient cognitive effort to consider the complexity of the issue had to be addressed. While the latter is a concern in any survey research study, it is especially a concern when it is difficult to simplify the topic without introducing bias. People typically respond to survey items with "top of the head" responses based on whatever relevant criteria most salient to them at the time [71]. In order to avoid bias in the responses the survey needed to avoid using overly simplified and loaded language. It was also critical to avoid framing the issue of drugged driving in any particular way in the question wording or ordering to minimize response error.

The researchers examined public perceptions of drugged driving by measuring "top of the head" responses about "drugged driving" and impaired driving in Louisiana (in general). Since it is possible individuals taking the survey lack familiarity with existing laws, an item

that provided the text of Louisiana's existing impaired driving law (RS 14:98) followed by a true/false question had to be included (It is currently illegal to operate a motor vehicle while impaired by drugs in the state of Louisiana). They had to answer correctly to move on in the survey, thus this item served as a validation measure to help ensure data quality. The last portion of the survey collected responses to a set of Likert scale statements about drugged driving (e.g., laws, perceptions of problem, etc.).

Throughout the survey, a number of items that might explain the basis for their judgements was included. Some of them were included at the beginning of the survey before getting into the topic of drugged driving laws. The survey asked about their prior crash experience, their overall concern about impaired driving, and the degree of the problem drugged driving poses to safety, relative to other dangerous driving behavior like texting or falling asleep, and whether or not they have seen any reports on drugged driving in the media. The survey also asked about their level of familiarity with the effects of commonly used drug types and whether or not they were currently taking a drug with the potential to affect driving abilities. At the end of the questionnaire, questions about their political perspectives, level of education, age, race/ethnicity, income level, sex, and zip code were included. Please see Appendix B for copies of all questionnaires used in this study.

DISCUSSION OF RESULTS

In this section, the results from the secondary data analysis followed by the results from the survey interviews are presented. The findings are discussed throughout this section.

Data Analysis

The scope of this data analysis includes the prevalence of drugged driving in Louisiana, and where data permit (e.g., FARS), other states. The study relies on observational data including drug tests from crashes, crime lab results, lab test results from a hospital and self-report surveys, of which there are many limitations. Consequently, there are considerable limitations to this study. First, it is not possible to obtain an unbiased estimate of prevalence of drugged driving without designing a randomized roadside survey and testing all drivers selected. A roadside survey is beyond the scope of this research and the resources available. Second, this research uses available data to gain insight into risks associated with drugged driving, however, it must be noted from the outset this portion of analysis is not generalizable to the broader population. There are many limitations. The data are observational and selection biases must be taken into consideration. Each dataset is discussed in detail and selection biases are addressed. Many of the sub-sections contain embedded hyperlinks to interactive dashboards which may provide additional context for the analyses presented here.

Fatality Analysis Reporting System (FARS)

The Fatality Analysis Reporting System (FARS) is a census of all fatal motor vehicle crashes on public roads in the United States, collected by NHTSA. The information collected through FARS includes several variables pertaining to drug involvement in fatal crashes which include: drugs reported by law enforcement, whether driver(s) were tested for drugs (i.e., test status), and drug test results. FARS data are not suitable for estimating the prevalence of drugged driving or risk assessment of drugged driving due to inherent selection bias. Only drivers involved in fatal crashes are included in the reporting system. Additionally, there are substantial limitations to interpreting FARS data, due to the lack of consistent uniform reporting and drug testing by states and jurisdictions [37]. Accordingly, this analysis concentrates on evaluating drug involvement and testing reported in the crash report.

Drug Involvement Reported by Law Enforcement. The data element (Drugs) is a person-level element; according to the 2011 FARS Coding and Validation Manual, “this data element reflects only the judgment of law enforcement as to whether drugs were involved or not for this person” [72]. The dashboard, which is accessible through the hyperlink in this subsection’s header, shows the percentage of drugs reported for each state from 2001 to 2013

for all drivers that died on the scene or en-route to the hospital. Several trends are observed. First, while officer-reported drug-involvement in the US (as a whole) has increased from 2001 to 2013, the increase is not consistent. The reported drug-involvement in Louisiana reached a high of 6.36% in 2010 but dropped down to 2.86% in 2013. Louisiana ranked 37th lowest in the nation with respect to reported drug involvement among fatally injured drivers in 2013. Louisiana fatality records (FARS) show that from 2008 to 2013 the reported drug involvement declined from 81 to 34.

FARS reports up to three sets of variables describing a drug test and the result: test status, test type, and test result. Test status identifies whether a test was given, refused or not given, not reported, or unknown. The type of test is either blood, urine, unknown, other, not reported, or unknown if tested. The test results are coded using a three digit number. The drugs and their respective codes appear below in the following table:

Table 4
FARS drug codes

Code Range	Drug Category
100-295	Narcotic
300-395	Depressant
400-495	Stimulant
500-595	Hallucinogen
600-695	Cannabinoid
700-795	Phencyclidine (PCP)
800-895	Anabolic Steroid
900-995	Inhalant
996	Other Drug
997	Tested for Drugs, Results Unknown
998	Tested for Drugs, Drugs Found, Type Unknown/Positive
095	Not Reported
999	Unknown If Tested

Tested for Drugs. States generally report a high rate of testing for drugs in FARS, e.g., Louisiana reported a 60% rate of testing for drugs in 2013. But this high rate of reported drug testing is not supported by the drug test results variable. Very few of the reported drug tests are based on blood or urine evidence and thus not many actual drugs are reported. Thus using the ‘tested for drugs’ field in FARS is not a reliable indicator of actual drug tests and studies using this field may lead to considerable bias in the estimates of drug use.

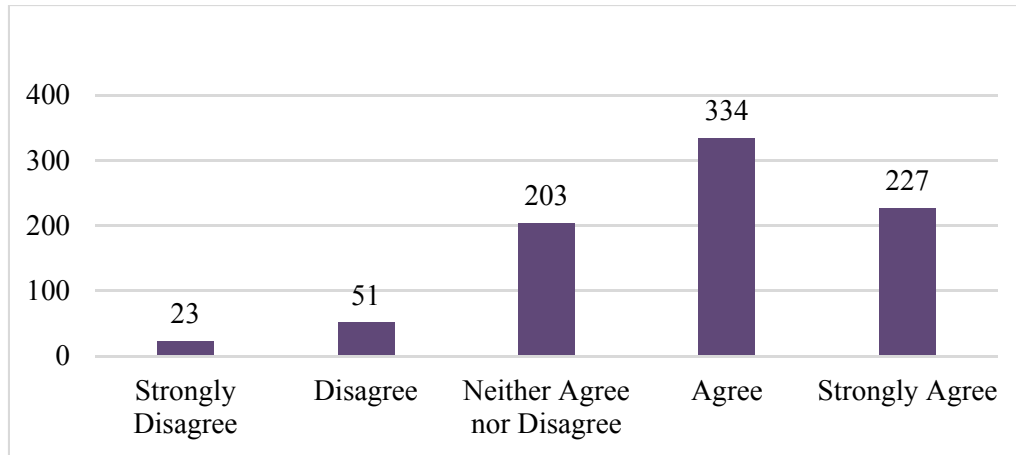


Figure 16
Drivers who take drugs are a threat to public safety

Figure 17 shows the response distribution for the statement “Prescription drugs pose as much threat to public safety as illegal drugs.” Similar to the previously reported item, respondents generally agreed with this statement. About 60% expressed some degree of agreement, 16% expressed disagreement. There were two groups where there were statistically significant differences between agreement: race, with whites expressing less agreement than minority races ($z=-2.178$, $p= 0.029$); and respondents reporting relatively high concern about impaired driving expressed stronger agreement than those relatively less concerned ($z = 3.147$, $p = 0.002$). Differences approaching statistical significance (i.e., $p < 0.10$) exist between those taking medications ($z= -1.711$, $p= 0.087$) who expressed less agreement and those who reported seeing media about drugged driving ($z= 1.826$, $p = 0.068$) who expressed slightly stronger agreement.

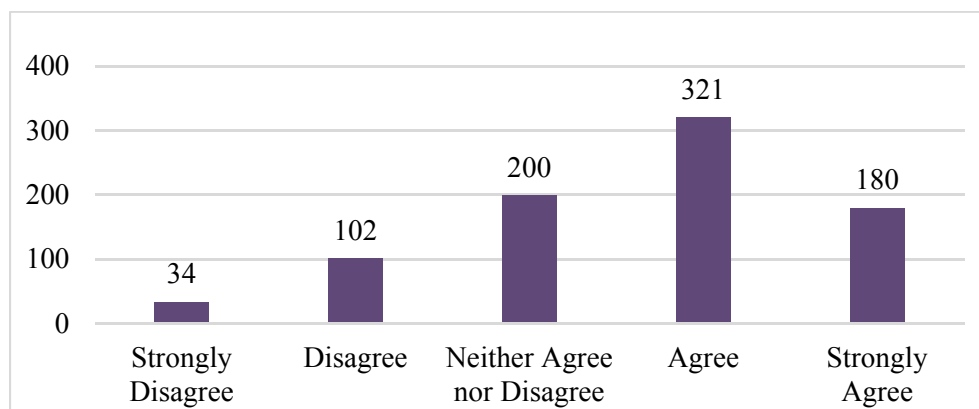


Figure 17
Prescription drugs pose as much threat to public safety as illegal drugs

Figure 18 displays the response distribution for the statement: “Some drugs might improve a person's driving abilities rather than impair them.” There was less agreement on this item than the previous items ($M=2.84$, $SD=1.11$). About 36% expressed disagreement. About 35% neither agreed nor disagreed. There were statistically significant differences in agreement between several groups. Respondents currently taking medications express stronger agreement than those who are not currently on such medications ($z= 2.877$, $p= 0.004$). Those with relatively less concern about impaired driving expressed stronger agreement than those with high concern ($z= -4.084$, $p= 0.00$). Also expressing stronger agreement are those who did not recall seeing any media reports on drugged driving ($z= -2.872$, $p= 0.004$) and respondents with higher educational attainment ($z= 2.122$, $p= 0.034$). Age differences between younger and older respondents were approaching statistical significance ($z= 1.885$, $p= 0.059$) with millennials expressing stronger agreement than older adults.

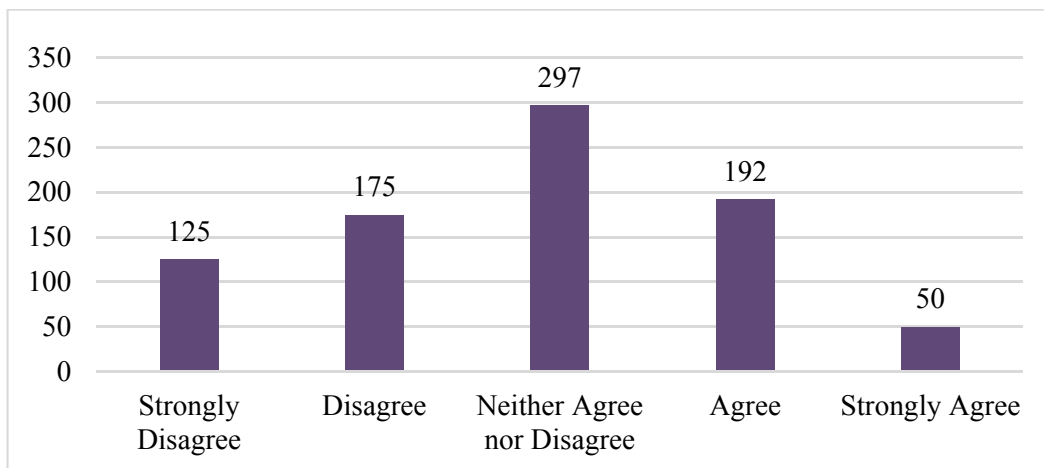


Figure 18
Some drugs might improve a person's driving abilities

As Figure 19 illustrates, about 50 percent of respondents agreed or strongly agreed with the statement: “Making it a crime to drive with drugs in one’s system will make the roads safer by keeping them off the road.” However, there were statistically significant differences in how various groups responded. Perhaps expectedly, respondents who are very or extremely concerned about impaired driving expressed significantly stronger agreement ($z= 3.813$, $p= 0.00$); respondents currently taking medications expressed significantly stronger disagreement ($z= -4.582$, $p= 0.00$). Older respondents expressed slightly less agreement than younger respondents which is statistically significant ($z= 2.136$, $p= 0.033$); as were white respondents relative to non-whites ($z= -2.373$, $p= 0.018$).

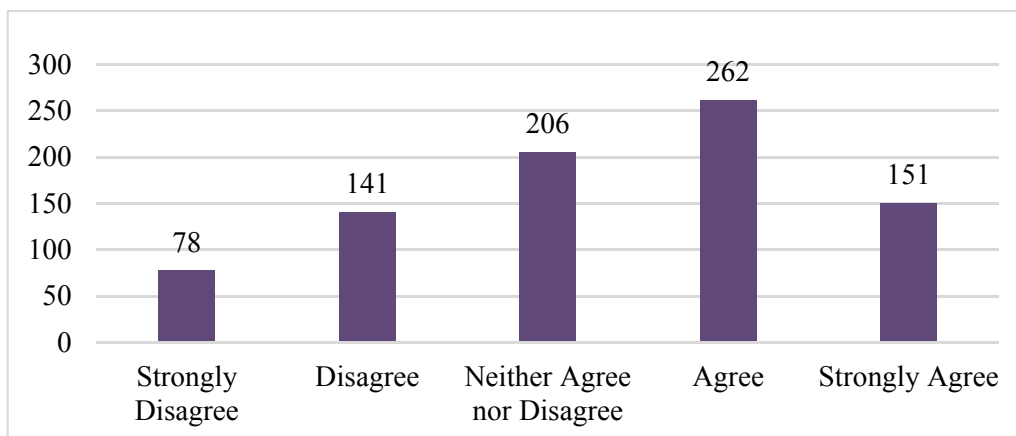


Figure 19
Making it a crime... will make roads safer by keeping drug users off the road

Figure 20 displays the response distribution for the statement: “Drivers should not be charged with DUID unless they are clearly impaired.” Slightly over 50% agreed or strongly agreed. There were statistically significant differences in agreement between several groups: those taking medications express stronger agreement than those who are not ($z= 3.681, p= 0.00$); also expressing stronger agreement are those with relatively less concern about impaired driving ($z= -2.293, p= 0.022$); those who did not recall seeing any media reports on drugged driving ($z= -2.617, p= 0.009$); and those with less educational attainment ($z= -2.769, p= 0.006$).

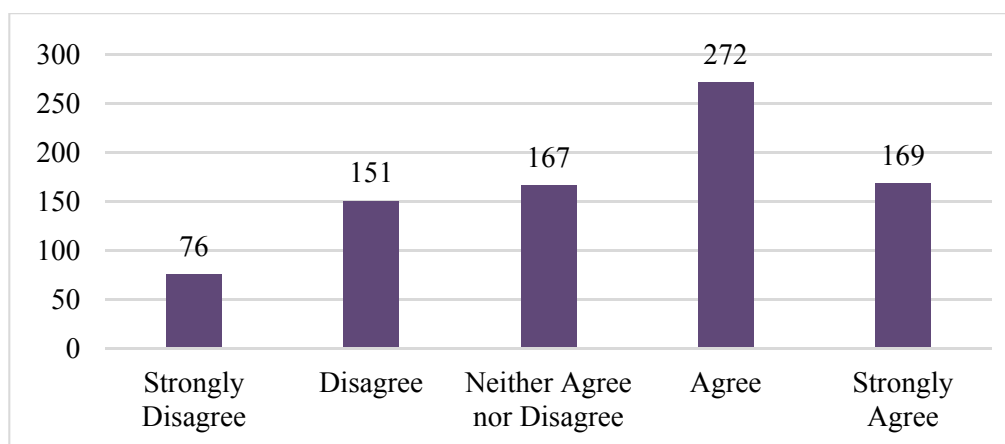


Figure 20
Drivers should not be charged with "DUID" unless they are clearly impaired

Drugged Driving Laws. Just under 25% of the sample expressed disagreement with the statement: “There is no need to pass a new law targeting drugged driving because it is already a crime under existing law.” There were statistically significant differences among men and women, with men expressing stronger levels of agreement than women ($z = -2.221$, $p = .026$). Those taking medications were expressed stronger agreement than those who are not ($z = 2.911$, $p = 0.004$). Those who claimed to see a media report about drugged driving expressed significantly less agreement ($z = -2.764$, $p = .006$) as well as those who are very or extremely concerned about impaired driving ($z = -3.164$, $p = 0.002$).

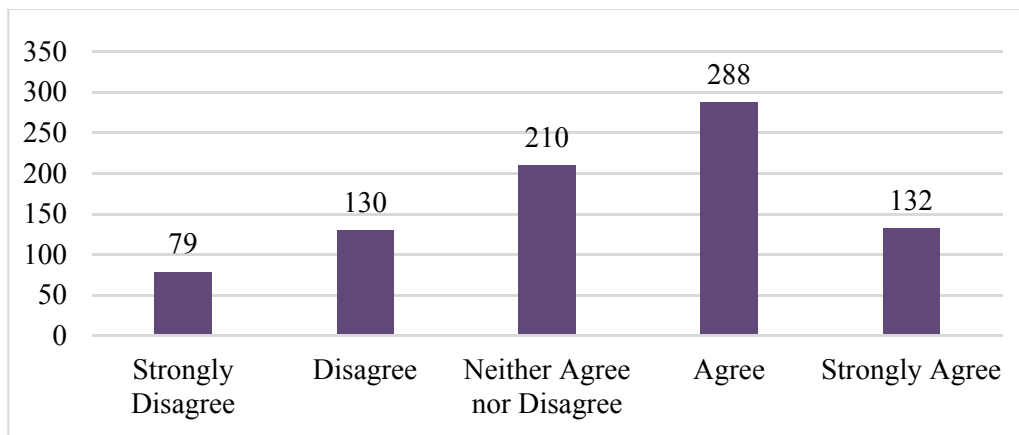


Figure 21
There is no need to pass a new law targeting drugged driving

The last two statements ask about ZT laws. The response distributions appear in Figures 22 and 23 (below). In reference to Figure 22, about 47% of the sample expressed some degree of agreement with the statement: “If Louisiana adopts a ZT drugged driving law, the law will be enforced fairly across the population regardless of race, gender, age, etc.” Non-white respondents expressed slightly less agreement than whites however this difference was not statistically significant. There were statistically significant differences between women and men, with men expressing significantly less agreement than women ($z = 2.286$, $p = .022$). Respondents currently taking medications expressed less agreement with that statement than those who aren’t taking medications ($z = -2.574$, $p = 0.01$). Those who are very/extremely concerned about impaired driving were of stronger agreement than those with relatively less concern ($z = 4.068$, $p = 0.00$). Respondents with higher educational attainment expressed less agreement than those with lower education ($z = -2.528$, $p = 0.011$).

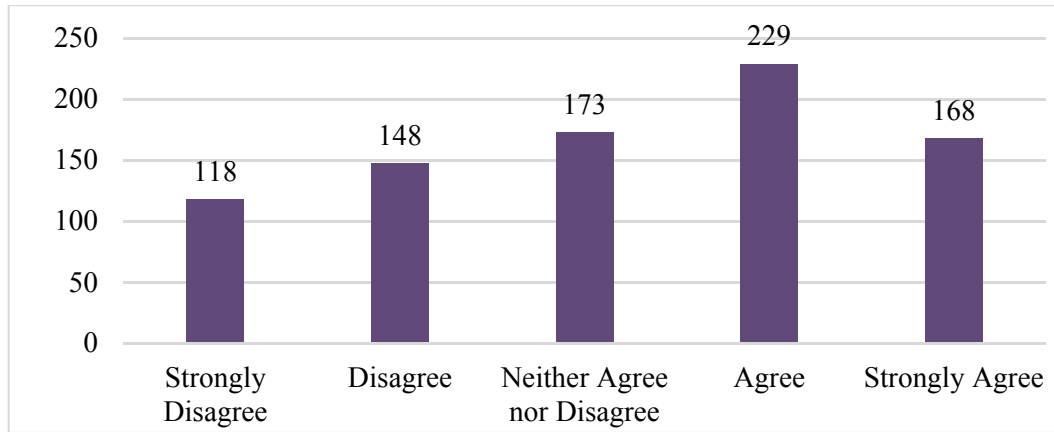


Figure 22
If LA adopts a ZT DUID law it will be enforced fairly across the population

As Figure 23 illustrates, about 41% of the sample agreed or strongly agreed with the statement: “ZT per se drugged driving laws are fair.” Those taking medications expressed significantly less agreement than those who are not ($z = -3.78, p = 0.00$). Non-white respondents had slightly more agreement than whites ($z = -1.997, p = .046$). Respondents stating they had seen a media report about drugged driving expressed stronger agreement than those who had not ($z = 2.297, p = .022$) as well as those who are very or extremely concerned about impaired driving ($z = 3.355, p = 0.001$). Respondents with higher education expressed slightly less agreement than those with lower educational attainment, which approaches significance ($z = -1.716, p = .086$).

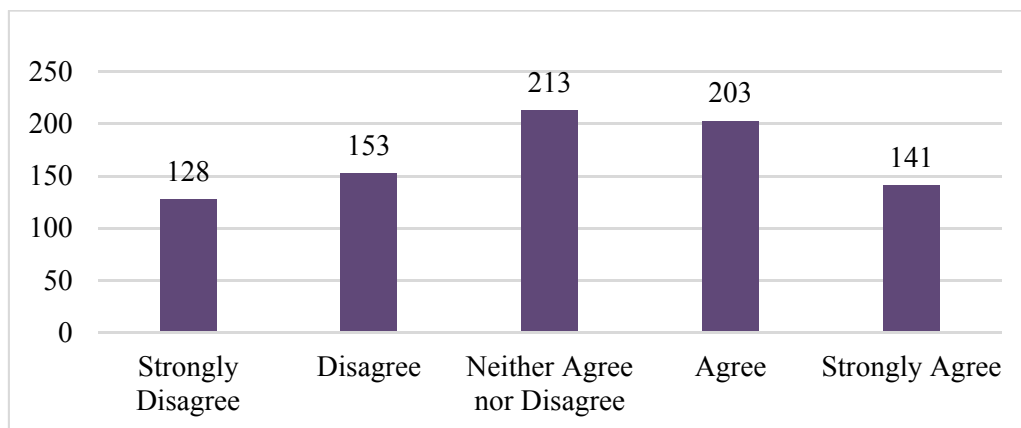


Figure 23
Zero-tolerance per se drugged driving laws are fair

Summary

The general public in this sample express a range of opinions about drugged driving and per se laws. Since this is a nonprobability sample that is considerably under-representative across demographics, the findings cannot be extrapolated to the Louisiana population. Specifically, the sample over-represents the opinions of middle-aged, white women who report a particularly heightened concern about impaired driving. The nonparametric tests provide some insight into group differences across most of the opinion items, suggesting the public is quite divided. The differences, rather than the level of agreement with the statements, provide greater insight into socio-cultural factions that would likely be more pronounced with a representative sample. Additionally, there are important differences in how the public responded to the familiarity with the effects of commonly used drugs. The statistically significant differences in age (i.e., millennials, older non-millennials) suggests generational differences. Across all of the drug categories but narcotics and allergy medication, younger people have higher levels of familiarity.

CONCLUSIONS

Despite the inherent limitations to studying “drugged driving,” this report provides important insight into the state of knowledge surrounding the issue and identifies specific areas most warranting attention. There are two primary areas of focus: the frequency of (and risk associated with) drugged driving in Louisiana and elsewhere, and the efficacy of per se laws for drugged driving as well as the obstacles to such laws. The conclusions are presented very general and revolve around consistencies in the analysis that can help inform future data collection and approaches to managing this issue.

Prevalence and Risk

As discussed throughout the results this study, firm conclusions about the prevalence of drug-impaired driving or the crash risk associated with drug use cannot be drawn. Only a randomized experiment would make it possible to obtain an unbiased estimate. Even if the resources to do this were made available, there are inherent limitations to doing so. While observational data such as the National Roadside Survey allow some conclusion about prevalence of drug use among drivers, roadside surveys do not provide for inferences regarding crash risk or whether or not a driver was impaired by the drugs in their system. Unlike alcohol, the effects of drugs on people and their driving abilities are not universal and depend heavily on individual factors that vary.

Despite data limitations, this study provides an initial baseline of the relative frequency of drug-impaired driving in Louisiana. The limitations, in and of themselves, provide important insight into how the state should proceed from here. These include the lack of data available on drug use, specifically in the context of drug-impaired driving for the nation as well as Louisiana. In 2013, only five states had testing rates (i.e., blood or urine) of more than 50% for fatalities who died on-scene or en-route to the hospital. Louisiana had one of the lowest at 1%. The analysis of the FARS and crime lab data suggests that best practices should be developed for the consistent use of drug testing throughout the state and the nation.

The analysis of the Crime Lab data, as well as the interviews, helped to point out areas of attention for law enforcement and prosecutors. The analysis indicates disparities across the state in both the frequency and quality of drug tests, which also reflect a lack of standardized procedures and resources. Moreover, a few parishes represented a disproportionate number of DUID arrests. This prevents drawing conclusions from the data about prevalence of drug-impaired driving for the whole state. While it is possible there are parts of the state where

drug-abuse and DUID may be more prevalent, this cannot be determined based on the parish data.

With the exception of Jefferson Parish, most parishes rely on urine tests. There is a large difference in drug testing and evidence type between parishes and an over-reliance on urine tests, which are generally not sufficient to establish that the driver is impaired. There is a greater risk of false positives and the elimination time of many drugs means they will show up in the drug screens days or weeks after use. Only blood tests can indicate recent use. This finding suggests that more needs to be done to establish statewide guidelines for best practices in drug testing.

There are some general observations that can be made about drivers which could serve as hypotheses for future studies as more data becomes available. First, the analysis of the Crime Lab data suggests the drivers being *arrested* for drug-impaired driving are generally drivers that pose a higher safety risk. These drivers have higher prior arrests for DWIs than other drivers as well as higher incidence of prior speeding and crash involvement. In general, a high percentage of drivers that tested positive for drugs also had prior DWI arrests with BAC=0. There is also indication that the drivers who tested positive for any drug have a higher prior DWI arrest rate with BAC between 0.01 and 0.079 than all other drivers. These associations suggest that when drivers fail the SFST and present clear signs of impairment without a BAC (or below the per se limit), the driver should be tested for drugs. The prior DWI arrest rate with BAC above the legal limit is about 4 to 11 percentage points higher for the drivers that tested positive for drugs than other drivers. The difference is highest for drivers testing positive for narcotics and stimulants. Drivers who tested positive for cannabinoids had a lower frequency of prior crashes and about the same frequency of prior speeding tickets as users of “other” prescription drugs.

Zero-Tolerance Laws

The evaluation of ZT/per se laws for drugged driving cannot be separated from analysis about prevalence and risk associated with drug use among drivers. One of the greatest hindrances to evaluating the prevalence and crash risk associated with drugged driving is the lack of complete and reliable data. It is difficult to verify that drug-impaired driving is on the rise without longitudinal analysis. FARS data should be used with caution because the percentage of tests based on oral fluid, urine or blood varies a great deal between states and is much lower than indicated by the percentage of tests performed. Comparing FARS data with the National Roadside Survey data may thus lead to severe biases in estimates. While New Hampshire, Colorado and Nevada had the highest percentage of blood and urine evidence for

drug use, there is no indication that states with a per se law for drugs have higher testing of drivers in fatal crashes than states without per se law. The researchers do not know about convictions in these states, but there are fewer tests in fatal crashes being conducted.

To date, the literature does not provide any evidence that ZT/per se drugged driving laws are effective at reducing drug-impaired driving or improving public safety. For one, there is a serious lack of reliable longitudinal data. This factor alone presents a substantial impediment to evaluating laws and policies targeting drugged driving. Thus as a matter of traffic safety or public health policy, ZT/per se laws for drugged driving cannot be considered “evidence-based.” Necessarily, the primary purpose behind per se DUID laws may be to make convictions easier for the state to obtain, however, there is no data collected on case factors and outcomes/dispositions to verify or test the hypothesis. While prosecutors in this study tended to favor them, they did not find them necessary for obtaining convictions. Interestingly, both defense attorneys and prosecutors tended to express low confidence in the per se law’s efficacy in improving public safety.

From a practical standpoint, the overall lack of training, resources, and testing capacities in Louisiana (and other states) does not provide the infrastructure necessary to enforce a per se law for drugs. First, police do not have sufficient resources. Second, there are no objective levels at which all people are impaired by drugs. Because drugs affect individuals differently, it is not possible to objectively measure impairment with chemical tests. Drugs prescribed by a physician to treat/manage chronic conditions such as ADHD, pain, anxiety, etc. may even improve a person’s driving. The challenges associated with determining when and how drugs impair driving abilities makes shifting the burden of proof solely to chemical results problematic.

Characterizing Drugged Driving

The analysis of the crime lab data suggests that the problem of drugged driving should be addressed as a behavioral drug abuse issue rather than a general drug-use issue. Drivers arrested for DUID exhibit a history of unsafe driving behavior at higher rates than all others in the driving population. Characterizing drugged driving as a technical offense (i.e., per se drugged driving) may result in unintended consequences like wrongful conviction of drug-positive drivers that are not actually impaired. The findings suggest that high risk drivers should be the focus of characterizing the problem of drugged driving, rather than drug use and prevalence among the population.

RECOMMENDATIONS

There are many steps that can be taken to improve the quality and collection of data, and ultimately, the adjudication of drugged driving cases. The recommendations are presented as follows:

- Increase testing of drivers in zero or low BAC in DWI arrests: With limited resources, a logical place to start would be to test drivers failing SFST with low or negative BACs for drugs collected from breathalyzers. A high percentage of drivers arrested for drugs had prior DWI arrests with low or zero BAC. Testing these drivers for drugs may reveal a high percentage of drug use. Handheld equipment for drug screening could be beneficial for deciding when to collect further blood evidence.
- Improve the collection of blood evidence: Law enforcement is the primary link in collecting quality data on impaired drivers. The use of urine in testing should be replaced with blood wherever resources allow and tests should quantify the amount of substances in the blood. A urine test showing traces of cannabinoids that may have been taken weeks ago is not the same as a blood test showing, for instance, 10ng/dl of cannabinoids as a direct result of recent use. Even though there are no levels in existence to determine impairment, quantified levels have probative value that will assist in the adjudication of drugged driving cases. One way to assist officers with this task is to provide on-site screening devices that can detect the presence of drugs using oral fluids. While these devices cannot be used to prove impairment, they are useful in aiding the officer in determining whether or not a drug test should be conducted.
- Improve the collection of supporting evidence for impairment: The interviews indicate the reliability of officer testimony and documentation of other evidence is critical to determining when conviction is warranted. Video recordings of the SFST being performed and whenever possible, recordings of the suspect's driving are important sources of evidence that provide third party evaluation. To establish reliable testimony, officers should prepare clearly written, thoroughly documented reports of the investigation. Quality reports and supporting evidence (including—but not relying—on drug test results alone) are the foundation of a DUID case that enable prosecutors to better evaluate evidence to determine the appropriate course of action. The importance of the police report and documentation of evidence cannot be overstated, particularly in situations where the defendant refuses to submit to

chemical tests or if testing is not possible for whatever reason. Even with test results, the outcome of a case hinges on the investigation as a whole. Efforts to improve drug testing should be part of efforts to improve collection of evidence overall.

- **Improve training:** More training is needed to prepare law enforcement to recognize signs of drug impairment. In the interviews, officers expressed a desire for appropriate training. Time is a critical issue in impaired driving cases if drug testing is deemed an appropriate follow up. Officers trained to investigate drug use among drivers will collect better evidence to establish a DUID case, whether it be physical, behavioral or chemical. If DREs are more readily available, it follows that the type of drug can be identified and confirmatory tests can be conducted. Confirmatory tests are more probative than toxicology screens and can better assist the state in meeting the burden of proof. In the absence of a DRE, officers could use portable saliva screens to help determine what drugs should be confirmed in the test, but these devices should supplement, not supplant, officer training. Refresher courses on performing the SFST for both drugs and alcohol should be regularly offered to ensure these tests are performed correctly.
- **Enhance training and use of forensic toxicologists:** In addition to improving the quality of evidence and quantifying the levels of drugs in the blood, the state should increase the use of expert forensic toxicologist testimony in DUID cases. Qualified expert forensic toxicologists provide interpretation of the toxicology results, which can better assist prosecutors and the adjudication process. To be qualified as an expert, forensic toxicologists need additional training in pharmacokinetics, pharmacodynamics, and pharmacology as it relates drug-impaired driving. For example, a toxicologist with qualified expertise in these areas can provide testimony about the type and amount of drug(s) detected in the defendant, such as whether or not the type and amount would be capable of causing the degree of impairment observed by the police, or they can interpret whether the toxicology results are consistent with therapeutic drug use or drug abuse. Prosecutors would benefit from working with forensic toxicologists to better understand the technical aspects of drug testing in DUID cases. Prosecutors may also benefit from working with DREs and police investigators to better understand how the signs and symptoms observed at the scene correlate to toxicology.
- **Develop best practices:** There is a need for statewide guidelines establishing best practices for type of evidence collection regarding drug testing. Toxicology tests

should include the amount of substances detected to improve both the quality of evidence and data quality in general. Developing policies at the state-level will improve the consistency of evidence collected and the quality of data on drugged driving. Establishing standards for equipment and cut-off thresholds for specific drugs and turnaround time for results would be highly beneficial. Standardizing the manner in which drug test results are recorded and stored in a database is useful for ongoing analysis and monitoring. Current methods and practices of data management should be critically evaluated to determine areas most in need of improvement or optimization.

- Focus on drug abuse: While a higher percentage of drivers arrested for drugged driving had prior histories of unsafe driving (DWI, speeding, crashes) compared to the general driving population, there is a large percentage of these drivers who did not have a record indicating a higher safety risk. Therefore, distinguishing between drivers abusing drugs and those who use drugs as directed by their physician is critical to increase traffic safety without threatening law abiding drivers. Quantifying drug levels through blood evidence, when combined with other observational evidence, will aid in identification and prosecution of drug-impaired drivers.
- Increase public awareness of the risks of drug impairment: The use of prescription drugs is a reality that does not appear to be changing. Efforts to educate the public can reduce unintentional drugged driving by emphasizing prevention and personal responsibility, rather than focusing on punishment and increasing fear of punishment. For example, providing information to help patients self-assess how medications affect them and their family members may prevent drugged driving before it happens. Also, increasing awareness of the impairment effect of using alcohol in combination with drugs is important. The public also may not be aware that it is illegal to drive while under the influence of drugs. This information could be added to drunk driving communications to increase awareness. Thus, the state should work with public health practitioners to determine the best course of action for addressing the information needs of communities and individuals.

ACRONYMS, ABBREVIATIONS, AND SYMBOLS

BAC	Blood alcohol concentration
BrAC	Breath alcohol concentration
CDC	Centers for Disease Control
COBRA	Louisiana Computerized Online BReath Archiving system
DEA	US Drug Enforcement Agency
DOTD	Louisiana Department of Transportation and Development
DRUID	DRiving Under the Influence of Drugs, alcohol and medicines
DUID	Driving under the Influence of Drugs
DWI	Driving while Intoxicated
FARS	Fatality Analysis Reporting System
HSRG	Highway Safety Research Group
NHTSA	National Highway Traffic Safety Administration
NRS	National Roadside Survey
ONDCP	Office of National Drug Control Policy
OTC	Over-the-Counter
LSBA	Louisiana State Bar Association
LSU	Louisiana State University
LTRC	Louisiana Transportation Research Center
SFST	Standardized Field Sobriety Test
THC	Delta-9-tetrahydrocannabinol
ZT	Zero-Tolerance

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APPENDIX A

Overview of per se drugged driving laws in the US

State	Implied Consent	Penalty for Refusal	Affirmative Defense	Penalty for First Offense
Arizona	blood, breath, urine, any bodily substance	Right to counsel prior to submission; Refusal may result in driver's license suspension or denial for 12 months; Refusal is admissible in court	Yes, prescription (but not for marijuana)	10 to 180 days in jail; Alcohol and/or drug treatment; fine approx. \$1,800 (plus jail costs); License suspension for 90 days; Probation for up to 5 years; Community service
Delaware	blood, breath, and/or urine	If informed of penalty for refusal, then driver's license may be revoked for at least 1 year for alleged DUI, however, officer may opt not to inform person of penalty for refusal and may proceed with tests without the person's consent; Refusal admissible in court	Yes, prescription (but not for marijuana)	60 days to 3 months in prison; fine \$575-\$2,300 (plus surcharges); Driver's license revoked for 12 months
Georgia	blood, breath, urine, any bodily substance	Suspension of driving privileges (but driver may request hearing); Refusal admissible in court	Prescription holders charged with the "less safe" type of DUI, state must prove drug made driving "less safe" for conviction	Incarceration for 10 days to 12 months; Mandatory minimum of 40 hours community service; Probation for 12 months; Mandatory participation in 20-hour risk reduction program (additional \$175 plus \$75 fee for assessment)
Illinois	blood, breath, or urine	Driver's license revoked and suspended; Refusal admissible in court	No	Possible imprisonment up to 1 year; fine up to \$2,500; loss of license for 1 year; DUI victim impact panel required
Indiana	"chemical tests" at officer discretion within 3 hours of driving	Immediate revoke of license and suspension of driving privileges (but driver entitled to a hearing); Refusal admissible in court	Yes, prescription	Minimum of 5 days up to 60 days in jail; Up to 180 hours of community service; fine up to \$500; License suspension up to 2 years, Court fees at least \$300; Up to 2 years of probation
Iowa	blood, breath, or urine	Right to counsel prior to submission; First withdraw of consent makes person ineligible for a temporary restricted license for a minimum of 90 days, second refusal the driver's license will be revoked for 2 years	Yes	Minimum imprisonment of 48 hours up to 1 year (sentence may accommodate defendant's work schedule); Up to \$1,250 fine; License revoked for 180 days up to 1 year
Michigan	blood, breath, or urine	Allowed a phone call to consult attorney; No stated penalty for refusal, officer may seek a court order in the event of a refusal	No	Community service up to 360; and/or imprisonment up to 93 days; and/ or fine up to \$300

Overview of per se drugged driving laws in the US (cont'd)

Minnesota	blood, breath, or urine	Right to counsel prior to submission; refusal is considered a crime and results in immediate suspension of license; if convicted, the refusal results in additional license restrictions	No	Up to 90 days in prison; Up to \$1000 fine; up to 180 days suspension of license (180 days is the mandatory minimum if defendant refused chemical tests)
Oklahoma	blood, saliva, or urine	No stated penalty, however, the Commissioner of Public Safety shall revoke the license to drive and any nonresident operating privilege	No	Must participate in a drug/alcohol assessment; at least 10 days but no more than 1 year in jail; fine no more than \$1000
Rhode Island	breath, blood, and/or urine	For first refusal, penalty consists of: a fine of \$200 to \$500, 10 to 60 hours of public community restitution, and license suspension for 6 months to 1 year (penalties increase with multiple offenses); even if person refuses, an officer may obtain a search warrant to authorize test of blood or breath without person's consent; evidence of refusal is not admissible in court unless defendant testifies	No	First offense with a controlled substance in the blood: fine of \$100 to \$300; 10 to 60 hours of public community restitution, possible imprisonment up to 1 year; may be required to attend a special course on driving while intoxicated or under the influence of a controlled substance; license suspension for 30 to 180 days.
Utah	blood, breath, urine, or oral fluids	No right to counsel prior to submission; refusal may result in revocation of the driver's license or requirement of an ignition interlock device	Yes: if substance/metabolite was involuntarily ingested, a prescription, or legal ingestion	At least 48 consecutive hours in jail, 48 hours of community service, or electronically monitored home confinement; participation in educational course; fine of at least \$700; possible probation or substance abuse treatment; if over age 21- license suspension for at least 120 days; if under 21- license suspension until person turns 21 or 120 days, whichever is longer
Wisconsin	breath, blood, or urine	License suspension for 1 year beginning at the time of refusal (appeal must be made within 10 days); ordered assessment and driver safety plan; individuals may also be ordered to participate in drug substance abuse assessment or treatment	Yes	Fine of \$150 to \$300

Overview of per se drugged driving laws in the US (cont'd)

North Carolina	“chemical tests”	License revoked for a year or longer, officer may compel person to be tested under other laws	Under 21- Yes, if lawfully obtained and at “therapeutically appropriate amounts”	Fine up to \$4000; imprisonment of 30 days (minimum) to 24 months (maximum); may be ordered to complete substance abuse assessment
South Dakota	blood, breath, any bodily substance	No right to counsel; license suspension; refusal admissible in court	No	One year imprisonment; fine of \$2,000; driving privileges revoked for 30 days to 1 year.
Virginia	blood, breath, or urine	First refusal to submit to testing is a civil offense and subsequent violations are criminal offenses; suspension of driving privilege for 1 year, no guaranteed right to counsel	No	Fine of \$250; loss of driving privileges for 1 year (ignition interlock device may be required upon restoration)
Washington	breath or blood	License, permit, or privilege to drive revoked for 1 year; refusal may be used in criminal trial; there is a limited window where person may contact attorney but extended delays may be considered a refusal	No	Imprisonment of 1 day to 1 year (mandatory minimum 24 consecutive hours imprisonment or 15 days electronic home monitoring); fine of \$350 to \$5000; license suspended for 90 days (possible requirement of an ignition interlock device on vehicle)
Montana	test or tests, does not specify fluids	For 1st refusal, license suspension of 6 months with no provision for a restricted probationary license. Refusal is admissible in court	No	Mandatory minimum of 24 hours up to 6 months in prison; fine of \$300 to \$1000; if passenger(s) are under 16, the penalty doubles
Nevada	blood, breath, urine or any bodily substance	No stated penalty, however, by this law the officer has reasonable grounds to believe the person was under the influence; refusal is admissible in court; officer may exert reasonable force to obtain samples following refusal	Yes	Imprisonment of 2 days to 6 months; OR 48-96 hours of community service; fine of \$400 to \$1,000; required to complete a course on the abuse of alcohol and other controlled substances
Ohio	whole blood, blood serum or plasma, breath, or urine	License suspension for 1 year for the first refusal, 2 years for the second refusal, and three for the third refusal. Refusing to submit until first speaking with an attorney is essentially a refusal	Yes, prescription taken in accordance with a licensed health professional's directions (note: medical marijuana is not legal in Ohio)	Mandatory minimum of 3 consecutive days imprisonment up to a maximum of 6 months; OR required attendance in a driver's intervention program for 3 days; fine between \$375 to \$1075; license suspension for 6 months to 3 years.

Overview of per se drugged driving laws in the US (cont'd)

Pennsylvania	breath, blood, or urine	Operating privilege suspended by department for 6 to 18 months; evidence of refusal is admissible in court as well as testimony concerning the circumstances of refusal	No	Mandatory minimum of 72 consecutive hours imprisonment up to a maximum of 6 months; fine of \$1000 up to \$5000; required attendance at alcohol highway safety school; license suspension for at least 18 months; may be required to complete 150 hours of community service; may be required to attend a victim impact panel
Colorado	breath, blood	No right to counsel prior to submission; Driver's license revoked 1 year for first refusal, 2 years for second refusal, and 3 for the third; Refusal is admissible evidence at trial	No	Mandatory minimum of 5 days to 1 year in jail; fine \$200-\$500, 24-48 hours of "useful public service"; Probation for up to 2 years

APPENDIX B

All Questionnaires Used in this Study

Prosecutor Survey on Drugged Driving

LSU IRB Approval # E8934

Approval Date 9/19/2014

How long have you been a prosecutor in Louisiana?

_____ Years
_____ Months

What is your current affiliation?

How frequently do you prosecute impaired driving cases, either involving alcohol, other drugs, or both?

- Never or hardly ever
- More than a few cases per year, but less than once a month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- 4-6 Times a Week
- Daily

About what percentage of impaired driving cases would you say are cases involving drugs only?

_____ %

Compared to previous years, has the number of drugged driving cases in your parish increased, decreased, or stayed about the same?

- Decreased
- Somewhat decreased
- About the same
- Somewhat increased
- Increased
- Unsure

How frequently do you prosecute drug-impaired driving cases when alcohol is not a factor or the driver's BAC is below the illegal limit?

- Never or hardly ever
- More than a few cases per year, but less than once a month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- 4-6 Times a Week
- Daily

In your experience, about how difficult is it to obtain a conviction in these particular cases?

- Very Difficult
- Difficult
- Somewhat Difficult
- Neutral
- Somewhat Easy
- Easy
- Very Easy

Answer If In your experience, about how difficult is it to obtain a conviction in these particular cases? Very Difficult Is Selected Or In your experience, about how difficult is it to obtain a conviction in these particular cases? Difficult Is Selected Or In your experience, about how difficult is it to obtain a conviction in these particular cases? Somewhat Difficult Is Selected

What are the greatest obstacles you face in prosecuting drug impaired driving cases?

When the driver has consumed drugs and also has a BAC of .08 or higher, do you pursue a drug case?

- Yes
- No

Why or why not?

In your personal experience, do drugged driving cases seem to be more likely to be contested than alcohol cases?

- Yes
- Sometimes, it depends on other factors involved as well
- No

In your personal experience, do drugged driving cases seem more likely to be dismissed than alcohol cases?

- Yes
- Sometimes, it depends on other factors involved as well
- No

Answer If In your personal experience, do drugged driving cases seem more likely to be dismissed than alcohol cases? Yes Is Selected Or In your personal experience, do drugged driving cases seem more likely to be dismissed than alcohol cases? Sometimes, it depends on other factors involved as well Is Selected

Under what condition(s) is a drugged driving case typically more likely to be dismissed?

Is it easier to obtain a drugged driving conviction when the case involves a crash?

- Yes
- No

In your experience, do most drugged driving cases involve crashes?

- Yes
- No

Do you believe the current impaired driving laws in Louisiana are adequate to prosecute drugged driving cases?

- Never
- Rarely
- Sometimes
- Most of the Time
- Always

Do you find it challenging to establish causation under Louisiana's current impaired driving laws?

- Never
- Rarely
- Sometimes
- Often
- Every time

What is your opinion on the efficacy of per se drugged driving laws in increasing conviction rates?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither Effective nor Ineffective
- Somewhat Effective
- Effective
- Very Effective

What is your opinion on the efficacy of per se drugged driving laws in improving public safety?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither Effective nor Ineffective
- Somewhat Effective
- Effective
- Very Effective

Do you think that a per se drugged driving law would make it easier for you to obtain a conviction?

- Definitely not
- Probably not
- Maybe
- Probably yes
- Definitely yes

Please tell how much you agree or disagree with the following statements. Click the button below to continue.

Drugged driving is a major problem in Louisiana.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Drugged driving poses a serious threat to public safety.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Drugged driving poses a threat to public safety on par with drunk driving.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Prescription drugs pose as much threat to public safety as illegal drugs.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Per se drugged driving laws should not differentiate between illegal or prescription drugs.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Per se drugged driving laws should apply to illegal drugs only.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Prescription drugs should be excluded under per se drugged driving laws.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

A per se drugged driving law will improve public safety in Louisiana.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Per se laws are not necessary to obtain convictions, provided the driver's behavior is observably impaired.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

There is no guarantee that per se drugged driving laws will improve public safety.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Per se drugged driving laws will keep drugged drivers off the road.

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Neither Agree nor Disagree
- Somewhat Agree
- Agree
- Strongly Agree

Please leave any additional comments for the researchers (optional)

Defense Attorney Survey on Drugged Driving

LSU IRB Approval # # E8933

Approval Date 9/19/2014

How long have you been a criminal defense lawyer in Louisiana?

_____ Years
_____ Months

Please select the parish in which you most frequently practice law.
(Table Truncated to 63 Columns)

Do you practice in other parishes as well? If so, please type the parish name(s) in the text box.

- Yes _____
- No

In general, about how often do you defend impaired driving cases, either involving alcohol, other drugs, or both?

- Never or hardly ever
- More than a few cases per year, but less than once a month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- 4-6 Times a Week
- Daily

About what percentage of your impaired driving cases would you say are cases involving drugs only?

_____ %

In recent years, has the number of drugged driving cases you've taken increased, decreased, or stayed about the same?

- Decreased
- Somewhat decreased
- About the same
- Somewhat increased
- Increased
- Unsure/ can't say

How frequently do you defend drivers charged with having the following drugs detected in their systems?

	Rarely	Occasionally	Frequently	Not sure
cannabis/ THC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
other illicit drugs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
prescription drugs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
multiple drugs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

About how often do you defend drug-impaired driving cases when alcohol is either not a factor or the driver's BAC is below the illegal limit?

- Never or hardly ever
- More than a few cases per year, but less than once a month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- 4-6 Times a Week
- Daily

For these cases where alcohol is not a factor, please indicate the percentage of cases that reach a resolution (e.g., settled, dismissed, etc.) at the following stages:

- _____ arraignment
- _____ pre-trial conference
- _____ trial assignment
- _____ jury or bench trial
- _____ Other (please specify)

How many drugged driving cases tend to result in your client accepting a plea bargain?

- None
- Very few
- Some
- Most
- Nearly All (or All)

What are some of the primary reasons/ circumstances under which you would be more likely accept a plea for drugged driving cases?

When your client's case is successful, what are some of the primary reasons the state fails to meet its burden?

Do you believe the state has a disadvantage when prosecuting drugged driving cases under existing law?

- Never
- Rarely
- Sometimes
- Often
- All of the Time

Why or why not?

What is your opinion on the efficacy of per se drugged driving laws in improving public safety?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither Effective nor Ineffective
- Somewhat Effective
- Effective
- Very Effective

Do you have any reservations about Louisiana passing a per se drugged driving law?

- Yes
- No

Why or why not?

Drugged driving is a major problem in Louisiana.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Drugged driving poses a threat to public safety.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Drugged driving poses a threat to public safety on par with drunk driving.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Prescription drugs pose as much threat to public safety as illegal drugs.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Per se drugged driving laws should apply to illegal drugs only.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Per se drugged driving laws should not differentiate between illegal or prescription drugs.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Prescription drugs should be excluded under per se drugged driving laws.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

A per se drugged driving law will improve public safety in Louisiana.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Per se laws are not necessary to obtain convictions, provided the driver's behavior is observably impaired.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

There is no guarantee that per se drugged driving laws will improve public safety.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Police Survey on Drugged Driving

LSU IRB Approval # E8929

Approval Date 9/15/2014

What type of law enforcement best describes your agency?

- State (1)
- Parish (2)
- City / Municipal (3)
- College / University (4)
- Other (please specify) _____

Answer If What type of law enforcement best describes your agency? State Is Selected

What is your Troop/ jurisdiction?

- Troop A (Baton Rouge)
- Troop B (Kenner)
- Troop C (Houma)
- Troop D (Lake Charles)
- Troop E (Alexandria)
- Troop F (Monroe)
- Troop G (Bossier City)
- Troop I (Lafayette)
- Troop L (Covington)

Answer If What type of law enforcement best describes your agency? Parish Is Selected

What is your agency's Parish/ jurisdiction?

Answer If What type of law enforcement best describes your agency? City / Municipal Is Selected

What is your City / Municipal jurisdiction?

Answer If What type of law enforcement best describes your agency? College / University Is Selected

What college or university is your agency's jurisdiction?

Answer If What type of law enforcement best describes your agency? Other (please specify) Is Selected

What is your agency's jurisdiction?

What is your rank and classification?

Rank / Title

Classification

How long have you been in your current position?

_____ Years

_____ Months

Is it part of your daily work routine to make traffic stops?

- No
- Sometimes
- Yes

In general, is it fairly common for you to make traffic stops because you observed the driver committing a crime or a traffic violation while in control of their vehicle?

- No
- Sometimes
- Yes

How often do you make a traffic stop because you have reason to suspect a driver is under the influence of alcohol and/or drugs?

- Never
- Rarely
- Occasionally
- Sometimes
- Often

Do you typically perform a SFST if there's a chance the driver has consumed drugs or alcohol?

- Never
- Rarely
- Sometimes
- Most of the Time
- Always

If the driver fails the SFST, how likely are you further investigate through chemical testing?

- Very Unlikely
- Unlikely
- Undecided
- Likely
- Very Likely

About how often do you make impaired driving arrests?

- Never
- Less than One a Month
- One a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- 4-6 Times a Week
- Daily

Of these, what percentage of the time does the driver have a BAC at or above .08?

_____ %

Under what circumstances are you most likely to test for drug(s) other than alcohol? Check all that apply.

- If the driver is clearly impaired at the scene but does not appear to be drunk
- If there is drug paraphernalia in the driver's vehicle or on his or her person
- If the driver was involved in a crash
- If the driver fails to cooperate
- If the driver has had at least one prior impaired driving offense in the past
- If the driver's BAC is below .05
- Other _____

If the driver has a BAC at or above .08, how likely are you to continue testing further?

- Very Unlikely
- Unlikely
- Somewhat Unlikely
- Undecided
- Somewhat Likely
- Likely
- Very Likely

If the driver below the age of 21 fails the SFST but upon chemical testing blows a BAC of .00, what do you typically do?

- Let them go
- Test blood for drug(s)
- Test urine for drug(s)
- Test both blood and urine for drug(s)
- Other _____

If the driver above the age of 21 fails the SFST but upon chemical testing blows a BAC of .05, what do you typically do?

- Let them go
- Test blood for drug(s)
- Test urine for drug(s)
- Test both blood and urine for drug(s)
- Other _____

In your jurisdiction, do you typically encounter multiple offenders in impaired driving cases?

- Not typically
- Sometimes
- Most of the Time

Relative to drunk driving, how prevalent is drugged driving in your jurisdiction?

- Much Less
- Less
- Somewhat Less

- The Same
- Somewhat More
- More
- Much More

What are some of the issues you experience investigating drugged driving cases?

Public Survey on Drugged Driving

LSU IRB Approval # E9157

Approval Date 1/24/2015

Are you licensed to drive in the state of Louisiana?

- Yes
- No
- I am not licensed to drive in the United States.

How long have you lived in Louisiana?

- Years
- Months

Have you ever been involved in a motor vehicle crash?

- Yes
- No

Answer If Have you ever been involved in a motor vehicle crash?; Yes Is Selected

To the best of your knowledge, have you ever been involved in a crash where drugs and/or alcohol were suspected factors?

- Yes
- No

In general, how concerned are you about impaired driving in Louisiana?

- Not at all
- Slightly
- Moderately
- Very
- Extremely

When traveling on Louisiana roads, about how often do you tend to encounter other drivers who appear to be possibly driving under the influence of alcohol or drugs?

- Never
- Less than Once a Month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- Daily
- I don't know

Compared to other forms of dangerous or distracted driving (such as falling asleep behind the wheel, texting, etc.), how much of a problem would you say impaired driving is in

Louisiana?

- Much Less
- Less
- About the Same
- More
- Much More
- Not Sure/ Don't know

In recent memory, have you heard or seen any reports in the media about drug-impaired driving, sometimes referred to as "drugged driving"?

- Yes
- No
- Not sure

The term "drugged driving" does not have a single legal definition. We are interested in learning the connotation the term has among the general public. Whether or not you've ever heard the term used in media, when you think of the meaning of "drugged driving," what thoughts, ideas, or images come to mind?

Text entry

Validation Question Below you will see the text of Louisiana's existing DWI law, Louisiana Revised Statute 14:98, which states the crime for operating a vehicle while intoxicated. Section A of RS 14:98 identifies the conditions under which a person operating a motor vehicle is legally considered driving while intoxicated:

LOUISIANA RS 14:98

§98. Operating a vehicle while intoxicated

A.(1) The crime of operating a vehicle while intoxicated is the operating of any motor vehicle, aircraft, watercraft, vessel, or other means of conveyance when any of the following conditions exist:

- (a) The operator is under the influence of alcoholic beverages.
- (b) The operator's blood alcohol concentration is 0.08 percent or more by weight based on grams of alcohol per one hundred cubic centimeters of blood.
- (c) The operator is under the influence of any controlled dangerous substance listed in Schedule I, II, III, IV, or V as set forth in R.S. 40:964.
- (d)(i) The operator is under the influence of a combination of alcohol and one or more drugs that are not controlled dangerous substances and that are legally obtainable with or without a prescription.
- (ii) It shall be an affirmative defense to any charge under this Subparagraph that the label on the container of the prescription drug or the manufacturer's package of the

drug does not contain a warning against combining the medication with alcohol.

(e)(i) The operator is under the influence of one or more drugs that are not controlled dangerous substances and that are legally obtainable with or without a prescription.

(ii) It shall be an affirmative defense to any charge under this Subparagraph that the operator did not knowingly consume quantities of the drug or drugs that substantially exceed the dosage prescribed by the physician or the dosage recommended by the manufacturer of the drug.

(2) A valid driver's license shall not be an element of the offense, and the lack thereof shall not be a defense to a prosecution for operating a vehicle while intoxicated.

It is currently illegal to operate a motor vehicle while impaired by drugs in the state of Louisiana.

- True
- False

To some, the term "drugged driving" refers to the act of operating a motor vehicle with any detectable levels of drugs in one's system, regardless of driver impairment. A number of states have passed zero-tolerance drugged driving per se laws based on this meaning. Under a per se law, a driver is automatically guilty of driving under the influence of drugs (DUID) if they have any levels (including trace amounts) of drug(s) and/or drug metabolites in his or her system, regardless of whether or not the driver is actually impaired. In many of these states, having a prescription for the drug is not a valid legal defense.

What, if any, concerns would you have with Louisiana passing a zero-tolerance per se drugged driving law?

Text entry

Are you currently taking any prescription medication(s) or over-the-counter drugs to treat or control a mental health or medical condition that could potentially impact your ability to operate a motor vehicle?

- Yes
- No

There are a large number of known drugs in existence. The next set of questions asks you to tell your level of familiarity with some commonly taken drugs. How would you describe your level of familiarity with the effects of various drugs on people? For each of the drugs listed below, please click on the point of the scale that most accurately reflects your level of familiarity.

Marijuana/ Cannabis (THC)

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Narcotics/ prescription pain relievers (such as opium or codeine)

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Antidepressants like Zoloft or Paxil

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Stimulants like Adderall or Ritalin

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Party drugs like MDMA or Molly

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Benzodiazepines like Xanax or Diazepam

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OTC allergy, sinus or cold medications like Benadryl or Sudafed

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Prescription or OTC sleep-aids like Ambien or ZzzQuil

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
Very Unfamiliar: Very Familiar (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Drivers who take drugs are a threat to public safety.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Prescription drugs pose as much threat to public safety as illegal drugs.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Some drugs might improve a person's driving abilities rather than impair them.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Drivers should not be charged with driving under the influence of drugs unless they are clearly impaired.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Making it a crime to drive with drugs in one's system will make the roads safer by keeping drug using drivers off the road.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Drugged driving is a major problem in Louisiana.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Drugged driving is as big a problem as drunk driving in Louisiana.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

If Louisiana adopts a "zero tolerance" drugged driving law, the law will be enforced fairly across the population regardless of race, gender, age, etc.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

There is no need to pass a new law targeting drugged driving when Louisiana's existing impaired driving law already makes driving while under the influence of drugs a crime.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Zero-tolerance per se drugged driving laws are fair.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

In terms of social issues and policy, how would you describe your political viewpoints?

- Very liberal
- Liberal
- Moderate (neither liberal nor conservative)
- Conservative
- Very conservative
- Some other viewpoint (please specify) _____
- None of these/ Don't know
- Prefer not to say

Do you identify with a political party?

- Republican
- Democrat
- Libertarian
- Independent
- Other (please specify) _____
- None of these/ Don't know
- Prefer not to say

What is your age?

What is your annual household income?

- Below \$25,000
- \$25,001 - \$35,000
- \$35,001 - \$40,000
- \$40,001 - \$45,000
- \$45,000 - \$50,000
- \$50,001 - \$60,000
- \$60,001 - \$65,000
- \$65,001 - \$75,000
- \$75,001 - \$85,000
- \$85,000 - \$100,000
- Above \$100,000
- Prefer not to say / Don't know

How do you describe your race/ ethnicity?

- White--not Hispanic
- Black--not Hispanic
- Hispanic or Latino
- Asian
- Native American
- Other _____
- Prefer not to say/ Don't know

What is your sex?

- Male
- Female
- Prefer not to say

What is the highest level of education you have completed?

- Did not finish high school
- High school graduate (diploma awarded)
- Some college
- College graduate (Associate's or Bachelor's degree awarded)
- Some graduate school
- Graduate (e.g., MA, MS, MBA) or professional degree (e.g., J.D., M.D.)
- Doctorate

What is your zip-code?

If you have any additional comments about the topic of drugged driving or impaired driving laws in Louisiana that you would like to leave for the researchers, please type them below.
submit To submit your responses please click on the continue button below.

APPENDIX C

Table 30
Group differences in responses to per se law statements

		Drivers who take drugs are a threat to public safety.	Rx drugs pose as much threat ...	Some drugs might improve a person's driving abilities ...	Drivers should not be charged with DUID unless clearly impaired.	Making it a crime to drive with drugs will make the roads safer ...	Drugged driving is a major problem in LA.	Drugged driving is as big a problem as drunk driving ...	If LA adopts a ZT DUID law, [it] will be enforced fairly ...	There is no need to pass a new law targeting drugged driving ...	ZT per se drugged driving laws are fair.
Sex	z value	0.595	1.255	1.382	-0.414	1.568	3.057	3.331	2.286	-2.221	1.526
	p value	0.552	0.209	0.167	0.679	0.117	.002**	.001**	.022*	.026*	0.127
	mean rank women	420.06 (n=586)	423.01 (n=585)	424.74 (n=586)	413.33 (n=584)	425.27 (n=585)	432.16 (n=585)	433.73 (n=586)	428.52 (n=587)	405.85 (n=586)	425.10 (n=585)
	mean rank men	409.74 (n=247)	401.08 (n=247)	400.40 (n=248)	420.65 (n=246)	397.50 (n=248)	379.41 (n=247)	375.46 (n=246)	387.70 (n=245)	445.03 (n=248)	397.90 (n=248)
Race	z value	-1.026	-2.178	0.67	0.229	-2.373	0.25	-0.542	1	0.743	-1.997
	p value	0.305	.029*	0.503	0.819	.018*	0.802	0.588	0.317	0.457	.046*
	mean rank minority	432.70 (n=207)	448.35 (n=207)	409.63 (n=209)	413.78 (n=208)	451.95 (n=208)	414.57 (n=208)	425.01 (n=208)	403.36 (n=208)	408.55 (n=208)	446.82 (n=208)
	mean rank white	413.83 (n=629)	408.00 (n=628)	422.12 (n=628)	418.07 (n=625)	407.42 (n=628)	419.14 (n=627)	415.00 (n=626)	422.20 (n=626)	422.45 (n=629)	409.12 (n=628)
Age	z value	-0.972	-9.79	1.885	-0.753	2.136	0.017	-0.563	-1.148	-1.211	0.352
	p value	0.331	0.327	.059^	0.451	.033*	0.986	0.574	0.251	0.226	0.725
	mean rank < 35	407.93 (n=255)	407.12 (n=254)	443.02 (n=255)	408.74 (n=253)	445.72 (n=255)	419.21 (n=255)	411.70 (n=255)	404.32 (n=254)	405.17 (n=255)	423.87 (n=254)
	mean rank 36 +	424.61 (n=583)	424.18 (n=583)	409.95 (n=584)	422.02 (n=582)	408.03 (n=583)	418.91 (n=582)	421.48 (n=581)	424.69 (n=582)	426.48 (n=584)	417.60 (n=584)

note: reject the null if **p<.01, *p<.05; approaching significance ^p<.10; the test item response options ranged from 1=strongly disagree to 5=strongly agree

Table 30
Group differences in responses to per se law statements (cont'd)

		Drivers who take drugs are a threat to public safety.	Rx drugs pose as much threat ...	Some drugs might improve a person's driving ...	Drivers should not be charged with DUID unless clearly .	Making it a crime to drive with drugs will make the roads	Drugged driving is a major problem in LA.	Drugged driving is as big a problem as drunk ...	If LA adopts a ZT DUID law, [it] will be enforced ...	There is no need to pass a new law targeting drugged ...	ZT per se drugged driving laws are fair.
Education	z value	-0.016	0.035	2.122	-2.769	-1.334	0.461	-2.228	-2.528	-0.256	-1.716
	p value	0.987	0.972	.034*	.006**	0.182	0.645	.026*	.011*	0.798	.086^
	mean rank no degree	419.11 (n=478)	418.26 (n=479)	404.68 (n=479)	436.80 (n=479)	428.38 (n=478)	423.54 (n=478)	433.40 (n=478)	435.81 (n=478)	421.30 (n=479)	431.09 (n=480)
	mean rank degree +	418.85 (n=359)	418.82 (n=357)	439.27 (n=359)	391.45 (n=355)	406.51 (n=359)	411.77 (n=358)	397.38 (n=357)	394.15 (n=357)	417.10 (n=359)	402.75 (n=357)
Medications	z value	-3.927	-1.711	2.877	3.681	-4.582	1.027	0.477	-2.574	2.911	-3.78
	p value	.000**	.087^	.004**	.000**	.000**	0.304	0.633	.010**	.004**	.000**
	mean rank not taking	433.92 (n=681)	425.08 (n=679)	408.20 (n=682)	403.14 (n=677)	436.87 (n=680)	414.61 (n=680)	416.16 (n=678)	428.10 (n=678)	408.20 (n=681)	433.83 (n=680)
	mean rank taking	353.86 (n=156)	390.02 (n=157)	468.05 (n=156)	479.40 (n=157)	341.61 (n=157)	435.45 (n=156)	425.93 (n=157)	374.39 (n=157)	468.54 (n=157)	354.76 (n=157)
Concern	z value	4.577	3.147	-4.084	-2.293	3.813	10.063	8.403	4.068	-3.164	3.355
	p value	.000**	.002**	.000**	.022*	.000**	.000**	.000**	.000**	.002**	.001**
	mean rank less	371.01 (n=305)	385.261 (n=305)	463.061 (n=305)	442.141 (n=302)	378.131 (n=305)	313.53 1 (n=305)	329.151 (n=304)	374.171 (n=304)	453.321 (n=305)	382.821 (n=305)
	mean rank high	446.511 (n=532)	437.591 (n=531)	394.57 1 (n=533)	403.511 (n=532)	442.431 (n=532)	478.791 (n=531)	468.871 (n=531)	443.091 (n=531)	400.141 (n=533)	439.741 (n=532)
Media Report	z value	3.558	1.826	-2.872	-2.617	1.548	5.858	4.963	0.672	-2.764	2.297
	p value	.000**	.068^	.004**	.009**	0.122	.000**	.000**	0.501	.006**	.022*
	mean rank no/ unsure	395.57 (n=488)	406.66 (n=489)	439.61 (n=489)	435.88 (n=488)	408.86 (n=488)	379.91 (n=489)	384.96 (n=488)	413.87 (n=488)	438.92 (n=489)	403.64 (n=489)
	mean rank yes	452.87 (n=350)	436.34 (n=348)	392.60 (n=350)	392.86 (n=347)	434.34 (n=350)	473.93 (n=348)	465.54 (n=348)	424.99 (n=348)	393.57 (n=350)	441.72 (n=350)

This public document is published at a total cost of \$250. 42 copies of this public document were published in this first printing at a cost of \$250. The total cost of all printings of this document including reprints is \$250. This document was published by Louisiana Transportation Research Center to report and publish research findings as required in R.S. 48:105. This material was duplicated in accordance with standards for printing by state agencies established pursuant to R.S. 43:31. Printing of this material was purchased in accordance with the provisions of Title 43 of the Louisiana Revised Statutes.