

# ASSESSMENT OF THE 24/7 SOBRIETY PROGRAM IN NORTH DAKOTA: PARTICIPANT BEHAVIOR DURING ENROLLMENT



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## **ABSTRACT**

The 24/7 Sobriety Program is an intervention strategy mandating that repeat impaired driving offenders remain sober as a condition of bond or pre-trial release. The goal is to monitor the most dangerous offenders in North Dakota and require that these individuals remain sober in order to keep roadways safe from hazardous drivers. As a component of the program, offenders are required to submit to twice-a-day blood alcohol concentration tests, ankle bracelet monitoring, drug patches, urinalysis, or a combination of techniques. If a program participant fails to remain sober, the individual is sent directly to jail. During the most recent legislative biennium, the North Dakota legislature passed House Bill 1302, a resolution mandating that repeat offenders participate in the program for 12 months. This new legislation went into effect on August 1, 2013. This project seeks to understand if the 24/7 Sobriety Program has a positive deterrent effect on repeat impaired driving offenders. Results show that drivers significantly improve traffic metrics after enrolling in the program. The program appears to have more of a deterrent effect on women than on men. The mandatory 12-month enrollment period has a stronger deterrent effect than did prior sentences which were generally left to judicial discretion. Nonetheless, for a group of high-risk offenders – those who likely abuse alcohol and have issues with self-control – the program was found to have little positive effect on non-DUI convictions and crash patterns.

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# 1. INTRODUCTION

Impaired driving is a traffic safety hazard that poses a threat to both drivers who operate vehicles while impaired and other sober drivers sharing the roadway. The effects of alcohol on drivers are multifaceted, and include slowed reaction time, vision impairment, interference with concentration, dulling of judgment, and creating a false sense of confidence (NDDOT 2010). In the United States, motor vehicle crashes are the leading cause of death for people between the ages of 3 and 34 (Subramanian 2009). At a national level, 31% of all motor vehicle crash fatalities are related to alcohol (NHTSA 2012). This rate is even greater in North Dakota (Figure 1.1). The North Dakota Highway Patrol (NDHP) has tracked alcohol-related crash fatalities since 2007 and found that anywhere from 40% to 58% of all fatal crashes involve alcohol. Mothers Against Drunk Driving (MADD) (2014) estimates the burden on North Dakota taxpayers for drunken driving fatalities is \$352 million annually. Clearly, there are both public health and economic benefits if impaired driving is deterred and roadways are made safer in North Dakota.



**Figure 1.1** Alcohol-Related Fatalities in North Dakota, 2007-2013

Historically, criminal fines and punishment associated with impaired driving in North Dakota have been perceived as lenient when compared to other state jurisdictions (VanWechel, Vachal, and Benson 2008). At present, the State of North Dakota utilizes many nationally accepted strategies to deter instances of impaired driving. For instance, the state has various laws in place designed to deter drivers from operating a vehicle while impaired. These laws include an illegal per se law, implied consent law, preliminary breath test law, punishment for refusal, administrative license suspensions, minimum mandatory (“hard”) suspension periods, and open container laws, among others (NHTSA 2007).

Traditionally, North Dakota legislators have passed changes to impaired driving law via piecemeal legislation. In the first few months of 2013, however, the state passed comprehensive impaired driving reform via North Dakota House Bill 1302, one of the first pieces of legislation passed during the legislative session. The successful passing of this comprehensive reform was attributed to two impaired driving events that gained statewide publicity after taking place within days of one another (Birst and Pettit Venhuizen 2014). In early July 2012, an impaired driver was traveling the wrong way on I-94 near Jamestown when his pickup collided head-on with the vehicle of a young family. The impaired driver and

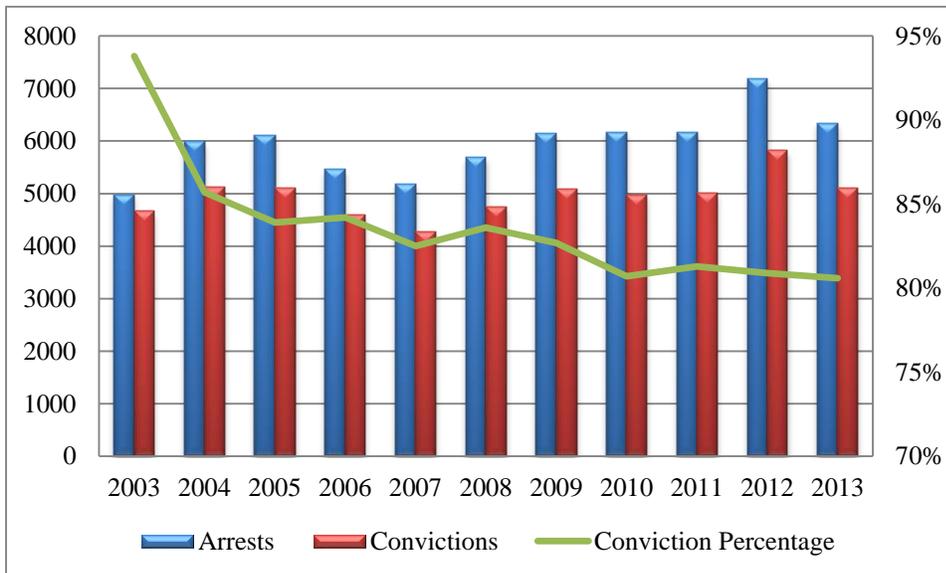
all three travelers in the other car – a husband, pregnant wife, and 18-month-old daughter – were killed. Just a few days later at a campground near the Canada-North Dakota border, an impaired driver got behind the wheel of a pickup truck, lost control of the vehicle, and drove over a tent being used by a father, his two young sons, and one of their close friends. The two brothers – a five-year-old and a nine-year-old – were killed. It is widely accepted that these two events propelled legislators to reconsider the fines and punishment associated with impaired driving. These events also accelerated the process for passing impaired driving reform and helped make the issue a priority among legislators (Birst and Pettit Venhuizen 2014).

Included in House Bill 1302 was expanded use of the 24/7 Sobriety Program. Although the program had been in use for a few years in the state – it was introduced in pilot study form in 2008 and extended statewide in 2010 – enrollment in the program was largely contingent upon judicial discretion. Whereas the 24/7 Sobriety Program was used mostly as a condition of pre-trial release for repeat offenders prior to 2013 (Smith 2013), House Bill 1302 mandated enrollment for repeat offenders. Beginning in 2013, second-time offenders have a mandatory 12-month enrollment in the 24/7 Sobriety Program. Third-time offenders also have a mandatory 12-month enrollment in the program but are also subjected to supervised probation. Fourth and subsequent offenders are required by law to be enrolled in the program for 24 months in addition to being placed on supervised probation. This law went into effect on August 1, 2013. The following paper discusses trends among DUI offenders enrolled in the program.

## 2. BACKGROUND

According to the National Highway Traffic Safety Administration (NHTSA), alcohol-impaired motor vehicle crashes cost more than an estimated \$37 billion each year. During 2010, NHTSA reported more than 10,000 deaths caused by alcohol-impaired driving, which accounts for one-third of all traffic crashes. This is a serious problem facing the nation in promoting public health safety. Several interventions and countermeasures have been used in efforts to reduce losses caused by impaired drivers. These strategies focus on minimizing losses for both the driver choosing to operate a vehicle while impaired and for other sober roadway users impacted by someone else's flawed decision to drink-drive. Countermeasures are typically coupled in these efforts as states work to stop alcohol-impaired driving. For instance, confounding effects may be found with policies that levy in penalties such as fines, licensure loss, and incarceration, along with public education deterrence efforts. Other efforts may focus on enforcement, such as high-visibility enforcement or sustained enforcement programs. In rare cases, some states have deployed programs designed to provide interventions for individual drivers.

In North Dakota, impaired driving is an endemic problem in public safety. On average, state law enforcement personnel arrest between 5,000 and 7,000 individuals for DUI each year (Figure 2.1). Of these arrested drivers, however, only about 80% will be convicted of operating a vehicle while impaired. Nonetheless, with regard to impaired driving arrests and convictions per capita, North Dakota is among the national leaders for this dangerous activity.



**Figure 2.1** DUI Conviction Rates in North Dakota, 2003-2013

According to the North Dakota Highway Patrol, anywhere from roughly two-fifths to three-fifths of fatal crashes in the state involve impaired drivers (2014). This statistic places North Dakota in the top 10 states with the highest rates of alcohol-related motor vehicle fatal crashes (Ziegler et al. 2011). In North Dakota, repeat DUI offenders account for one-third to one-half of all DUI offenses (Ziegler et al. 2010). Due to the high share of repeat DUI offenders, it may be particularly beneficial to understand the success for driver-based interventions that can be targeted at specific offender groups. Although early in its implementation, the goal here is to conduct an assessment of one such program in North Dakota – the 24/7 Sobriety Program – which was first introduced during a 2008 pilot study.

## 2.1 Impaired Driving in the United States

In a seminal study surveying impaired driving attitudes and behaviors, Drew et al. (2010) estimated that 85.5 million drinking-driving trips were taken in 2008. A separate study found that 2% of randomly selected nighttime weekend drivers in the United States had illegal blood alcohol content levels (Lacey et al. 2009). Beitel, Sharp, and Glauz (2000) estimated that the detection and apprehension rate of impaired drivers is rare: there is less than one arrest for every 300 trips by drivers with illegal blood alcohol concentrations. Hause, Voas, and Chavez (1982) had similar findings. A study by the NHTSA (2006) showed even lower apprehension rates and estimated that there are between 500 and 2,000 DUI violations committed for every one DUI violator arrested. In addition to trips taken by impaired drivers, there is also the threat of impaired drivers being involved in more serious crashes, such as those that result in injuries or fatalities. One study found that alcohol-impaired driving crashes injure 200,000 Americans and accrue roughly \$130 billion in societal costs annually in the United States (Zaloshnja and Miller 2009). According to the latest estimates released by the FBI (2013) 1,166,824 drivers were arrested for DWI or DUI in the United States in 2013.

Making smart decisions with regard to driving after drinking is a major safety and public health concern in a nation where one-third of the population consumes alcohol (Voas and Fell 2011). The National Survey of Drinking and Driving Attitudes and Behaviors conducted by the NHTSA found that one in five of those surveyed aged 16 or older reported driving within two hours after drinking (NHTSA 2010). Between 1982 and 1997 the enactment of basic impaired driving laws decreased alcohol-related crash fatalities but no major declines have occurred since (Voas and Fell 2011). These laws commonly included a 0.08 g/dL BAC legal limit, license revocation or suspension for BAC higher than the legal limit, a minimum legal drinking age of 21, and the zero-tolerance law for drivers younger than 21 with alcohol in their system (Voas and Fell 2011). Currently all 50 states and the District of Columbia have a 0.08 g/dL BAC legal limit as well as vehicle sanctions for repeat offenders (Voas and Fell 2011). Even with these laws in place, impaired driving is still occurring at dangerous rates.

A study conducted by the Center for Disease Control and Prevention (CDC) used data from the 2010 Behavioral Risk Surveillance System Survey (BRSSS) to assess the prevalence of drink-driving among adults. The study used a phone survey which asked the respondents if they had a drink in the past 30 days. Those that reported having a drink were also asked how many times they drove in the past 30 days while they were inebriated. The results of the survey were that 2.8% of respondents reported at least one episode of alcohol-impaired driving. The four million respondents yielded an estimated 112,116,000 episodes of alcohol-impaired driving in the United States for the 2010 calendar year. The results showed that impaired driving was highest among ages 21-24, binge drinkers, and among those less likely to wear seat belts (Bergen, Shults, and Rudd 2011). The impaired driving trends were also analyzed for regions and states and showed that the Midwest region had the highest rate of impaired driving with 643 episodes per 1,000 population. The South, West, and Northeast regions followed with 460, 422, and 396 episodes, respectively, per 1,000 population, respectively (Bergen, Shults, and Rudd 2011). The state with the highest self-reported impaired driving in the Midwest region was North Dakota (Bergen, Shults, and Rudd 2011).

## 2.2 Reasons for Drinking, Treatment, and Sobriety

Reasons for drinking are diverse and vary on an individual basis. Ekendahl (2007) interviewed 12 compulsory alcohol abusers to learn about their drinking tendencies. Common themes for abusing alcohol included problem denial and lack of treatment. Huseth and Kubas (2012) administered a survey to first-time and repeat DUI offenders in North Dakota. A link was discovered between inebriated drivers not having a passenger present in the vehicle at the time of arrest, suggesting that some individuals may be

drinking alone for escapism. Other respondents showed behaviors indicative of alcoholism and/or issues with self-control: for example, repeat offenders were more likely to have also used illicit drugs on the same day as their DUI arrest. In a study by Wiliszowski et al. (1996), counselors interviewed DWI recidivists about why they continued to drive after a DWI conviction. Offenders reported a need for thorough alcohol use assessment, self-commitment to dealing with problems, personalized treatment, and continued contact with caring individuals as factors needed to reinforce positive lifestyle changes. DWI courts also emphasize these principles (Fell, Tippetts, and Ciccel 2010).

Fiellin, Reid, and O'Connor (2000) conducted a study examining the effectiveness of multiple screening instruments – “CAGE,” “AUDIT,” and “MAST” – to gauge social and behavioral aspects of alcohol problems. The authors found that patients with alcohol dependence “typically require more intensive counseling in alcohol treatment programs than patients with less severe alcohol problems” (Fiellin, Reid, and O'Connor 2000: 820-821). Hazel and Mohatt (2001) examined treatment and sobriety in Alaskan native communities. The study noted that there was an inextricable link between culture, spirituality, and one's sense of “native community” as it related to the ultimate goal of sobriety. In this report, recovering men typically reported seven reasons for resisting temptation and staying sober: acknowledging the benefits of sobriety, fearing the consequences of drinking, a conscious desire for sobriety, support from family, formal support programs, keeping active, and religion or spirituality. When the researchers conducted focus groups of recovering men, they found that sobriety was related to four themes – spirit, thought, physical, and feelings – at the individual, family, community, and world/environment levels. The researchers later administered a survey about one's experiences with drinking and sobriety. This survey identified a pivotal event, cognitive appraisal, social support, culture, and spirituality as key factors that guide alcoholics toward the “sobriety path” (Hazel and Mohatt 2001: 552-555).

## 2.3 Recidivism

Many studies have examined how impaired driving is related to recidivism. Approximately 35% of all DUI convictions are for drivers with a previous DUI conviction in the prior seven years (Schell, Chan, and Morral 2006). This is reaffirmed by Fell (1995), who found that roughly one-third of the drivers arrested for DWI are repeat offenders. It is known that DWI recidivists carry a higher risk of future DWI arrest (Gould and Gould 1992), have a higher risk of involvement in alcohol-related and non-alcohol-related crashes (Perrine, Peck, and Fell 1988), and have a higher risk of being involved in fatal crashes (Fell and Klein 1994). DeMichele and Lowe (2011) assessed the likelihood of becoming a repeat offender using pilot risk assessment tools of the LSI-R and ASUS statistical techniques. The LSI-R is a commonly used risk assessment tool in community corrections and the ASUS measures substance use patterns and consequences. They assessed a sample of 3,884 convicted drink-driving offenders from a Southwest state and compared the one-time DWI offender with multiple-DWI offenders. They found that repeat offenders were more likely to have prior criminal history, less education, and more likely to have substance use than the single drink-driving offenders. Another study found that demographics such as gender, unemployment, and ethnicity also were factors in DWI recidivism (Nochajski and Stasiewicz 2006). Males were more likely to be recidivists than females. However, ethnicity depends on region and showed that the majority of the repeat DWI offenders were white in the Midwest, Northeast, Northwest, and the South whereas the majority of the recidivists were Hispanics or Native Americans in the Southwest.

The NHTSA developed a guide explaining appropriate sentencing for DWI offenders. Working collaboratively with the National Institute on Alcohol Abuse and Alcoholism (NIAAA), the NHTSA identified six factors as critically important when dealing with DWI offenders to reduce recidivism:

- Evaluating offenders for alcohol-related problems and recidivism risk
- Selecting appropriate sanctions and remedies for each offender

- Including provisions for appropriate alcohol abuse or alcohol-dependent treatment in the sentencing order for offenders who require such treatment
- Monitoring the offender's compliance with the sanctions and treatment
- Acting swiftly to correct noncompliance
- Imposing vehicle sanctions, where appropriate, that make it difficult for offenders to drink and drive during said period (2006: 3).

With recidivism being a common characteristic of impaired drivers in fatal crashes, this problem should be addressed (Kleiman and Hawken 2008). The current parole system largely fails to rehabilitate the parolee's behavior leading to high recidivism rates. With this failure, it is important to find ways to address this problem as a potential means to reduce drink-driving, especially with repeat offenders. It is suggested that the best way is to use certainty over severity – responding to violations quicker and communicating the deterrent threat to the likely violators to minimize recidivism (Kleiman and Hawken 2008).

These techniques are used in programs such as the HOPE program and the South Dakota 24/7 Sobriety Project, and have shown some positive results in reducing recidivism among parolees who participate in the program (Kleiman and Hawken 2008). These community corrections programs conduct alcohol and drug screenings, paid by the offender, which are less costly than long-term jail sentences (Voas et al. 2011). Dill and Wells-Parker (2006) state that mandated alcohol treatment has been shown to reduce drink-driving and alcohol-related crashes among offenders who receive mandatory interventions. Dill and Wells-Parker also suggest that alcohol-related intervention and treatment in combination with licensing actions is the best strategy to reduce recidivism among drink-driving offenders. Advances in technology, such as the use of electronic monitoring devices for home detention and remote BAC monitoring, are other sanction options that can further decrease DUI recidivism (Dill and Wells-Parker 2006).

It is also important to note that DUI interventions do not necessarily work for every individual convicted of impaired driving. Interventions show different results for recidivism among those who complete an intervention program. One such study looked at driver performance related to a Drink-Impaired Drivers (DID) program in England and Wales (Palmer et al. 2012). The DID program used a cognitive-behavioral and educational approach and addressed attitudes that lead to drink-driving. The study recruited 375 participants, of which 144 were enrolled in the DID program and the other 235 served as a control group. Authors also tracked participants that dropped out of the program during the study as a separate group. The participants' collected data included age, previous convictions, and an Offender Group Reconviction Scale-2 (OGRS2). The OGRS2 estimates an offender's risk for reconviction within two years based on demographics and criminal history (Palmer et al. 2012). The rate of recidivism was higher among those who did not complete the intervention than for the other groups – those who completed the program and those in the control group (Palmer et al. 2012). The study recommends highlighting the factors associated with non-completion of the program and high rates of reconviction, and also advocates directing resources to those at high-risk for reconviction rather than those who are at a lower risk for reconviction.

Two programs identified as currently active and with positive initial results are the Hawaii Opportunity Probation with Enforcement (HOPE) program and the South Dakota 24/7 Sobriety Project. These interventions, which are focused on individual drivers and rehabilitation, have been implemented as strategies to reduce recidivism among drivers. The HOPE program is a broader program that has been used with criminal offenses far beyond impaired drivers. The 24/7 Sobriety Project has been targeted specifically at impaired drivers.

## **2.4 The HOPE Program**

According to the Office of National Drug Control Policy (2011), the Hawaii Opportunity Probation with Enforcement (HOPE) was started in 2004 to break the cycle of repeating offenses. The program engages rigorous principles to keep probationers at high-risk of failure from breaking their probation terms and being sent back to prison. It is carried out by imposing “swift, certain, and short jail sanctions” for every violation of the probation terms (Office of National Drug Control Policy 2011).

The program’s principles are to identify probationers who are at high-risk for probation violation and to notify them that for every probation violation there will be an immediate penalty. The program conducts frequent and random drug tests and imposes short jail sanctions for every detected violation. It also refers participants to drug treatment upon request or for probationers who are resistant to abstain from drugs while under sanctions (Office of National Drug Control Policy 2011).

The HOPE program is estimated to cost \$2,500 per program participant, which is more than standard probation terms but saves money in comparison with re-arrests and re-incarceration. The program was evaluated in 2009 by the National Institute of Justice, which concluded that of more than 1,500 HOPE program participants, they were 55% less likely to be arrested for new crimes, 72% less likely to use drugs, 61% less likely to miss appointments with their probation officer, and 53% less likely to have their probation revoked when compared with a control group.

The literature on the HOPE program discusses the positive effects it has on the participants as well as its cost effectiveness. The program’s swiftness leads to longer lasting change unlike typical treatment programs (Kiyabu, Steinberg, and Yoshida 2010; DuPont and Skipper 2012). Specific impacts of the HOPE program were not found regarding alcohol-impaired driving.

## **2.5 The South Dakota 24/7 Sobriety Project: A Model for North Dakota and Other States**

Another program that uses tactics similar to the HOPE program in targeting repeat driving under the influence (DUI) offenders is the South Dakota 24/7 Sobriety Project. The pilot program was started under former Attorney General Larry Long in 2005 due to South Dakota’s high alcohol and drug-related incarcerations. Between 1999 and 2007, 59% of South Dakota’s nearly 25,000 felonies were related to drugs and alcohol (Long 2009) and 13.6% of the incarcerated were DUI offenders (Loudenburg, Drube, and Leonardson 2010). The South Dakota 24/7 Sobriety Program was started as an alternative for DUI incarceration, but as of 2009 only 59% of the participants were DUI offenders and the remaining 41% were enrolled in the program for other offenses (Loudenburg, Drube, and Leonardson 2010).

The program operates by requiring participants to be tested for alcohol by measures such as reporting twice daily for breath testing, wearing an ankle bracelet to electronically monitor alcohol, and using a drug patch or urine testing as a means for their probation (Voas et al. 2011). The project has strict enforcement: if offenders pass the alcohol screening tests, their days carry on as usual. However, if they fail an alcohol screening test or do not show up to take it, the offenders go directly to jail (Chavers 2008). An evaluation conducted by Mountain Plains Evaluation, LLC on the South Dakota 24/7 Sobriety Project shows that the program has some success and suggests further studies be conducted on its effectiveness as more data become available (Loudenburg, Drube, and Leonardson 2010). A comparison analysis on recidivism was conducted for the 24/7 Sobriety Project evaluation report. It was found that the participants of the 24/7 Sobriety Project had a 74%, 44%, and 31% reduction in recidivism on their second, third, and fourth DUI, respectively. The reductions in DUI recidivism exceed the reported

reductions for other interventions such as educational interventions and sanctions found throughout the literature. DuPont and Skipper (2012) also noted that DUI offenders in the 24/7 Sobriety Project had lower rates of DUI recidivism when compared with control groups not enrolled in the program. A study by Kilmer et al. (2013) looked at differences between counties when comparing changes in DUI arrests, arrests for domestic violence, and traffic crashes in South Dakota counties with and without the 24/7 Sobriety Project. The authors found a 12% reduction in repeat DUI arrests, a 9% reduction in domestic violence arrests, and mixed results for traffic crashes. Currently, RAND Corporation, a nonpartisan research organization, is conducting a study on the effectiveness of the South Dakota 24/7 Sobriety Project funded by the National Institute of Alcohol Abuse and Alcoholism (Office of National Drug Control Policy 2011).

South Dakota's 24/7 Sobriety Project is now imitated in North Dakota, Montana, and parts of Wyoming (Brown 2012). The North Dakota 24/7 Sobriety Program was one of six programs chosen for a Secure Continuous Remote Alcohol Monitoring (SCRAM) study by the National Highway Traffic Safety Administration and the Pacific Institute for Research and Evaluation. The case study found that transdermal alcohol monitoring was beneficial to courts and probation and parole departments in all the case study sites, and that research is needed to study whether transdermal alcohol monitoring reduces drinking and DUI recidivism among offenders (McKnight, Fell, and Auld-Owens 2012).

## **2.6 Implementing the 24/7 Sobriety Program in North Dakota**

North Dakota's 24/7 Sobriety Program is modeled directly after the South Dakota program. Program authorization is granted by North Dakota Century Code 54-12-27 through 54-12-31. These statutes grant the Attorney General the ability to use the program, establish program fees, create program funding, and establish the program's use as conditions of bond for offenders (North Dakota Century Code 54-12-27 – 54-12-31). A pilot program was first authorized by the North Dakota legislature in 2007 to administer breath tests for alcohol offenders in select parts of the state (Fisher, McKnight, and Fell 2013). On January 1, 2008, the pilot program began in 12 counties in the South Central Judicial District, and statewide implementation was completed in August 2010 on account of the success of the pilot study (Fisher, McKnight, and Fell 2013).

For the majority of the program's existence, DUI offenders were assigned to the program at the discretion of judges. This allowed for individuals with other alcohol-related offenses – such as domestic violence or abuse/neglect of a child – to also be enrolled in the program. New legislation implemented on August 1, 2013, however, now mandates that any repeat DUI offender will be required to participate in the program as a condition of bond or pre-trial release (Fisher, McKnight, and Fell 2013).

Like South Dakota's 24/7 Sobriety Project, North Dakota DUI offenders are required to have twice-daily breath tests or, alternatively, urinalysis and/or ankle bracelet monitoring. Some offenders may also be required to wear a drug patch if deemed necessary by the judge. Like the South Dakota model, DUI offenders in North Dakota are also required to pay for each breath test or alcohol monitoring system. This makes the program self-sustainable as it is fully funded by DUI offenders. The most recent available data indicate that more than 98% of the individuals placed in the 24/7 Sobriety Program successfully complete it (North Dakota Attorney General 2013).

Impaired driving is an endemic safety and public health problem in the United States (Voas and Fell 2011). The seriousness of this problem is evident in the involvement of impaired drivers in fatal crashes. This creates unnecessary financial and societal costs on other road users in the form of lost lives and medical expenditures (NHTSA 2010). The implementation of laws to reduce impaired driving did substantially reduce road crashes when initially introduced two decades ago. It is evident in the current

crash, court, and incarceration literature, however, that more must be done to further improve these numbers (Voas and Fell 2011). The problem of impaired driving recidivism is evident via multiple studies from multiple research disciplines. The failure of the parole system to deter recidivism in impaired drivers has led to new versions of parole systems in some regions that use certainty over severity. These new systems respond to violations quicker and communicate the deterrent threat with the belief that violators will subsequently minimize recidivism (Kleiman and Hawken 2008). Examples of these programs are found in the HOPE Program and the South Dakota 24/7 Sobriety Project. These programs have the sole purpose to make roads safe and keep communities safer. The forthcoming analysis will contribute to the current understanding of the 24/7 Sobriety Program as effects are measured during early implementation in North Dakota.

### 3. METHODS

Individual records were obtained from two data sets. First, the North Dakota Bureau of Criminal Investigation (BCI) provided the research team with historical records of North Dakotans enrolled in the 24/7 Sobriety Program. This database encompassed just over six full years of driver records from a 2008 to 2014 study period. The first record in the database occurred in February 2008 during the pilot program era. The most recent record was entered in April 2014, shortly before the data were transferred to the researchers. This original data transfer consisted of 4,354 records. Of the original 4,354 records, 726 were not used for the purposes of this study. These unused records consisted of duplicated entries, drivers under the age of 18, or drivers enrolled in the program for non-traffic alcohol-related reasons. (For example, it is possible to be enrolled in the 24/7 Sobriety Program upon conviction of domestic violence, child neglect, or other crimes in the event that the individual is impaired at the time of arrest. For the purposes of this study, only traffic-related alcohol crimes were considered relevant.) After these 726 records were removed from the original BCI data, there were 3,628 valid traffic-related records tracking 24/7 Sobriety Program participants.

Second, the valid 24/7 Sobriety Program records were matched to driver's license records provided to the research team by the North Dakota Department of Transportation. This driver's license database includes both crash and conviction information for North Dakota drivers. Thus, if a link is established connecting these two databases, it then becomes possible to track individual drivers enrolled in the 24/7 Sobriety Program with regard to crashes and convictions before, during, and after enrollment in the program.

Two methods were used to link 24/7 Sobriety Program records with driver's license records. First, the date of birth of the driver and subsequent conviction date for the impaired driving crime were connected from the two data sets. This combination process provided a very strong source of data matching, though just 19.1% of data points were matched using this technique. Second, for the remaining unmatched cases, driver date of birth was coupled with gender, and cases were manually sorted. This process matched 41.5% of the remaining unmatched cases. Ultimately, of the 3,628 records in the 24/7 Sobriety Program data set, 1,910 were able to be matched to driver's license records for an overall matching rate of 52.6%. These matched cases serve as the primary data source used in the analysis.

Once records were matched, the database was cleaned and a series of variables were created for use in various statistical analyses. These variables include DUI history pre-enrollment, BAC results pre-enrollment, the date of enrollment in the 24/7 Sobriety Program, the type of alcohol monitoring system used by the offending driver, impaired driving counts during program enrollment, non-DUI convictions during program enrollment, traffic crashes during program enrollment, and BAC levels for offenders who recidivate during program enrollment, among others. One variable highlighted the type of monitoring system being used to track program participants. Within this variable, it was discovered that 17 participants were tracked using only a drug patch. Since the focus of this research paper is on understanding impaired driver behavior, these 17 records were eliminated from the database as they were not specific to impaired driving. The final database consisted of 1,893 impaired driving-related records.

Per the data agreement between NDSU and the BCI, once the data were cleaned and useful variables were created, personal identification information was removed from the database to protect the anonymity of DUI offenders. For all drivers in the final data set, the first name, middle name, last name, date of birth, and address were removed prior to any statistical analyses being performed. Results from the forthcoming data analysis will be discussed in aggregate.

## 3.1 Data Characteristics

### 3.1.1 Program Start Year

As expected, a majority of the DUI offenders in this sample started the program in calendar year 2011, calendar year 2012, or calendar year 2013 (Table 3.1). It is evident that during the three full years of data provided to the researchers, enrollment in the program grew steadily. Undoubtedly, some of this growth in 2013 can be attributed to the new legislation mandating that repeat offenders participate in the 24/7 Sobriety Program.

**Table 3.1** Program Start Year of Offenders in Sample

| Start Year        | Number of Offenders | Percent of Sample |
|-------------------|---------------------|-------------------|
| 2008 <sub>1</sub> | 72                  | 3.8%              |
| 2009 <sub>1</sub> | 110                 | 5.8%              |
| 2010 <sub>2</sub> | 244                 | 12.9%             |
| 2011              | 359                 | 19.0%             |
| 2012              | 412                 | 21.8%             |
| 2013              | 573                 | 30.3%             |
| 2014 <sub>3</sub> | 123                 | 6.5%              |

<sub>1</sub> 24/7 Sobriety Program was used only in pilot form

<sub>2</sub> 24/7 Sobriety Program was used statewide starting on August 1, 2010

<sub>3</sub> Figure is based on enrollment through April 2014

### 3.1.2 Demographic Information

In this sample of DUI offenders, men outnumbered women at roughly a three-to-one ratio; 77.3% of participants were male and 22.7% were female. This follows other studies of DUI offenders in the state (Huseth and Kubas 2012). Younger drivers had a higher representation in the sample than older drivers (Table 3.2). A majority (56.9%) in the sample were under age 34, which parallels other statewide studies finding that 18-to-34 year-olds exhibit behaviors at odds with traffic safety goals, such as operating a vehicle after consuming alcohol more frequently than others (Vachal, Benson, and Kubas 2014). This is especially true for male drivers, as this particular group has been labeled as high-risk throughout the literature. It is worth noting that, in this sample, drivers in two age cohorts – those between ages 65 and 74 and those older than 75 – have fewer than 30 offenders in their respective age groups. Sample sizes smaller than 30 are not considered reliable when conducting tests of significance and cannot be extrapolated to fit the entire demographic being studied. Therefore, any conclusions made in this report about the 65-to-74 year-old age group or the 75+ cohort cannot be considered representative of all DUI offenders in those age groups in North Dakota.

**Table 3.2** Offenders in Sample, by Age

| Age Cohort | Number of Offenders | Percent of Sample |
|------------|---------------------|-------------------|
| 18-24      | 429                 | 22.7%             |
| 25-34      | 647                 | 34.2%             |
| 35-44      | 398                 | 21.0%             |
| 45-54      | 309                 | 16.3%             |
| 55-64      | 92                  | 4.9%              |
| 65-74      | 16                  | 0.8%              |
| 75+        | 2                   | 0.1%              |

### 3.1.3 Monitoring System

Once enrolled in the 24/7 Sobriety Program, participants must remain sober for the duration of the enrollment period. In order for the offender to stay accountable and remain sober when in the program, regular alcohol testing must occur. In North Dakota, multiple alcohol monitoring systems are utilized as part of the 24/7 Sobriety Program. These systems include twice-a-day preliminary breath tests, secure continuous remote alcohol monitoring (SCRAM) ankle bracelets that require data to be uploaded to a database at various times based on user download frequency, wireless SCRAM bracelets that automatically upload data every 30 minutes to the database, and urinalysis testing. Some respondents, as advocated by judicial discretion, may be subjected to more than one monitoring system when enrolled in the program. Of the 1,893 offenders in this sample, about four-fifths (1,504 enrollees) were monitored with only one type of alcohol-testing system. The majority of participants (67.8%) in this sample were monitored with twice-a-day preliminary breath tests only (Table 3.3). Of the remaining 391 program participants who were subjected to two or more alcohol-monitoring systems, nearly 95% were monitored by both the twice-a-day preliminary breath tests and SCRAM ankle bracelets. Just five participants were monitored simultaneously by three monitoring systems. For these five participants, two alcohol-testing systems were used in conjunction with drug patches; therefore no participant was subjected to being monitored by more than two alcohol-monitoring devices at once.

**Table 3.3** Monitoring Systems

| Monitoring System                              | Number of Offenders | Percent of Sample |
|--|---------------------|-------------------|
| Preliminary Breath Test only                   | 1,295               | 67.8%             |
| Preliminary Breath Test and SCRAM              | 372                 | 19.5%             |
| SCRAM only                                     | 209                 | 10.9%             |
| Drug Patch only*                               | 17                  | 0.9%              |
| Drug Patch and Preliminary Breath Test         | 8                   | 0.4%              |
| Drug Patch, Preliminary Breath Test, and SCRAM | 5                   | 0.3%              |
| Drug Patch and SCRAM                           | 2                   | 0.1%              |
| Preliminary Breath Test and Urinalysis         | 1                   | 0.05%             |
| Preliminary Breath Test and SCRAM Wireless     | 1                   | 0.05%             |

\*Data provided to the researchers included some individuals tracked by drug patch only. These individuals are excluded from the analysis as this report of 24/7 Sobriety Program participants requires at least one alcohol monitoring system.

### 3.1.4 Recidivist Status

In general, most studies monitoring the behaviors and patterns of alcohol abusers define recidivists as anyone who relapses into repetitive criminal behaviors. With regard to driving under the influence of alcohol, repeat DUI offenders are considered to be among the most dangerous drivers as their habitual use of alcohol and subsequent decisions to drive while impaired pose a major threat on the roadway. Studies throughout the literature validate that these drivers do, in fact, pose a safety threat to other drivers sharing the road. For the purposes of this study, however, the term “recidivist” will refer to drivers in the 24/7 Sobriety Program who committed a DUI violation after enrolling in the program. This definition will be used because 95.1% of the sample had at least one DUI conviction on record *before* starting the 24/7 Sobriety Program (Table 3.4). Therefore, almost every individual in the sample is classified as a recidivist by standard definitions and analysis of such a homogeneous group would be impractical.

**Table 3.4** Impaired Driving Arrests on Record before Starting 24/7 Sobriety Program

| Number of DUI Arrests on Record | Number of Participants |
|---------------------------------|------------------------|
| 1                               | 607                    |
| 2                               | 817                    |
| 3                               | 287                    |
| 4                               | 67                     |
| 5                               | 18                     |
| 6                               | 4                      |

Based on this study’s definition of a recidivist driver, two levels of recidivism will be examined: high-risk recidivists and moderate-risk recidivists. High-risk recidivists are classified as those drivers receiving a DUI conviction within 60 days of entering the 24/7 Sobriety Program. An arbitrary period of 60 days was chosen because – prior to the latest legislative changes made in House Bill 1302 – this represents the average time a DUI offender was sentenced to the program (McKnight, Fell, and Auld-Owens 2012). In this sample of impaired driving offenders, 77.2% began the 24/7 Sobriety Program prior to the enactment of House Bill 1302. Therefore, a majority of the sample was subjected to the program for a period of 60 days – though it should be noted that some enrollment lengths could be shorter or longer due to judicial discretion. Moderate-risk recidivists are categorized as those drivers who received a DUI conviction after the 60-day window as this represents offenders who most likely completed the program. In this sample of offenders, 53 (2.8%) were convicted of DUI within 60 days of starting the program and are considered high-risk recidivists. A smaller share of 204 drivers (10.8%) were convicted of DUI at some point after 60 days of beginning the 24/7 Sobriety Program. These individuals represent moderate-risk recidivists in this sample.

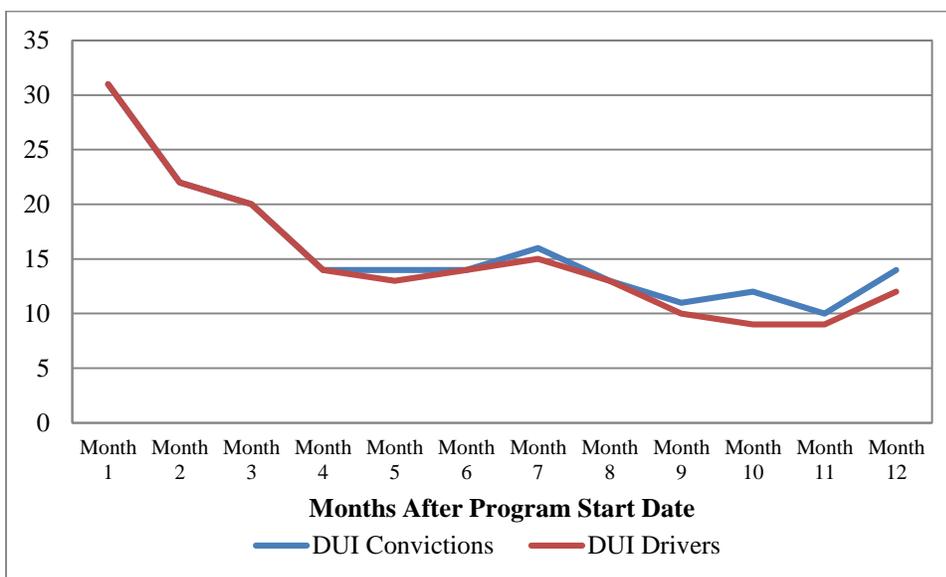
## 4. RESULTS

Data will be reported both in terms of general trends and specific differences between driver groups. Descriptive consideration must occur to account for overall patterns among DUI offenders. Beyond these overall trends, different hypothesis testing statistical procedures – Chi-Square tests and one-way ANOVAs – will be used to determine if there are differences in DUI offenders when factoring for various driver groups. This information will be provided to highlight possible differences in DUI violations, BAC levels, non-DUI citations, and crash trends.

### 4.1 Descriptive Statistics

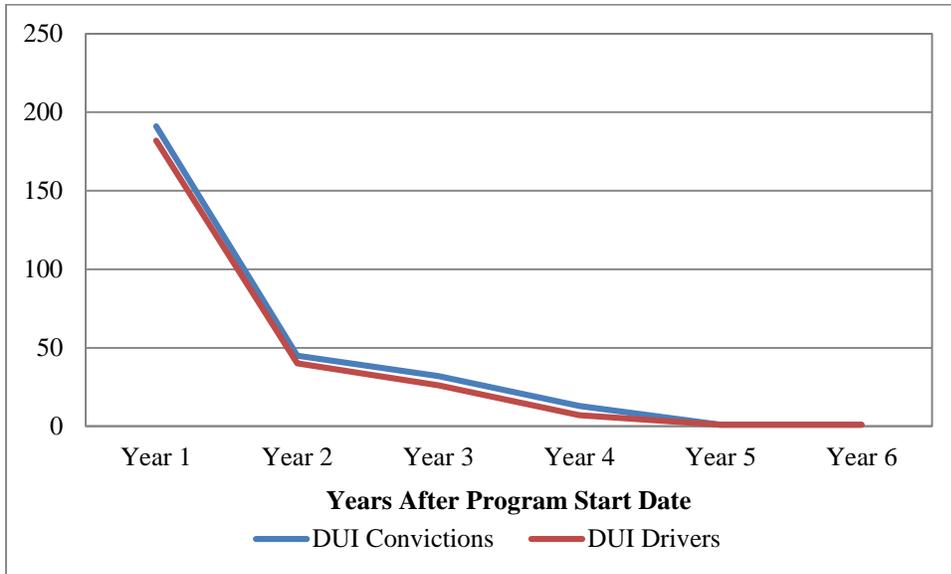
#### 4.1.1 Impaired Driving Events

Within the first year of being enrolled in the 24/7 Sobriety Program, there were 191 DUI convictions made by 182 unique drivers. Seven drivers had multiple DUI arrests within one year of starting the 24/7 Sobriety Program. In sum, of the 1,893 DUI offenders in this sample, 175 (9.2%) committed one DUI violation within one year of starting the program, six (0.3%) committed two DUI violations within one year of their program start date, and one driver (0.1%) had four impaired driving violations within one year of starting the 24/7 Sobriety Program. Of the 182 drivers who committed an impaired driving violation within one year of starting the program, the citation was most commonly received within the first three months of being enrolled in the program; over two-fifths (40.1%) received a DUI citation in this timeframe. Beyond the initial three months, impaired driving convictions tapered off slightly (Figure 4.1). It is clear that program participants have a strong chance of reoffending within the first 90 days of being enrolled in the 24/7 Sobriety Program. Therefore, it is crucial to monitor offenders during these first three months, as maintaining sobriety appears to be more common thereafter. It should be emphasized that there were moderate peaks between the sixth and seventh month and the 11<sup>th</sup> and 12<sup>th</sup> month, though the proportion of enrollees offending in these months was noticeably smaller than those offending within the first 90 days. Considering that some studies associate habitual alcohol use with addiction and/or a lack of self-control, it is reasonable to assume that enrollees reoffending within the first 90 days may have underlying issues with alcohol dependency.



**Figure 4.1** Impaired Driving Events by Program Enrollees within One Year from Start Date

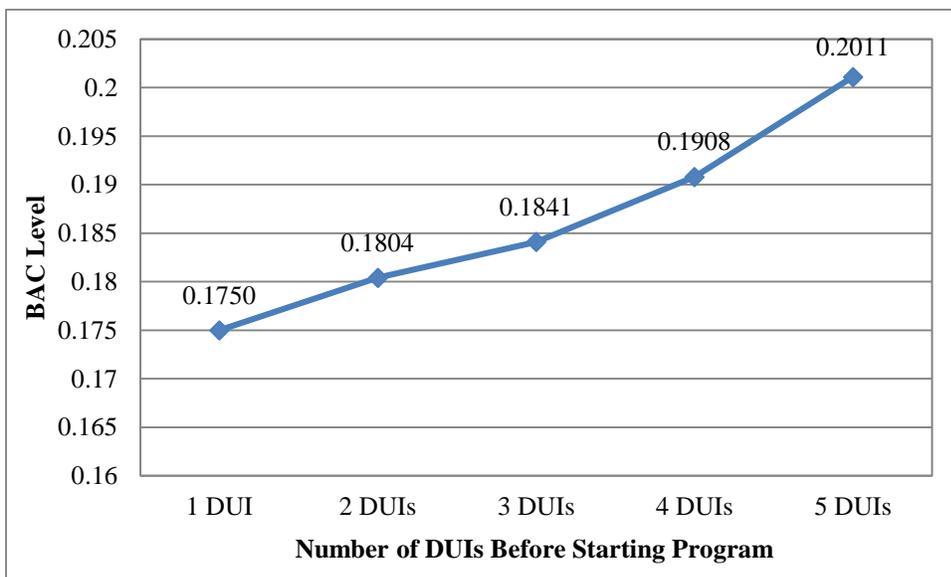
From an annual perspective, program participants are most likely to have an impaired driving event within the first year of starting the 24/7 Sobriety Program (Figure 4.2). The majority of drivers who reoffend (70.8%) and the majority of total DUI citations (67.5%) were represented in the first year of starting the program. In this sample of enrollees, impaired driving events consistently declined thereafter.



**Figure 4.2** Annual Impaired Driving Events by Program Enrollees

#### 4.1.1.1 Overall BAC Levels before Starting the 24/7 Sobriety Program

It is possible to track BAC level by offender, but only if the offender chose to submit to chemical testing. There was a positive linear link between BAC level prior to beginning the 24/7 Sobriety Program and the number of DUIs on record: those with more DUIs had a higher average BAC level ( $R^2=0.9637$ ) (Figure 4.3). This is expected as multiple DUI offenses are typically uncommon and may be a sign of chemical



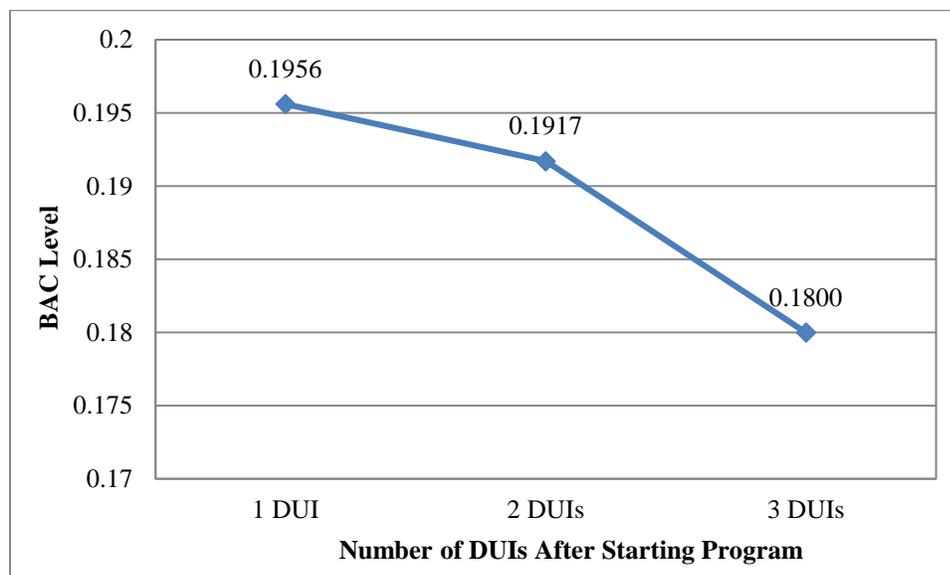
**Figure 4.3** Offender BAC Level before Starting Program, by Number of DUIs on Record

dependency. It should be mentioned that there were only 18 valid BAC level entries for program participants with at least five DUIs on record prior to beginning the 24/7 Sobriety Program. Therefore, although this number provides a strong indication of trends within this sample, this particular BAC value should not be considered representative of a typical BAC level for all DUI offenders in North Dakota with five DUIs on record.

#### 4.1.1.2 Overall BAC Levels after Starting the 24/7 Sobriety Program

After starting the 24/7 Sobriety Program, some drivers continued to operate a vehicle while impaired in spite of the treatment received during enrollment. A total of 257 offenders committed 283 impaired driving violations. Most offenders (91.1%) committed just one additional DUI violation, but there was one offender who had four DUI citations on record after beginning the program.

The average BAC level of an offender after enrolling in the 24/7 Sobriety Program follows a negative linear trend ( $R^2=0.9231$ ) (Figure 4.4). It should be emphasized, however, that there were less than 30 participants who committed two or three DUI violations and the individual who committed four violations refused to submit to chemical testing. It should also be reiterated that these figures do not represent before-and-after changes as these are only meant to show general trends across the impaired driving population. Links between individual drivers and the influence the program had with regard to before-and-after changes are discussed in section 4.3 of this report.

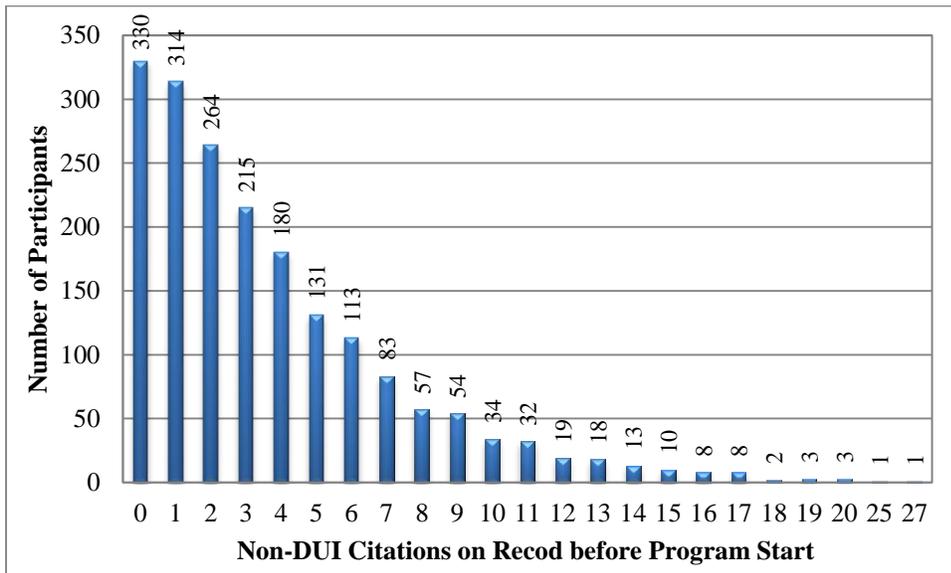


**Figure 4.4** Offender BAC Level after Starting Program, by Number of DUIs on Record

#### 4.1.2 Non-DUI-Related Convictions

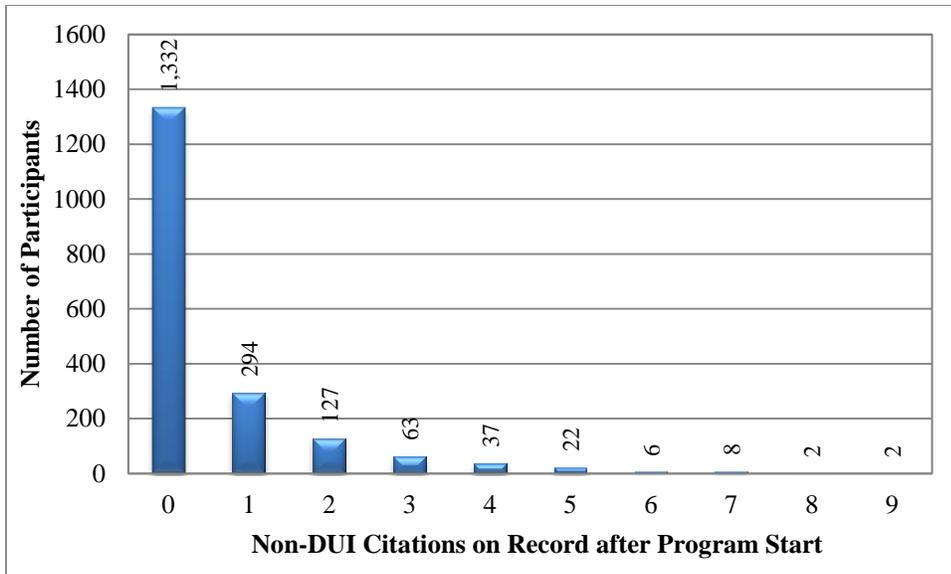
It is important to track trends in non-DUI-related convictions, as convictions related to alcohol are known to spread across other dimensions as well. It is not uncommon for someone with an alcohol-related conviction on record to also have convictions related to illegal drug use, domestic violence, reckless driving, and so forth. Therefore, highlighting potential improvements to non-DUI-related convictions after a participant has started the 24/7 Sobriety Program may shed light into how this program successfully deters crime beyond just impaired driving.

Figure 4.5 provides a snapshot of participant arrest trends for non-DUI-related citations. Citations follow a distinct negative linear trend: as non-DUI-related citations increase, there are fewer program participants with that many citations on record. Interestingly, program participants most commonly (17.4%) had zero non-DUI-related citations. This may be indicative of two scenarios. First, it is plausible that some program participants may have no criminal history whatsoever. Perhaps these individuals simply had too much to drink, made a mistake in judgment, and chose to operate a vehicle while impaired. Subsequently, these offenders got caught violating the law and were then enrolled in the program. Second, it is also possible that some offenders have a history of DUI-only violations. These individuals would be appropriately categorized as alcohol abusers and represent a major risk on the road. The data provided to the researchers does not specify the type of non-DUI violation on record for program participants; therefore it is impossible to distinguish these two categories of drivers from one another.



**Figure 4.5** Non-DUI-Related Citations before Starting Program

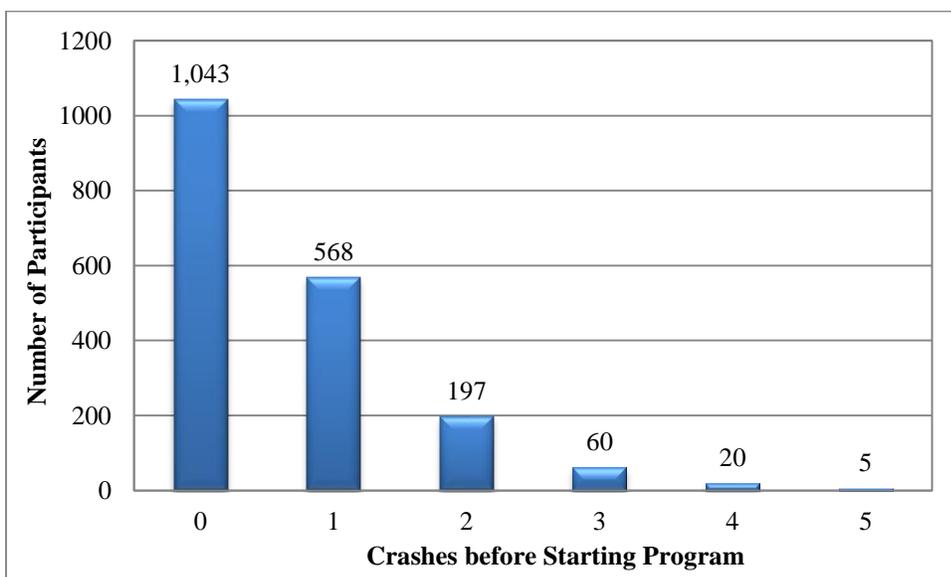
A similar negative linear trend emerges when factoring for non-DUI-related citations after program enrollment (Figure 4.6). One difference is that the majority of program participants (70.4%) have no non-DUI-related citation on record after being enrolled in the 24/7 Sobriety Program. Like BAC level, however, this should be interpreted with caution: this does not show a cause-and-effect relationship between participant behavior before and after enrollment in the program. Changes linked to individual participants and these citations are discussed further in section 4.3 of this report.



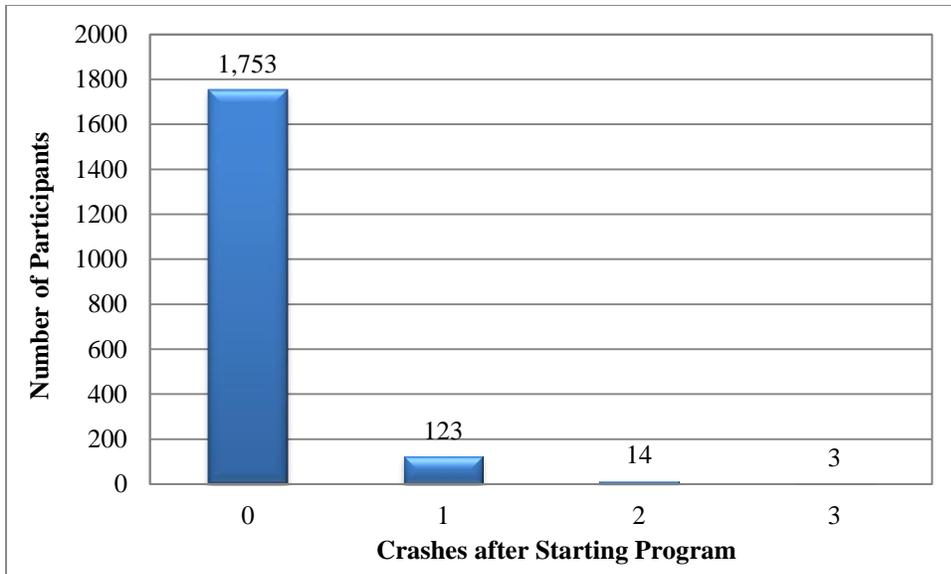
**Figure 4.6** Non-DUI-Related Citations after Starting Program

### 4.1.3 Crash Trends

About half of all DUI offenders in this study (44.9%) had a traffic crash on record prior to starting the 24/7 Sobriety Program (Figure 4.7). A much smaller proportion (7.4%) was involved in a traffic crash after enrolling in the program (Figure 4.8). This does not explain a cause-and-effect relationship, but does show that traffic crashes were less prevalent after enrollment. The data given to the researchers do not include information about impairment at the time of the crash. Therefore, it is unknown if the crash was due to the influence of alcohol. Moreover, there was no variable in the data set indicating crash severity. It is possible that some of the crashes encompassed in Figures 4.7 and 4.8 were minor property-damage-only collisions without impairment. It is also possible that the crashes could have resulted in serious injuries as a result of operating a vehicle under the influence of alcohol. Without these additional variables, it is impossible to make accurate claims regarding crash severity and/or impairment.



**Figure 4.7** Crashes before Starting 24/7 Sobriety Program



**Figure 4.8** Crashes after Starting 24/7 Sobriety Program

## 4.2 Driver Groups

It is important to analyze the response of different variables – DUI convictions, non-DUI convictions, BAC levels, and crashes – when factoring for individual driver groups. Differences across groups can help explain behavior and can also be used to target safety strategies to high-risk groups. Four driver groups will be examined as discussed in the methods section of this report: gender, age, recidivist status, and prior impaired driving history.

### 4.2.1 Gender

Dangerous driving behaviors have been associated with emotional responses and riskier personalities. Studies show that individuals with higher risk-taking behaviors are more likely to drive dangerously, even after being involved in a traffic crash (Lin et al. 2004). Therefore, it is prudent to track the impaired driving metrics used in this study in multiple ways. Program participants should be analyzed with two approaches: first, by comparing participants who have ever been categorized by one of the impaired driving metrics; and, second, by comparing the total number of times a participant has been categorized by each individual impaired driving metric.

There were some differences across gender when comparing participants who have ever had one of the impaired driving metrics (Table 4.1). For example, women were more likely to have had at least one DUI conviction prior to starting the 24/7 Sobriety Program (Chi-Sq.=11.032, df=1, p=0.001) but men were more likely to have committed at least one DUI violation after enrolling in the program (Chi-Sq.=9.512, df=1, p=0.002). This suggests that the program has a greater influence on women with regard to committing a DUI violation: on average, females have a smaller likelihood of committing at least one DUI violation after starting the 24/7 Sobriety Program. Given this relationship, it is logical that women were more likely to have had a failed BAC test prior to starting the program (Chi-Sq.=6.433, df=1, p=0.011) and men were more likely to have had a failed BAC test after enrolling in the program (Chi-Sq.=9.929, df=1, p=0.002). Again, it appears as though the program has a more noticeable influence on women than on men.

**Table 4.1** Mean Values Displaying Participants with at Least One Violation, by Gender

| Metric                                   | Gender |        | Significance |
|--|--------|--------|--------------|
|  | Male   | Female |              |
| DUI Conviction, before Program Start     | 0.94   | 0.98   | **           |
| DUI Conviction, after Program Start      | 0.15   | 0.09   | **           |
| Non-DUI Conviction, before Program Start | 0.82   | 0.85   |              |
| Non-DUI Conviction, after Program Start  | 0.30   | 0.28   |              |
| Crash, before Program Start              | 0.42   | 0.54   | **           |
| Crash, after Program Start               | 0.07   | 0.08   |              |
| BAC Test, before Program Start           | 0.82   | 0.87   | *            |
| BAC Test, after Program Start            | 0.15   | 0.09   | **           |

\*\*Significant at the 1% level for Chi-Square test  
 \*Significant at the 5% level for Chi-Square test

In terms of the total number of convictions and crashes committed by program participants (Table 4.2), results were comparable to those found in Table 4.1. In this sample of DUI offenders, the average 24/7 Sobriety Program participant had 1.84 DUI convictions before enrolling in the program. On average, women had more DUI convictions before starting the program than did men; the difference was statistically significant at the 5% level ( $F=5.194$ ,  $df=1$ ,  $p=0.023$ ). Men, however, had more DUI convictions after starting the program. This difference was statistically significant at the 1% level ( $F=9.333$ ,  $df=1$ ,  $p=0.002$ ). Men once again were also more likely to have failed a BAC test after enrolling in the program ( $F=7.010$ ,  $df=1$ ,  $p=0.008$ ). This parallels earlier findings and once again indicates that the 24/7 Sobriety Program has a stronger deterrent effect on women than on men.

Men also had more non-DUI convictions on their records before starting the program. On average, men in this sample of DUI offenders had 3.82 non-DUI-related convictions compared with just 3.31 for women. This difference was statistically significant at the 5% level ( $F=6.219$ ,  $df=1$ ,  $p=0.013$ ).

Like those program participants who have ever had a crash, with regard to the average total number of crashes on one's record, women once again had a higher average number of crashes than did men ( $F=10.355$ ,  $df=1$ ,  $p=0.001$ ). On average, women had 0.78 crashes before starting the program and men had just 0.62 prior crashes. There was no statistically significant difference between the two groups with regard to the average number of crashes after starting the sobriety program. This once again suggests that the program had a positive influence on females with regard to safer driving practices as women shifted from being worse than men to being on par with men after program enrollment for this metric.

**Table 4.2** Mean Values Displaying Total Participant Violations, by Gender

| Metric                                   | Mean Value |      |        | Significance |
|--|------------|------|--------|--------------|
|  | Total      | Male | Female |              |
| DUI Conviction, before Program Start     | 1.84       | 1.81 | 1.93   | #            |
| DUI Conviction, after Program Start      | 0.15       | 0.16 | 0.10   | ##           |
| Non-DUI Conviction, before Program Start | 3.71       | 3.82 | 3.31   | #            |
| Non-DUI Conviction, after Program Start  | 0.59       | 0.60 | 0.56   |              |
| Crash, before Program Start              | 0.66       | 0.62 | 0.78   | ##           |
| Crash, after Program Start               | 0.08       | 0.08 | 0.09   |              |
| BAC Test, before Program Start           | 1.48       | 1.46 | 1.55   |              |
| BAC Test, after Program Start            | 0.15       | 0.17 | 0.11   | ##           |

##Significant at the 1% level for 1-way ANOVA  
 #Significant at the 5% level for 1-way ANOVA

## 4.2.2 Age

Some noticeable trends emerged when examining impaired driving-related crime across age cohorts (Table 4.3). With regard to statistically significant differences, younger 24/7 Sobriety Program participants were more likely to have at least one violation on record than were older participants. For instance, whereas 90% of 18-to-24 year-olds had at least one non-DUI-related conviction on record before starting the program, just 74% of participants over the age of 55 had at least one non-DUI-related conviction. This difference was statistically significant at the 1% level (Chi-Sq.=30.381, df=4, p<0.001). A consistent decline across age groups with regard to non-DUI-related convictions was also evident once participants started the program, though this difference was statistically significant at the 5% level (Chi-Sq.=12.235, df=4, p=0.016).

The same reduction across age groups was evident when factoring for traffic crashes prior to enrolling in the program. Interestingly, younger drivers were once again more likely to have at least one traffic crash on record prior to starting the 24/7 Sobriety Program. This is especially alarming considering that older drivers have likely had a driver's license for a longer period of time, and thus, have had a greater chance of being involved in a traffic crash. In this sample of DUI offenders, 59% of 18-24 year-olds were involved in at least one crash before enrolling in the program, a much larger percentage than the 35% of participants over age 55 who had a crash on record (Chi-Sq.=49.771, df=4, p<0.001).

**Table 4.3** Mean Values Displaying Participants with at Least One Violation, by Age

| Metric                                   | Mean Value |       |       |       |                  | Sig. |
|--|------------|-------|-------|-------|------------------|------|
|  | 18-24      | 25-34 | 35-44 | 45-54 | 55+ <sub>1</sub> |      |
| DUI Conviction, before Program Start     | 0.94       | 0.95  | 0.96  | 0.94  | 0.98             |      |
| DUI Conviction, after Program Start      | 0.16       | 0.14  | 0.12  | 0.14  | 0.06             |      |
| Non-DUI Conviction, before Program Start | 0.90       | 0.83  | 0.81  | 0.76  | 0.74             | **   |
| Non-DUI Conviction, after Program Start  | 0.34       | 0.30  | 0.29  | 0.26  | 0.20             | *    |
| Crash, before Program Start              | 0.59       | 0.45  | 0.38  | 0.38  | 0.35             | **   |
| Crash, after Program Start               | 0.08       | 0.07  | 0.07  | 0.07  | 0.04             |      |
| BAC Test, before Program Start           | 0.82       | 0.83  | 0.84  | 0.83  | 0.85             |      |
| BAC Test, after Program Start            | 0.16       | 0.14  | 0.13  | 0.13  | 0.05             |      |

<sub>1</sub>The 65-74 and 75+ age cohorts were merged with the 55-64 age group because there were fewer than 30 drivers in those cohorts

\*\*Significant at the 1% level for Chi-Square test

\*Significant at the 5% level for Chi-Square test

With the exception of DUI convictions prior to enrolling in the program, the total number of impaired driving-related crimes once again declined as age increased (Table 4.4). For instance, 18-to-24 year-olds had an average of 4.95 non-DUI convictions on record before starting the program, yet those over age 55 had an average of just 2.41 non-DUI convictions (F=23.816, df=4, p<0.001). Once again, on average, younger drivers had more non-DUI convictions after enrolling in the program than did older drivers (F=4.066, df=4, p=0.003). The same pattern occurred when factoring for traffic crashes before starting the program (F=16.161, df=4, p<0.001).

One variable – the number of DUI convictions on record prior to starting the 24/7 Sobriety Program – followed a different trend. The number of prior DUI convictions generally increased with age, though there was a slight decrease between the 35-to-44 and 45-to-54 year-old cohorts. Nonetheless, those over age 55 had the greatest average number of DUI convictions before starting the program (1.96) and those in the 18-to-24 year-old age group had the fewest (1.63). This difference was statistically significant at the 1% level (F=76.799, df=4, p<0.001).

**Table 4.4** Mean Values Displaying Total Participant Violations, by Age

| Metric                                   | Mean Value |       |       |       |                  | Sig. |
|--|------------|-------|-------|-------|------------------|------|
|  | 18-24      | 25-34 | 35-44 | 45-54 | 55+ <sub>1</sub> |      |
| DUI Conviction, before Program Start     | 1.63       | 1.91  | 1.93  | 1.81  | 1.96             | ##   |
| DUI Conviction, after Program Start      | 0.18       | 0.16  | 0.13  | 0.15  | 0.06             |      |
| Non-DUI Conviction, before Program Start | 4.95       | 3.77  | 3.48  | 2.60  | 2.41             | ##   |
| Non-DUI Conviction, after Program Start  | 0.76       | 0.59  | 0.58  | 0.49  | 0.31             | ##   |
| Crash, before Program Start              | 0.94       | 0.65  | 0.53  | 0.51  | 0.49             | ##   |
| Crash, after Program Start               | 0.09       | 0.09  | 0.08  | 0.08  | 0.05             |      |
| BAC Test, before Program Start           | 1.36       | 1.52  | 1.51  | 1.53  | 1.54             |      |
| BAC Test, after Program Start            | 0.18       | 0.16  | 0.14  | 0.16  | 0.06             |      |

<sub>1</sub>The 65-74 and 75+ age cohorts were merged with the 55-64 age group because there were fewer than 30 drivers in those cohorts

##Significant at the 1% level for 1-way ANOVA

## 4.2.3 Recidivist Status

Although four impaired driving-related metrics have been studied thus far in this report, only two will be examined when addressing recidivist drivers: non-DUI convictions and crashes. The justification for this approach is that, by definition, in order to be classified as a recidivist a participant must have a failed BAC test and have a subsequent DUI conviction. Therefore, it is to be expected that recidivist drivers will have a statistically higher likelihood of DUI conviction and at least one failed BAC test. What is important for safety experts to know is whether or not these individuals pose a threat to other drivers beyond the realm of impaired driving.

### 4.2.3.1 High-Risk Recidivists

With regard to high-risk recidivist status, the effect of the 24/7 Sobriety Program on non-DUI convictions is minimal (Table 4.5). High-risk recidivists are less likely to have at least one non-DUI conviction on record before starting the program (Chi-Sq.=25.537, df=1, p<0.001) but are more likely to have a non-DUI conviction after enrolling in the program (Chi-Sq.=21.771, df=1, p<0.001). There was no statistically significant difference in this sample when looking at changes among high-risk recidivists before and after enrolling in the 24/7 Sobriety Program (t=-0.227, df=52, p=0.821). Whereas 57% of high-risk recidivists had at least one non-DUI conviction before starting the program, 58% of the same group had at least one non-DUI conviction after enrollment – a higher total after program intervention. In contrast, there was a noticeable decline among all other participants: 83% had at least one non-DUI conviction before enrollment. This number declined to just 29% after program participation (t=41.627, df=1,839, p<0.001).

Interestingly, both high-risk recidivists and non-high-risk recidivists had reductions in crash rates after enrolling in the program. This indicates that although recidivating appears to be linked to other crimes, it may not extend into behind-the-wheel danger. Nonetheless, it should be noted that non-high-risk recidivists had a much larger reduction than did high-risk recidivists.

**Table 4.5** Mean Values Displaying Participants with at Least One Violation, by High-Risk Status

| Metric                                   | Mean Value           |       | Sig. |
|--|----------------------|-------|------|
|  | High-Risk Recidivist | Other |      |
| Non-DUI Conviction, before Program Start | 0.57                 | 0.83  | **   |
| Non-DUI Conviction, after Program Start  | 0.58                 | 0.29  | **   |
| Crash, before Program Start              | 0.19                 | 0.46  | **   |
| Crash, after Program Start               | 0.13                 | 0.07  |      |

\*\*Statistically significant difference at 1% level for Chi-Square test

Similar patterns emerged when analyzing high-risk recidivists by the total number of violations committed (Table 4.6). On average, high-risk recidivists once again had fewer non-DUI convictions before starting the program ( $F=7.016$ ,  $df=1$ ,  $p=0.008$ ) but more non-DUI convictions after enrollment ( $F=8.814$ ,  $df=1$ ,  $p=0.003$ ). This implies that – with regard to non-DUI crime – the program had a greater deterrent effect on non-high-risk recidivists than on those who reoffended within 60 days of beginning the 24/7 Sobriety Program.

One contrast when analyzing the data by the total number of violations is that – even though high-risk recidivists had more non-DUI convictions than other participants after enrolling in the program – this dangerous driving group had a statistically significant improvement before and after program intervention ( $t=2.875$ ,  $df=52$ ,  $p=0.006$ ). The same result took place for non-high-risk recidivists ( $t=35.887$ ,  $df=1,839$ ,  $p<0.001$ ). In other words, although the 24/7 Sobriety Program has a larger deterrent effect on non-high-risk participants, it still has a noticeable influence on high-risk offenders as well.

**Table 4.6** Mean Values Displaying Total Participant Violations, by High-Risk Status

| Metric                                   | Mean Value           |       | Sig. |
|--|----------------------|-------|------|
|  | High-Risk Recidivist | Other |      |
| Non-DUI Conviction, before Program Start | 2.38                 | 3.75  | ##   |
| Non-DUI Conviction, after Program Start  | 1.08                 | 0.58  | ##   |
| Crash, before Program Start              | 0.23                 | 0.67  | ##   |
| Crash, after Program Start               | 0.13                 | 0.08  |      |

##Statistically significant difference at 1% level for 1-way ANOVA

#### 4.2.3.2 Moderate-Risk Recidivists

Moderate-risk recidivists display similar behaviors to their high-risk counterparts. Moderate-risk recidivists were less likely to have had at least one non-DUI conviction before starting the program ( $\text{Chi-Sq.}=5.904$ ,  $df=1$ ,  $p=0.015$ ) yet were more likely to have had at least one non-DUI conviction after enrollment ( $\text{Chi-Sq.}=201.917$ ,  $df=1$ ,  $p<0.001$ ) (Table 4.7). Like high-risk recidivists, the proportion of moderate-risk participants with non-DUI convictions before and after program intervention remains relatively constant ( $t=1.089$ ,  $df=203$ ,  $p=0.277$ ) yet declines significantly for others ( $t=44.131$ ,  $df=1,688$ ,  $p<0.001$ ). Once again, based on how the concept of risk is constructed in this study, the program is less influential on risky participants with regard to non-DUI-related crime.

In terms of traffic crashes, moderate-risk recidivists were just as likely as other participants to have had at least one crash before beginning the program ( $\text{Chi-Sq.}=2.988$ ,  $df=1$ ,  $p=0.084$ ). However, this group was more likely to have at least one crash after starting the 24/7 Sobriety Program ( $\text{Chi-Sq.}=53.866$ ,  $df=1$ ,  $p<0.001$ ). Nevertheless, before-and-after results show positive trends: fewer moderate-risk recidivists have at least one crash on record after participating in the program ( $t=4.308$ ,  $df=203$ ,  $p<0.001$ ). The same situation took place for other program participants ( $t=29.633$ ,  $df=1,688$ ,  $p<0.001$ ). Although these crashes may not be directly attributable to alcohol consumption, these initial trends provide an early indicator as to how the program positively impacts other traffic safety concerns beyond impaired driving.

**Table 4.7** Mean Values Displaying Participants with at Least One Violation, by Moderate-Risk Status

| Metric                                   | Mean Value               |       | Sig. |
|--|--------------------------|-------|------|
|  | Moderate-Risk Recidivist | Other |      |
| Non-DUI Conviction, before Program Start | 0.76                     | 0.83  | *    |
| Non-DUI Conviction, after Program Start  | 0.73                     | 0.24  | **   |
| Crash, before Program Start              | 0.39                     | 0.46  |      |
| Crash, after Program Start               | 0.20                     | 0.06  | **   |

\*\*Statistically significant difference at 1% level for Chi-Square test

There were no statistically significant differences between moderate-risk recidivists and all other offenders in this sample prior to beginning the 24/7 Sobriety Program when factoring for the average number of non-DUI convictions ( $F=0.181$ ,  $df=1$ ,  $p=0.671$ ) and crashes ( $F=1.837$ ,  $df=1$ ,  $p=0.175$ ) on one's record. However, after enrolling in the program there were notable differences (Table 4.8). Upon starting the 24/7 Sobriety Program, moderate-risk offenders on average had more non-DUI convictions ( $F=233.166$ ,  $df=1$ ,  $p<0.001$ ) and more traffic crashes ( $F=59.750$ ,  $df=1$ ,  $p<0.001$ ). Moderate-risk participants did show significant before-and-after improvement for these two metrics ( $t=7.492$ ,  $df=203$ ,  $p<0.001$  and  $t=4.734$ ,  $df=203$ ,  $p<0.001$ , respectively) but this group still had higher average levels of dangerous behavior.

**Table 4.8** Mean Values Displaying Total Participant Violations, by Moderate-Risk Status

| Metric                                   | Mean Value               |       | Sig. |
|--|--------------------------|-------|------|
|  | Moderate-Risk Recidivist | Other |      |
| Non-DUI Conviction, before Program Start | 3.60                     | 3.72  |      |
| Non-DUI Conviction, after Program Start  | 1.74                     | 0.45  | ##   |
| Crash, before Program Start              | 0.58                     | 0.67  |      |
| Crash, after Program Start               | 0.25                     | 0.07  | ##   |

##Statistically significant difference at 1% level for 1-way ANOVA

#### 4.2.4 Prior Impaired Driving History

Examining the impaired driving histories of participants sheds light into whether or not there are differences based on prior alcohol abuse. As mentioned in the literature, repeat offenders have been associated with habitual alcohol use and/or issues with self-control. Therefore, it is plausible that participants with more DUI convictions on record may exhibit more dangerous behaviors across the driving spectrum. This assertion appears to be somewhat correct (see Table 4.9 and Table 4.10). For instance, participants with more DUI convictions on record before starting the program had more non-DUI convictions as well ( $F=37.312$ ,  $df=3$ ,  $p<0.001$ ). Before beginning the 24/7 Sobriety Program, the same exact trend occurred for crashes: participants with more DUI convictions were also, on average, more likely to have been in a crash ( $F=11.840$ ,  $df=3$ ,  $p<0.001$ ).

Interestingly, there were no statistically significant differences across impaired driving history with regard to traffic crashes after beginning the program. This pattern occurred when examined by participants with at least one crash on record ( $Chi-Sq.=3.838$ ,  $df=3$ ,  $p=0.280$ ) or by the average number of crashes on record ( $F=2.091$ ,  $df=3$ ,  $p=0.099$ ). The program had a positive deterrent effect with regard to traffic collisions for especially dangerous drivers as crash rates by drivers with more prior DUI convictions were reduced and comparable after beginning the program – a positive sign of the program's effectiveness.

**Table 4.9** Mean Values Displaying Participants with at Least One Violation, by History

| Metric                                   | Prior Impaired Driving Convictions |      |      |                 | Sig. |
|--|------------------------------------|------|------|-----------------|------|
|  | 1                                  | 2    | 3    | 4+ <sub>1</sub> |      |
| DUI Conviction, before Program Start     | 1.00                               | 1.00 | 1.00 | 1.00            |      |
| DUI Conviction, after Program Start      | 0.11                               | 0.09 | 0.09 | 0.16            |      |
| Non-DUI Conviction, before Program Start | 0.73                               | 0.89 | 0.92 | 0.98            | **   |
| Non-DUI Conviction, after Program Start  | 0.24                               | 0.29 | 0.36 | 0.31            | **   |
| Crash, before Program Start              | 0.40                               | 0.48 | 0.52 | 0.55            | **   |
| Crash, after Program Start               | 0.06                               | 0.07 | 0.08 | 0.10            |      |
| BAC Test, before Program Start           | 0.65                               | 0.97 | 1.00 | 0.99            | **   |
| BAC Test, after Program Start            | 0.11                               | 0.10 | 0.13 | 0.15            |      |

<sub>1</sub>Drivers with 4, 5, or 6 DUI convictions prior to starting the program were combined into one group due to sample size  
\*\*Significant at the 1% level for Chi-Square test

**Table 4.10** Mean Values Displaying Total Participant Violations, by History

| Metric                                   | Prior Impaired Driving Convictions |      |      |                 | Sig. |
|--|------------------------------------|------|------|-----------------|------|
|  | 1                                  | 2    | 3    | 4+ <sub>1</sub> |      |
| DUI Conviction, before Program Start     | 1.00                               | 2.00 | 3.00 | 4.29            | ##   |
| DUI Conviction, after Program Start      | 0.12                               | 0.09 | 0.09 | 0.22            | ##   |
| Non-DUI Conviction, before Program Start | 2.70                               | 4.15 | 4.54 | 6.09            | ##   |
| Non-DUI Conviction, after Program Start  | 0.52                               | 0.59 | 0.70 | 0.57            |      |
| Crash, before Program Start              | 0.53                               | 0.69 | 0.84 | 0.99            | ##   |
| Crash, after Program Start               | 0.06                               | 0.09 | 0.09 | 0.13            |      |
| BAC Test, before Program Start           | 0.72                               | 1.61 | 2.55 | 3.51            | ##   |
| BAC Test, after Program Start            | 0.13                               | 0.11 | 0.15 | 0.19            |      |

<sub>1</sub>Drivers with 4, 5, or 6 DUI convictions prior to starting the program were combined into one group due to sample size  
##Significant at the 1% level for 1-way ANOVA

## 4.3 Before-and-After Results

### 4.3.1 Gender

Before-and-after trends can be tracked narrowly by demographic information. A before-and-after comparison by gender shows positive improvements among program participants (Table 4.11). For instance, more than four-fifths of both men (82%) and women (85%) had at least one non-DUI conviction on record prior to beginning the 24/7 Sobriety Program. After enrollment, these proportions declined to 30% and 28%, respectively, which were both statistically significant at the 1% level ( $t=34.506$ ,  $df=1,463$ ,  $p<0.001$ ;  $t=21.177$ ,  $df=428$ ,  $p<0.001$ ). This reduction implies that the program may influence participant behavior beyond impaired driving-related crime. Another noticeable trend separate from impaired driving is that of a reduction in traffic crashes. About two-fifths of men (42%) and half of women (54%) had a crash on record before starting the 24/7 Sobriety Program. These numbers declined to 7% and 8%, respectively, after enrollment in the program, which was once again statistically significant at the 1% level ( $t=23.996$ ,  $df=1,463$ ,  $p<0.001$ ;  $t=16.561$ ,  $df=428$ ,  $p<0.001$ ).

**Table 4.11** Before-and-After Results: Gender Percentages and Averages

| Males  | Before Program | After Program | Sig. |
|--|----------------|---------------|------|
| Percent with at least one DUI                | 94%            | 15%           | **   |
| Number of DUIs on record                     | 1.81           | 0.16          | **   |
| Percent with at least one non-DUI conviction | 82%            | 30%           | **   |
| Number of non-DUI convictions on record      | 3.82           | 0.60          | **   |
| Percent with at least one crash              | 42%            | 7%            | **   |
| Number of crashes on record                  | 0.62           | 0.08          | **   |
| Percent with at least one failed BAC test    | 82%            | 15%           | **   |
| Number of failed BAC tests on record         | 1.46           | 0.17          | **   |
| Females                                      | Before Program | After Program | Sig. |
| Percent with at least one DUI                | 98%            | 9%            | **   |
| Number of DUIs on record                     | 1.93           | 0.10          | **   |
| Percent with at least one non-DUI conviction | 85%            | 28%           | **   |
| Number of non-DUI convictions on record      | 3.31           | 0.56          | **   |
| Percent with at least one crash              | 54%            | 8%            | **   |
| Number of crashes on record                  | 0.78           | 0.09          | **   |
| Percent with at least one failed BAC test    | 87%            | 9%            | **   |
| Number of failed BAC tests on record         | 1.55           | 0.11          | **   |

\*\*Statistically significant difference at 1% level for paired samples t-test

As a whole, when studied across gender, every metric saw a statistically significant improvement when factoring for before-and-after trends. Whether the metric was examined by percentage or by average, both men and women noticeably reduced dangerous driving behaviors after enrolling in the program. This pattern remained constant when factoring for both impaired-related and non-impaired-related crime.

### 4.3.2 Age

An examination of before-and-after trends factoring for individual age cohorts shows that participants once again were positively influenced after enrollment in the 24/7 Sobriety Program (Table 4.12). Like results across gender, participants once again improved overall and average crime scores across all metrics used in this study. The 55+ age cohort had the largest improvement with regard to the percentage of participants having at least one DUI on record. Whereas 98% of this group had at least one DUI before starting the program, just 6% had at least one DUI on record after program enrollment ( $t=28.710$ ,  $df=109$ ,  $p<0.001$ ). The largest improvement in terms of non-DUI convictions came from the 18-to-24 year-old age cohort ( $t=20.918$ ,  $df=428$ ,  $p<0.001$ ). Whereas 90% of participants in this age cohort had at least one non-DUI conviction on record before beginning the program, 34% had such a conviction on record after program enrollment, a reduction of 56%.

In terms of traffic crashes, the 55+ age cohort was safest. This group had the lowest percentage with at least one crash before starting the program (35%) and also had the fewest participants (4%) to have a traffic crash after partaking in the 24/7 Sobriety Program. All age cohorts significantly reduced the number of drivers with at least one crash on record after beginning the program.

The 18-to-24 year-old cohort had the highest number of drivers recidivate based on those who failed BAC tests after beginning the program. Of all 18-to-24 year-olds in this sample, 16% failed at least one BAC test after beginning the program – a larger percentage than any other group. Similarly, this group had the highest average number of failed BAC tests (0.18 per participant) after enrolling in the program. In contrast, the 55+ age group was least likely to recidivate; just 6% of participants in this cohort had at least

one failed BAC test after starting the program and there were only 0.06 failed BAC tests per participant among these DUI offenders.

It should be noted that the driver's license information available to the researchers was restricted to a look-back period of seven years. Thus, it is possible that some drivers had the full seven-year "look-back" period and subsequently had their licenses for a longer period of time before starting the program than they did after enrolling in the 24/7 Sobriety Program. However, nearly half of all drivers in this sample have been followed after enrolling in the program for three or more years – making these findings more robust. To further complicate the interpretation of these results, the researchers were not given information regarding the date for which a driver obtained a license and/or passed a driver's exam. Without this information, it is difficult to interpret the seven-year look-back period as some of these participants may not have had a driver's license during this time. Nonetheless, the impact the program has on offender behavior is evident across demographic profiles: DUI offenders in this sample were significantly less likely to engage in dangerous alcohol-related and non-alcohol-related traffic activity.

**Table 4.12** Before-and-After Results: Age Cohort Percentages and Averages

| 18-to-24 Year-Old Cohort                     | Before Program | After Program | Sig. |
|--|----------------|---------------|------|
| Percent with at least one DUI                | 94%            | 16%           | **   |
| Number of DUIs on record                     | 1.63           | 0.18          | **   |
| Percent with at least one non-DUI conviction | 90%            | 34%           | **   |
| Number of non-DUI convictions on record      | 4.95           | 0.76          | **   |
| Percent with at least one crash              | 59%            | 8%            | **   |
| Number of crashes on record                  | 0.94           | 0.09          | **   |
| Percent with at least one failed BAC test    | 82%            | 16%           | **   |
| Number of failed BAC tests on record         | 1.36           | 0.18          | **   |
| 25-to-34 Year-Old Cohort                     | Before Program | After Program | Sig. |
| Percent with at least one DUI                | 95%            | 14%           | **   |
| Number of DUIs on record                     | 1.91           | 0.16          | **   |
| Percent with at least one non-DUI conviction | 83%            | 30%           | **   |
| Number of non-DUI convictions on record      | 3.77           | 0.59          | **   |
| Percent with at least one crash              | 45%            | 7%            | **   |
| Number of crashes on record                  | 0.65           | 0.09          | **   |
| Percent with at least one failed BAC test    | 83%            | 14%           | **   |
| Number of failed BAC tests on record         | 1.52           | 0.16          | **   |
| 35-to-44 Year-Old Cohort                     | Before Program | After Program | Sig. |
| Percent with at least one DUI                | 96%            | 12%           | **   |
| Number of DUIs on record                     | 1.93           | 0.13          | **   |
| Percent with at least one non-DUI conviction | 81%            | 29%           | **   |
| Number of non-DUI convictions on record      | 3.48           | 0.58          | **   |
| Percent with at least one crash              | 38%            | 7%            | **   |
| Number of crashes on record                  | 0.53           | 0.08          | **   |
| Percent with at least one failed BAC test    | 84%            | 13%           | **   |
| Number of failed BAC tests on record         | 1.51           | 0.14          | **   |
| 45-to-54 Year-Old Cohort                     | Before Program | After Program | Sig. |
| Percent with at least one DUI                | 94%            | 14%           | **   |
| Number of DUIs on record                     | 1.81           | 0.15          | **   |
| Percent with at least one non-DUI conviction | 76%            | 26%           | **   |
| Number of non-DUI convictions on record      | 2.60           | 0.49          | **   |
| Percent with at least one crash              | 38%            | 7%            | **   |
| Number of crashes on record                  | 0.51           | 0.08          | **   |
| Percent with at least one failed BAC test    | 83%            | 13%           | **   |
| Number of failed BAC tests on record         | 1.53           | 0.16          | **   |
| 55+ Year-Old Cohort                          | Before Program | After Program | Sig. |
| Percent with at least one DUI                | 98%            | 6%            | **   |
| Number of DUIs on record                     | 1.96           | 0.06          | **   |
| Percent with at least one non-DUI conviction | 74%            | 20%           | **   |
| Number of non-DUI convictions on record      | 2.41           | 0.31          | **   |
| Percent with at least one crash              | 35%            | 4%            | **   |
| Number of crashes on record                  | 0.49           | 0.05          | **   |
| Percent with at least one failed BAC test    | 85%            | 5%            | **   |
| Number of failed BAC tests on record         | 1.54           | 0.06          | **   |

\*\*Statistically significant difference at 1% level for paired samples t-test

### 4.3.3 Recidivist Status

Unlike differences across gender and age – which were found to be statistically significant for every metric studied in this report – before-and-after results for high-risk and moderate-risk offenders suggest that the program was not as effective of a deterrent (Table 4.13 and Table 4.14). High-risk recidivists were just as likely to have at least one non-DUI conviction on record after program enrollment as they were before starting the sobriety program ( $t=-0.227$ ,  $df=52$ ,  $p=0.821$ ). Although high-risk recidivists had fewer crashes on average after beginning the program, the decline was not a statistically significant improvement ( $t=1.151$ ,  $df=52$ ,  $p=0.255$ ). For this at-risk driver group, the program was not effective at deterring dangerous driving activity for both alcohol-related and non-alcohol-related crime.

Moderate-risk recidivists saw more positive results than did high-risk recidivists. For instance, the percentage of moderate-risk offenders with at least one crash on record nearly dropped in half ( $t=4.308$ ,  $df=203$ ,  $p<0.001$ ) and the average number of crashes this group was involved in declined noticeably as well ( $t=4.734$ ,  $df=203$ ,  $p<0.001$ ). Although this group improved its driving with regard to traffic crashes, these participants were still just as likely to have a non-DUI conviction on record after beginning the program as they were prior to starting it ( $t=1.089$ ,  $df=203$ ,  $p=0.277$ ). For this group of drivers, the program appears to be successful at reducing the overall number of crashes, but is not as strong of a deterrent in terms of non-DUI-related crime.

**Table 4.13** Before-and-After Results: High-Risk Recidivist Percentages and Averages

| High-Risk Recidivist                         | Before Program | After Program | Sig. |
|--|----------------|---------------|------|
| Percent with at least one non-DUI conviction | 57%            | 58%           |      |
| Number of non-DUI convictions on record      | 2.38           | 1.08          | **   |
| Percent with at least one crash              | 19%            | 13%           |      |
| Number of crashes on record                  | 0.23           | 0.13          |      |
| Others                                       | Before Program | After Program | Sig. |
| Percent with at least one non-DUI conviction | 83%            | 29%           | **   |
| Number of non-DUI convictions on record      | 3.75           | 0.58          | **   |
| Percent with at least one crash              | 46%            | 7%            | **   |
| Number of crashes on record                  | 0.67           | 0.08          | **   |

\*\*Statistically significant difference at 1% level for paired samples t-test

**Table 4.14** Before-and-After Results: Moderate-Risk Recidivist Percentages and Averages

| Moderate-Risk Recidivist                     | Before Program | After Program | Sig. |
|--|----------------|---------------|------|
| Percent with at least one non-DUI conviction | 76%            | 73%           |      |
| Number of non-DUI convictions on record      | 3.60           | 1.74          | **   |
| Percent with at least one crash              | 39%            | 20%           | **   |
| Number of crashes on record                  | 0.58           | 0.25          | **   |
| Others                                       | Before Program | After Program | Sig. |
| Percent with at least one non-DUI conviction | 83%            | 24%           | **   |
| Number of non-DUI convictions on record      | 3.72           | 0.45          | **   |
| Percent with at least one crash              | 46%            | 6%            | **   |
| Number of crashes on record                  | 0.67           | 0.06          | **   |

\*\*Statistically significant difference at 1% level for paired samples t-test

#### 4.3.4 Prior Impaired Driving History

All program participants – regardless of the number of impaired driving events on record prior to starting the 24/7 Sobriety Program – saw significant improvements after beginning the program (Table 4.15). Those with one DUI on record before enrollment had significantly fewer DUIs on record after beginning the program ( $t=62.404$ ,  $df=606$ ,  $p<0.001$ ). Those with two DUIs before the program intervention had significantly fewer non-DUI convictions after starting the program ( $t=25.339$ ,  $df=816$ ,  $p<0.001$ ). Participants with three DUIs before beginning the program saw a significant reduction in the number of crashes after beginning the program ( $t=12.177$ ,  $df=286$ ,  $p<0.001$ ). Participants had fewer failed BAC tests after starting the program than they did beforehand for those with at least four DUIs on record ( $t=26.869$ ,  $df=88$ ,  $p<0.001$ ).

Despite these significant improvements, there was a noticeable trend: participants with more DUIs on record had higher rates of impaired driving events than did participants with fewer DUIs on record. For example, there was a consistent growth in the percentage with at least one crash after beginning the program: 6% of those with only one DUI on record had at least one crash and 10% of those with four or more DUIs on record had at least one crash. Similar patterns emerged when looking at the percentage of participants with at least one failed BAC test after beginning the program. Interestingly, those with three DUIs on record prior to starting the program had higher rates of non-DUI convictions than did those with four or more DUIs on record. Nonetheless, for all participants, there were statistically significant improvements with regard to this metric, revealing that the program still had a strong deterrent effect.

**Table 4.15** Before-and-After Results: Prior DUI History Percentages and Averages

| 1 DUI in the 7 Years before Starting Program   | Before Program | After Program | Sig. |
|--|----------------|---------------|------|
| Percent with at least one DUI                  | 100%           | 11%           | **   |
| Number of DUIs on record                       | 1.00           | 0.12          | **   |
| Percent with at least one non-DUI conviction   | 73%            | 24%           | **   |
| Number of non-DUI convictions on record        | 2.70           | 0.52          | **   |
| Percent with at least one crash                | 40%            | 6%            | **   |
| Number of crashes on record                    | 0.54           | 0.06          | **   |
| Percent with at least one failed BAC test      | 65%            | 11%           | **   |
| Number of failed BAC tests on record           | 0.72           | 0.13          | **   |
| 2 DUIs in the 7 Years before Starting Program  | Before Program | After Program | Sig. |
| Percent with at least one DUI                  | 100%           | 9%            | **   |
| Number of DUIs on record                       | 2.00           | 0.09          | **   |
| Percent with at least one non-DUI conviction   | 89%            | 29%           | **   |
| Number of non-DUI convictions on record        | 4.15           | 0.59          | **   |
| Percent with at least one crash                | 48%            | 7%            | **   |
| Number of crashes on record                    | 0.70           | 0.09          | **   |
| Percent with at least one failed BAC test      | 97%            | 10%           | **   |
| Number of failed BAC tests on record           | 1.61           | 0.11          | **   |
| 3 DUIs in the 7 Years before Starting Program  | Before Program | After Program | Sig. |
| Percent with at least one DUI                  | 100%           | 9%            | **   |
| Number of DUIs on record                       | 3.00           | 0.09          | **   |
| Percent with at least one non-DUI conviction   | 92%            | 36%           | **   |
| Number of non-DUI convictions on record        | 4.54           | 0.70          | **   |
| Percent with at least one crash                | 52%            | 8%            | **   |
| Number of crashes on record                    | 0.84           | 0.09          | **   |
| Percent with at least one failed BAC test      | 100%           | 13%           | **   |
| Number of failed BAC tests on record           | 2.55           | 0.15          | **   |
| 4+ DUIs in the 7 Years before Starting Program | Before Program | After Program | Sig. |
| Percent with at least one DUI                  | 100%           | 16%           | **   |
| Number of DUIs on record                       | 4.29           | 0.22          | **   |
| Percent with at least one non-DUI conviction   | 98%            | 31%           | **   |
| Number of non-DUI convictions on record        | 6.09           | 0.57          | **   |
| Percent with at least one crash                | 55%            | 10%           | **   |
| Number of crashes on record                    | 0.99           | 0.13          | **   |
| Percent with at least one failed BAC test      | 99%            | 15%           | **   |
| Number of failed BAC tests on record           | 3.51           | 0.19          | **   |

\*\*Statistically significant difference at 1% level for paired samples t-test

## 5. PARTICIPANT PATTERNS RELATED TO HOUSE BILL 1302

House Bill 1302 became effective on August 1, 2013. The legislative changes mandated by this bill included longer enrollment periods in the 24/7 Sobriety Program for repeat offenders. The last entry into the database provided to the researchers occurred in April of 2014. Therefore, participants beginning the 24/7 Sobriety Program after the new legislation was implemented were only tracked for approximately eight months. In total, 431 participants began the program after the new legislation was implemented.

In order to maintain congruity, patterns related to the passing of House Bill 1302 were only tracked for 240 days following the date on which a participant began the 24/7 Program. This is because some participants who started the program before House Bill 1302 was passed were subsequently tracked for multiple years. It would be inaccurate to include offenses that occurred years after beginning the program for participants who started before the passing of House Bill 1302 because the data set contains only eight months of post-House Bill 1302 information.

Identical patterns emerged when studying participants with at least one violation (Table 5.1) and the average number of violations (Table 5.2) factoring for whether or not the participant started the 24/7 Sobriety Program before or after the passing of House Bill 1302. For instance, participants who started the program before House Bill 1302 was enacted were more likely to have at least one DUI on record after starting the program (Chi-Sq.=34.751, df=1, p<0.001). On average, these same drivers had a DUI-related conviction after starting the 24/7 Sobriety Program at a rate that was 10 times higher than those who started the program after the passing of House Bill 1302 (F=34.985, df=1, p<0.001). Participants who started the program before the passing of House Bill 1302 also had more non-DUI convictions (F=36.387, df=1, p<0.001) and more crashes (F=4.709, df=1, p=0.030) after starting the program than did those participants who began the program after House Bill 1302 was enacted. These findings reveal that the more stringent standards set by House Bill 1302 do a better job at keeping participants sober. The effect of the more stringent standards also extends to non-DUI convictions and overall crash patterns.

**Table 5.1** Mean Values Displaying Participants with at Least One Violation, by House Bill 1302

| Metric                                   | Before House Bill 1302 | After House Bill 1302 | Sig. |
|--|------------------------|-----------------------|------|
| DUI Conviction, before Program Start     | 0.94                   | 0.97                  | *    |
| DUI Conviction, after Program Start      | 0.09                   | 0.01                  | **   |
| Non-DUI Conviction, before Program Start | 0.82                   | 0.84                  |      |
| Non-DUI Conviction, after Program Start  | 0.18                   | 0.04                  | **   |
| Crash, before Program Start              | 0.45                   | 0.44                  |      |
| Crash, after Program Start               | 0.03                   | 0.01                  | *    |
| BAC Test, before Program Start           | 0.89                   | 0.65                  | **   |
| BAC Test, after Program Start            | 0.07                   | 0.01                  | **   |

\*\*Statistically significant difference across groups at the 1% level for Chi-Square test

\*Statistically significant difference across groups at the 5% level for Chi-Square test

**Table 5.2** Mean Values Displaying Average Participant Violations, by House Bill 1302

| Metric                                   | Before House Bill 1302 | After House Bill 1302 | Sig. |
|--|------------------------|-----------------------|------|
| DUI Conviction, before Program Start     | 1.89                   | 1.66                  | ##   |
| DUI Conviction, after Program Start      | 0.10                   | 0.01                  | ##   |
| Non-DUI Conviction, before Program Start | 3.67                   | 3.85                  |      |
| Non-DUI Conviction, after Program Start  | 0.26                   | 0.06                  | ##   |
| Crash, before Program Start              | 0.67                   | 0.63                  |      |
| Crash, after Program Start               | 0.03                   | 0.01                  | #    |
| BAC Test, before Program Start           | 1.68                   | 0.83                  | ##   |
| BAC Test, after Program Start            | 0.08                   | 0.01                  | ##   |

##Statistically significant difference across groups at 1% level for 1-way ANOVA

#Statistically significant difference across groups at 5% level for 1-way ANOVA

Although participants who started the program after the passing of House Bill 1302 had safer behaviors compared with those who started the program before the passing of House Bill 1302, the program still had powerful before-and-after effects on participants regardless of when they began the program (Table 5.3). For each metric analyzed in this report, there was a statistically significant improvement after program intervention. Results were more powerful for participants who had to adhere to the longer 24/7 Sobriety Program standards after the passing of House Bill 1302. Regardless, it should be reiterated that the program still has a statistically significant impact on participants even if they are not required to participate for a full year as mandated by the most recent legislative changes.

**Table 5.3** Before-and-After Results: Pre/Post-House Bill 1302 Percentages and Averages

| Enrolled Before House Bill 1302              | Before Program | After Program | Sig. |
|--|----------------|---------------|------|
| Percent with at least one DUI                | 94%            | 9%            | **   |
| Number of DUIs on record                     | 1.89           | 0.10          | **   |
| Percent with at least one non-DUI conviction | 82%            | 18%           | **   |
| Number of non-DUI convictions on record      | 3.67           | 0.26          | **   |
| Percent with at least one crash              | 45%            | 3%            | **   |
| Number of crashes on record                  | 0.67           | 0.03          | **   |
| Percent with at least one failed BAC test    | 89%            | 7%            | **   |
| Number of failed BAC tests on record         | 1.68           | 0.08          | **   |
| Enrolled After House Bill 1302               | Before Program | After Program | Sig. |
| Percent with at least one DUI                | 97%            | 1%            | **   |
| Number of DUIs on record                     | 1.66           | 0.01          | **   |
| Percent with at least one non-DUI conviction | 84%            | 4%            | **   |
| Number of non-DUI convictions on record      | 3.85           | 0.06          | **   |
| Percent with at least one crash              | 44%            | 1%            | **   |
| Number of crashes on record                  | 0.63           | 0.01          | **   |
| Percent with at least one failed BAC test    | 65%            | 1%            | **   |
| Number of failed BAC tests on record         | 0.83           | 0.01          | **   |

\*\*Statistically significant difference at 1% level for paired samples t-test

## 6. CONCLUSIONS

It should be emphasized that the focus of this research was not to examine daily sobriety pass/fail rates by program participants during enrollment. Instead, the aim of this report was to determine if the program has a deterrent effect on participants and whether or not this effect extends beyond impaired driving into other traffic safety issues. Based on the analysis of 1,893 program participants, the 24/7 Sobriety Program has a strong deterrent effect in North Dakota. Among DUI offenders in this sample, positive improvements were made upon enrolling in the program. With regard to differences across gender, the program appeared to have a stronger influence on women than men; females were more likely to have DUIs and traffic crashes on record prior to starting the program but reduced these traffic metrics considerably after enrollment occurred. In terms of age, younger drivers were generally more dangerous prior to starting the program, a notion which parallels other studies of non-DUI offenders in North Dakota (see Vachal, Benson, and Kubas 2014).

Two especially dangerous groups of program participants were studied to find if the program deters unsafe driving behaviors across different risk-taking driver groups. Results were mixed. DUI offenders who committed an impaired driving event within 60 days of starting the 24/7 Sobriety Program had no significant improvement for non-DUI convictions on record. This group also did not improve crash rates. This was unlike all other drivers who saw statistically significant improvements for the same traffic metrics.

DUI offenders who committed at least one impaired driving event at any time after starting the 24/7 Sobriety Program saw some improvements after enrolling in the program. These drivers reduced the average number of non-DUI-related convictions on record and also saw statistically significant improvements for traffic crashes. Unlike all other enrollees – a group that had a statistically significant decline in the percent of participants who had at least one non-DUI conviction on record – moderate-risk offenders saw no statistically significant improvement for this driving metric.

As a whole, the 24/7 Sobriety Program has a positive effect for a majority of North Dakota residents. This deterrent effect is not as strong for the most dangerous drivers – those who likely abuse alcohol and have issues with self-control. This was evident when studying high-risk and moderate-risk offenders. To a lesser degree, despite statistically significant improvements in before-and-after results, it was also evident when examining prior DUI history as those with more DUIs before starting the program offended at higher rates than did those with fewer DUIs across the traffic safety metrics studied in this report.

There were limitations to this study. For instance, the researchers did not have access to the date for which individual participants obtained their license. It is possible that – for some participants – the seven-year look-back period included a time in the participant's life in which he or she did not yet have a driver's license. Along these same lines, without knowing the date for which the license was obtained, the before-and-after comparisons should be interpreted with some caution. For many participants, it is likely that the seven-year look-back period is a longer amount of time than the period for which participants have been tracked after starting the 24/7 Sobriety Program. This may explain the statistically significant improvements participants made after enrolling in the program. Even when factoring for this disconnect, it should still be seen as a warning to topic experts about the propensity for high-risk offenders to commit non-DUI violations and traffic crashes after starting the program at a similar rate to the seven-year look-back period. In other words, compared to the seven years before starting the program, high-risk offenders commit a similar number of violations as they did prior to starting the program – and in many instances, they do so in a shorter amount of time.

When the amount of time after beginning the program is held constant – as was the case when studying the effect of passing House Bill 1302 – results were positive. Regardless of when a participant began the program, the before-and-after results for convictions and crashes improve significantly during the first eight months after program intervention. This was the maximum amount of time available to the researchers to study after the legislative changes were made. The 24/7 Sobriety Program clearly deters most participants from partaking in dangerous behaviors. Participants involved in the program after the passing of House Bill 1302 were found to have fewer convictions and crashes than were participants who started the program before the passing of House Bill 1302. There is a clear link between the amount of time one is enrolled in the program and its influence on participants to abide by the law.

The viability of a program to deter unsafe behaviors does not equate to cost effectiveness. It would be prudent in the future to have the 24/7 Sobriety Program subjected to a cost-benefit analysis in order to validate that the program is using resources in the most efficient way possible. It is undeniable that the program has a positive deterrent effect, but at what cost? This question will need answering if the program is going to be used at a wider scale in the future.

Finally, it should be mentioned that this study focused solely on repeat offenders. It is not implausible to think that some of the metrics used in this report – crashes, non-DUI convictions, and others not covered in this project – could be used to predict which first-time impaired driving offenders are most likely to reoffend in the future. A general linear model and/or multiple regression model could be developed to create a risk assessment instrument that could be administered to first-time DUI offenders to accurately gauge if some first-time offenders are at a higher risk for reoffending than others. More stringent sanctions could be placed on these at-risk first-time offenders in an effort to prevent recidivism before it happens.

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