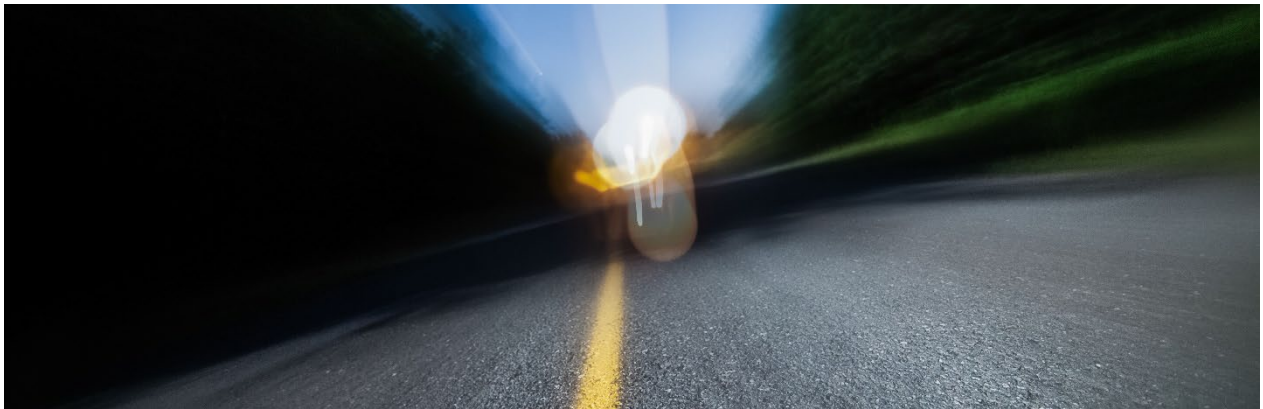


The 24/7 Sobriety Program's Effects on Impaired Drivers in North Dakota: 2014-2021



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ABSTRACT

The 24/7 Sobriety Program is an intervention strategy mandating that alcohol-impaired driving offenders remain sober as a condition of bond or pre-trial release. The goal is to monitor the most at-risk 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, or urinalysis as a monitoring technique. While a pilot phase included a 60-day and discretionary enrollment options for repeat DUI offenders, the current standard is a minimum 360-day sentencing period for all repeat offenders in North Dakota and other early adaptor states. Stakeholder experiences and empirical evidence supported the program's deterrent effects on DUI-related citations. This assessment sought to extend the earlier research into North Dakota experience as a promising program into a maturing program. The goal was to offer evidence-based knowledge for critical program aspects in the state's continuous program improvement initiative. The focus areas were: (1) if positive deterrent effects were statistically evident during program enrollment; (2) if deterrent effects were sustained beyond program completion; (3) if deterrent effects were stronger among certain participant subpopulations; and, (4) if select factors were associated with greater likelihood for to recidivism. Results show that participants significantly improve crash and citation metrics after enrolling in the program. Individuals participating in the program for a fourth-time offense or higher have greater likelihood of relapsing into the alcohol impaired driving behavior. These individuals may benefit from supplemental strategies as they comprise a driver subpopulation more likely to have chronic alcohol abuse and mental health issues.

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1. INTRODUCTION

Alcohol-impaired driving is an endemic problem in the United States. Motor vehicle crashes are the leading cause of death among people between the ages of three and 34 years. Alcohol-impaired driving poses a threat to both drivers who operate vehicles while impaired and others who share the roadway. A national survey estimates 8.0% of U.S. drivers 16 years and older drive while under the influence of alcohol (Centers for Disease Control and Prevention per Center for Behavioral Health Statistics and Quality 2019). Drunk drivers create unnecessary financial and societal costs on other road users in the form of lost lives and medical expenses, costing the United States \$44 billion annually (National Highway Traffic Safety Administration [NHTSA] 2010).

The effects of alcohol on drivers are multifaceted, including slowed reaction time, vision impairment, concentration interference, judgment dulling, and false confidence sensation (NHTSA). North Dakota experiences roughly 100 crash fatalities per year. Figure 1.1 shows trends in traffic fatalities and the deaths involving alcohol-impaired drivers. The fatal share involving recognized alcohol impairment hovers around 40% for North Dakota. Community health and economic benefits are attainable with strong efforts to deter alcohol-impaired driving in the state.

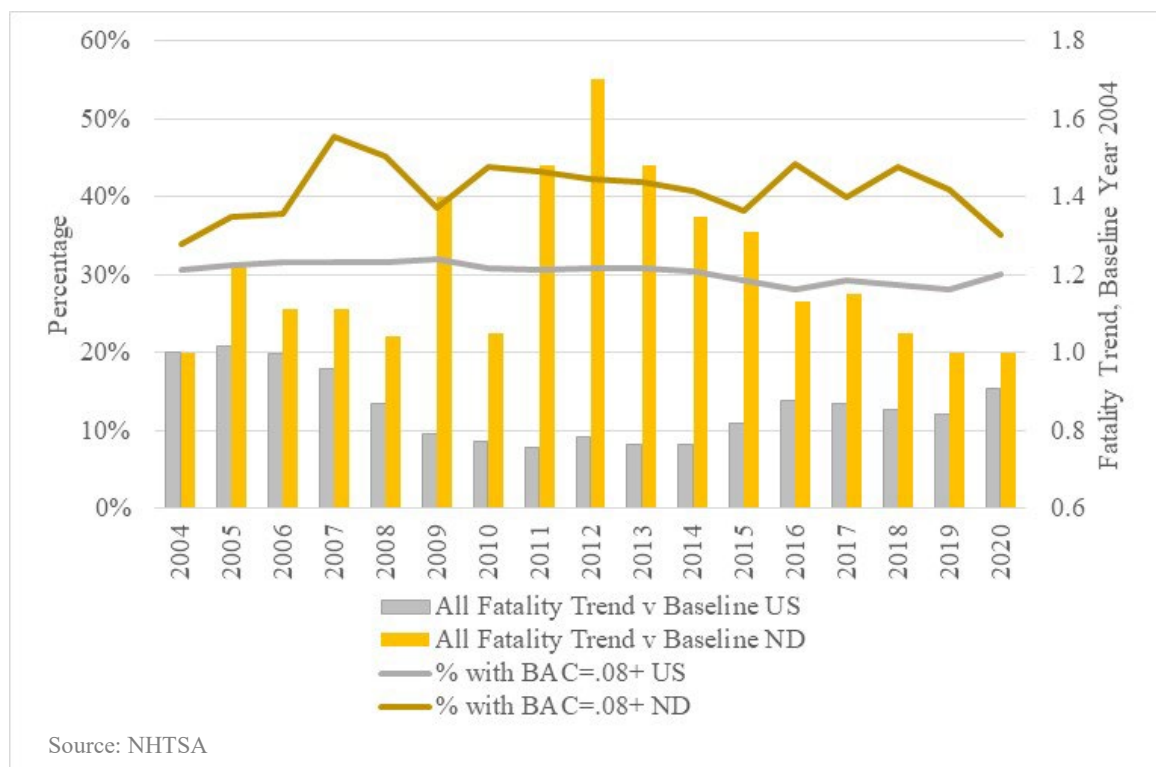


Figure 1.1 Alcohol Impairment in North Dakota Crash Fatalities

North Dakota utilizes nationally accepted strategies to deter impaired driving (Compton et al. 2018). Legislation supports these strategies; some examples 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 (NHTSA 2017). While many programs stem from administrative decisions, they are guided by state policies. Traditionally, North Dakota legislators adopted impaired driving policies via piecemeal legislation. In the first few months of 2013, however, comprehensive impaired driving reform was enacted via North Dakota House Bill 1302. It was

one of the first pieces of legislation passed during the legislative session. The successful adoption 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 pickup truck driver traveling the wrong way on I-94 near Jamestown collided head-on with a vehicle with a young family – all were killed. A few days later an impaired driver lost control of the vehicle and drove over a tent – five- and nine-year-old brothers were killed. These events heightened an awareness and accelerated the process for passing impaired driving reform (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. As part of the legislation enacted in 2013, second-time offenders now have a mandatory 12-month enrollment period in the 24/7 Sobriety Program. Third-time offenders also have a mandatory 12-month enrollment in the program but are further 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.

Sanctions placed on impaired driving offenders have multifaceted objectives, including retribution, incapacitation, deterrence, and rehabilitation (NHTSA and National Institute on Alcohol Abuse and Alcoholism 2005). These objectives generally include some form of sanctioning to the offender (jail, alcohol-specific intervention program, probation), the vehicle (ignition interlock device, vehicle impoundment), or driving rights (license suspensions, administrative license suspensions) (NHTSA and NIAAA 2005). The sentencing, evaluation, sanctioning, and rehabilitation processes require coordination across several agencies.

North Dakota has four sanction levels for alcohol-impaired driving (Table 1.1). With the first DUI offense, the driver pays up to a \$750 fine and serves up to two days in prison. A driver with a second offense in seven years is sanctioned with a \$1,500 fine and required to participate in the 24/7 Sobriety Program for 360 days. Additional suspension penalties are based on blood alcohol concentration (BAC) levels at the time of the arrest. A third offense results in a \$2,000 fine and 360 days participation in the 24/7 Sobriety Program along with a two-year supervised probation term. The fourth and subsequent offenses in 15 years are Class C felonies. The sanctions include one-year and one-day imprisonment, \$2,000 fine, two-year mandatory participation in the 24/7 Sobriety Program, and two-year supervised probation. License suspension is two years with a BAC below 0.18, or three years if above that level. Other sanctions may apply at all levels depending on circumstances in the event.

The following paper discusses trends among DUI offenders enrolled in the program. Section 2 provides contextual background for impaired driving prevention and intervention. The following outlines methodologies used by the research team to conceptualize and operationalize program data. Section 4 examines results of statistical analyses in an attempt to answer the research questions that guided the overall study. The final section concludes with relevant insights into utilizing the 24/7 Sobriety Program moving forward.

Table 1.1 Penalties for Impaired Driving in North Dakota

Sanctions by Offense Occurrence			
1 st Offense	2 nd Offense in 7 Years	3 rd Offense in 7 Years	4 th and Subsequent Offenses in 15 years
Class B misdemeanor	Class B misdemeanor	Class A misdemeanor	Class C felony
\$500 fine if below 0.16 blood alcohol concentration (BAC) Two-day imprisonment and \$750 fine if BAC 0.16 or greater 91-day suspension if below 0.18 BAC 180-day suspension if 0.18 BAC or greater	Ten-day imprisonment and \$1,500 fine 360-day participation in the 24/7 Sobriety Program 365-day suspension if below 0.18 BAC Two-year suspension if 0.18 BAC or greater	120-day imprisonment and \$2,000 fine 360-day participation in 24/7 Sobriety Program 360-day supervised probation Two-year suspension if below .18 BAC Three-year suspension if .18 BAC or greater	One year and one day imprisonment and \$2,000 fine Two-years participation in the 24/7 Sobriety Program Two-year supervised probation
Addiction evaluation	Addiction evaluation	Addiction evaluation	Addiction evaluation
<p>Other Possible Sanctions:</p> <ul style="list-style-type: none"> • Penalty for a DUI with a minor in the vehicle is up to one-year imprisonment and/or a \$2,000 fine. • Refusal to submit to a chemical test as required by law may be considered a crime and may result in revocation of your driving privileges for 180 days to three years. • Criminal vehicular injury results in up to five-year imprisonment. • Criminal vehicular homicide results in up to 20-year imprisonment. 			
<p>Source: ND Department of Transportation, https://www.dot.nd.gov/divisions/safety/penaltiesdrinkingdriving.htm.</p>			

2. BACKGROUND

According to the North Dakota Department of Transportation, impairment by alcohol and/or drugs remains a major factor in fatal crashes (NDDOT 2020). Several interventions and countermeasures have been used to reduce losses caused by impaired drivers. 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 penalties such as fines, licensure loss, or incarceration, along with prevention efforts through public education. Other deterrence 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.

On average, about 5,031 individuals were arrested for DUI annually between 2016 and 2020 (ND Attorney General 2021). North Dakota is among the national leaders in terms of drunk driving arrests and convictions per capita (US Drug Test Centers 2019). In North Dakota, repeat DUI offenders account for approximately one-quarter of all DUI offenses (NDDOT 2022). Because of 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. A program that is relatively new in its implementation compared to more traditional prevention strategies is the 24/7 Sobriety Program. The goal here is to offer empirical analysis for decisionmakers in their continuous improvement program strategies, for the state, in a program that was introduced in a 2008 pilot study.

2.1 Alcohol-Impaired Driving in the United States

A seminal study surveying impaired driving attitudes and behaviors estimated that 85.5 million drinking-driving trips were taken in 2008 (Drew et al. 2010). 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). The detection and apprehension rate of impaired drivers is rare (Hause, Voas, and Chavez 1982), and there is less than one arrest for every 300 trips by drivers with illegal blood alcohol concentrations (Beitel, Sharp, and Glauz 2000). An NHTSA study (2006) showed even lower apprehension rates and estimated 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. The latest estimates released by the FBI (2020) show that over one million drivers were arrested for driving under the influence in the United States in 2019.

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), and the alcohol-impaired driving fatality rate per 100 million VMT has remained relatively unchanged since 2009 (NHTSA 2016). These laws commonly include 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 systems. 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). Legislators in Utah chose to set a stricter BAC limit of 0.05 g/dL, which went into effect on December 30, 2018 (GHSA 2017). Even with these laws in place, the current crash, court, and incarceration research

suggest more must be done to reduce impaired driving incidence, as this activity is still occurring at an alarming rate.

A national survey to assess the prevalence of alcohol-impaired driving among adults found 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 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 the Midwest region had the highest rate of impaired driving with 643 episodes per 1,000 population. North Dakota had the highest self-reported impaired driving rate in the Midwest region (Bergen, Shults, and Rudd 2011). A recent survey of North Dakota drivers also shows great propensity with 28.6% of the population reporting they had operated a vehicle within two hours of consuming one or two alcoholic beverages (Vachal and Kubas 2021).

2.2 Drinking and Recidivism

Reasons for drinking are diverse and vary on an individual basis. Interviews with 12 compulsory alcohol abusers found problem denial and lack of treatment to be two common themes for abusing alcohol (Ekendahl 2009). A survey of first-time and repeat DUI offenders in North Dakota discovered that inebriated drivers often did not have a passenger present in the vehicle at the time of arrest, which suggests 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 (Huseth and Kubas 2012). In a study in which counselors interviewed DUI recidivists about why they continued to drive after a DUI 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 (Wiliszowski et al. 1996). DUI courts also emphasize these principles (Fell, Tippetts, and Ciccel 2010).

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 drivers arrested for DUI are repeat offenders. It is known that DUI recidivists carry a higher risk of future DUI arrests (Cavaiola, Strohmetz, and Abreo 2007; 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). Higher BAC levels at the time of arrest have also been shown as a significant predictor for the DUI recidivism (Marowitz 1998).

In a sample of 3,884 convicted impaired drivers, repeat offenders were more likely to have a prior criminal history, less education, and substance use than first-time offenders (DeMichele and Lowe 2011). Gender, unemployment, and ethnicity are also determinants of DUI recidivism with males more likely to be recidivists than females (Nochajski and Stasiewicz 2006). Regionally, this study showed recidivism rates were associated with ethnicity as a majority of repeat DUI offenders were Hispanic or Native American in the Southwest compared with Caucasian in other regions.

The NHTSA (2006) developed a guide explaining appropriate sentencing for DUI offenders. Working collaboratively with the National Institute on Alcohol Abuse and Alcoholism (NIAAA), six factors were identified as critically important 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

It has been posited that recidivism is a common characteristic of impaired drivers in fatal crashes because the current parole system largely fails to rehabilitate the parolee's behavior (Kleiman and Hawken 2008). Moreover, the habitual abuse of alcohol is common among the incarcerated population, as more than two-thirds of jail inmates met substance dependence or abuse criteria (Karberg and James 2005). The nature of the abuse may offer some insight into why increased severity in DUI punishment does not curb future drunk driving intentions, particularly among repeat offenders (Bouffard, Niebuhr and Exum 2017). With this failure, it is important to find ways to address this problem as a potential means to reduce impaired driving, especially with repeat offenders. It has been suggested that the best way to deter recidivism is to use certainty over severity – quicker responses to violations and communicating the deterrent threat to the likely violators minimizes repeat offenses (Kleiman and Hawken 2008).

These strategies are used in programs such as the Hawaii Opportunity Probation with Enforcement (HOPE) program and the South Dakota 24/7 Sobriety Project, and have shown positive results in reducing recidivism among parolees who participate (Midgette and Kilmer 2015, Loudenburg et al. 2010, Kleiman and Hawken 2008). These community corrections programs conduct alcohol and drug screenings, paid for by the offender, which are less costly than long-term jail sentences (Voas et al. 2011). Such alcohol treatment has been shown to reduce impaired driving and alcohol-related crashes among offenders who receive mandatory interventions (Dill and Wells-Parker 2006). It has been further suggested that alcohol-related intervention and treatment in combination with licensing actions is the best strategy to reduce recidivism (Dill and Wells-Parker 2006). 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).

Note that DUI interventions do not necessarily work for every individual convicted of impaired driving. For example, in a limited assessment of North Dakota drivers, 2.8% of individuals participating in the 24/7 Sobriety Program had at least one DUI during program enrollment (Kubas 2016). Interventions do, however, show different results for recidivism among those who complete an intervention program. A study highlighting driver performance in England and Wales examined 144 individuals in an intervention program and compared them with both a control group and a subgroup of participants who did not complete the intervention program. 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 recommended highlighting the factors associated with non-completion of the program and high rates of reconviction, and also advocated directing resources to those at high risk for reconviction rather than those who are at a lower risk for reconviction.

The parole system does have an important role in deterring recidivism in impaired drivers that has led to new versions of it 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). Two ongoing programs with positive initial results are the HOPE program and the South Dakota 24/7 Sobriety Project. These programs have the sole purpose of making roads and communities safer. These interventions, which are focused on individual drivers and

rehabilitation, have been implemented as strategies to reduce recidivism. The HOPE program is broader and has been used with criminal offenses beyond impaired driving. The 24/7 Sobriety Project has been targeted specifically at impaired drivers.

2.2.1 HOPE Program

The HOPE program was started in 2004 to break the cycle of repeat offenses (Office of National Drug Control Policy 2011). The program engages rigorous principles to keep probationers at high risk of failure from breaking probation terms and being sent back to prison. It is carried out by imposing “swift, certain, and short jail sanctions” for every violation of probation (Office of National Drug Control Policy 2011). The program’s principles are to identify probationers who are at high risk for violation and to notify them there will be an immediate penalty. The program conducts frequent and random drug tests and imposes short jail sanctions for each violation.

Early literature on the HOPE program outlined the positive effects it has on the participants as well as its cost effectiveness. The program’s swiftness was tied to longer lasting change compared with typical treatment programs based on the Hawaii experiment (Kiyabu, Steinberg, and Yoshida 2010; DuPont and Skipper 2012). The program has been adopted by several other jurisdictions. A rigorous multi-site evaluation of the HOPE model, however, did not show measurable long-term advantage compared with traditional probation programs. This program, however, is not wholly discouraged due to mixed results with regard to probation violations, fine payments, and recidivism outcomes (Hawken et. al 2016, Cullen et. al 2018).

2.2.2 24/7 Sobriety Program

A program that uses tactics similar to HOPE in targeting repeat DUI offenders is the 24/7 Sobriety Project. A pilot program was started under former Attorney General Larry Long in 2005 in response to South Dakota’s high alcohol- and drug-related incarceration counts. Between 1999 and 2007, 59% of the nearly 25,000 recorded felonies in the state were drug and alcohol related (Long 2009). The South Dakota 24/7 Sobriety Project was started as an alternative for DUI incarceration, but as of 2009 only 59% of the participants were DUI offenders and the remaining 41% enrolled for other offenses (Loudenburg, Drube, and Leonardson 2010). As a requirement of their probation, the program mandated that participants 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 (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 early evaluation of the program demonstrated that it has some success and suggested further studies be conducted on its effectiveness as more data become available (Loudenburg, Drube, and Leonardson 2010). Since then, the program has been monitored across a number of academic disciplines. A comparison analysis on recidivism found that participants in 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. DUI offenders in the 24/7 Sobriety Project also had lower rates of DUI recidivism when compared with control groups not enrolled in the program (DuPont and Skipper 2012). When the presence of the 24/7 Sobriety Project was treated as an intervention variable, counties with the program had a 12% reduction in repeat DUI arrests, a 9% reduction in domestic

violence arrests, and mixed results for traffic crashes (Kilmer et al. 2013). These findings have been reaffirmed by Midgette (2014), who also determined that males between 18 and 40 may have fewer incidences of traffic crashes upon enrollment in the course.

South Dakota's 24/7 Sobriety Project is now imitated in several states including North Dakota, Montana, and Wyoming (Brown 2012) and is being tested for urban scalability in Jacksonville, Florida (Midgette 2016). The U.S. Department of Justice labeled the 24/7 Sobriety Project initiative as a "promising" program (Midgette 2016). At an international level, the program has also been introduced in pilot form in the United Kingdom (Kilmer and Humphreys 2013). 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 to 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). Kilmer and Midgette (2020) estimate a 13.7 percentage point reduction, which translates to 49% lower re-offense rates when comparing the 24/7 Sobriety Program intervention group to a control group. Estimates at 24 and 36 months show sustained gains but the extent was less certain.

2.3 24/7 Sobriety Program in North Dakota

North Dakota's 24/7 Sobriety Program is modeled directly after the South Dakota program. Several statutes govern the program: attorney general granted use authority, program fees established, program funding created, and program's use as conditions of bond for offenders. A pilot program was first authorized by the North Dakota Legislative Assembly 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 that comprise the Southcentral Judicial District. Statewide implementation was completed in August 2010 based on the success of the pilot study (Fisher, McKnight, and Fell 2013).

In early stages of the program's existence, DUI offenders were typically assigned to the program at the discretion of judges. Legislation implemented on August 1, 2013, mandates that any repeat DUI offender be required to participate in the program as a condition of bond or pre-trial release (Fisher, McKnight, and Fell 2013). Similar to South Dakota's 24/7 Sobriety Project, North Dakota DUI offenders are required to have twice-daily breath tests or, alternatively, urinalysis and/or transdermal bracelet monitoring. Some offenders may also be required to wear a drug patch if deemed necessary by a judge. DUI offenders in North Dakota are also required to pay for each breath test or alcohol monitoring system. This user fee makes the program self-sustainable as it is fully funded by DUI offenders. The most recently available data indicate that 95.82% of the individuals placed in the 24/7 Sobriety Program complete it (North Dakota Attorney General's Office 2016).

In September 2016, the National Highway Traffic Safety Administration sent a technical assessment team to Bismarck to conduct a comprehensive assessment of the state's impaired driving program. The team met with a variety of North Dakota stakeholders dedicated to impaired driving prevention and intervention. Individuals included those involved in planning, prevention, criminal justice, communication, treatment and rehabilitation, and data/records management. Ultimately, the team had 18 priority recommendations to improve the North Dakota impaired driving prevention/intervention program (Burch et al. 2016). One of these recommendations is directly related to this project as a continuous improvement effort: expand the evaluation of the 24/7 Sobriety Program to include comparison groups (e.g., test failure, treatment, geography) as a way to determine the general effectiveness of the program in addition to the internal process effectiveness.

In conjunction with this assessment, NDDOT subsequently released its *Impaired Driving Strategic Plan for North Dakota*, which reaffirms the priority areas (NDDOT 2017c). Detailed throughout this plan are strategies for performance measurement, descriptions of current activities and projects, and a detailed discussion of the recommendations made by the NHTSA assessment team. Included in this plan is continued support to evaluate the 24/7 Sobriety Program and its effectiveness on traffic safety metrics.

A prior assessment of the 24/7 Sobriety Program in North Dakota found positive results. The program appeared to have a stronger deterrent effect on females, and the legislation enacted by House Bill 1302 was more effective at reducing impaired driving events (Kubas, Kayabas, and Vachal 2015). There were some limitations to this study via probabilistic matching and tracking participants in equal intervals before and after completing the program. The forthcoming analysis is more robust, as it includes an improved participant probabilistic matching process and a higher volume of participants. The following research questions continue to guide the work:

- Is there a before-and-after deterrent effect when examining program entrants?
- Do offender subgroups experience different deterrent effects in traffic safety outcomes and DUI reoffense?
- Can models be developed to assist practitioners in identifying characteristics of at-risk enrollees when discussing potential for re-offense during and after program completion?
- Are deterrent effects sustained beyond program completion in general and with respect to subpopulations?

This study contributes to the literature by assessing the efficacy of legislation and evaluating traffic safety performance by a diverse set of program participant groups. Gender, region, geography, repeat DUI offenders, and multi-entry participation are factors considered throughout the report. In addition, the annual investigation into the 24/7 Sobriety Program and associated administrative records are essential in contributing to a robust data pool to explore alcohol-impaired driving priorities and prevention strategies in the state.

3. DATA AND METHOD

Study records were obtained from two administrative datasets. First, the North Dakota Bureau of Criminal Investigation (BCI) shared population history records for participants enrolled in the state's 24/7 Sobriety Program since inception. These records encompassed seven years of participant entries from January 2014 to December 2021. Per the data agreement between NDSU and the BCI, once the data were cleaned and useful variables were created, personal identification information (PII) was removed from the database to protect anonymity. The first record in the database started the program on January 1, 2014, after House Bill 1302 became effective on August 1, 2013.

In previous study iterations, the Upper Great Plain Transportation Institution (UGPTI) devised a quasi-history using deterministic matching in program entrant records. The history-building protocol was an ongoing process to collect the most recent year records and merge back to a "locked" history that has been building over several years. This non-PII participant history database was maintained to support program assessment. Following the established database protocol, the 2021 records were to be extracted, electronically validated, manually augmented, and merged into the locked program database to extend the 24/7 Sobriety Program entrant record history from 2008 to 2021.

Records for 2021 were requested and obtained from BCI program records provided in early 2021 based on an updated limited use data sharing agreement. Since the record management system (RMS) of BCI was changed in 2019, the detailed data merging process can be referred to Appendix A. Deterministic matching was used to link 24/7 Sobriety Program records with driver's license records. The link connects the two databases so 24/7 Sobriety Program participants can be assessed with regard to driver safety in terms of traffic crashes and citations before, during, and after enrollment in the program. Once linked, the RecID was used to extract relevant DOT driver records to left merge with BCI program records.

There were 1,057 records for 2021 participants in which 913 records were successfully linked to the driver's license records. The linked dataset for participants with start dates between January 1, 2014, to December 31, 2021, was finalized with risk markers defined based on the driver record events and risk metric intervals. The final database consisted of 8,209 alcohol-impaired driving-related program entries associated with 6,669 participants. The eight-year study was selected based on discussions with expert stakeholders in moving the assessment to accommodate continuous improvement for a maturing program by removing early entries associated with pilot and shorter-enrollment term phases prior to the House Bill 1302 enactment.

3.1 Data Characteristics

3.1.1 Program Start Year

As expected, enrollment in the 24/7 Sobriety Program expanded once it was scaled statewide. Participation in the program grew noticeably after 2013, which is probably attributed to the new legislation mandating that repeat offenders participate in the 24/7 Sobriety Program mid-year 2013 (Table 3.1). With this study, the study scope was updated to encompass the time period since this substantial change was made in program participant tenure. The early studies had continued to assess program efficacy related to the pilot phase experiences and early statewide program parameters such as the 60-day tenure and judges' discretion regarding program enrollment in alcohol-impaired driving sentencing. The historical start year counts are provided as ongoing context for the program and study scope.

Table 3.1 Program Start Year

Start Year	Validated Matched Entries	Percent of Current Study Sample
2008 ₁	128	
2009 ₁	203	
2010 ₂	528	
2011	810	
2012	743	
2013	958	
2014	1,354	16.49%
2015	1,375	16.75%
2016	1,328	16.18%
2017	1,201	14.63%
2018	1,150	14.01%
2019 ₃	427	5.20%
2020	461	5.62%
2021	913	11.12%

₁24/7 Sobriety Program was used only in pilot form
₂24/7 Sobriety Program was used statewide starting on August 1, 2010
₃24/7 Sobriety Program transitioned to new record management system

3.1.2 Demographic Information

In this 24/7 Sobriety Program participant sample, men outnumbered women at roughly a four-to-one ratio based on program entries. Males were 78.1% of the entries, compared with just 21.9% who identified as female. The gender was based on the DOT driver record due to missing data and inconsistencies with this field in the BCI records. This ratio is consistent with other studies of DUI offenders in the state (Huseth and Kubas 2012; Kubas, Kayabas, and Vachal 2016). Younger drivers had a higher representation in the sample than older drivers (Table 3.2). A majority (53.3%) in the sample were under age 35, 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 and Kubas 2021). This proclivity is especially true for male drivers, as this particular group has been labeled as high-risk throughout the literature. Note that in this sample, drivers in one age cohort – those over age 75 – had fewer than 30 entries in their age group. 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 75-plus cohort cannot be considered representative of all DUI offenders in that age group in North Dakota. To account for this shortcoming, the 65-to-74 and the 75-plus age cohorts were aggregated to create one larger 65-and-above cohort used throughout statistical analyses.

Table 3.2 Age of Participant at Time of Entry

Age Cohort	Number of Entries	Percent of Sample
18-24	1,299	15.82%
25-34	3,075	37.46%
35-44	1,896	23.10%
45-54	1,205	14.68%
55-64	626	7.63%
65-74	88	1.07%
75+	5	0.06%

Participation in the 24/7 Sobriety Program was considered with regard to distribution across region and geography (Table 3.3). The regional definition was created by aggregating state health regions into two areas representing an east/west division. The geography definition includes an urban/rural dichotomy. Urban participants are from counties with the largest urban population according to the most recently published data estimates from the U.S. Census Bureau (2016). Six urban counties are located in the east and another six are located in the west based on population density metrics in the study (Figure 3.1). These counties represent the majority of the state’s urban population.

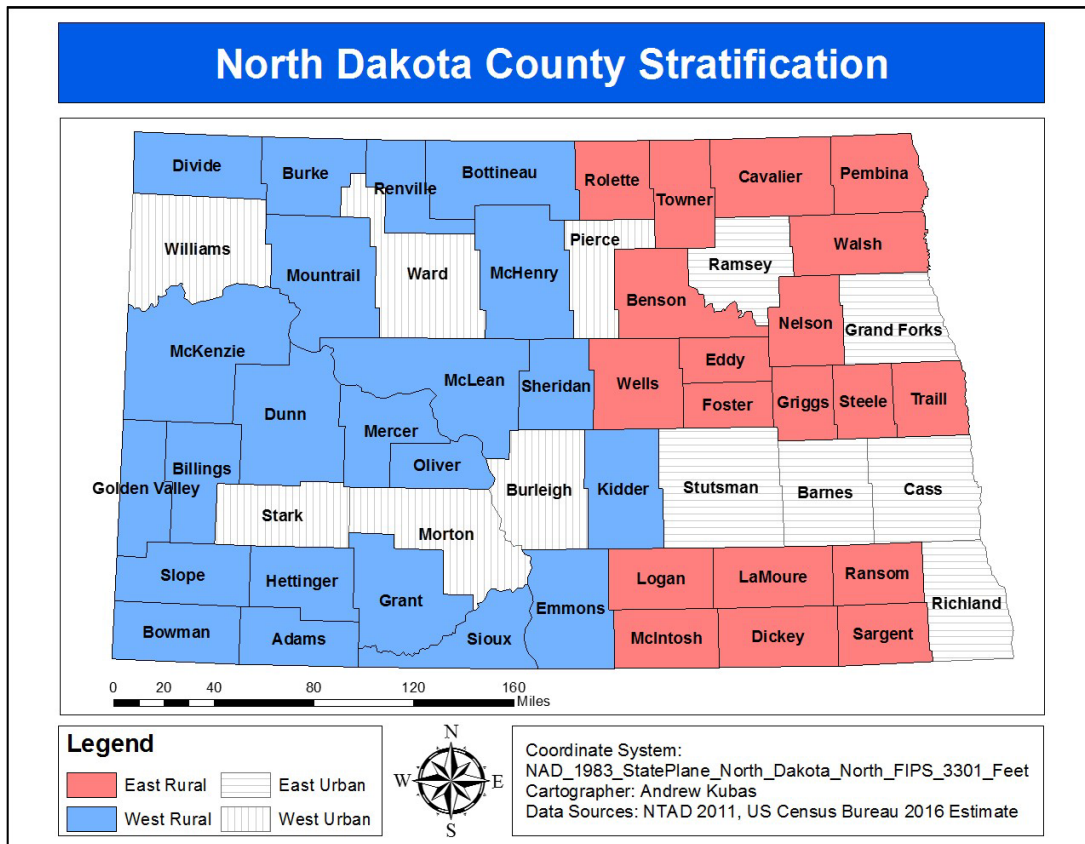


Figure 3.1 North Dakota County Stratification

Roughly half of program entries (41.9%) were from urban counties in the western half of the state. The region is over-represented regarding the driver population of 34.0%. The east-urban share is low compared with the driver population share at 40.5%. The rural regions are slightly below what would be anticipated based on populations that comprise about 12% of the share in each region. Underlying population distributions do influence this distribution, but it seems evident that local cultural tendency for alcohol-impaired driving, associated enforcement activity, and ride alternatives also play a role. Most recently, availability of ride alternatives such as Uber and Lyft may have influenced driver decisions. The earliest market development in Fargo has expanded to other urban areas, but statewide surveys suggest most areas are early in market development as a sustained and reliable alternative to alcohol-impaired driving.

Table 3.3 Program Entries, by Region and Geography

		GEOGRAPHY		
		Urban	Rural	Total
R E G I O N	East	2,960 (36.1%)	878 (10.7%)	3,838 (46.2%)
	West	3,443 (41.9%)	928 (11.3%)	4,371 (53.3%)
Total		6,403 (77.7%)	1,806 (22.3%)	8,209

3.1.3 Monitoring System

Once enrolled in the 24/7 Sobriety Program, participants must remain sober for the duration of the 360- or 730-day enrollment period. For the offender to stay accountable and remain sober in the program, regular alcohol testing occurs. 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 (PBT), continuous ankle bracelet monitoring, urinalysis testing, remote PBT, and custom. Some respondents, as advocated by judicial discretion, may be subjected to additional monitoring via drug patches capable of monitoring illegal substances in a participant's sweat. The secure continuous remote alcohol monitoring (SCRAM) ankle bracelets vary by function and are not a truly continuous monitoring device. In general, the bracelet takes a test roughly every 30 minutes. These data remain stored and may require hard line/Ethernet, machine, or wireless capability to upload data to a database. This information is downloaded to track compliance to sobriety, but the download frequency varies.

Prior to 2019, individuals who switched monitoring devices in the program were recorded to be monitored with more than one alcohol-monitoring devices. It should be clarified that these individuals were never monitored by two devices at once. In 2019, the monitoring system was changed to record the most recent monitoring system, so only one type of alcohol-testing system was recorded in the data provided to the research team. Under this record system, in 2020, the PBT and SCRAM were listed in 31% and 62.5% of cases, respectively. The drug patch was in use in 3.7% and mixed methods in a single case. In 2021, the PBT and SCRAM were listed in 39% and 51.6% of cases, respectively. The remote PBT was used in 2.2% of cases. The drug patch was in use in 6.0% and mixed methods in a single case that may be attributed to reasoning such as a court decision for monitoring.

Table 3.4 Monitoring System

Monitoring System	2020		2021	
	Number of Entries	Percent	Number of Entries	Percent
Preliminary Breath Test only	143	31.00%	356	38.99%
SCRAM only	288	62.50%	471	51.59%
Drug-patch only	17	3.70%	55	6.02%
Remote Preliminary Breath Test only	10	2.20%	20	2.19%
Urinalysis only			5	0.55%
Custom	3	0.70%	6	0.66%

3.1.4 Recidivist Status

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 confirm that these drivers pose a safety threat to other drivers sharing the road. For the purposes of this study, however, “recidivist” refers to drivers in the 24/7 Sobriety Program who receive a DUI citation after enrolling in the program. This definition will be used because the agencies supporting this research are most interested in determining how the program affects traffic safety. Other alcohol-related citations neither guarantee that an individual was operating a vehicle at the time of the citation nor guarantee that the individual was impaired. In this sample of 24/7 Sobriety Program entries, about four-fifths (83.0%) had a DUI as the triggering event mandating enrollment in the program (Table 3.5). This share was higher when considering the 2021 records alone at 89.8%.

Table 3.5 Offense Type Triggering Enrollment in 24/7 Sobriety Program

Offense Type	Entries 2014-2021		Entries 2021	
	Number of Entries	Percent	Number of Entries	Percent
Actual Physical Control	1,196	14.6%	41	4.5%
Driving Under Suspension	68	0.8%	27	3.0%
Minor in Possession/Control	109	1.3%	9	1.0%
DUI with Aggravating Circumstance	24	0.3%	16	1.8%
DUI 1 st Offense	1,429	17.4%	172	18.8%
DUI 2 nd Offense	3,539	43.1%	378	41.4%
DUI 3 rd Offense	833	10.2%	104	11.4%
DUI 4 th + Offense	1,011	12.3%	166	18.2%

Based on this study’s recidivism focus, subpopulation definition for the recidivist driver was defined for three groups: high-risk recidivists, moderate-risk recidivists, and post-program recidivists. High-risk recidivists are classified as those drivers receiving an impaired driving citation within 60 days of entering the 24/7 Sobriety Program. Fourth-time offenders are also considered a high-risk subpopulation. A period of 60 days was initially chosen as an interval in risk assessment because, prior to the latest legislative changes made in House Bill 1302, it represented the typical time a DUI offender was sentenced to the program (McKnight, Fell, and Auld-Owens 2012). The 60-day period was retained as a possible “risk” marker for participants in program assessment with the current minimum 360-day program sentence.

All entries in the dataset used for the analysis were mandated to the program for a minimum of 360 days in this study, considering the entrants since 2014. One moderate-risk recidivist group has been defined previously, based on prior years’ analyses, as those drivers who received an impaired driving citation while enrolled in the program at some point after day 61 of participation. Post-program recidivists are those who successfully remain sober while enrolled in the program but have an impaired driving violation at some point after completing the 24/7 Sobriety Program. The remaining risk intervals were defined to cover the enrolled and post-program markers for citation and crash record markers within 360, 730, and 1,080 days. Although the 360-day term is slightly shorter than one year, a one-year reference is used

along with the two-year and three-year terms used in the report. This detail is noted as it is important within the adjudication protocols and guidelines.

In this sample of entries, 26 participants (0.32%) received a citation for impaired driving within 60 days of starting the program and were considered high-risk recidivists. A larger share of 147 entries (1.79%) received an impaired driving citation at some point while enrolled in the program after day 61. These individuals represent moderate-risk recidivists in this sample. A much larger share of 363 entries (4.42%) received an impaired driving citation at some point after completing the program and were considered post-program recidivists. The data preparation assured independence of observations among these three recidivist types.

The ND BCI began consistently collecting information on the reason for case closure in 2020 when its record management system was fully transitioned to the new software system. The status for 1,057 participants in 2021 was available in early 2022. Figure 3.2 shows the composition for the case status in 2021 for cases recorded in the new record management system. Some inconsistencies were noticed in querying the records with regard to the status for a case in the reason for case closure. The vendor did add a new field in 2019 to maintain the most recent participant status with regard to cases closed. It is anticipated this field will provide more consistent information due to software coding related to the active and inactive status related to each participant record. The sample summary was developed to offer insight about the participant status categories and the potential future use of this new field. The figures and categories should be used with caution since the status field has a limited history for understanding the stability and interpretation with the reason for closed reporting¹.

The new record management system also provided a field to record the referring entity for the cases opened in 2021. The information had been lightly reported for cases opened in previous years. As expected, the district courts handled the majority of the cases that were referred to the 24/7 Sobriety Program (Table 3.6). The South Central Judicial District was responsible for 17.6% of cases followed by the East Central with 16.7% of the 2021 cases. Among the court groups, the district courts attributed 71.7% of cases and the municipal courts 22.2% for cases opened in 2021. Three interstate probation cases and 61 with unknown referring entities complete the jurisdictional origin profile.

¹ 15 DUI second-time offenders successfully complete the program within 180 days after their enrollment.

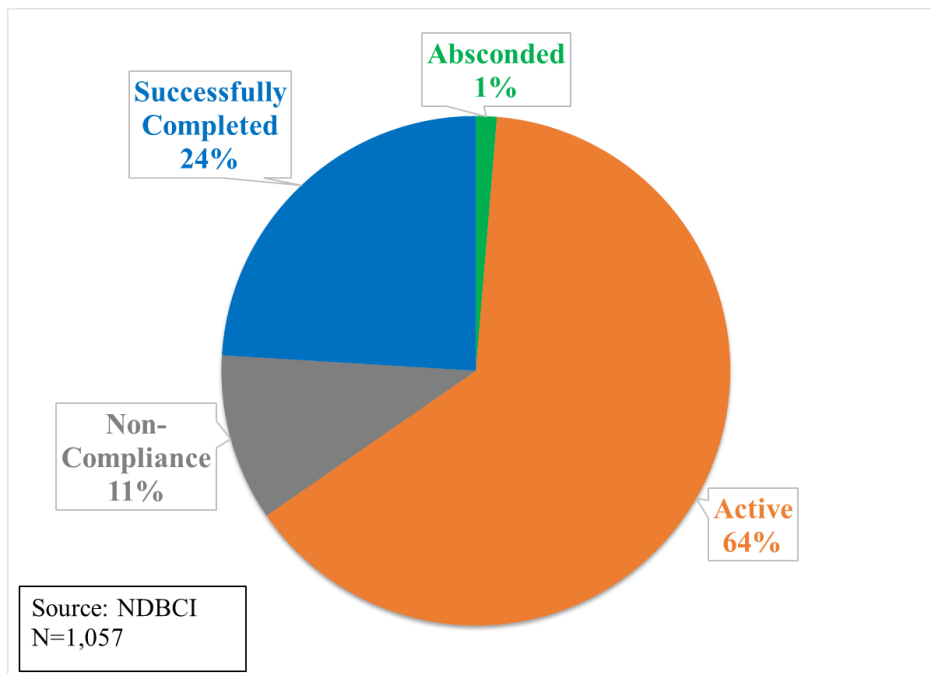


Figure 3.2 Participant Status, Cases Opened in 2021

Table 3.6 Referring Entity Composition, Cases Opened in 2021

Jurisdictional Agency	Count	Percent
Bismarck Municipal Court	58	5.5%
Devils Lake Municipal Court	9	0.9%
Dickinson Municipal Court	15	1.4%
East Central District Court	176	16.7%
Fargo Municipal Court	65	6.2%
Grand Forks Municipal Court	16	1.5%
Jamestown Municipal Court	5	0.5%
Mandan Municipal Court	6	0.6%
Minot Municipal Court	33	3.1%
North Central District Court	70	6.6%
Northeast Central District Court	56	5.3%
Northeast District Court	80	7.6%
Northwest District Court	60	5.7%
South Central District Court	186	17.6%
Southeast District Court	73	6.9%
Southwest District Court	57	5.4%
Valley City Municipal Court	0	0.0%
West Fargo Municipal Court	20	1.9%
Williston Municipal Court	8	0.8%
Probation (Interstate Court)	3	0.3%
Unknown	61	5.8%
Total	1,057	

Note that although the conceptualization of these variables remains consistent with previous assessments, the operationalization of these variables is markedly different. Whereas early assessments of the 24/7 Sobriety Program included citations for actual physical control, driving under suspension/revocation, and minor in possession/control among the impaired-driving-related program failures, the nature of the revised record management system meant assessments were limited to citations for driving under the influence of alcohol when referencing “DUI citations” after 2019. Table 3.7 explains the conceptualization and operationalization of the DUI citation, DUI-related citation, non-DUI-related traffic citation, and crash variables used in this study.

Table 3.7 Conceptualization and Operationalization of Impaired Driving Data

Variable	Conceptualization	Operationalization
DUI Citation	An offender receives a citation for driving under the influence of alcohol that would trigger enrollment (or re-enrollment) into the program	Drivers in the 60, 365, 730, and 1,080 days before (or after) starting the program are coded as a “1” if they have the following citations in those time periods: <ul style="list-style-type: none"> • DUI 1st offense • DUI 2nd offense • DUI 3rd offense • DUI 4th+ offense All other drivers are coded as “0”
DUI-Related Citation	An offender receives a citation related to driving under the influence of alcohol that would trigger enrollment (or re-enrollment) into the program	Drivers in the 60, 365, 730, and 1,080 days (or after) starting the program are coded as a “1” if they have the following citations in those time periods: <ul style="list-style-type: none"> • DUI 1st offense • DUI 2nd offense • DUI 3rd offense • DUI 4th+ offense • DUI with aggravating circumstance • Actual physical control • Driving under suspension/revocation • Minor in possession/control All other drivers are coded as “0”
Non-DUI-Related Traffic Citations	An offender receives a citation for a traffic offense unrelated to driving under the influence of alcohol	Drivers in the 60, 365, 730, and 1,080 days before (or after) starting the program are coded as “1” if they have the following citations in those time periods: <ul style="list-style-type: none"> • Speeding • Reckless driving • Failure to obey stop sign • Other traffic offenses All other drivers are coded as “0”
Crashes	An offender has a crash event	Drivers in the 60, 365, 730, and 1,080 days before (or after) starting the program are coded as “1” if they have the following crashes in those time periods: <ul style="list-style-type: none"> • Fatal crash • Injury crash • Property-damage-only crash All other drivers are coded as “0”

4. RESULTS

Data were analyzed in terms of general trends and specific differences between driver groups. Descriptive consideration must occur to account for overall patterns among impaired driving offenders. Beyond these overall trends, different hypothesis testing statistical procedures – including Chi-square tests, one-way ANOVAs, and t-tests – were used to determine if there were statistically significant differences in DUI offenders when factoring for various participant groups. This information was compiled to highlight possible shifts and trends in impaired driving events, non-DUI-related citations, and crash rates related to the program population and subpopulations.

4.1 Descriptive Statistics

4.1.1 DUI-Related Citation Events

With regard to DUI-related citations, this sample of 24/7 Sobriety Program entries was responsible for 8,754 citations committed by 7,886 entrants in the three years prior to entering the program. After starting the program, there were just 918 DUI-related citations committed by 874 program entrants in the three-year period following enrollment into the program. Before-and-after improvements were made in the three-year, two-year, one-year, and sixty-day intervals used in the analysis (Figure 4.1). The number of impaired-driving-related citations may not be the best metric to measure program performance because having an impaired-driving-related event is a prerequisite for program entry. Nonetheless, the rate at which DUI citations are issued per program entry does show that offenders have a lower rate of DUI citations after entering the program.

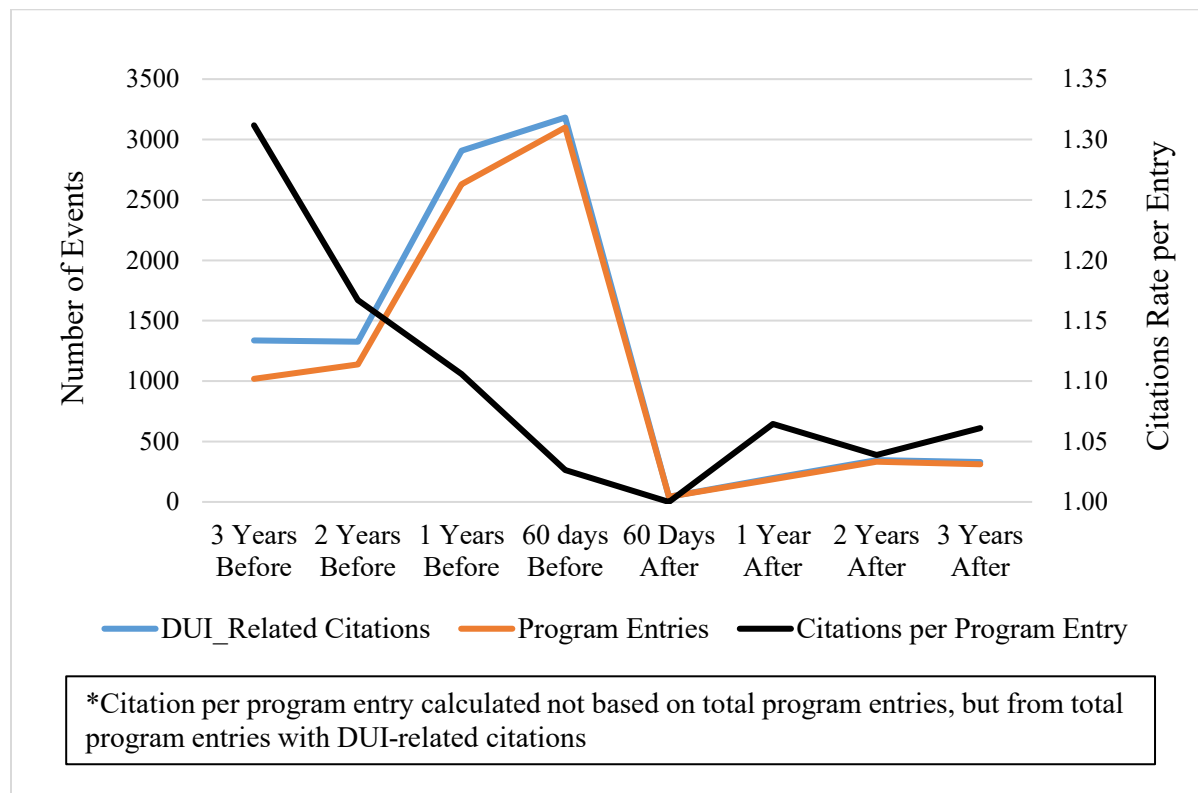


Figure 4.1 DUI-Related Citation Events

4.1.2 Non-DUI-Related Traffic Citation Events

A similar trend emerged when analyzing non-DUI-related traffic citations suggesting a broader high-risk driving behavior propensity. For all risk intervals studied in this report, both the number of citations and the rate in which citations are issued per program entry was smaller after starting the 24/7 Sobriety Program (Figure 4.2). Because non-DUI-related traffic citations do not necessarily trigger a legislatively mandated enrollment into the program, this demonstrates a positive aspect of the program: it appears as though entrance into the 24/7 Sobriety Program has some deterrent effect on participants that extends to non-DUI-related traffic offenses.

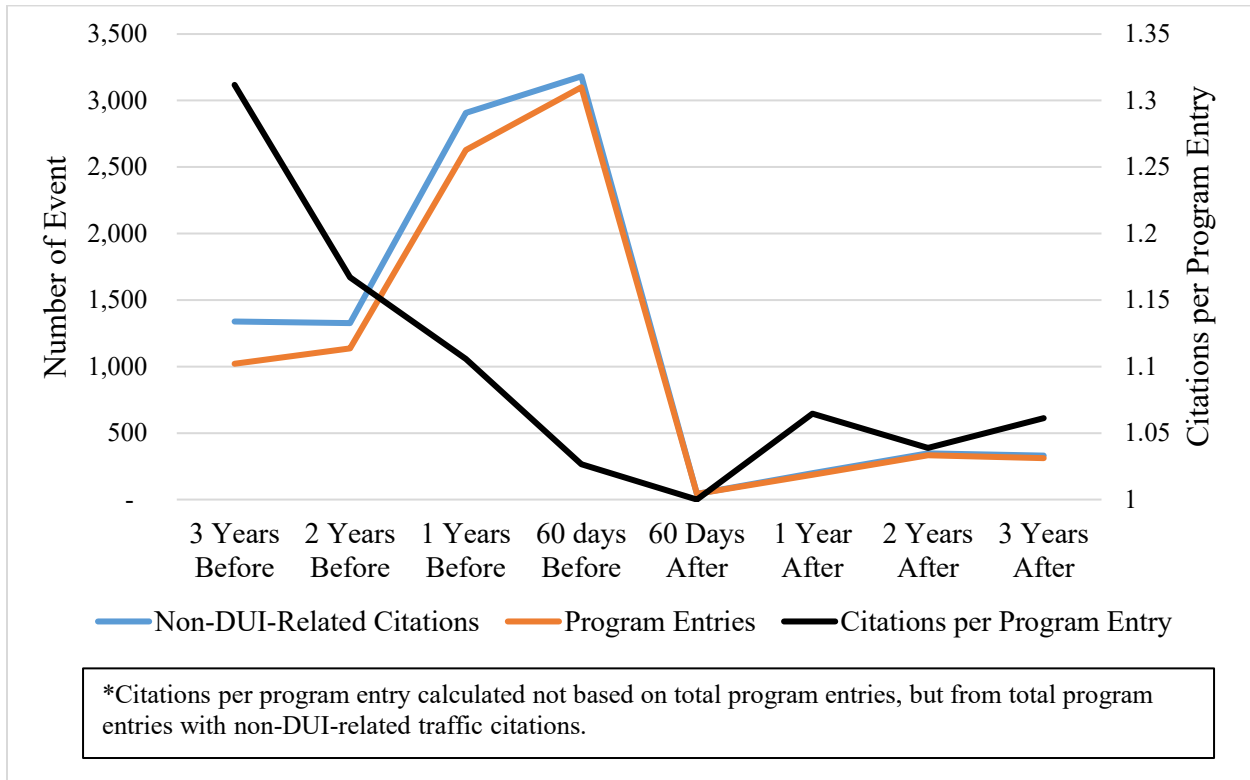


Figure 4.2 Non-DUI-Related Traffic Citation Events

4.1.3 Crashes

Crashes serve as another metric with noticeable improvement after individuals begin the 24/7 Sobriety Program. The volume of fatal, injury, and property-damage-only crashes declines significantly after participants are enrolled in the program (Table 4.1). For instance, program participants were responsible for seven fatal crashes in the three years before starting the intervention. The number of fatal crashes declined to just three in the two years after a participant entered the program. Similar reductions took place for the other crash severity levels. One limitation is that travel for individual participants was not tracked by vehicle miles traveled; therefore, an exposure rate is unknown.

One method for normalizing crash rates is to examine the number of crashes per program entry (Figure 4.3). This method determined that the rate at which crashes occur does generally decline after an individual enters the 24/7 Sobriety Program. The positive trend in the latter risk intervals should be monitored and potentially explored as additional program data become available to consider the two- and three-year risk intervals.

Table 4.1 Crash Severity Before and After Starting 24/7 Sobriety Program (2014-2021)

Metric	Severity		
	Fatal	Injury	Property Damage Only
3 Years Before Program Start	7	205	459
2 Years Before Program Start	2	209	497
1 Year Before Program Start	4	273	612
60 Days Before Program Start	8	245	407
60 Days After Program Start	1	22	46
1 Year After Program Start	3	67	205
2 Years After Program Start	2	103	258
3 Years After Program Start	3	83	213

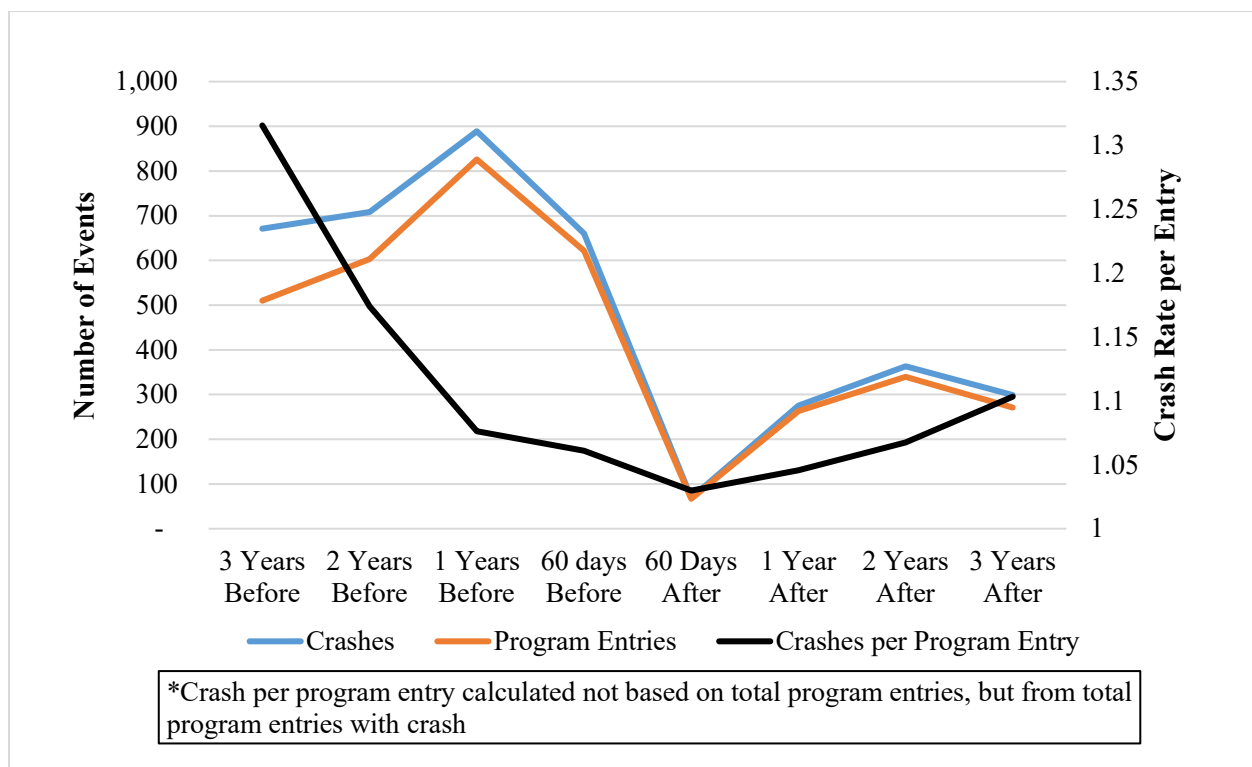


Figure 4.3 Crash Events

4.2 Participant Groups

It is important to analyze the response of different variables – DUI-related citations, non-DUI-related traffic citations, and crashes – when factoring for individual driver groups. Differences across groups can distinguish behaviors to potentially target safety strategies with high-risk groups and/or consider program supplements, enforcement strategies, educational efforts, or revised program participation guidelines for subpopulations. Six features were examined: gender, age, region, geography, multi-time program entrants, and repeat DUI offenders.

4.2.1 Gender

Results across gender were mixed (Table 4.2). Males, on average, had more DUI-related citations one year before ($p=0.019$) enrolling in the 24/7 Sobriety Program. This follows other studies that recognize men tend to have higher rates of impaired driving than women (Kubas, Kayabas, and Vachal 2015; Kubas, Kayabas, and Vachal 2016; Kubas, Kayabas, and Vachal 2017; Kubas, Vachal, and Malchose 2018). After starting the 24/7 Sobriety Program, there were no statistically significant differences between men and women based on tests at one-, two-, and three-year intervals after program enrollment, indicating that the 24/7 Sobriety Program successfully reduced DUI recidivism without gender bias. While these tendencies may provide some insight regarding risk markers prior to arrest, analysis focus moves to results following program entry. There were no statistically significant differences between men and women on non-DUI-related traffic citations for all intervals.

Women were more likely to have had a traffic crash 60 days prior ($p=0.0015$) to their program start date and within the 60 days after ($p=0.0002$) their program enrollment. When that timeline was extended back to one year ($p=0.0037$) before the start date, women maintained a greater likelihood for crash involvement. This propensity to be involved in a traffic collision does not vary significantly between male and female cohorts for the 360-day or three-year post start risk intervals. A higher rate was attributed to women at the two-year post start time risk interval ($p<0.0044$), but the rates were lower and statistically similar when compared at the three-year post start time risk interval.

Table 4.2 Mean Values Displaying Total Violations Across Program Entries, by Gender

Metric	Mean Value		Sig.
	Male	Female	
DUI-Related Citations, 60 Days Before Program Start	0.38	0.41	
DUI-Related Citations, 60 Days After Program Start	0.00	0.01	
DUI-Related Citations, 1 Year Before Program Start	0.36	0.33	#
DUI-Related Citations, 1 Year After Program Start	0.02	0.02	
DUI-Related Citations, 2 Years Before Program Start	0.16	0.16	
DUI-Related Citations, 2 Years After Program Start	0.04	0.04	
DUI-Related Citations, 3 Years Before Program Start	0.16	0.17	
DUI-Related Citations, 3 Years After Program Start	0.04	0.03	
Non-DUI-Related Traffic Citations, 60 Days Before Program Start	0.41	0.40	
Non-DUI-Related Traffic Citations, 60 Days After Program Start	0.09	0.10	
Non-DUI-Related Traffic Citations, 1 Year Before Program Start	0.66	0.61	
Non-DUI-Related Traffic Citations, 1 Year After Program Start	0.32	0.32	
Non-DUI-Related Traffic Citations, 2 Years Before Program Start	0.57	0.58	
Non-DUI-Related Traffic Citations, 2 Years After Program Start	0.32	0.32	
Non-DUI-Related Traffic Citations, 3 Years Before Program Start	0.55	0.54	
Non-DUI-Related Traffic Citations, 3 Years After Program Start	0.29	0.28	
Crashes, 60 Days Before Program Start	0.08	0.10	##
Crashes, 60 Days After Program Start	0.01	0.02	##
Crashes, 1 Year Before Program Start	0.10	0.13	##
Crashes, 1 Year After Program Start	0.03	0.04	
Crashes, 2 Years Before Program Start	0.08	0.10	
Crashes, 2 Years After Program Start	0.04	0.06	##
Crashes, 3 Years Before Program Start	0.08	0.09	
Crashes, 3 Years After Program Start	0.03	0.04	

4.2.2 Age

Significant differences were found among age cohorts in considering the traffic safety outcome risk markers (Table 4.3). The youngest cohort group (18-24) appears to be a high-risk group for DUI-related citations at two years before program enrollment ($p < 0.0001$), two years after ($p = 0.0021$), and three years after ($p = 0.044$) program enrollment. The youngest cohort group (18-24) remains a high-risk group for non-DUI-related traffic citations at all time intervals. Before the program start, mean values were 0.54 to 0.96 for the risk intervals. These values were lower after enrollment, ranging between 0.14 and 0.50.

In terms of traffic crashes, the youngest (18-24) had substantially higher crash involvement two years ($p < 0.0001$) and three years ($p < 0.0003$) prior to program enrollment. A similar trend was found early in the program ($p = 0.0436$) and then again at the one-year ($p = 0.0189$) and three-year ($p = 0.0101$) risk markers that capture at least one year of post-program driver record events. The oldest (65+) cohorts typically had the highest average number of crashes a year prior to start, which may be a potential risk identifier for DUI prevention. The novice teen driver has elevated risk due to inexperience and more dangerous behaviors (Mayhew, Simpson, and Pak 2003). Elderly drivers have slower reaction times, putting them at a higher propensity to be in a crash or traffic incident resulting in a citation (Svetina 2016). Recent highlights on polysubstance use may also be a factor with older drivers' impairment when mixing medications and alcohol (Hill, et al 2020, Gowan 2022).

Table 4.3 Mean Values Displaying Total Violations Across Program Entries, by Age Group

Metric	Mean Value						Sig.
	18-24	25-34	35-44	45-54	55-64	65+	
DUI-Related Citations 60 Days Before Program Start	0.38	0.39	0.38	0.39	0.44	0.35	
DUI-Related Citations 60 Days After Program Start	0.01	0.00	0.01	0.00	0.00	0.01	
DUI-Related Citations 1 Year Before Program Start	0.38	0.36	0.34	0.33	0.34	0.38	
DUI-Related Citations 1 Year After Program Start	0.03	0.02	0.02	0.02	0.03	0.03	
DUI-Related Citations 2 Years Before Program Start	0.22	0.15	0.15	0.15	0.14	0.17	##
DUI-Related Citations 2 Years After Program Start	0.06	0.04	0.04	0.03	0.03	0.02	#
DUI-Related Citations 3 Years Before Program Start	0.14	0.16	0.18	0.15	0.19	0.14	
DUI-Related Citations 3 Years After Program Start	0.14	0.16	0.18	0.15	0.19	0.14	#
Non-DUI-Related traffic Citations 60 Days Before Program Start	0.54	0.42	0.32	0.38	0.38	0.47	##
Non-DUI-Related traffic Citations 60 Days After Program Start	0.14	0.09	0.08	0.07	0.06	0.06	##
Non-DUI-Related traffic Citations 1 Year Before Program Start	0.97	0.68	0.55	0.47	0.52	0.62	##
Non-DUI-Related traffic Citations 1 Year After Program Start	0.49	0.35	0.27	0.21	0.20	0.18	##
Non-DUI-Related traffic Citations 2 Years Before Program Start	0.96	0.58	0.48	0.39	0.36	0.46	##
Non-DUI-Related traffic Citations 2 Years After Program Start	0.50	0.33	0.30	0.22	0.19	0.20	##
Non-DUI-Related traffic Citations 3 Years Before Program Start	0.85	0.59	0.46	0.36	0.34	0.28	##
Non-DUI-Related traffic Citations 3 Years After Program Start	0.43	0.31	0.29	0.20	0.13	0.09	##
Crashes, 60 Days Before Program Start	0.09	0.09	0.07	0.08	0.08	0.06	
Crashes, 60 Days After Program Start	0.02	0.01	0.01	0.01	0.01	0.01	#
Crashes, 1 Year Before Program Start	0.15	0.11	0.09	0.08	0.10	0.16	##
Crashes, 1 Year After Program Start	0.05	0.03	0.03	0.02	0.03	0.03	#
Crashes, 2 Years Before Program Start	0.16	0.07	0.07	0.07	0.09	0.07	##
Crashes, 2 Years After Program Start	0.06	0.04	0.04	0.04	0.04	0.05	
Crashes, 3 Years Before Program Start	0.11	0.09	0.06	0.06	0.06	0.06	##
Crashes, 3 Years After Program Start	0.05	0.04	0.03	0.04	0.03	0.02	#

/The 65-74 and 75+ age cohorts were merged because there were fewer than 30 drivers in the 75+ age cohort

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

Red font, highest among the group

Green font, lowest among the group

4.2.3 Region

Regional discrepancies in driver performance were identified in means comparisons across the time risk markers (Table 4.4). Across the risk metrics, program participants from the western half of the state are generally more dangerous than those from the eastern half. Drivers from the west were statistically more likely to have a DUI-related citation 60 days before enrollment ($p=0.0018$). The east region participant risk significantly exceeded the west in the DUI-related risk marker interval one year before the program start ($p=0.0008$). Results show DUI-related citations were statistically similar at other time intervals. The rate at the risk markers remained noticeably high until the program started and remained lower in both regions considering the extended risk interval metrics as drivers move toward and beyond program completion. The DUI-related citation rate three years prior to program start was 0.16 and 0.17 compared with 0.04 and 0.04 three years after enrollment, respectively, for the east and west region drivers. Comparing driver cohort crash involvement by region shows little measurable difference. Similar to the DUI-related citations, the post-enrollment rates were lower than those associated with these drivers in pre-program crash events.

Table 4.4 Mean Values Displaying Total Violations Across Program Entries, by Region

Metric	Mean Value		Sig.
	East	West	
DUI-Related Citations, 60 Days Before Program Start	0.37	0.40	##
DUI-Related Citations, 60 Days After Program Start	0.00 ₁	0.01	
DUI-Related Citations, 1 Year Before Program Start	0.38	0.34	##
DUI-Related Citations, 1 Year After Program Start	0.02	0.03	
DUI-Related Citations, 2 Years Before Program Start	0.16	0.17	
DUI-Related Citations, 2 Years After Program Start	0.04	0.05	
DUI-Related Citations, 3 Years Before Program Start	0.16	0.17	
DUI-Related Citations, 3 Years After Program Start	0.04	0.04	
Non-DUI-Related Traffic Citations, 60 Days Before Program Start	0.40	0.42	
Non-DUI-Related Traffic Citations, 60 Days After Program Start	0.07	0.10	##
Non-DUI-Related Traffic Citations, 1 Year Before Program Start	0.62	0.68	#
Non-DUI-Related Traffic Citations, 1 Year After Program Start	0.26	0.37	##
Non-DUI-Related Traffic Citations, 2 Years Before Program Start	0.52	0.61	##
Non-DUI-Related Traffic Citations, 2 Years After Program Start	0.27	0.37	##
Non-DUI-Related Traffic Citations, 3 Years Before Program Start	0.52	0.57	
Non-DUI-Related Traffic Citations, 3 Years After Program Start	0.25	0.33	##
Crashes, 60 Days Before Program Start	0.08	0.08	
Crashes, 60 Days After Program Start	0.00 ₁	0.01	##
Crashes, 1 Year Before Program Start	0.11	0.11	
Crashes, 1 Year After Program Start	0.02	0.04	##
Crashes, 2 Years Before Program Start	0.08	0.09	
Crashes, 2 Years After Program Start	0.04	0.05	
Crashes, 3 Years Before Program Start	0.07	0.09	
Crashes, 3 Years After Program Start	0.04 ₂	0.04 ₂	

##Significant at the 1% level for two-sample T-Test; #Significant at the 5% level for two-sample T-Test

₁ The number showed to be zero was due to rounding.

₂The means showed to be same in the table were due to rounding.

With regard to non-DUI-related traffic citations, the western region was associated with higher citation incidence across all risk intervals. The significant differences prior to the participant program enrollment date were identified at one- and two-year intervals prior to the start date ($p=0.0174$ and $p=0.0001$, respectively). Highly significant differences continued after program enrollment beyond the 60-day interval ($p=0.004$) as drivers from the west were statistically more likely to have a non-DUI-related citation during the one-, two-, and three-year post enrollment risk intervals ($p<0.0001$ at all three intervals). Comparing the cohort rates across the pre and post intervals does, however, show that both groups' incidence rates were lower after the 24/7 Sobriety Program start date.

Statistical differences in rates were found between the east and west regions only for the earliest intervals after program start considering the crash propensity metrics. In the 60- and 360-day intervals after the program start date, participants in the west region had higher crash incidence ($p=0.0018$ and $p<0.0001$, respectively). The 24/7 Sobriety Program participants from the regional cohorts tended to have similar crash rate in all other intervals. As with the other regional comparisons, the within region incidence rates after program start are lower than those prior to program enrollment. For the east and west region drivers, the respective crash rates three years prior to program start were 0.07 and 0.09, compared with 0.04 and 0.04 three years after enrollment. It is a positive statewide metric but does show room for improvement.

4.2.4 Geography

Results for traffic violations are consistent when factoring for geography; urban residents generally exhibit more dangerous behaviors than their rural counterparts (Table 4.5). Urban participants were statistically more likely to have a non-DUI-related traffic citation in the 360-day period after program starts ($p<0.023$). Likewise, urban residents had statistically higher rates of crashes across most time intervals except two years before and two years after enrolling in the program. Notably, when factoring for geography, results show DUI-related citations were statistically similar at all time intervals (Table 4.5). The mean values of urban and rural DUI-related citations were reduced from 0.39 and 0.37, respectively, 60 days prior to enrollment to 0.04 and 0.04 three years after the program start.

Table 4.5 Mean Values Displaying Total Violations Across Program Entries, by Geography

Metric	Mean Value		Sig.
	Urban	Rural	
DUI-Related Citations, 60 Days Before Program Start	0.39	0.37	
DUI-Related Citations, 60 Days After Program Start	0.01	0.00 ₁	
DUI-Related Citations, 1 Year Before Program Start	0.35	0.36	
DUI-Related Citations, 1 Year After Program Start	0.03	0.02	
DUI-Related Citations, 2 Years Before Program Start	0.16	0.16	
DUI-Related Citations, 2 Years After Program Start	0.04	0.04	
DUI-Related Citations, 3 Years Before Program Start	0.17	0.15	
DUI-Related Citations, 3 Years After Program Start	0.04	0.04	
Non-DUI-Related Traffic Citations, 60 Days Before Program Start	0.41	0.38	
Non-DUI-Related Traffic Citations, 60 Days After Program Start	0.09	0.08	
Non-DUI-Related Traffic Citations, 1 Year Before Program Start	0.66	0.62	
Non-DUI-Related Traffic Citations, 1 Year After Program Start	0.33	0.28	#
Non-DUI-Related Traffic Citations, 2 Years Before Program Start	0.58	0.54	
Non-DUI-Related Traffic Citations, 2 Years After Program Start	0.33	0.31	
Non-DUI-Related Traffic Citations, 3 Years Before Program Start	0.54	0.55	
Non-DUI-Related Traffic Citations, 3 Years After Program Start	0.29	0.29	
Crashes, 60 Days Before Program Start	0.09	0.06	##
Crashes, 60 Days After Program Start	0.01	0.00₁	##
Crashes, 1 Year Before Program Start	0.11	0.09	##
Crashes, 1 Year After Program Start	0.04	0.02	##
Crashes, 2 Years Before Program Start	0.09	0.07	
Crashes, 2 Years After Program Start	0.05	0.04	
Crashes, 3 Years Before Program Start	0.09	0.06	#
Crashes, 3 Years After Program Start	0.04	0.02	##

##Significant at the 1% level for two-sample T-Test

#Significant at the 5% level for two-sample T-Test

₁ The number showed to be zero was due to rounding.

4.2.5 Multi-Time Program Entrants

As discussed in the methods section, it is possible for an individual to enroll in the program multiple times. It was hypothesized that there might be differences between individuals who have been enrolled in the intervention program just once and those who have been sentenced to the program two or more times. Perhaps the program has a stronger deterrent effect on those who only participated in the course once, and there is knowledge to be gained about recidivism. Conversely, perhaps external factors such as addiction or self-control factors can explain why participants may be enrolled in the program multiple times. Understanding differences across these groups contributes to the existing literature regarding why standardized intervention may be successful for some but not others.

Those offenders enrolled in the program multiple times were much more likely to have DUI-related citations across most of the time intervals except 60 days and one year before enrolling in the program (Table 4.6). This indicates that there are some pattern behaviors among offenders in this sample. Additional efforts could be considered in targeting individuals entering the program for a second or subsequent time, as rates show these enrollees exhibit a dangerously higher likelihood to reoffend with alcohol-impaired driving relative to first-time enrollees. Notably, the first-time enrollees are more likely to have DUI-related citations 60 days before the program start ($p=0.0198$). While after the intervention, the mean of DUI-related citations for first-time enrollees was reduced from 0.4 at 60 days prior to program start to 0.01 at three years after enrollment.

Table 4.6 Mean Values Displaying Total Violations Across Program Entries, by Multi-Time Entrants

Metric	Mean Value		Sig.
	Multi-Entrant	Single-Entrant	
DUI-Related Citations, 60 Days Before Program Start	0.37	0.40	#
DUI-Related Citations, 60 Days After Program Start	0.01	0.00₁	##
DUI-Related Citations, 1 Year Before Program Start	0.35	0.35	
DUI-Related Citations, 1 Year After Program Start	0.05	0.01	##
DUI-Related Citations, 2 Years Before Program Start	0.22	0.13	##
DUI-Related Citations, 2 Years After Program Start	0.10	0.01	##
DUI-Related Citations, 3 Years Before Program Start	0.23	0.13	##
DUI-Related Citations, 3 Years After Program Start	0.09	0.01	##
Non-DUI-Related Traffic Citations, 60 Days Before Program Start	0.41	0.41	
Non-DUI-Related Traffic Citations, 60 Days After Program Start	0.09	0.09	
Non-DUI-Related Traffic Citations, 1 Year Before Program Start	0.71	0.62	##
Non-DUI-Related Traffic Citations, 1 Year After Program Start	0.39	0.28	##
Non-DUI-Related Traffic Citations, 2 Years Before Program Start	0.68	0.52	##
Non-DUI-Related Traffic Citations, 2 Years After Program Start	0.43	0.27	##
Non-DUI-Related Traffic Citations, 3 Years Before Program Start	0.65	0.49	##
Non-DUI-Related Traffic Citations, 3 Years After Program Start	0.39	0.24	##
Crashes, 60 Days Before Program Start	0.08	0.08	
Crashes, 60 Days After Program Start	0.01	0.01	
Crashes, 1 Year Before Program Start	0.11	0.11	
Crashes, 1 Year After Program Start	0.04	0.03	##
Crashes, 2 Years Before Program Start	0.11	0.08	##
Crashes, 2 Years After Program Start	0.06	0.03	##
Crashes, 3 Years Before Program Start	0.10	0.07	##
Crashes, 3 Years After Program Start	0.05	0.03	##

##Significant at the 1% level for two-sample T-Test; #Significant at the 5% level for two-sample T-Test

₁ The number showed to be zero was due to rounding.

Findings show the multi-entrant individuals generally continue to exhibit riskier driving behaviors based on not only the DUI infractions but also other traffic offenses and crash involvements. In general, these same multi-entry individuals were more likely to have crashes two years and three years before enrolling in the program. Moving forward to one-, two- and three-year intervals after program enrollment, the multi-entry individuals maintain a greater likelihood for crash involvement. If the program does have a deterrent effect on multi-entry offenders, it is created over the longer term and is not present in the 360 days of enrollment. With regard to non-DUI-related traffic citations, multi-entry individuals were more likely to have citations across all risk interval markers except 60 days before, one year before, and 60 days after enrolling in the program. The post-program values were lower in both groups compared with the pre-program risk interval values. Thus, benefits were found as the program reduces risk among multi-entry offenders, but it does not appear as swift nor as substantial as with the single time offender group.

4.2.6 Repeat DUI Offenders

On average, entrants with multiple DUI-related citations had more DUI arrests before starting the program in each time interval. This is logical since first-time offenders would never have more than one DUI-related arrest, but repeat DUI offenders are required to have at least two DUI-related arrests to be categorized as a multiple-DUI offender (Table 4.7). First-time offenders were more likely to have DUI-related citations during the 60-day period after program enrollment ($p=0.02$). Results showed statistical insignificance for DUI-related citations at one-year after, two-years after, and three-years after program enrollment intervals. The fact that these individuals receive DUI-related citations on par with their first-time offender counterparts after starting the program indicates that the program structure does improve one's behavior with regard to alcohol-related citations. The lower rates were sustained to even the three-year interval when participants would be at least one and possibly two years beyond program completion.

For non-DUI-related traffic citations, first-time offenders were more likely to have non-DUI-related citations 60 days, two years, and three years after enrolling in the program ($p=0.0031$, $p=0.0095$, and $p=0.0145$, respectively). Repeat offenders were more likely to have non-DUI-related citations three years before enrolling in the program ($p=0.0019$). Repeat offenders were also more likely to have crashes three years before enrollment ($p=0.0274$).

Table 4.7 Mean Values Displaying Total Violations Across Program Entries, by DUI Recidivist Status

Metric	Mean Value		Sig.
	First-Time Offender	Repeat Offender	
DUI-Related Citations, 60 Days Before Program Start	0.35	0.41	##
DUI-Related Citations, 60 Days After Program Start	0.01	0.00₁	#
DUI-Related Citations, 1 Year Before Program Start	0.33	0.37	##
DUI-Related Citations, 1 Year After Program Start	0.03	0.02	
DUI-Related Citations, 2 Years Before Program Start	0.11	0.18	##
DUI-Related Citations, 2 Years After Program Start	0.04	0.04	
DUI-Related Citations, 3 Years Before Program Start	0.09	0.19	##
DUI-Related Citations, 3 Years After Program Start	0.05	0.04	
Non-DUI-Related Traffic Citations, 60 Days Before Program Start	0.39	0.41	
Non-DUI-Related Traffic Citations, 60 Days After Program Start	0.11	0.08	#
Non-DUI-Related Traffic Citations, 1 Year Before Program Start	0.65	0.65	
Non-DUI-Related Traffic Citations, 1 Year After Program Start	0.34	0.31	
Non-DUI-Related Traffic Citations, 2 Years Before Program Start	0.59	0.56	
Non-DUI-Related Traffic Citations, 2 Years After Program Start	0.36	0.31	#
Non-DUI-Related Traffic Citations, 3 Years Before Program Start	0.48	0.57	##
Non-DUI-Related Traffic Citations, 3 Years After Program Start	0.33	0.28	#
Crashes, 60 Days Before Program Start	0.08	0.08	
Crashes, 60 Days After Program Start	0.01	0.01	
Crashes, 1 Year Before Program Start	0.11	0.11	
Crashes, 1 Year After Program Start	0.04	0.03	
Crashes, 2 Years Before Program Start	0.08	0.09	
Crashes, 2 Years After Program Start	0.05	0.04	
Crashes, 3 Years Before Program Start	0.07	0.09	#
Crashes, 3 Years After Program Start	0.04	0.03	

##Significant at the 1% level for two-sample T-Test; #Significant at the 5% level for two-sample T-Test

₁ The number showed to be zero was due to rounding.

4.3 Entry Patterns Related to House Bill 1302 Program Terms

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; second-time and third-time offenders were required to remain sober for one year, and fourth-or-subsequent offenders were mandated to participate in the program for two years. In sum, 8,209 entries started the program after the new legislation was implemented. Of these, 4,372 were enrolled due to a second or third impaired driving citation and were required to participate for one year. A smaller number of entries, 1,011, were for fourth-or-subsequent offenders mandated by law to be in the program for two years.

As anyone enrolled for 360 or 730 days was adhering to more stringent standards created by House Bill 1302, tests were performed on DUI 1st offenders, DUI 2nd offenders, DUI 3rd offenders, and DUI 4th offenders to make comparisons across groups. In this sample, results showed there were statistical insignificance among groups across all time intervals (Table 4.8). DUI 1st offenders were more likely to have at least one non-DUI-related traffic citation two years after enrolling in the program ($p=0.0379$). A one-way ANOVA test was conducted only on DUI 2nd offenders, DUI 3rd offenders, and DUI 4+ offenders. Results showed there is no statistical significance among these three groups with regard to the likelihood for reoffense for the associated risk marker intervals. This table was primarily used to examine the effect of program length associated with the type of DUI offense reported at the time of enrollment. It

was used heavily in the early program assessment, which included the 60-day and discretionary enrollment factors.

Table 4.8 Mean Values Displaying Total Violations Across Program Entries, by DUI

Metric	Mean Value				Sig
	1st	2nd	3rd	4+	
DUI-Related Citations, 60 Days After Program Start	0.01	0.00	0.00	0.00	
DUI-Related Citations, 1 Year After Program Start	0.03	0.02	0.02	0.02	
DUI-Related Citations, 2 Years After Program Start	0.04	0.04	0.05	0.03	
DUI-Related Citations, 3 Years After Program Start	0.05	0.03	0.03	0.03	
Non-DUI-Related Traffic Citations, 60 Days After Program Start	0.06	0.06	0.05	0.05	
Non-DUI-Related Traffic Citations, 1 Year After Program Start	0.17	0.18	0.17	0.16	
Non-DUI-Related Traffic Citations, 2 Years After Program Start	0.19	0.17	0.16	0.14	##
Non-DUI-Related Traffic Citations, 3 Years After Program Start	0.16	0.15	0.14	0.14	
Crashes, 60 Days After Program Start	0.01	0.01	0.01	0.00	
Crashes, 1 Year After Program Start	0.04	0.03	0.04	0.02	
Crashes, 2 Years After Program Start	0.05	0.04	0.04	0.03	
Crashes, 3 Years After Program Start	0.03	0.03	0.03	0.03	

##Significant at the 1% level for 1-way ANOVA
#Significant at the 5% level for 1-way ANOVA
1st=DUI 1st Offense; 2nd=DUI 2nd Offense; 3rd=DUI 3rd Offense;4+ = DUI 4+ Offense

We have included counts of individuals who had at least one record in each risk interval category in Table 4.9 for the various offenses. The frequencies show that several low-count cells would be associated with unstable statistical results that should be used with extreme caution. Per the note at the end of the previous paragraph, the use and value of the previous table will be assessed moving forward with the analysis.

Table 4.9 Count of Displaying Total Violations Across Program Entries, by DUI offense

Metric	Count			
	1st	2nd	3rd	4+
DUI-Related Citations, 60 Days After Program Start	10	16	4	2
DUI-Related Citations, 1 Year After Program Start	36	72	17	23
DUI-Related Citations, 2 Years After Program Start	47	136	37	25
DUI-Related Citations, 3 Years After Program Start	61	98	22	29
Non-DUI-Related Traffic Citations, 60 Days After Program Start	75	180	35	40
Non-DUI-Related Traffic Citations, 1 Year After Program Start	226	586	123	138
Non-DUI-Related Traffic Citations, 2 Years After Program Start	252	566	121	130
Non-DUI-Related Traffic Citations, 3 Years After Program Start	202	466	96	132
Crashes, 60 Days After Program Start	14	29	5	4
Crashes, 1 Year After Program Start	47	100	26	25
Crashes, 2 Years After Program Start	60	129	32	30
Crashes, 3 Years After Program Start	36	96	26	24

1st=DUI 1st Offense; 2nd=DUI 2nd Offense; 3rd=DUI 3rd Offense;4+ = DUI 4+ Offense

At its core, the program is designed to ensure that an individual does not consume alcohol after receiving an impaired-driving-related citation. The program does not specifically target non-DUI-related traffic citations or crashes; these are merely residual benefits that can plausibly emerge from an individual mandated to a period of sobriety. Therefore, the results associated with DUI-related citations validate one of the program’s core goals: the prevention of future impaired driving events. In other words, longer legislatively mandated periods of sobriety result in a greater likelihood of sober driving by participants.

4.3.1 DUI Citations

After starting the 24/7 Sobriety Program, 536 of DUI entrants in this sample had at least one DUI citation (Table 4.10). These numbers do not represent unique individuals because it is possible that an entrant could have started the program multiple times due to having multiple DUI citations. Of the 536 entrants with a DUI citation, 173 took place during enrollment in the program. This represents 32.28% of all DUI citations and only 2.1% of the overall sample. The remaining 363 entries with DUI citations committed the violation after completing the program. The DUI penalty detail in Table 1.1 was used to determine the enrollment period associated with each participant record based on offense type.

Table 4.10 DUI Citations During and After Program Enrollment

Metric	Enrolled in Program				Sub-total	Completed Program				Sub-total	Total
	1 st	2 nd	3 rd	4+		1 st	2 nd	3 rd	4+		
Failed in First 60 Days	10 ^{***}	12 ^{***}	2 ^{***}	2 ^{***}	26						26
Failed Day 61 to Day 360	32 ^{**}	54 ^{**}	14 ^{**}	25 ^{**}	125						125
Failed Day 361 to Day 730				22 ^{**}	22	33	113	34		180	202
Failed Day 731 to Day 1095						53	87	19	24	183	183
Total	42	66	16	49	173	86	200	53	24	363	536

***High-Risk Recidivists

**Moderate-Risk Recidivists

*Post-Program Recidivists

1st=DUI 1st Offense; 2nd=DUI 2nd Offense; 3rd=DUI 3rd Offense;4+=DUI 4+ Offense

5. CONCLUSIONS

The 24/7 Sobriety Program in North Dakota has positive deterrent effects on program enrollees. The study has transitioned from the perspective of a new and novel intervention to a sustained intervention that is moving toward maturation in the state. In addition, extending the follow-up period tracking participants with the year-three metrics in recent assessments permitted us to consider a post-program phase for all program entrants. The evidence presented in analyzing the four core research questions that guided this paper shows the sustained beneficial outcomes. First, three metrics identified in this study – crashes, non-DUI-related citations, and DUI-related citations – all were significantly lowered in the 60-, 365-, 730-, and 1,095-day intervals following program enrollment. On average, individual enrollees improved illicit behavior after starting the 24/7 Sobriety Program. Participants associated with a first-time offense were more likely to reoffend when considering the 1,095-day risk marker. The second, or other subsequent offenses, were similar with regard to recidivate likelihood considering DUI citation risk markers in intervals following program enrollment. These individuals were more likely to reoffend in the first 60 days of enrollment. The results support the notion that while the program certainly provides a cost-effective intervention as a population-based strategy, it may be beneficial to consider supplemental strategies that consider individual case factors. Programs such as drug courts, ignition interlock, Sentence and Treatment Early Release Program (STEP), and pilot individualized driver assessment programs come into the array of possibilities. Benefits to some individuals as supplemental or alternative treatment and intervention efforts may be needed to rehabilitate an offender and promote responsible driver decision-making.

5.1 Future Research

In North Dakota, drivers arrested for impaired driving are subjected to a seven-year look-back period when determining if they should be categorized as repeat offenders. The research team has access to all seven years of driving and citation data for participants prior to beginning the program and continues to build the participant history database. Good progress has been achieved within the current RMS, with each additional year providing a more robust dataset with regard to the longitudinal aspects and data consistency. The 360-day, 730, and 1,095-day intervals were chosen because they represent likely enrollment lengths as mandated by law. As the program ages and more follow-up data are acquired, it may behoove future assessments to include even longer before-and-after intervals. This extension would strengthen findings and could determine if any deterrent effect continues long after statutorily mandated enrollment. The maximum two-year interval used in this study is robust but includes some individuals (fourth-or-subsequent offenders) who are still enrolled in the program. A longer follow-up timeframe would guarantee that *all* participants are tracked for an increased period of time when the program is no longer influencing their behaviors. This initiative was started with the addition of the 1,095-day interval in recent studies.

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7. APPENDIX A. DATA PROCESS PROCEDURES FOR 24/7 SOBRIETY PROGRAM RECORDS OF 2019

In previous study iterations, the UGPTI had devised a quasi-history using deterministic matching in program entrant records. The history-building protocol was an ongoing process to collect the most recent year records and merge back to a 'locked' history that has been building over several years. This non-PII participant history database was maintained to support program assessment. Following the established database protocol, the 2019 records were to be extracted, electronically validated, manually augmented, and merged into the locked program database to extend the 24/7 Sobriety Program entrant record history from 2008 to 2019.

Records for 2019 were requested and obtained from BCI program records provided in early 2020 based on an updated limited use data sharing agreement. BCI advised us that during 2019 they had completed an anticipated migration to a new record management system (RMS). The initial evidence in the new RMS impact on our established record processing was evident with the record count. For context, the BCI population record file processed in 2019 included 26,350 records. This record count was an increase from 21,258 records in the 2018 BCI data file that, again, encompassed program entries since the program was established as a pilot. Researchers had anticipated the typical record increase, but the BCI file processed in 2020 included only 19,093 records. In addition, the record treatment and field content for records collected in 2019 severed a key field in sequence processing that had been developed over several years (Table A.1). The last four digits of the social security number (L4SSN) had been a component in a robust key matching field along with date of birth. Therefore, an expanded data and method section was needed to explain the heavy resource dedication.

We explored multiple possibilities in devising a protocol to continue to build the program history in a manner that facilitated linking with driver records. It has been a valuable information source in an ongoing program assessment related to program impacts in traffic safety outcomes and alcohol-impaired driving prevention. Each year the archived program history database was expanded with the most recent year records, including new and past program entrants, in preparation for linking to state driver record fields associated alcohol-impaired driving and traffic safety metrics.

Table A.1 Field Alignment with the 24/7 Sobriety Program Data

Pre-2019 Records (BCI Legacy RMS)	2019 Records (BCI 2019 RMS)	Definition
State	State	State where case was originated (ND)
	ClientId	Randomly assigned, no identifiers.
IdNumber	IdNumber	Randomly assigned, no identifiers in the pre-2019 records. Randomly assigned, these numbers appear to be static with regard to the individual participant identifiers in the 2019 records and were unique in 97.6% of cases.
Last name_3 char	Last name_3 char	First three characters in Last Name (F3LN)
Gender	Gender	Gender
DOB	DOB	Date of Birth
Driver License Number	Driver License Number	Driver License (DL) Number
Test Types	Latest Test Type	Pre-2019 records indicate all test methods associated with a participant entry. The 2019 records include only the most recent test method.
Start Date	Latest Start Date	Offender case start date in pre-2019 records was associated with each entry in the 24/7 Program. The 2019 records retain only the most recent entry and start date.
Offense	Offense	Offense Related to most recent start in the 24/7 Program
Offense Date	Case Latest Open Date	Offender case open date was offense date pre-2019 records; typically, equal to the Start Date but could be earlier if offender asks for hearing/serves jail time. The 2019 records retain only the most recent open date.
Exit Date	Case Latest Closed Date	Offender case closed data was exit date in pre-2019 records; day the 24/7 record is closed for an offender for the associated case in the 24/7 program. The 2019 records retain only the most recent closed date.
SSN_4 digits		Last Four Digits of Social Security Number (L4SSN)
	Status	Case current status - not available in pre-2019 records
	Close Reason	Case close reason - not available in pre-2019 records

As previously, the 2020 BCI dataset was parsed to include 2,307 participant entrant records with program start date between January 1 and December 31, 2019. Among the group, 2,017 had North Dakota addresses with 899 of these entries attributed to an alcohol-related driving offense. The BCI datasets were further cleaned, and entries were removed for numerous reasons. The BCI program ClientID and DOB were used to extract the 881 valid program entries after removing duplicates and those under age 18 years. These 2019 entrant records were available for the matching process to update the program participant history per the UGPTI protocol.

Due to the BCI RMS eliminating a key linking field, the 2019 records key field had to be redefined to associate with the historical data. In addition, the 2019 dataset reflects only the most recent record for the program participants. These changes impacted the processing and interpretation protocols that had been established over several years. It created major challenges in linking the 2019 records to the historical

dataset and further with the driver records. The BCI has no longer shared the last four digits of social security number (SSN) – a critical and reasonably consistent linking field previously used to merge with driver records. It was reasonably consistent in that it was often populated in the 24/7 Sobriety Program participant records and could sometimes be added by us based on public court records. The driver license (DL) numbers were collected sporadically for program entrants throughout the program history. In the 2019 records, only 367 of the 881 North Dakota driver participant records could be matched by DL number.

In an attempt to utilize additional 2019 records, a key term was created by joining the first three letters of the last name (F3LN) and the date of birth (DOB) as a ‘unique’ identifier. ZIP code was also initially included in this concatenated key term but it did not perform well, presumably because participants move or were not necessarily enrolled within their residence ZIP code area. With the F3LN||DOB key, the records unmatched with the DL term were first merged to the UGPTI historical BCI records locked in 2019. The F3LN||DOB was used to capture the NDDOT unique driver’s license Record ID to match batch to the BCI records in cases where that driver was had previously enrolled in the 24/7 Sobriety Program. The unique identifier for each participant had previously been collected from the NDDOT records as the unique driver number (hereafter referred to as the “Record ID”) that corresponds to each individual driver licensed in the state. The process captured an additional 63 potential matches that were presented to the ND Driver’s License Division for their internal validation. Among these, 62 additional records were validated.

In the record set produced for 2019, 48.7% of the validated North Dakota participant entries could be incorporated into the dataset used for the 2020 program investigation with a DL and F3LN||DOB linking field to the driver record. A flow chart illustrated the data processing that was developed in reinventing the linking process to consider the archived program history and the possibilities to update the sequence for past and new participants based on the variables available in the BCI program and the driver’s license records (Figure A.1).

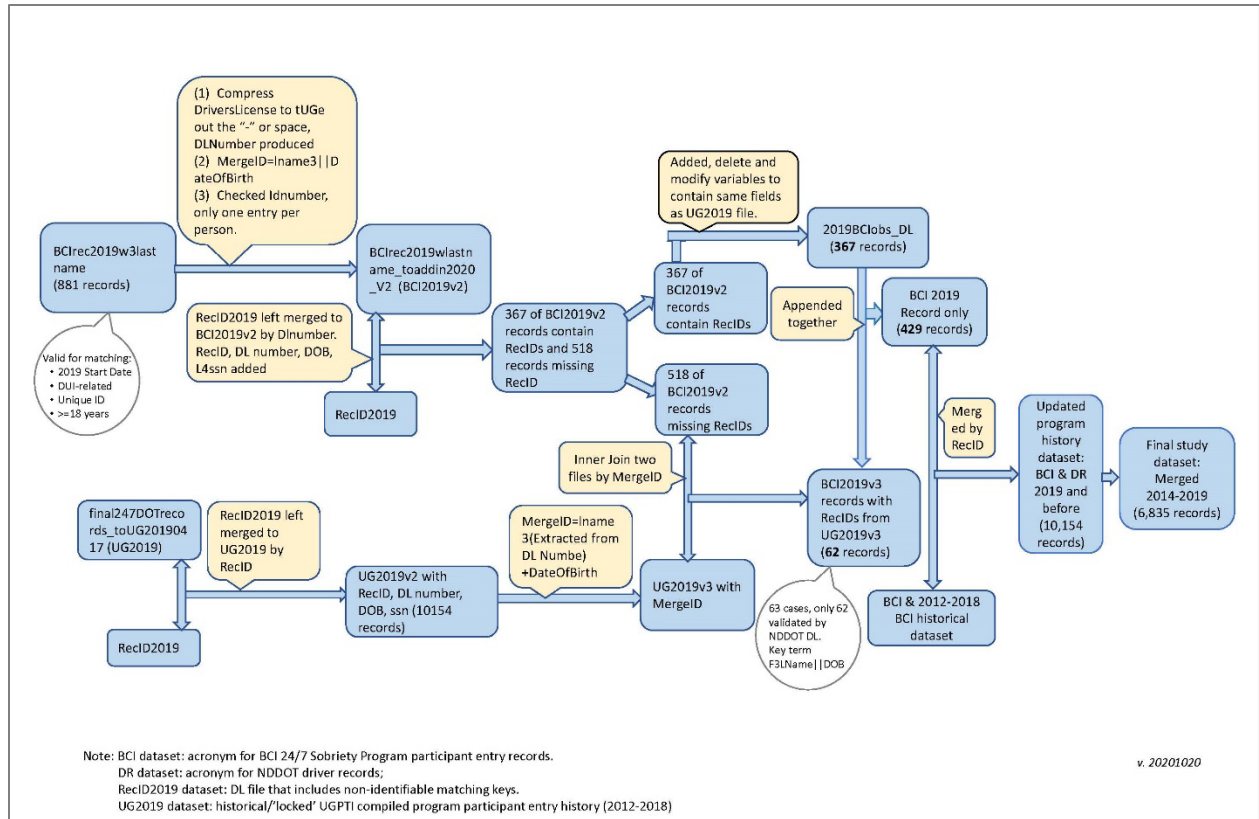


Figure A.1 Dataset Processing Flow Diagram, 2020