

DUI-RELATED OFFENSE CORRELATION TO INCREASED CRASH INVOLVEMENT

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Prepared for Traffic Safety Office
North Dakota Department of Transportation

February 2012

Traffic crashes stem from a variety of underlying causes. Too often, the cause is risky driving whether it is speeding, running a red light, or driving under the influence of drugs or alcohol. These risk factors have all been associated with increased risk of crashes. The goal of our work is to consider whether multiple citations for driving-under-the-influence (DUI) related offenses are linked with higher crash rates. This glimpse into DUI-related crash involvement contributes to knowledge about driver drinking, crash involvement, and recidivism will enable policymakers and public agents to direct resources to efforts that reduce social and economic losses from traffic crashes.

Driving records from the North Dakota Department of Transportation (NDDOT) were analyzed for all convictions from January 1, 2008, to December 31, 2010, for all North Dakota drivers having a Class D driver's license or a combination of Class D and Class M. Class D, the most common license, authorizes operation of any single vehicle less than 26,001 pounds gross vehicle weight rating (GVWR), with towing limits specified. Class M covers motorcycle operation only. Limiting the analysis in this manner precludes commercial drivers who have vastly different driving experience, exposure, and number of crashes reported compared to the average driver. Excluding commercial drivers also limits any impact from the unique ramifications associated with commercial driver DUIs offenses.

To further identify a homogeneous driving population by assuring that all drivers in the sample had roughly the same driving experience, we chose only drivers that were age 21 by the start of 2008. Therefore, newly licensed drivers are excluded as well as people under the legal drinking age. Even though drivers under the age of 21 may be cited for driving under the influence and related offenses, the length of time they have been driving limits the opportunity for underage drinkers to be arrested for multiple DUI offenses during the three year period under investigation. Licensing issues associated with newly licensed drivers are also avoided.

Crashes for the same time period were compiled into three categories - all crashes, property damage only (PDO) crashes and injury crashes. Injury crashes represent minor and incapacitating injuries as well as fatal crashes. There were 40,320 crashes for the population defined above during the three-year time period. Drivers were then classified by whether they had zero, one, or two or more DUI-related violations during the same time frame. In addition,

gender and age were considered as driver population segments in understanding the DUI-related crash risk.

Figure 1 displays the percent of drivers in each category who had a crash during the time period. The share of drivers who did not have a DUI-related violation but who were involved in a crash was under 9%. Among all drivers, this crash-involvement percentage increased by more than 75% for drivers who had one DUI-related violation during the study period. When a driver was reported to have at least two DUI-related violations during the study timeline, the share involved in crashes is more than two times greater than for drivers with no DUI-related violations. The trend is most pronounced, considering gender, in female drivers where the share ranges from 8.2% to 16.1% to 26.1% ($\chi^2 = 456.0233$, $n = 218,146$, $p < 0.0001$) for drivers having no DUI-related violations to those having two or more DUI-related violations, respectively. This represents an increase of 220%. The increase for males, although lower, is 108% greater when two or more DUI-related violations are reported compared to males with no DUI-related violations.

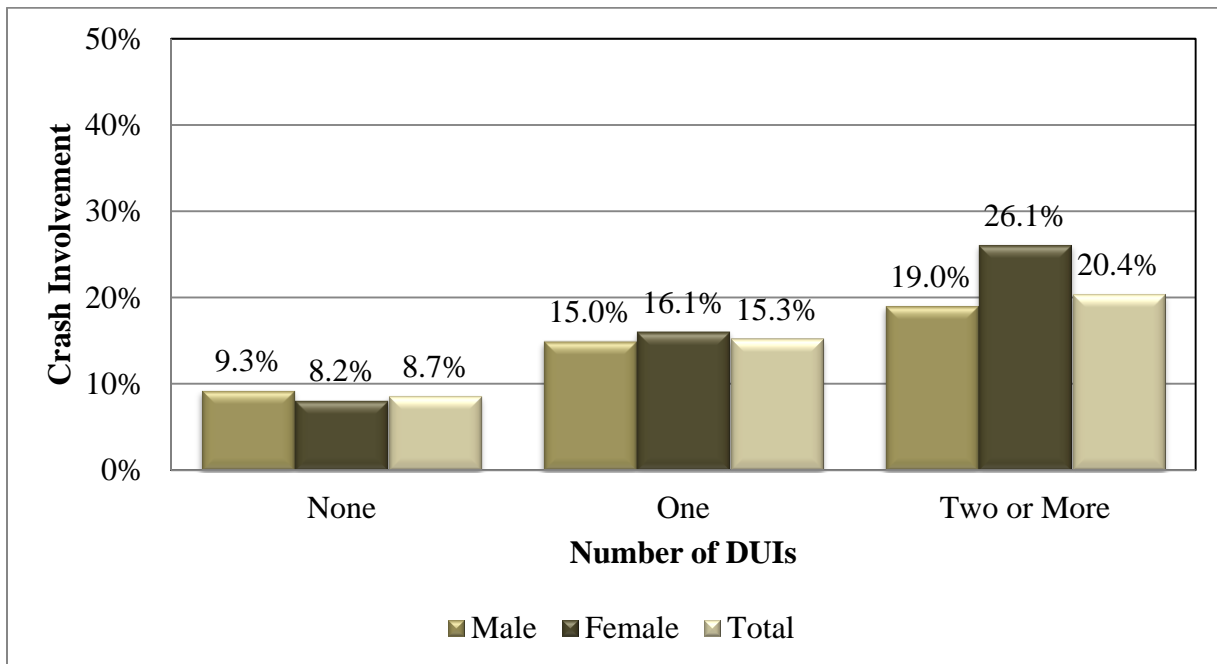


Figure 1. Share of Drivers Involved in a Crash, by Number of DUI Violations from 2008 to 2010

Note that a larger percentage of male drivers having no DUI-related violations are involved in crashes than the corresponding female group, 9.3% compared to 8.2% ($\chi^2 = 158.5779$, $n = 395,164$, $p < 0.0001$). This trend among drivers having no DUI-related violations is not unexpected as males are typically found to be more prone to risky driving and thrill seeking

behavior. The percentages are reversed for drivers who have at least one DUI-related violation, 15.0% compared to 16.1% ($\chi^2 = 2.4566$, $n = 12,602$, $p = 0.1170$). The reversal is even more pronounced for drivers with two or more violations, 19.0% for males compared to 26.1% ($\chi^2 = 10.3926$, $n = 2,119$, $p = 0.0013$) for females.

There are several possible reasons for both of the unusual crash percentages. Male drivers may be less likely to report crashes in general or it may be that DUI violations are more closely linked to the actual crashes for female drivers than they are for male drivers. Figures 2 and 3 provide some support to these ideas. In Figure 2, the analysis is limited to PDO crashes. Similar types of trends are exhibited. Minor PDO crashes, however, are not required to be reported to law enforcement – unlike injury crashes where every crash is to be reported. Therefore, a share of total PDO crashes would not be included in state driver record or crash incident files which are based on the law enforcement reports.

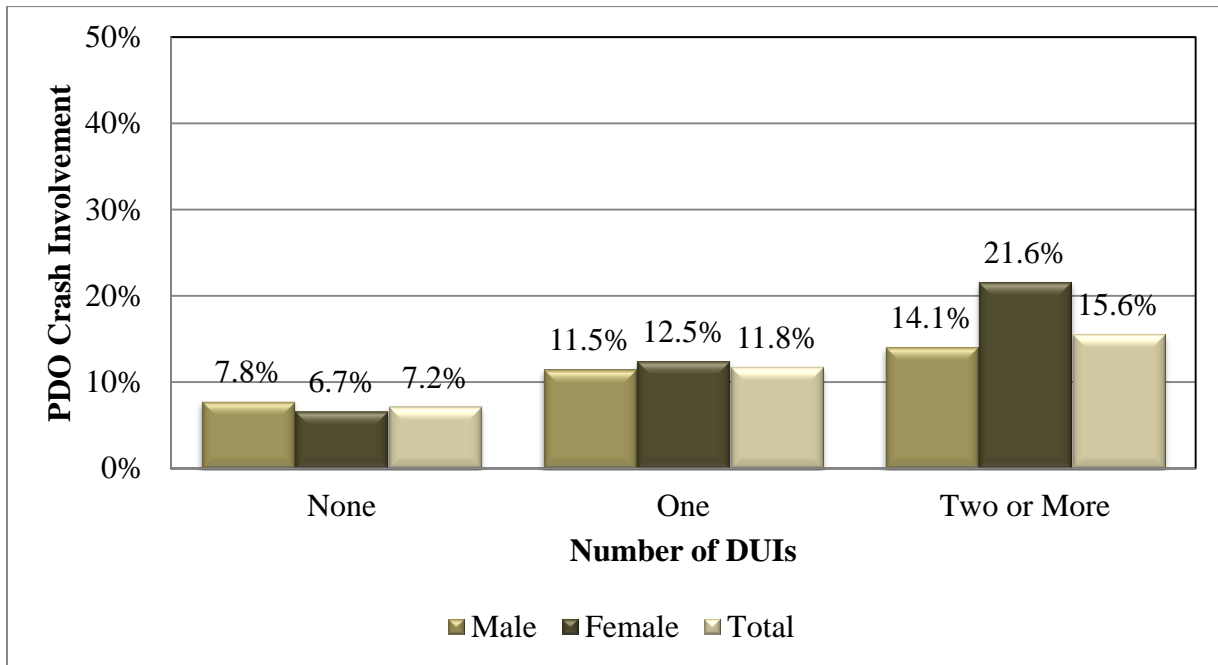


Figure 2. Percent of Drivers Involved in Property Damage Only Crashes, Stratified by Gender and Number of DUI Violations from 2008 to 2010

The percentages of drivers involved in injury related crashes (Figure 3) are almost identical for females and males regardless of the number of DUI-related violations, which further suggests that males underreport less serious crashes. Figure 3 also indicates that drivers with more DUI-related violations are involved in more crashes. Fewer than 2 percent of drivers with no violations are involved in injury related crashes compared to over 4% for drivers with one and roughly 6% for drivers with two or more violations ($\chi^2 = 643.6396$, $n = 409,885$, $p < 0.0001$).

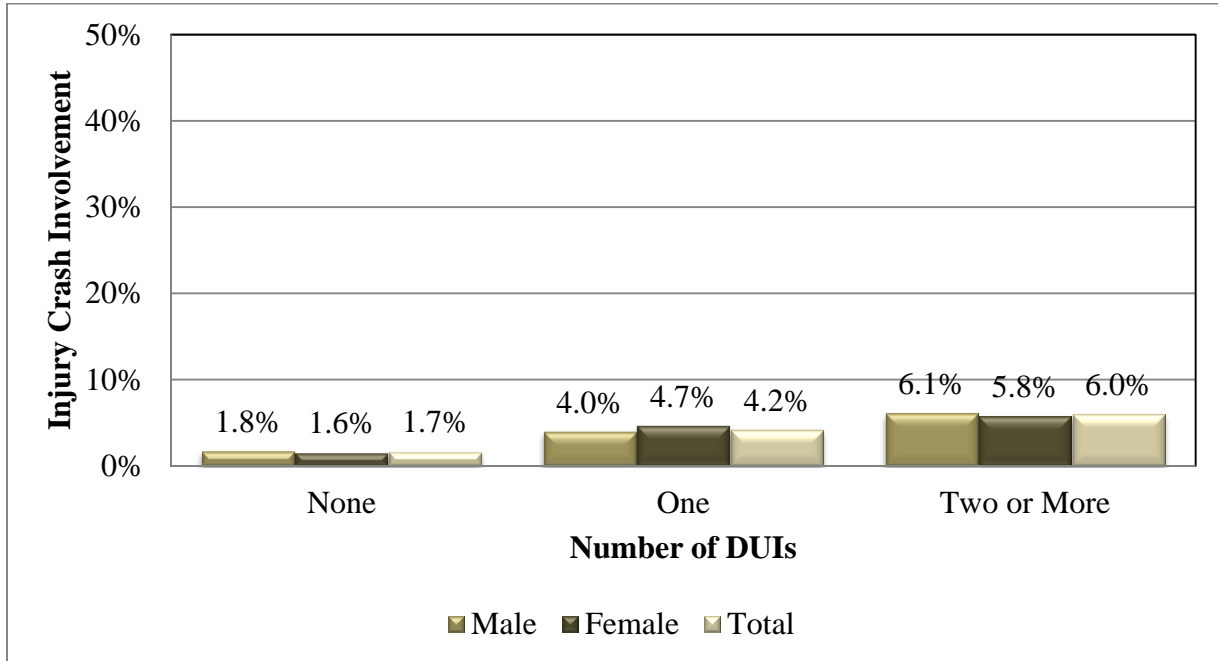


Figure 3. Percent of Drivers Involved in Injury Crashes, Stratified by Gender and Number of DUI Violations from 2008 to 2010

Figure 4 displays crash percentages by the age of the drivers as of January 1, 2008. Crash rates do not show any correlation to age when stratified by the number of DUI-related violations. When there is no violation, the percentage of drivers involved in crashes decreases with older drivers. Drivers groups with one and two or more DUI-related violations show no evident relation across age group. However, all three age groups show increasing crash trends as more violations are noted.

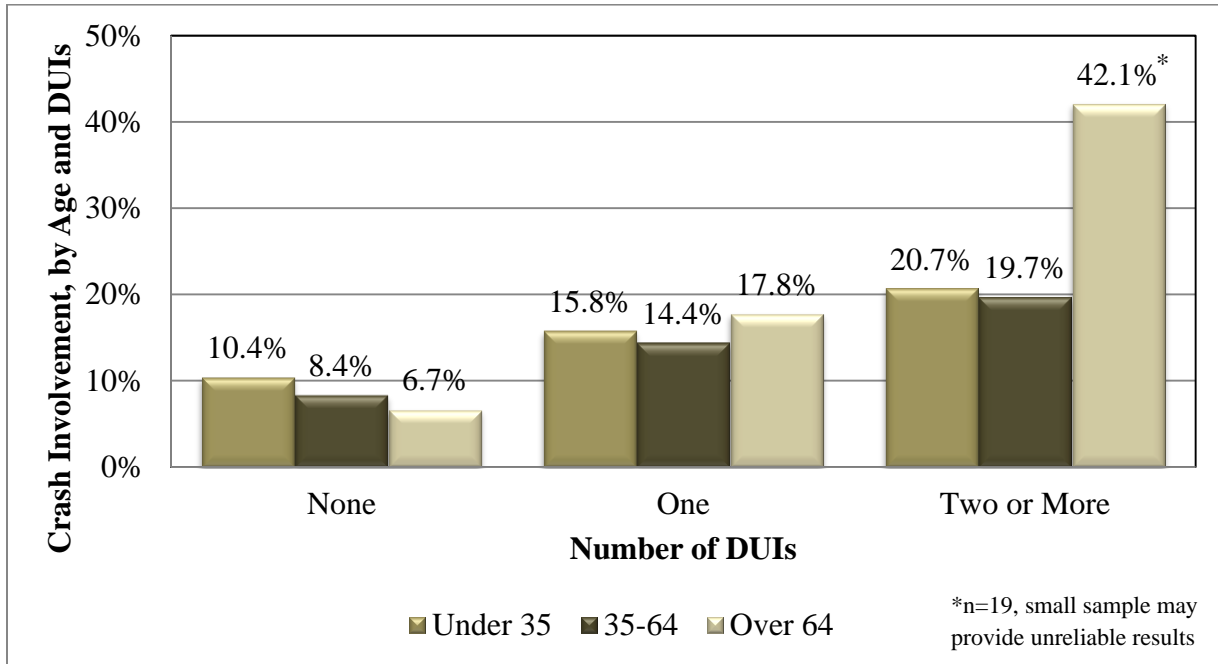


Figure 4 - Percent of Drivers Involved in Crashes, Stratified by Age and Number of DUI Violations from 2008 to 2010

Although these DUI-related violations may or may not be the direct cause of the crashes, this analysis indicates there is an increased crash risk associated with DUI-related violations. The actual DUI-related violations may be just part of the risky behavior these drivers engage in and may not alone explain the increased crash rates, but the significant increase in rates suggests that it is related. Directly linking DUIs to crashes may lend some insight to this correlation, but it is more likely that this increase is part of the overall risk behavior of these drivers.

Disclaimer

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