Research Article

Risk Factors for Self-reported Driving Under the Influence of Alcohol and/or Illicit Drugs Among Older Adults

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Abstract

Purpose of the Study: Despite the increasing number of older adults who have a history of substance use, little research has been done on alcohol- and drug-related driving safety among older drivers. This study (a) examined risk factors for older adults’ driving under the influence of alcohol and/or drugs (DUI) and (b) discerned differences between those aged 50–64 and those aged 65+.

Design and Methods: Data came from the public use files of the 2008–2012 National Survey on Drug Use and Health for respondents aged 50+ (N = 29,634). Descriptive statistics were used to present sample characteristics by past year substance use and self-reported DUI status for age groups 50–64 and 65+. Age group separate binary logistic regression analysis was used to identify risk factors for DUI.

Results: Of past-year substance users in the 50–64 and the 65+ age groups, 14.54% and 6.19%, respectively, self-reported DUI. Higher frequency alcohol use, binge drinking, marijuana use, and major depressive episode significantly increased the odds of DUI in both age groups. Lifetime arrest history was a predictor in the 65+ age group only.

Implications: Research is needed to improve identification of older drivers at high risk of DUI. Driving safety assessments for older adults can incorporate screening for substance abuse and comorbid mental conditions to identify those at high DUI risk. Older adults who engage in risky substance use should be directed to appropriate services that address substance use and mental health problems concurrently.

Key Words: Substance abuse, Driving under the influence, Alcohol expectancy, Psychosocial vulnerability

With the rapid growth of the population aged 65 and older, the number of older adult drivers is projected to double by 2030 from the 2009 figure of 33 million or 15.6% of all licensed drivers (United States Census Bureau, 2012). Although older drivers tend to have the lowest accident rate (4 per 100 drivers) of all age groups, they have one of the highest motor vehicle crash rates per vehicle mile of travel, and older drivers involved in crashes also tended to have more serious injuries requiring more health care resources than younger drivers (Lotfipour, Cisneros, & Chakravarty, 2013). The fatal injury risk from crashes also significantly increases in the 70+ group (Sifrit, Stutts, Martell, & Staplin, 2011). In 2009 alone, almost 1.4 million adults aged 65 or older had motor vehicle accidents, and 3,500 of the 65–74 group and 3,800 of the 75+ group were killed in crashes (United States Census Bureau, 2012).

Studies of driving safety among older adults have focused primarily on age-related declines in cognitive, functional, and visual capacities (Awadzi, Classen, Hall, Duncan, & Garvan, 2008; Thomas, Blomberg, Knodler, Mathew, & Romoser, 2013). Few have considered one of the major sources of preventable accidents—driving under...
the influence of alcohol and/or drugs. Alcohol and/or other drug involvement in crashes is less prevalent among older adults than among younger adults (Fell, Tippetts, & Voas, 2009). In 2012, drivers aged 65+ were 4.4% of all drivers involved in fatal crashes who had a blood alcohol concentration (BAC) ≥ 0.08 g/dl; the proportion of drugged older drivers is estimated to be even lower (National Highway Traffic Safety Administration, 2013). However, studies have shown an increasing rate of substance use disorders among older adults, partly owing to aging baby boomers who are more likely to have a history of substance use and related problems than earlier cohorts (Blazer & Wu, 2009). A study based on the 2005 and 2006 National Survey of Drug Use and Health (NSDUH) found that 36.4% of those aged 65+ and 44.7% of those aged 50–64 used alcohol without abuse or dependence symptoms, but 6.7% of those aged 65+ and 11.2% of those aged 50–64 showed dependence, abuse, or subthreshold dependence symptoms (Blazer & Wu, 2011). A study based on data from the 2005–2008 National Health and Nutrition Examination Survey also found that 14.5% of drinkers aged 65+ consumed alcohol above the National Institute on Alcohol Abuse and Alcoholism’s recommended limits (Wilson, Knowles, Huang, & Fink, 2014). When health status was taken into account, 37.4% had engaged in harmful consumption (i.e., exacerbating or complicating existing health problems) and 15.9% had engaged in hazardous consumption (i.e., drinking that posed risks of future harm).

Data from the 2007–2009 NSDUH also show that 9.0% of those aged 50–59 and 2.3% of those aged 60+ used illicit drugs (marijuana being the most common substance—5.9% of the 50–59 group and 1.1% of the 60+ group) (Substance Abuse and Mental Health Services Administration [SAMHSA], 2011). Illicit drug abuse treatment admissions among those 55 years and older have also been increasing. SAMHSA’s Treatment Episode Data Set (a compilation of descriptive data on the national flow of admissions to specialty substance abuse treatment providers) for 1998–2008 showed a steady and substantial increase in admissions of those aged 55+ for a primary problem of illicit drug use (marijuana, cocaine, heroin, phencyclidine, hallucinogens, and methamphetamine), whereas alcohol use as the primary substance decreased slightly (Arndt, Clayton, & Schultz, 2011). Illicit drug use is much more common in the 50–59 age group than in the 60+ age group, but the prevalence may rise substantially in the 65+ age group as the younger cohort ages (Blazer & Wu, 2009; Han, Gfroerer, Collier, & Penne, 2009).

Older adults tend to restrict or stop driving when physical, cognitive, and/or vision impairments begin to affect their driving abilities (Baldock, Mathias, McLean, & Berndt, 2006; Kostyniuk & Molnar, 2008; Stiffler & Wilber, 2013). However, older adults tend to overrate their driving abilities (Freund, Colgrove, Burke, & McLeod, 2005; Okonkwo, Crowe, Wadley, & Ball, 2008; Ross, Dodson, Edwards, Ackerman, & Ball, 2012). Alcohol and drug use may contribute to older drivers’ overrating tendency because these substances affect cognitive functioning, especially reasoning and decision-making abilities, despite the fact that these substances negatively affect motor coordination and reaction times, concentration and memory, vision and ability to follow objects with eyes, and discrimination between light intensity and sound that are requisite for safe driving (Mitchell, 1985). Although drinking quantity tends to decline with age, alcohol-induced neurotoxicity in late life is a significant concern even with moderate alcohol consumption (Kapogiannis et al., 2012). Aging- and disease-related physiological changes (e.g., smaller body mass and lower water content) lead to higher and longer-lasting BACs in older adults than in younger adults (Ferreira & Weems, 2008). Older adults who take multiple prescription and nonprescription medications are also at higher risk for dangerous interaction effects of these medications with alcohol and/or illicit drugs.

For older adults, driving is not just a means of getting from one location to another but an essential tool for remaining mobile, socially integrated, and independent (Curl, Stowe, Cooney, & Proulx, 2014; Mezuk & Rebok, 2008; Oxley, 2008). Preserving older adults’ mobility by prolonging their safe driving capacities and providing alternative transportation for those who can no longer drive is a necessity for successful aging. Older driver safety involves both vehicle/roadway characteristics and driver health/medical conditions (Staplin & Freund, 2013; Stutts, Martell, & Staplin, 2009). Increases in the number of older drivers combined with increases in the prevalence of substance use among older adults indicate that concerns should extend beyond those typically associated with older adult drivers’ health and safety (e.g., physical/functional, cognitive, and sensory impairments) to include substance use. Despite a projected upward trajectory in the number and proportion of older adults who drive under the influence of alcohol and/or drugs (DUI), DUI among older adults has received little research attention compared with DUI among adolescents and young and middle-aged adults.

Using multiyear survey data from nationally representative samples, the present study (a) examined DUI risk factors among older adults, focusing on their substance use patterns and psychosocial vulnerabilities and (b) discerned differences between those aged 50–64 and those aged 65+.

Conceptual Framework and Hypotheses

Driving under the influence of alcohol and/or other drugs may be explained using alcohol (or drug) expectancy theory, psychosocial vulnerability, and poor decision-making tendencies. According to expectancy theory, people engage in certain behaviors because they expect particular outcomes (reinforcing effects) as a result of engaging in the behavior. Those with more positive alcohol outcome expectations (e.g., social and physical pleasure, relaxation, coping, and assertiveness) are therefore likely to drink more (Devine & Rosenberg, 2000; Jones, Corbin, & Fromme, 2001; Oei & Baldwin, 1994). Schell, Chan, and Morral (2006) also found
that those with more positive alcohol expectancies tended to persist in driving after drinking. However, not all adults who drink at problem levels drive under the influence or engage in other hazardous behaviors. Sadava (1985) found a weak-to-moderate correlation between self-reported alcohol consumption and alcohol-related problems, showing that heavy alcohol use is a necessary but not sufficient condition for problem behaviors. In addition to frequency and quantity of alcohol consumption, other drug involvement and psychosocial vulnerability (e.g., work-related and life-change stress and emotional problems) contributed significantly to alcohol-related problem behaviors (Sadava).

Studies have found that older adults drink for the same reasons as younger adults—to enhance positive mood or well-being, obtain social rewards (e.g., celebrate special occasions with family and friends), cope with and attenuate negative emotions (e.g., to forget worries and improve depressed or anxious mood), or for medicinal purposes (Gilson et al., 2013; Immonen, Valvanne, & Pitkälä, 2011). Gilson and colleagues found that enhancement motives (but not social and coping motives) were associated with drinking quantity and that coping motives had strong direct associations with drinking problems. Others (Devanand, 2002; Satre, Sterling, Mackin, & Weisner, 2011) have found significant associations between late-life depression and alcohol/drug use. In addition to emotional distress, previous research has shown that poor decision-making tendencies, as indicated by other legal transgressions and other forms of irresponsibility rooted in impulsivity and lack of self-control, may also contribute to DUI (Cavaiola, Strohmetz, & Abreo, 2007; Keane, Maxim, & Teevan, 1993). However, it remains unknown if psychosocial vulnerability (e.g., depression) and poor decision-making tendencies are associated with DUI in older adults.

Based on expectancy theory and the perspective that psychosocial vulnerability and poor decision-making tendencies contribute to alcohol (or drug)-related problem behaviors, we tested the following hypotheses: The likelihood of DUI among older adults will be positively associated with (H1) quantity and frequency of alcohol consumption, (H2) use of any illicit drug, (H3) depression (an indicator of psychosocial vulnerability), and (H4) any arrest history (an indicator of poor decision-making tendencies). Potential differences between those aged 50–64 and aged 65+ in DUI risk factors were also examined. Although age and gender differences in substance use and DUI have been well established (Maxwell & Freeman, 2007; SAMHSA, 2011), associations between DUI and health status are less well established. Given the scant previous research on DUI in older adults, we also examined sociodemographic and health correlates of DUI in both age groups.

**Design and Methods**

**Data and Sample**

Data for this study came from the public use files of the 2008–2012 National Survey on Drug Use and Health. The annual NSDUH series primarily measures the prevalence and correlates of drug use and health status of the civilian, noninstitutionalized U.S. population aged 12 or older (Inter-university Consortium for Political and Social Research [ICPSR], 2012a). The survey covers substance abuse, treatment history, illegal activities, and arrest record and included questions from the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) that were asked of respondents aged 18 and older. Survey respondents were selected based on multistage area probability sampling methods designed to ensure their representativeness and uniqueness (i.e., nonduplication from year to year). Respondents were interviewed in private at their place of residence using a combination of methods (audio computer-assisted self-interview, computer-assisted personal interview, and computer-assisted self-interview) to increase the validity of reports of substance use and illegal activity (ICPSR, 2012a).

To increase the study’s power to detect low frequency events (e.g., DUI arrest), we combined 5 years of the identified, public-domain survey data. The data collection methods for the variables examined in this study were the same for all five survey years. The total number of respondents who completed the survey was 55,739 in 2008, 55,772 in 2009, 57,873 in 2010, 58,397 in 2011, and 55,268 in 2012. The number of respondents in the 50–64 age group was 3,317 in 2008, 3,461 in 2009, 3,523 in 2010, 4,219 in 2011, and 3,923 in 2012. The number of respondents in the 65+ age group was 2,008 in 2008, 2,015 in 2009, 2,144 in 2010, 2,486 in 2011, and 2,448 in 2012. This study focused on the 29,634 respondents aged 50+ from 2008 to 2012: 18,443 were 50–64 years of age and 11,191 were 65+ years of age.

**Measures**

**DUI in the Past 12 Months**

The NSUDH included four DUI-related questions: (a) “During the past 12 months, have you driven a vehicle while you were under the influence of a combination of alcohol and illegal drugs used together?” (b) “During the past 12 months, have you driven a vehicle while you were under the influence of alcohol/illegal drugs only?” (c) “During the past 12 months, have you driven a vehicle while you were under the influence of illegal drugs/alcohol only?” and (d) “In the past 12 months, were you arrested and booked for driving under the influence of alcohol or illegal drugs?” (ICPSR, 2012b). An affirmative response to any of the earlier questions was considered DUI (1 = yes, 0 = no).

**Alcohol Use in Past 12 Months**

This was defined as consuming at least one drink of any type of alcoholic beverage (described as a can or bottle of beer, a glass of wine or a wine cooler, a shot of liquor, or a mixed drink with liquor) and excluded the use of only a sip or two from a drink (ICPSR, 2012b). Frequency of alcohol use:
Alcohol users reported the total number of days they used alcohol in the past 12 months (1–11, 12–49, 50–99, 100–299, and 300–365 days). *Binge alcohol use* was defined as drinking ≥5 drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days. *Heavy alcohol use* was defined as drinking ≥5 drinks on the same occasion on each of five or more days in the past 30 days; all heavy alcohol users are, therefore, also binge alcohol users. *DSM-IV* diagnoses of *alcohol dependence and abuse* are also presented to describe the sample. Alcohol dependence and abuse were determined only if respondents reported alcohol use on more than 5 days in the past year.

### Illicit Drug Use in Past 12 Months

This included “marijuana use” (1 = yes, 0 = no) and “illicit drug use other than marijuana” (1 = yes, 0 = no). Because of the small proportion of illicit drug users, frequency of use was not considered, but *DSM-IV* diagnoses of *illicit drug dependence and abuse* were presented to describe the sample. Marijuana dependence and abuse were determined only if respondents reported use on more than 5 days in the past year, but the diagnostic criteria for other illicit drugs applied regardless of days of use.

### Psychosocial Vulnerabilities in Past 12 Months

This was represented by major depressive episode (MDE) in the past year that met *DSM-IV* diagnostic criteria (yes = 1, no = 0). To describe the sample, we also present worst month serious psychological distress (SPD), which was measured with the six-item, 4-point Kessler Psychological Distress Scale (K6; 0 = none of the time to 4 = all of the time; *Kessler et al., 2003*). NSDUH respondents were asked how frequently during the past 30 days they experienced “feeling nervous; feeling hopeless; feeling restless or fidgety; feeling so sad or depressed that nothing could cheer you up; feeling that everything was an effort; and feeling down on yourself, no good, or worthless.” A summed score of 13 or higher was considered as having had SPD in the past year. Cronbach’s alpha for the K6 among the study sample was 0.91. Of those aged 50–64, 53.76% of those with SPD also had MDE and 29.47% of those 65+ years who had SPD also had MDE.

### Poor Decision-Making Tendencies

This was measured by lifetime arrest history. Respondents were asked whether or not they had ever been arrested/booked for “breaking the law” in their lifetime (yes = 1, no = 0).

### Sociodemographic and Health Status

Sociodemographic factors included age group (individual chronological age is not available in the public use data sets), gender, race/ethnicity, marital status, education, and income. Health status variables included self-ratings of health (on a 5-point scale; 1 = *excellent* and 5 = *poor*) and the number of diagnosed chronic illnesses (asthma, cirrhosis of liver, diabetes, high blood pressure, heart disease, stroke, lung cancer, and pancreatitis).

### Analysis

All analyses were conducted with Stata/MP 13’s *svy* function to take into account NSDUH’s multistage, stratified sampling design. For the 5-year pooled data set for this study, adjusted person-level analysis weights were created by dividing the final person-level analysis weights by the number of years of combined data (five in the current study) following NSDUH guidelines for combining sampling weights across multiple survey years. All estimates presented in this study are weighted except for sample sizes. Descriptive statistics, *t* tests, and χ² tests were used to present sample characteristics by past-year alcohol and/or illicit drug use and DUI status by age group (50–64 and 65+). Age group separate binary logistic regression analysis, with DUI status as the dependent variable, was used to test study hypotheses among those who reported past-year alcohol and/or illicit drug use and to identify DUI risk factors in each age group.

### Results

#### Sample Characteristics by Past-Year Substance Use

Table 1 shows that 69.56% of the 50–64 age group and 52.19% of the 65+ age group used alcohol and/or illicit drugs in the preceding 12 months. In both age groups, more than 98% of users of any substance used alcohol, whereas 12.47% of the 50–64 age group and 3.30% of the 65+ age group used illicit drugs. For both age groups, compared with nonusers, substance users had higher proportions of men, non-Hispanic whites, married persons, college graduates, employed persons, and those with income at or above 200% of federal poverty guidelines. Substance users also reported better self-ratings of health and fewer chronic illnesses and included a smaller proportion of those who experienced SPD. For the 50–64 age group, substance users also included a smaller proportion of those with MDE. However, for the 65+ age group, there was no difference between users and nonusers in MDE rates.

Table 2 shows that 14.54% and 6.19% of substance users in the 50–64 age group and the 65+ age group, respectively, self-reported DUI in the preceding 12 months, but only a tiny proportion reported having been arrested/booked for DUI. As expected, a majority of those reporting past-year alcohol and/or illicit drug use under the influence of alcohol rather than other drugs.

#### Sample Characteristics by Past-Year DUI Status Among Substance Users

Table 3 shows that for both age groups, those reporting DUI, compared with those who did not, were more likely to be men, college graduates, employed, had income at or above 200% of federal poverty guidelines, and reported better self-ratings of health and fewer chronic illnesses. In the 50–64 age group, DUI reporters were also more likely to be non-Hispanic white, but the racial/ethnic distribution...
in the 65+ age group did not differ significantly by DUI status. DUI reporters aged 65+ were also more likely to be married than those not reporting DUI, but DUI reporters aged 50–64 were less likely to be married.

As expected, those who reported DUI, compared with those who did not, used alcohol more frequently and in larger quantities. Of DUI reporters, 20.38% aged 50–64 and 34.78% aged 65+ reported consuming alcohol on 300+ days in the preceding 12 months. Nearly 20% of DUI reporters in both age groups reported heavy drinking in the preceding 30 days and 33.89% of DUI reporters aged 50–64 and 27.73% aged 65+ reported binge, although not heavy drinking, in the preceding 30 days. Nearly 25% of DUI reporters, compared with 3% of nonreporters, aged 50–64 and more than 21% of DUI reporters, compared with 2% of nonreporters, aged 65+ met DSM-IV diagnostic criteria for alcohol dependence or abuse.

Of DUI reporters, 28.95% in the 50–64 age group and 9.96% in the 65+ age group reported any illicit drug use, with 22.14% and 8.18%, respectively, reporting marijuana use. Nearly 4% of DUI reporters, compared with less than 1% of nonreporters, in the 50–64 age group,

<table>
<thead>
<tr>
<th>Table 1. Sample Demographic, Health, and Mental Health Characteristics by Past-Year Substance Use Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>50–64 years old (N = 18,443)</td>
</tr>
<tr>
<td>Nonusers</td>
</tr>
<tr>
<td>(30.44%)</td>
</tr>
<tr>
<td>Any alcohol use (%)</td>
</tr>
<tr>
<td>Any illicit drug use (%)</td>
</tr>
<tr>
<td>Gender (%)</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Race/ethnicity (%)</td>
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<tr>
<td>Non-Hispanic white</td>
</tr>
<tr>
<td>Non-Hispanic black</td>
</tr>
<tr>
<td>Hispanic</td>
</tr>
<tr>
<td>Asian</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific islander</td>
</tr>
<tr>
<td>American Indian/Alaska native</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Marital status (%)</td>
</tr>
<tr>
<td>Married</td>
</tr>
<tr>
<td>Widowed</td>
</tr>
<tr>
<td>Divorced/separated</td>
</tr>
<tr>
<td>Never married</td>
</tr>
<tr>
<td>Education (%)</td>
</tr>
<tr>
<td>&lt;High school</td>
</tr>
<tr>
<td>High school</td>
</tr>
<tr>
<td>Some college</td>
</tr>
<tr>
<td>College graduate</td>
</tr>
<tr>
<td>Employment status (%)</td>
</tr>
<tr>
<td>Employed full time</td>
</tr>
<tr>
<td>Employed part time</td>
</tr>
<tr>
<td>Unemployed</td>
</tr>
<tr>
<td>Not in the labor force/other</td>
</tr>
<tr>
<td>Income (%)</td>
</tr>
<tr>
<td>&lt;100% of poverty line</td>
</tr>
<tr>
<td>100%–199% of poverty line</td>
</tr>
<tr>
<td>200%+ of poverty line</td>
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<tr>
<td>Self-ratings of healtha (M, SE)</td>
</tr>
<tr>
<td>Number of chronic illnesses (M, SE)</td>
</tr>
<tr>
<td>Major depressive episode (MDE; %)</td>
</tr>
<tr>
<td>Had serious psychological distress (%)</td>
</tr>
</tbody>
</table>

Notes: Statistics are weighted. All within–age group differences are significant at \( p < .001 \), except MDE for both age groups: MDE for the 50–64 age group: \( \chi^2(1) = 145.91, \ p = .005 \); MDE for the 65+ age group: \( \chi^2(1) = 2.30, \ p = .805 \).

Higher scores refer to lower ratings.
and approximately 1.5% of DUI reporters, compared with 0.17% of nonreporters, in the 65+ age group met DSM-IV diagnostic criteria for illicit drug dependence or abuse, but the abuse diagnosis alone was not statistically different between DUI reporters and nonreporters in the 65+ age group. Further analysis (not shown in Table 3) also found that higher proportions of DUI reporters than nonreporters in both age groups reported having received substance abuse treatment in their lifetime (12.52% vs. 4.52% in the 50–64 age group, $\chi^2(1) = 4195.0, p < .001$; 5.19% vs. 1.69% in the 65+ age group, $\chi^2(1) = 1082.20, p < .001$) or during the preceding 12 months (3.17% vs. 0.79% in
the 50–64 age group, \( \chi^2(1) = 1785.30, p < .001; 0.93\% \) vs. 0.27\% in the 65+ age group, \( \chi^2(1) = 228.40, p = .039 \). Of DUI reporters, 25.36\% aged 50–64 and 22.32\% aged 65+ reported that they needed treatment but did not receive it during the preceding year.

As also shown in Table 3, a higher proportion of DUI reporters than nonreporters in both age groups experienced MDE. Although a higher proportion of DUI reporters than nonreporters in the 50–64 age group experienced SPD, the difference was not statistically significant in the 65+ age group. A significantly higher proportion of DUI reporters than nonreporters in both age groups had been arrested/booked for breaking the law in their lifetimes. Further analysis also found that a higher proportion of DUI reporters than nonreporters in both age groups reported that they received mental health treatment in the preceding 12 months (19.93\% vs. 15.48\% in the 50–64 age group, \( \chi^2(1) = 515.29, p < .001; 15.96\% \) vs. 9.63\% in the 65+ age group, \( \chi^2(1) = 730.84, p = .012 \)).

**DUI Risk Factors Among Substance Users: Multivariate Analysis Results**

Table 4 shows that controlling for demographic and health status, both frequency and quantity of alcohol use were significant predictors of DUI in both age groups. For example, in both age groups, compared with those who consumed alcohol on fewer than 50 days, those who did so on 300 or more days had nearly fivefold greater odds of reporting DUI (odds ratio [OR] = 4.97, 95\% confidence interval [95\% CI] = 3.76–6.57, \( p < .001 \) for the 50–64 age group; OR = 4.72, 95\% CI = 2.98–7.50, \( p < .001 \) for the 65+ age group). Compared with nonbinge drinkers, binge drinkers had significantly higher odds of DUI reports (OR = 2.52, 95\% CI = 2.18–2.91, \( p < .001 \) for the 50–64 age group; OR = 3.22, 95\% CI = 2.27–4.58, \( p < .001 \) for the 65+ age group). Marijuana use was also a significant predictor of DUI reports in both age groups (OR = 3.12, 95\% CI = 2.54–3.82, \( p < .001 \) for the 50–64 age group; OR = 4.94, 95\% CI = 2.12–11.52, \( p < .001 \) for the 65+ age group). Other illicit drug use was a significant predictor in the younger, but not the older, age group. MDE was a significant predictor for both age groups (OR = 2.05, 95\% CI = 1.64–2.57, \( p < .001 \) for the 50–64 age group; OR = 4.20, 95\% CI = 1.83–9.63, \( p = .001 \) for the 65+ age group). Lifetime arrest history did not predict DUI in the younger age group, but it did in the 65+ age group (OR = 2.32, 95\% CI = 1.58–3.42, \( p < .001 \)). Of the demographic variables, being male and having income at or above 200\% of federal poverty guidelines significantly increased the odds of DUI reports for both age groups. In addition, higher education in the 65+ age group and being non-Hispanic white and being employed in the 50–64 age group increased the odds, whereas being married decreased the odds in the 50–64 age group. The health status variables significantly predicted DUI in the 50–64 age group only, with better health being associated with greater odds of DUI reports.

**Discussion**

Older adults have increased susceptibility to the effects of alcohol and drugs and higher fatal injury risks from motor vehicle crashes. In the face of increasing rates of substance use among older adults, this study examined DUI risk factors among the growing older population. The higher rates of substance use, particularly illicit drug use, among 50–64 year olds compared with those aged 65+ indicate that substance use among older adults is likely to continue to increase as those in the younger age group (baby boomers) swell the ranks of older adults. The findings show that substance users tend to be better off economically and are healthier than nonusers. Those with limited financial resources and very poor health may be less likely to drink alcohol or use drugs due to inability to obtain these substances or because they recognize that these behaviors are detrimental to their health. The self-reported DUI rate of 6.19\% among substance users in the 65+ age group was significantly lower than 14.54\% in the 50–64 age group. However, the DUI rate in the 65+ age group may actually be higher if those who never drove or stopped driving due to age- and disease-related disabilities had been excluded (NSDUH does not include this information). Even a 6\% DUI rate is alarming given older adults’ higher motor vehicle crash rates per vehicle mile of travel and higher fatal injury risks from these crashes. As DUI offenders are at risk for committing subsequent offenses (Cavaola et al., 2007), older adults who continue to drive under the influence pose a substantial safety concern.

The findings also provide support for alcohol expectancy theory, psychosocial vulnerability, and poor decision-making tendencies in predicting DUI risks. Higher frequency alcohol use, binge drinking, and marijuana use significantly increased the odds of self-reported DUI in both age groups. These findings indicate that substance use patterns among older DUI reporters do not differ from those of younger age groups for whom binge drinking has consistently been found to significantly predict DUI and DUI recidivism (Brady & Li, 2013; Maxwell, 2011; Romano & Voas, 2011). These studies also found that following alcohol, marijuana/cannabinoids is the second most prevalent substance found in fatally injured drivers, and significant alcohol–drug and drug–drug interactions among polysubstance users were also observed. Our findings also show that DUI reporters were more likely to have a history of substance abuse and encounters with law enforcement. Higher rates of MDE and SPD among the DUI reporters also indicate that this group suffers from substantial emotional distress (i.e., co-occurring mental disorders) that should be addressed in combination with substance use and abuse.

The findings for both age groups regarding DUI sociodemographic risk factors (being male, non-Hispanic
Table 4. DUI Risk Factors Among Past-Year Substance Users by Age Group: Logistic Regression Results

<table>
<thead>
<tr>
<th></th>
<th>50–64 years old (N = 12,622)</th>
<th>65 years and older (N = 5,605)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds ratio (SE)</td>
<td>95% CI</td>
</tr>
<tr>
<td>Male</td>
<td>1.54 (0.12)**</td>
<td>1.31–1.81</td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>1.94 (0.21)**</td>
<td>1.56–2.42</td>
</tr>
<tr>
<td>Married</td>
<td>0.82 (0.07)*</td>
<td>0.69–0.96</td>
</tr>
<tr>
<td>College graduate</td>
<td>1.17 (0.10)</td>
<td>0.98–1.39</td>
</tr>
<tr>
<td>Employed full or part time</td>
<td>1.48 (0.14)**</td>
<td>1.22–1.79</td>
</tr>
<tr>
<td>Income 200+% of poverty line</td>
<td>1.49 (0.17)**</td>
<td>1.19–1.86</td>
</tr>
<tr>
<td>Self-ratings of health</td>
<td>0.88 (0.04)*</td>
<td>0.81–0.97</td>
</tr>
<tr>
<td>Number of chronic illnesses</td>
<td>1.12 (0.05)*</td>
<td>1.02–1.23</td>
</tr>
<tr>
<td>Frequency of alcohol use†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50–99 days</td>
<td>2.22 (0.25)**</td>
<td>1.77–2.79</td>
</tr>
<tr>
<td>100–299 days</td>
<td>3.80 (0.33)**</td>
<td>3.19–4.53</td>
</tr>
<tr>
<td>300–365 days</td>
<td>4.97 (0.69)**</td>
<td>3.76–6.57</td>
</tr>
<tr>
<td>Binge (and heavy) alcohol use</td>
<td>2.52 (0.18)**</td>
<td>2.18–2.91</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>3.12 (0.32)**</td>
<td>2.54–3.82</td>
</tr>
<tr>
<td>Illicit drug, other than</td>
<td>2.47 (0.34)**</td>
<td>1.88–3.25</td>
</tr>
<tr>
<td>marijuana use</td>
<td>2.05 (0.23)**</td>
<td>1.64–2.57</td>
</tr>
<tr>
<td>Major depressive episode</td>
<td>1.10 (0.11)</td>
<td>0.91–1.34</td>
</tr>
</tbody>
</table>

Notes: F(16, 45) = 72.18, p < .001 for the 50–64 age group and F(16, 45) = 22.55, p < .001 for the 65+ age group. DUI = driving under the influence of alcohol and/or drugs.

†Reference category was 0–49 days.

*p < .05. **p < .01. ***p < .001.

white, employed, and having higher education/income) and health-status risk factors (better or similar self-ratings of health and chronic illnesses) are also worth noting. Older drivers tend to have higher socioeconomic and physical, functional, and cognitive health statuses than former drivers, as health deterioration is associated with driving cessation (O’Connor, Edwards, Waters, Hudak, & Valdés, 2013). Although DUI-reporting older adults appear to be more advantaged socioeconomically and more or similarly advantaged in health statuses as their age peers who did not report DUI, their mental health status is worse. Continued heavy drinking and illicit drug use combined with psychological distress may also portend worse health and mental outcomes for these older adults.

The study has a few limitations: (a) The reliability and validity of respondents’ self-report of DUI was not ascertained, and underreporting due to recall or social desirability bias is a concern. (b) Respondents’ driving status was not available; some nonreporters may not have driven during the survey period. (c) Despite the 5-year pooled data, the small number of older adults reporting DUI hampered more in-depth analysis (e.g., polysubstance use as a risk factor). Despite its limitations, this study suggests the following policy and practice implications for promoting driving safety by preventing and reducing DUI among the growing number of older drivers: (a) Health and social service providers can educate older, substance-using drivers about age-related changes that affect substance use effects in general and driving safety in particular and motivate those in need to seek treatment. (b) Access to evidence-based treatment needs to be facilitated for older substance abusers in general and DUI reporters in particular, given that approximately one quarter of older DUI reporters perceived the need for treatment but did not receive it. (c) Addressing the emotional distress many DUI reporters experience may also reduce substance use and promote driving safety.

This study also underscores the need for continued research to improve identification of older drivers at high risk of DUI and identify effective intervention approaches. These approaches should take into account older drivers’ characteristics, behaviors, and expectations in order to prevent crash and injury while also prolonging their mobility. Suggested steps are as follows: (a) Test improved protocols for assessing older adults’ driving safety by screening for substance abuse and comorbid mental health conditions in addition to assessing motor, visuoperceptual, and cognitive functioning. (b) Expand research on nonmedical use of prescription and over-the-counter psychoactive medications and use of multiple medications that may affect older adults’ driving safety and DUI. (c) Focus on intelligent transportation system technology that holds promise for maintaining and enhancing safe mobility of older adults (Dickerson et al., 2007). Advanced technology should not just help older adults drive safely but also prevent them from driving when it is not safe, for example, by providing a tool that older adults can easily use to self-screen their substance-impaired driving limitations.
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References


