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Does state repeal of alcohol exclusion laws increase problem drinking?

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Abstract

Background: For decades, alcohol exclusion laws (AELs) have allowed insurance companies to reject claims for physical injuries caused by alcohol consumption, including injuries from impaired driving. A central premise of AELs is that they function as a deterrent to risk-taking behaviors, such as excessive drinking. If this assumption is correct, state repeal of these laws should result in increased drinking. This study examines whether the repeal of AELs by some states affects drinking behaviors.

Methods: Data were obtained from the 1993 to 2017 Behavioral Risk Factor Surveillance System nationwide survey. Exploiting the natural experiment presented by state repeal of AELs, we assessed the impact on current drinking and binge drinking. We used a rigorous quasi-experimental difference-in-differences analysis and conducted a battery of sensitivity analyses to assure robust findings.

Results: Overall, the study found no discernable impact of state repeal of AELs on alcohol consumption. While the repeal of AELs significantly decreased the odds of reporting drinking in the past 30 days compared to those living in states with AELs or that never had AELs, the effects were small (aOR = 0.98, 95% CI = 0.96, 0.99). Likewise, there were higher odds of binge drinking among individuals living in states that repealed AELs compared to those living in states without AELs, yet with small effects (aOR = 1.03, 95% CI = 1.01, 1.05). After additionally adjusting for state-varying characteristics and state-specific time trends, no significant effects were identified regarding current and binge drinking. Findings from the sensitivity analyses were largely consistent with the main analysis.

Conclusion: This study found no evidence supporting the idea that repealing AELs increased alcohol consumption or binge drinking. Future studies should consider other state-specific dimensions within the Uniform Accident and Sickness Policy Provision Law.

KEYWORDS

binge drinking, intoxication clause, uniform accident and sickness policy provision law

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INTRODUCTION

Binge drinking, heavy drinking, or [any alcohol use by pregnant women or those younger than the legal drinking age](#) is a substantial cause of death and disability worldwide, with 5% of the global burden of disease and injury attributable to alcohol (World Health Organization, 2019). The short-term and long-term health risks of the harmful use of alcohol are well documented, including alcohol poisoning, stillbirth or fetal alcohol spectrum disorders, high blood pressure, heart disease, stroke, liver disease, digestive problems, injuries, violence, and cancer (International Agency for Research on Cancer, 2012; Naimi et al., 2003; Smith et al., 1999; World Health Organization, 2009, 2019). In the U.S., alcohol use was associated with over 140,000 deaths and 3.6 million years of potential life lost each year from 2015 to 2019 (Centers for Disease Control and Prevention (CDC), 2022). In addition to adverse health consequences, the economic costs of excessive alcohol consumption in the U.S. were estimated at \$250 billion in 2010, resulting from losses in workplace productivity and health care expenses, law enforcement and criminal justice expenses, and motor vehicle alcohol-related crash expenses (Esser et al., 2020; Sacks et al., 2015).

A U.S. national survey estimated that less than one in seventeen individuals with alcohol use disorder (AUD) aged 12 and older received treatment in 2019 (SAMHSA, Center for Behavioral Health Statistics and Quality, 2019). Previous work has identified stigma as one of the most impactful barriers for those in need of treatment for AUDs (Chartier et al., 2016; Hammarlund et al., 2018; Satterlund et al., 2015; Smith et al., 2010). Concern about alcohol-related stigmatization (Keyes et al., 2010) has led to a movement to repeal alcohol exclusion laws (AELs), which were primarily designed to discourage problem drinking and reduce insurance costs. The original catalyst for states' passage of AELs occurred in 1947 when the National Association of Insurance Commissioners (NAIC) included them as part of their Uniform Individual Accident and Sickness Policy Provision Law (UPPL). These laws allow insurers to refuse claims for physical injuries caused by alcohol consumption. A report notes that approximately \$19 billion in additional health costs were incurred due to AELs limiting the number of those screened and subsequently treated for alcohol and substance use disorder problems (National Conference of Insurance Legislators, 2004).

In 2001, the key stakeholder, NAIC, acknowledged that the laws failed to consider that alcohol dependency is a chronic illness responsive to treatment, based on research evidence in the past five decades and advances in drug and alcohol treatment (National Conference of Insurance Legislators, 2004). Recognizing the societal costs of alcohol dependency, NAIC changed its position that year to support the repeal of AELs in states that had such laws. However, changes must take place at the state level, as NAIC recommendations are nonbinding on states.

Many states continue to have AELs, yet the extent to which these laws are effective is largely unaddressed in the extant literature. Additionally, AUDs may relate to the social and structural stigma associated with treatment, despite years of progress in the

science of addiction (Room, 2005). The original intent of AELs (i.e., to discourage problem drinking) suggests an important empirical question that motivates this study: Does the repeal of such laws increase problem drinking? Overall, there has been a limited empirical study of AELs (Wolfson & Hourigan, 1997). Understanding the nature and magnitude of public policy effects, intended and unintended, is critical to improving public policy decision-making and overall well-being (Wolfson & Hourigan, 1997). Exploiting the natural experimental setting of some states repealing their AELs, this study used nationally representative survey data to examine the impact of repeal on drinking behaviors.

METHOD

Data

We used data from the 1993–2017 BRFSS nationwide survey. The BRFSS was designed in the early 1980s by the CDC to collect state resident data about health-related risk behaviors and events, chronic health conditions, and the use of preventive services for all noninstitutionalized U.S. adult population (age ≥ 18). More than 400,000 adult interviews are completed each year. The BRFSS survey contains a core component, optional modules, and state-added questions. Due to the rapid rise in the proportion of U.S. households containing only cellular telephones and no landline telephones, the BRFSS adopted a new weighting methodology to incorporate cellular telephone survey data in 2011. A binary indicator was used (i.e., “1” for years after 2010; “0,” otherwise) to capture the change in BRFSS weighting methodology incorporating the cellular telephone survey data in 2011 (a sensitivity analysis was performed to address this as described in the analysis section).

Measures

Dependent variables

Current drinking and binge drinking were created as binary variables. Current drinking was defined as having had at least one drink of alcohol in the 30 days preceding the survey. Binge drinking was defined differently for males and females, as is standard in the literature (CDC, 2018). Binge drinking was defined as having 5 or more drinks on one occasion for males and having 4 or more drinks on one occasion for females; however, before 2006, binge drinking was defined as having 5 or more drinks on one occasion for both males and females (CDC, 2019).

Independent variables

Our primary independent variable was the repeal of AELs. As described previously (Azagba et al., 2022), a time-varying policy

indicator was created to represent whether a state repealed its AEL during a particular year, based on NIAAA's Alcohol Policy Information System, complemented by our legal analysis of state health insurance codes. AEL repeal was operationalized as fractions of exposure months in a year that AEL was repealed and as "1" in subsequent years. Additionally, vectors of state-level characteristics that vary by state and time were compiled, including unemployment rate, insurance coverage rate, the log of state personal income per capita, log of population, the mean age, percentage of the state population that is non-Hispanic White, percentage of the state population that is male, state medical marijuana law, blood alcohol concentration laws, and state beer taxes (inflation-adjusted). The insurance coverage rate is the proportion of the population covered by any health insurance for each state, which was obtained from the U.S. Census Bureau. Following the U.S. Census Bureau's recommendation, we used the Current Population Survey Annual Social and Economic Supplement data to estimate 2001–2007 insurance coverage and the American Community Survey for the insurance coverage rate after 2007. We obtained state unemployment rates (Bureau of Labor statistics, 2020a) and median household income (Bureau of Labor Statistics, 2020b) (in 1000s of dollars) for each state from the Bureau of Labor Statistics, state alcohol taxes from the tax policy center (Tax Policy Center, 2018), and the existence of a state medical marijuana law from the National Conference of State Legislatures (National Conference of State Legislatures, 2021). Additional state-level characteristics, including the log of the population, the mean age, percentage of the state population that is male, and percentage of the white population, were calculated using U.S. Population Data through the National Cancer Institute (National Cancer Institute, n.d.). The inflation-adjusted beer excise tax was measured at the 2018 price level. Blood alcohol concentration laws were derived as a binary variable (0.08 or 0.10 g/dl) based on the BAC limit for a violation for adults operating noncommercial motor vehicles in each state for a given year. Individual-level factors, including age (18–24, 25–34, 35–44, 45–54, 55–64, and 65+), sex (male and female), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic other), educational attainment (high school or less, some college, and at least bachelor's degree), marital status (married, unmarried couple, divorced/widowed/separated, and never married), insurance status (yes and no), and employment status (employed, out of work, and homemaker/student/retired/unemployed), were also collected.

Statistical analysis

Demographic and socioeconomic characteristics were described for three state AEL categories: (1) states with AELs, (2) states that never had AELs, and (3) states that repealed their AEL, with the weighted frequency and its 95% confidence interval reported for all categorical variables. The generalized difference-in-differences (DID) framework was used to estimate the impact of repealing AELs on alcohol use behaviors (current drinking and binge drinking). Multivariable

logistic regression was performed, adjusting for individual-level characteristics, including age, sex, race, educational attainment, marital status, insurance status, employment status, and the methodology change indicator (Model 1). The state fixed effects and year trend were also included in Model 1 to account for unobserved confounding influences that are time-invariant within a state as well as common shocks or secular trends (in this specification, our policy variable of interest was identified from within-state changes). Model 2 added an interaction between state and year to Model 1, to capture unobserved state-specific heterogeneity that evolves at a constant smooth function. This model allows states to have a unique time trend and controls for unobserved-state level factors. When data show a clear trend, DID with state-specific trends can produce more convincing results (Angrist & Pischke, 2008; Besley & Burgess, 2004). Models 3 and 4 added additional state-level controls to Models 1 and 2, respectively. Additional state-level controls included unemployment rate, insurance coverage rate, log of state personal income per capita, log of population, mean age, percentage of the state population that is non-Hispanic White, percentage of the state population that is male, state medical marijuana law, blood alcohol concentration laws, and state beer taxes (inflation-adjusted). Similarly, four models were conducted for binge drinking behaviors.

As with any rigorous quasi-experimental analysis, we conducted a battery of sensitivity analyses to examine whether our findings were robust to different specifications. First, we restricted the analyses to the 1993 to 2010 period and compared those results to the full sample (1993–2017), in order to assess the impact of change in the BFRSS sampling frame. Second, separate analyses used alternative control conditions by excluding states that never had AELs. Doing so removes the legal ambiguity created by the fact that when state laws are silent on AELs, insurance companies are not necessarily precluded from issuing contracts with an exclusionary intoxication clause (Oliver Bishop and Oliver Bishop v. National Health Insurance Company, 2003). Third, additional analyses removed states with ambiguous treatment condition. Specifically, four states (Montana, Tennessee, Texas, and Vermont) that simply deleted AEL from their insurance codes rather than legislatively prohibiting alcohol exclusion insurance provisions were not considered treatment states. Sampling weights were included in all analyses to account for the complex survey design.

RESULTS

The sociodemographic characteristics of the residents of states in the three legal categories are presented in Table 1. Among the 7,614,302 subjects included in the study, 3,033,489 (39.5%) lived in states with AELs, 3,119,987 (46.8%) lived in states that repealed AELs, and 1,460,826 (13.8%) lived in states that never had AELs. More than half of the study sample (53.4%) reported drinking alcohol in the past 30 days, and approximately 15.5% reported past-30-day binge drinking. More than 70% were non-Hispanic whites (76.2%), and 29.6% had at least a bachelor's degree. The unadjusted

TABLE 1 Sample descriptive statistics by three alcohol exclusion law categories

	Full sample	With AELs	Repealed AELs	Never had AELs
Age				
18–24	12.35 (12.28, 12.41)	11.87 (11.78, 11.97)	12.62 (12.52, 12.72)	12.76 (12.64, 12.88)
25–34	18.48 (18.41, 18.54)	17.87 (17.77, 17.97)	19.11 (19.00, 19.22)	18.08 (17.97, 18.19)
35–44	19.25 (19.20, 19.31)	18.85 (18.77, 18.94)	19.67 (19.57, 19.76)	19.00 (18.89, 19.10)
45–54	17.70 (17.65, 17.75)	17.62 (17.54, 17.70)	17.75 (17.66, 17.84)	17.77 (17.67, 17.87)
55–64	14.06 (14.02, 14.11)	14.35 (14.28, 14.42)	13.76 (13.69, 13.84)	14.27 (14.19, 14.36)
65+	18.16 (18.10, 18.21)	19.44 (19.35, 19.52)	17.09 (17.01, 17.18)	18.13 (18.03, 18.22)
Sex				
Male	48.11 (48.04, 48.18)	47.66 (47.55, 47.76)	48.48 (48.36, 48.60)	48.14 (48.00, 48.27)
Female	51.89 (51.82, 51.96)	52.34 (52.24, 52.45)	51.52 (51.40, 51.64)	51.86 (51.73, 52.00)
Race/ethnicity				
Non-Hispanic Whites	70.73 (70.65, 70.81)	71.71 (71.59, 71.82)	66.98 (66.85, 67.11)	80.69 (80.58, 80.80)
Non-Hispanic Blacks	10.21 (10.17, 10.26)	12.86 (12.78, 12.94)	8.69 (8.62, 8.76)	7.82 (7.73, 7.90)
Hispanic	12.86 (12.79, 12.92)	9.68 (9.60, 9.77)	17.49 (17.38, 17.60)	6.15 (6.09, 6.22)
Non-Hispanic Other	6.20 (6.16, 6.25)	5.75 (5.69, 5.81)	6.84 (6.77, 6.91)	5.34 (5.28, 5.41)
Educational attainment				
High school or less	42.74 (42.66, 42.81)	43.91 (43.79, 44.03)	42.36 (42.24, 42.49)	40.63 (40.49, 40.77)
Some college	27.63 (27.56, 27.69)	26.85 (26.76, 26.95)	27.82 (27.72, 27.93)	29.20 (29.07, 29.32)
At least bachelor's degree	29.64 (29.57, 29.70)	29.24 (29.12, 29.35)	29.81 (29.70, 29.92)	30.18 (30.05, 30.30)
Marital status				
Married	57.13 (57.06, 57.21)	56.74 (56.62, 56.86)	57.05 (56.92, 57.17)	58.56 (58.42, 58.70)
A member of an unmarried couple	3.66 (3.63, 3.70)	3.23 (3.19, 3.28)	4.16 (4.10, 4.21)	3.22 (3.17, 3.28)
Divorced/widowed/separated	19.04 (18.99, 19.09)	19.84 (19.76, 19.92)	18.70 (18.62, 18.78)	17.91 (17.82, 18.00)
Never been married	20.16 (20.09, 20.23)	20.19 (20.07, 20.30)	20.09 (19.98, 20.21)	20.31 (20.18, 20.43)
Employment status				
Employed	59.95 (59.87, 60.02)	58.80 (58.69, 58.91)	60.44 (60.32, 60.55)	61.58 (61.44, 61.71)
Out of work	5.67 (5.63, 5.71)	5.66 (5.61, 5.72)	5.86 (5.80, 5.92)	5.03 (4.97, 5.09)
Homemaker/student/retired/ unable to work	34.38 (34.31, 34.45)	35.53 (35.43, 35.64)	33.70 (33.59, 33.82)	33.39 (33.27, 33.52)
Medical marijuana law				
No	74.66 (74.57, 74.75)	88.02 (87.88, 88.15)	61.69 (61.54, 61.85)	80.44 (80.31, 80.58)
Yes	25.34 (25.25, 25.43)	11.98 (11.85, 12.12)	38.31 (38.15, 38.46)	19.56 (19.42, 19.69)
BAC concentration law				
0.02mg/L	75.16 (75.09, 75.23)	72.50 (72.38, 72.61)	80.36 (80.27, 80.46)	65.12 (64.97, 65.27)
0.10 mg/L	24.84 (24.77, 24.91)	27.50 (27.39, 27.62)	19.64 (19.54, 19.73)	34.88 (34.73, 35.03)
Insurance status				
Yes	85.25 (85.19, 85.31)	85.51 (85.42, 85.60)	84.11 (84.00, 84.21)	88.40 (88.30, 88.50)
No	14.75 (14.69, 14.81)	14.49 (14.40, 14.58)	15.89 (15.79, 16.00)	11.60 (11.50, 11.70)
Current drinking				
No	46.63 (46.56, 46.71)	48.27 (48.15, 48.40)	46.12 (45.99, 46.25)	43.80 (43.66, 43.94)
Yes	53.37 (53.29, 53.44)	51.73 (51.60, 51.85)	53.88 (53.75, 54.01)	56.20 (56.06, 56.34)
Binge drinking				
No	84.54 (84.48, 84.60)	85.41 (85.31, 85.51)	84.35 (84.25, 84.45)	82.78 (82.67, 82.90)
Yes	15.46 (15.40, 15.52)	14.59 (14.49, 14.69)	15.65 (15.56, 15.75)	17.22 (17.10, 17.33)

Note: Categorical variables are presented as weighted percentages and 95% confidence intervals.

TABLE 2 Regression analysis of state AEL repeal on current drinking, 1993–2017

	Model 1	Model 2	Model 3	Model 4
AEL repeals	0.98 (0.96, 0.99)	0.99 (0.97, 1.01)	0.99 (0.97, 1.00)	1.00 (0.98, 1.02)
State fixed effect	✓	✓	✓	✓
Year trend	✓	✓	✓	✓
State-specific trend		✓		✓
Individual characteristics	✓	✓	✓	✓
State-varying characteristics			✓	✓

Note: Individual-level characteristics included age, sex, race, educational attainment, marital status, insurance status, employment status, and methodology change indicator. State-level controls included unemployment rate, insurance coverage rate, the log of state personal income per capita, log of population, the mean age, percentage of the state population that is non-Hispanic White, percentage of the state population that is male, state medical marijuana law, blood alcohol concentration laws, and state beer taxes (inflation-adjusted).

estimates showed that current and binge drinking was highest among participants living in states that never had AELs, followed by those living in states that repealed AELs, and lowest among those living in states with AELs.

Table 2 shows the results from the DID model analysis examining the impact of the repeal of AELs on current drinking behavior using data from 1993 to 2017. In Model 1, adjusting for state-fixed effects, year trend, and individual-level covariates, repeal of AELs significantly decreased the odds of reporting drinking in the past 30 days compared to those living in states with AELs or that never had AELs (aOR = 0.98, 95% CI = 0.96, 0.99), albeit with small effects. A nonsignificant change was found in Model 2, extending Model 1 by allowing for state-specific time trends. Similarly, after adjusting for state-varying characteristics, the effects of the repeal of AELs on current drinking were not significant (Models 3 and 4).

Table 3 reports the DID results of the impact of AEL repeal on binge drinking behavior using data from 1999 to 2017. Although effects were small, the results from the baseline models (Models 1 and 3 without state-specific trends) showed higher odds of binge drinking (Model 1: aOR = 1.03, 95% CI = 1.01, 1.05; Model 3: aOR = 1.03, 95% CI = 1.01, 1.05) among those living in states that repealed AELs compared to those living in states without AELs or states with AELs. However, the effects were not significant in the models that allowed for state-specific time trends (Models 2 and 4).

The results of the sensitivity analyses are shown in Tables S1–S3. The findings from sensitivity analyses restricted to 1993 to 2010 were largely consistent with the main analyses (Table S1). While the baseline model (aOR = 1.04, 95% CI = 1.02, 1.06) found a positive relationship between the repeal of AELs and current drinking, Model 4 showed no statistically significant effect (aOR = 1.04, 95% CI = 1.02, 1.06). In the analysis with different control states (excluding states that never had AELs), the results for all model specifications showed no statistically significant impact of repeal of AELs on binge drinking (Table S2). The results in the analysis with different treatment states (whether states expressly prohibited alcohol exclusion provisions) were also consistent with the results of the primary analyses (Table S3).

DISCUSSION

Historically, states' enactment of AELs was based on the premise that public awareness that insurance companies could reject claims for physical injuries caused by alcohol consumption would deter problem drinking. Thus, if this assumption is correct, repealing AELs would lead to an increase in problem drinking. However, little is known regarding the extent to which, if any, AELs impact drinking. This study addresses this gap by examining whether the repeal of these laws impacts drinking behaviors. The findings from the current study were largely consistent, including the sensitivity analyses showing that state repeal of AELs had no meaningful impact on drinking behaviors. Even with the few statistically significant positive or negative results, the magnitude of the estimates was small.

Several factors may help explain the findings of the current study. First, a central underpinning of AELs rests on them functioning as a deterrent to moral hazard (i.e., increased propensity for risk-taking behaviors due to having some form of protection such as health insurance policy coverage) (Ehrlich & Becker, 1972). There is inconclusive evidence supporting moral hazard more generally in the health insurance context (Azagba et al., 2021; Barbaresco et al., 2015; Dave & Kaestner, 2009; Dong, 2013; Khwaja, 2010). Second, the primary purpose of the AELs in statutes was not to permit these clauses but instead to specify that, when they are used, they should have certain forms and content, and in practice, restrictions on applying alcohol exclusion provisions varied across states. As part of their repeal, 16 states specifically stated that alcohol exclusion might not be used for health insurance, and two others (Colorado and Illinois) prohibited the use of accident insurance (NIAAA's Alcohol Policy Information System, 2020). Further studies should examine whether the impact of repeal differs in states also prohibiting accident insurance from excluding alcohol-related injury. It remains unclear whether states with broader restrictions are more likely to demonstrate a discernable impact of AELs. Additionally, there is limited information about if and how awareness of AELs influences drinking behaviors. Thus, it is possible that low awareness of AEL repeal may not influence alcohol consumption to any meaningful degree. The results of the current study should be considered in light of the small, but growing,

TABLE 3 Regression analysis of state AEL repeal on binge drinking, 1993–2017

	Model 1	Model 2	Model 3	Model 4
AEL repeals	1.03 (1.01, 1.05)	1.02 (0.99, 1.05)	1.03 (1.01, 1.05)	1.01 (0.98, 1.05)
State fixed effect	✓	✓	✓	✓
Year trend	✓	✓	✓	✓
State-specific trend		✓		✓
Individual characteristics	✓	✓	✓	✓
State-varying characteristics			✓	✓

Note: Individual-level characteristics included age, sex, race, educational attainment, marital status, insurance status, employment status, and methodology change indicator. State-level controls included unemployment rate, insurance coverage rate, log of state personal income per capita, log of population, mean age, percentage of the state population that is non-Hispanic White, percentage of the state population that is male, state medical marijuana law, blood alcohol concentration laws, and state beer taxes (inflation-adjusted).

literature on the effects of AELs. For example, a recent study found evidence that AELs may function as a barrier to treatment-seeking³⁵.

This study is subject to some limitations that are worth noting. First, the BRFSS survey relies on information reported by the participant and may, therefore, be subject to response error due to inaccurate recall of events or experiences. In particular, alcohol use is self-reported and typically underreported (Nelson et al., 2010). Second, there was a methodological change in the BRFSS in 2011 (addition of cell phone numbers to the sampling frame). However, we obtained largely consistent findings in the restricted analyses that used data from 1993 to 2010. Third, fixed-effect models were used to adjust for time-invariant characteristics of each state and state-invariant time effects, and there may be important time- and state-varying confounders not captured in our models. However, one of the specifications extended our fixed-effect models to allow state-specific time trends.

CONCLUSION

This study examined whether the repeal of laws (AELs) allowing insurers to refuse claims for physical injuries caused by alcohol consumption impacts increased alcohol consumption. No discernable impact of state AEL repeal on alcohol consumption was found in most models, and the few statistically significant positive or negative results found involved small and inconsistent effects. Future studies should consider other state-specific dimensions within the Uniform Accident and Sickness Policy Provision Law.

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CONFLICT OF INTEREST

None of the authors have any conflict of interest to declare.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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