Published in final edited form as:

Addiction. 2015 February ; 110(2): 300–307. doi:10.1111/add.12762.

Acute alcohol use among suicide decedents in 14 U.S. States: Impacts of off-premise and on-premise alcohol outlet density

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Abstract

Background and Aims—This study estimates the association between per capita alcohol retail outlet density and blood alcohol concentration (BAC) from 51,547 suicide decedents. It also analyzes the relationship between alcohol outlet density and socio-demographic characteristics among alcohol positive suicide decedents in the United States by racial/ethnic groups and method of suicide.

Design—Analysis of U.S. data, 2003–11, National Violent Death Reporting System

Setting—Suicide decedents from 14 U.S. States

Cases—A total of 51,547 suicide decedents tested for blood alcohol content.

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Declaration of interest: The authors have no conflicts of interest to declare

Measurements—Blood alcohol content and levels were derived from coroner/medical examiner reports. Densities of county level on-premise and off-premise alcohol retail outlets were calculated using the 2010 Census.

Findings—Multilevel logistic regression models suggested that higher off-premise alcohol outlet densities were associated with greater proportions of alcohol-related suicides among men -- for suicides with alcohol present (BAC>0; adjusted odds ratio [AOR]= 1.08, 95% confidence interval [CI]= 1.03–1.13). Interactions between outlet density and decedents' characteristics were also tested. There was an interaction between off-premise alcohol availability and American Indian/Alaska Native race (AOR=1.36; 95% CI=1.10–1.69) such that this sub-group had highest BAC positivity. On-premise density was also associated with BAC > 0 (AOR=1.05; 95% CI=1.03–1.11) and BAC 0.08 (AOR=1.05; 95% CI=1.02–1.09) among male decedents.

Conclusions—County-level on- and off-premise density are associated with alcohol-related suicide, especially among American Indians/Alaska Natives.

Keywords

suicide; acute alcohol use; alcohol outlet density; U.S. States

Introduction

According to the U.S. Centers for Disease Control and Prevention (CDC), on average, 8,179 suicides (23%) and 273,206 years of potential life lost (YPLL) (36%) were attributable to alcohol consumption annually in the United States during 2006–10 (1). There have been several descriptive studies of the association between acute use of alcohol and suicide (2), including three published reports of national U.S. data by our investigative team (3–5). Our research group recently reported that 37% of male and 29% of female suicide decedents in a U.S. national sample had positive blood alcohol levels (3). Furthermore, we recorded estimates of mean blood alcohol concentrations (BACs) of 0.15 g/dl and 0.13 g/dl in male and female suicide decedents, respectively, who used alcohol prior to suicide (4), levels that far exceed the 0.08 g/dl legal limit for drinking and driving in the United States. The present study focuses on the association between access to alcohol and those suicide decedents with evidence of alcohol consumption just prior to death.

Studies have assessed the potency of several alcohol policies to curtail heavy drinking or alcohol-related harm (6–9). The international analysis by Babor et al. (8) concluded that alcohol policies are among the most potent population-level interventions that influence drinking levels, drinking patterns, and/or damage from alcohol. Such policies may affect density of outlets, relative prices and alcohol taxation, types of retail system (public vs. private), hours and days of sale, and legal drinking age, along with server intervention/control programs.

Studies focusing at the population level have shown that alcohol consumption (10–14) outlet density (15), price (16), and sales (17–19) are associated with increased suicide rates. There is substantial international evidence over several decades indicating that alcohol outlet density is associated with a range of alcohol-related harms including suicide (8, 20–23).

Nevertheless, it is unclear whether alcohol consumption is mediating the relationship between alcohol outlets and alcohol-related harms.

A systematic review of the international evidence from high income countries conducted by Campbell et al. (24) reported that most studies indicated that greater alcohol outlet density is associated with medical harms, injury, crime and violence, including suicide.

Previous studies have pointed to a positive association between alcohol outlet density and suicide rates (15, 19, 25, 26). Escobedo and Ortiz (26) examined data from New Mexico for 1990 to 1994 and found that as outlet density increases so do suicides and alcohol-related crashes, reporting that these associations continued to be statistically significant when they considered the effects of age, sex and minority status.

Two studies with contrary findings are noted. A case-control study in Philadelphia reported firearm suicide risk to individuals in areas of high alcohol outlet density was less than firearm suicide risk associated with acute alcohol consumption (27). Berman (28) examined alcohol control and suicide rates among young rural Alaska Native men from 1980–2007, and after controlling for other risk factors, found that alcohol control neither increased nor reduced suicide rates.

These studies typically were at the aggregate level (suicide rates for a jurisdiction and alcohol outlet density were assessed) and were not able to document whether individual decedents were alcohol positive at the time of death. Our research is designed to address this issue.

Using the available multi-level data our analysis had two aims:

1. To estimate the association between density of alcohol outlets and prevalence of alcohol positive suicides and prevalence of elevated BACs among decedents
2. To examine relationships between alcohol outlet density and socio-demographic characteristics among alcohol positive suicide decedents in several U.S. racial/ethnic groups

Methods

In the U.S. context, there is substantial variation by state, (and within states) in the levels of alcohol outlet density; and data on alcohol outlet density were available for the states and counties that were the foci of our study. Conversely, for some measures that might have a bearing on alcohol-related harm (such as minimum legal drinking age) there was no state or county level variation; for other measures (such as days of sale or server intervention programs) – there was minimal variation by state; for still others (such as alcohol pricing or hours of sale) it would be daunting to obtain state and county level data. Therefore, building on the research literature noted above, we used alcohol outlet density as the measure of alcohol availability.

Data sources

This study used pooled restricted data for decedents from the 2003–2011 National Violent Death Reporting System (NVDRS) (29). Supported by the CDC, the NVDRS is a state-based active surveillance system that provides a detailed account of violent deaths in the participating states. The present study is based on 14 of the 17 participating states (Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, South Carolina, Virginia, and Wisconsin). Rhode Island, Utah, and Ohio did not have density data and were excluded. Counties without suicides were also excluded (27 counties out of 928).

The CDC bases its model on four primary data sources: coroner/medical examiner (C/ME) records, police reports, death certificates, and crime laboratories. Information on acute alcohol use was based on toxicological analyses of decedents as part of the C/ME investigation. Suicide decedents were identified using the *International Classification of Diseases, 10th Revision* codes X60–X84 or Y87 (30). Pooled 2003–2011 NVDRS data yielded 51,347 suicide decedents tested for blood alcohol content.

Measures

Blood alcohol content—BAC positivity (BAC+) refers to the presence of alcohol (BAC>0) versus its absence (BAC = 0). The BAC was first coded as a continuous measure in terms of weight by volume (expressed as a percentage for whole blood) and then classified as any detectable BAC (BAC+) versus none.

Alcohol outlet density—County off- and on-premise liquor licenses numbers (from state alcohol licensing agencies for the year 2011–12) were divided by Census 2010 county populations aged 18 and older and reported per 10,000 population. ZIP code data were not available at the time of the study. Classifications of off- and on-premise were based on the definitions provided by the state alcohol licensing agencies. Those classified as *off-premise* included two types of establishments: those with an off-premise license included stores selling alcohol only for off-premise consumption and establishments selling alcohol for both on- or off-premise consumption. Those classified as *on-premise* licenses were those where alcohol could be purchased for consumption on the premises only. Numbers of licenses were not available for Rhode Island, Utah, and Ohio, which were excluded from the analysis. County liquor outlet density was linked to the county of residence of the decedent (3% missing). Alcohol outlet density varied from 0 (dry counties) to 210 establishments per 10,000 population. On-premise outlet data from South Carolina were not available for this study.

Covariates—The following characteristics of the suicide decedents were included as covariates in all adjusted analyses: age (<21, 21–29, 30–39, 40–49, and 50 years), race/ethnicity (White, Black, American Indian/Alaska Native, Asian/Pacific Islander, and Hispanic), year of death, marital status (married, not married), metropolitan status assessed using the U.S. Department of Agriculture Urban-rural continuum (31), method of suicide (firearm, hanging/suffocation, poisoning, and other), and year of death.

Statistical Analysis

Decedents were classified into those with a BAC ≥ 0.08 g/dl (the legal limit for driving in all U.S. States) or a BAC < 0.08 g/dl. Associations between alcohol outlet density and blood alcohol levels (BAC+ vs BAC- and BAC ≥ 0.08 g/dl vs BAC < 0.08 g/dl) were assessed using multilevel logistic regression models estimated with HLM 7.01 (Hierarchical Linear Modeling) where the suicide decedent's information is at Level-1 and county-level outlet density and metropolitan status are at level-2.

Preliminary analyses showed that model fit at the county level was improved by logarithmic transformation of the outlet density predictor. Owing to differences between men and women with regard to rates and methods of suicide, the models were stratified by gender. Because there were too few states to add a third level, states significantly associated with the outcome were included at level 2 as dummy variables (all other states were the referent category).

Three models for each BAC level using either on- or off-premise density were constructed and stratified by gender. The baseline model was unadjusted and tested the effect of alcohol outlet density on blood alcohol levels. The model (without interaction terms) adjusted for age, race/ethnicity, year of death, marital status, metropolitan status, method of suicide, and state of residence. Previous research (4, 5, 32) shows that the prevalence of BAC among suicide decedents varies by age, race/ethnicity, and method of suicide. Thus, the full model added cross-level interaction terms between age, race/ethnicity, and method of suicide with alcohol outlet density. All variables were entered simultaneously in the model. Non-significant interactions were excluded from the full model. The significance level was set to $p < .01$ to adjust for multiple models.

Results

Table 1 presents the characteristics of the decedents. Overall, 33.9% of suicide decedents were BAC positive and 21.4% had a BAC greater or equal 0.08g/dl. Alcohol positivity and high alcohol level was more prevalent among men, those aged 21 to 49, decedents who were not married, and decedents who died by firearm or hanging/suffocation.

Table 2 shows the odds ratios and 95% confidence intervals for positive BAC or BAC greater or equal to 0.08 g/dl, respectively, at the time of death among male suicide decedents. As shown, greater availability of alcohol, as measured by off-premise alcohol outlet density per capita, is associated with greater proportion of alcohol-related suicides. This relationship is evident for suicides with presence of alcohol (BAC >0) in the baseline (unadjusted) and in the two adjusted models as well as for BAC equal to or greater than legal limit for motor vehicle operation in the United States (0.08g/dl) in the baseline (unadjusted) model. There was also interaction between off-premise alcohol availability and American Indian/Alaska Native racial group membership with regard to being positive for BAC. Among female suicide decedents, the association between off-premise density and presence of alcohol (OR= 0.99, 95%CI= 0.91–1.07) and BAC ≥ 0.08 (OR = 0.99, 95%CI= 0.91–1.09) did not reach the significance level of .01.

Table 3 shows the on-premise results for male suicide decedents. On-premise density was associated with a greater proportion of BAC positivity and BAC ≥ 0.08 . There were no significant interactions (at $p < .01$). Among female suicide decedents, on-premise density was minimally associated with BAC > 0 (OR=1.08, 95%CI=1.02–1.14; $p=.012$) in the baseline (unadjusted) model. There were no significant interactions between on-premise density and demographic characteristics.

Discussion

Overall, 34% of those suicide decedents tested were positive for alcohol and 22% of those tested had an elevated BAC (> 0.08 g/dl). Positive associations were found for both on-premise and off-premise alcohol outlet density with the presence of alcohol in suicide decedents. There was also an interaction between our measure of alcohol availability and American Indian/Alaska Native status. Previous analyses by our research group have shown that alcohol use and legal intoxication prior to completed suicide are common among U.S. racial sub-groups, especially among American Indians and Alaska Natives – who had the highest rate of legal (> 0.08 g/dl) intoxication (5). The associations between off premise density and American Indian/Alaska Native race status be due to specific patterns of drinking. For instance, many American Indian/Alaska Native reservations and villages are dry, which may lead drinkers to seek off premise outlets outside reservations or villages to purchase alcohol. These individuals may also be affected by the concentration of off premise outlets because they are disproportionately of low socioeconomic status, and buying and drinking off premise is cheaper than drinking on premises.

The findings from our analysis of this large multi-state dataset are generally consistent with earlier population-level research on access to alcohol and suicide (18, 19) and are supportive of the prevention policies recommended by Anderson et al. (7) and Babor et al. (8). Implementing alcohol control policies, in order to reduce access to alcohol, may reduce alcohol-associated suicides. In addition, more focused initiatives, such as greater access to screening, brief intervention and referral programs (SBIR) (33), have prevention potential among those contemplating suicide.

Our analysis has a number of strengths. It uses the only U.S. national data set available that examines blood alcohol levels among suicide decedents, providing accurate, timely, and comprehensive surveillance data with unrivaled toxicology information. It includes detailed information about on-premise and off-premise alcohol outlet densities for 14 U.S. States. This combination of mortality data and environmental information provides a resource to design and implement effective policies and programs to reduce the incidence of suicide.

The study has some potential limitations, which need to be considered. There was some inter-state variability in the proportions of suicides that were tested for alcohol. Also, decedents suspected of not having a chronic alcohol problem may not have been BAC tested. Our analysis focused on 0.08 BAC as a threshold measure of alcohol intoxication and we believe that this is the best single measure; however, different measures such as average BAC may provide alternative views on alcohol involvement in suicide. Our study is limited to 14 States that were part of the NVDRS system and also where alcohol outlet density

could be obtained. However, data from these 14 states are representative of suicides in the United States as a whole (34). Owing to the modest number of states, it was not possible to construct three-level models. Indeed, several authors have advised against construction of hierarchical models with small numbers of units at a given level (35–38). Therefore, states were entered as covariates into the models. Preliminary analyses showed that model fit at the county level was improved by logarithmic transformation of the outlet density predictor. Owing to differences between men and women with regard to rates and methods of suicide, the models were stratified by gender. Because there were too few states to add a third level, states significantly associated with the outcome were included at level 2 as dummy variables (all other states were the referent category). Intra-class correlation coefficients were computed for baseline (unadjusted or null) models. The intra-class correlations were less than six percent for all models suggesting that spatial auto-correlation was not a concern.

Furthermore, as mentioned, it was not possible to examine other alcohol control policies such as county-level server training initiatives. Of course, county geographic boundaries are artificial. Theoretically, there could have been spatial auto-correlation among suicides that was not addressed. However, the county-level intra-class correlation coefficients were small and suggested spatial auto-correlation was not a concern.

Our measure of physical availability of alcohol (outlet density per capita) is the one used most extensively in the research literature. A more refined measure of physical access to alcohol would be to obtain volume of sales for each outlet, if feasible. If this is not available then other alternatives might be ‘shelf space’ or size of retail area for off-premise outlets, or regulated ‘occupant capacity’ for on-premise outlets -- thus not treating outlets as if each one represents comparable access to alcohol. However, no known study has used these measures, possibly because they would involve major and very costly efforts to locate and tabulate the relevant information. In addition, outlets per roadway or using ZIP codes rather than counties could provide more refined information on the relationship between alcohol density and alcohol-related suicides. We examined associations between alcohol outlet density and the proportion of suicide decedents who had positive BAC levels (or positive BAC levels > 0.08 g/dl) but not suicide rates more generally. And, as mentioned, it was not possible to examine other alcohol control policies such as county-level server training initiatives.

Future research might examine a combination of alcohol availability measures to determine what association there is, if any, between elevated access to alcohol – such as low price, long hours of sale, extensive marketing, and high density of outlets – and rate of suicide with positive BACs. More focused and smaller scale initiatives might examine, through in-depth interviews with next-of-kin or suicide attempt survivors, the dynamics of access to alcohol in the community and alcohol consumption by the individual at the time of the suicide attempt or just prior to the tragic event.

Suicide prevention programs have minimally addressed acute alcohol use, which is troubling, given that 37% of male and 29% of female suicide decedents in the United States had positive BACs at the time of death (3). Further work might be undertaken to explore and assess how SBIR protocols (33) need to be refined so as to be relevant to and potent for

those who drink excessively and are prone to contemplating suicide. Furthermore, future work should seek a harmonization with frequent and more efficient communication between alcohol control and problem prevention initiatives and suicide prevention programs.

Acknowledgments

This study was supported by grant R01 AA020063 from the National Institute on Alcohol Abuse and Alcoholism. All analyses, interpretations, and conclusions based on the analysis of these data are solely the responsibility of the authors and do not represent the views of either the Centers for Disease Control and Prevention or the states participating in the National Violent Death Reporting System. We also thank the state alcohol beverage control commissions for providing information on the outlet licenses.

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Table 1

Blood alcohol content levels among sub-groups

	% BAC=0 (n = 33,267)	% BAC>0 (n = 17,398)	% BAC<0.08 ^b (n = 38,491)	% BAC 0.08 (n = 10,993)
Gender				
Women	71.4	28.6	82.7	17.3
Men	63.9	36.1	76.3	23.7
Age				
<21	78.2	21.8	87.3	12.7
21–29	58.6	41.4	71.3	28.7
30–49	59.2	40.8	72.8	27.3
30–49	59.7	40.3	73.2	26.8
50	72.5	27.5	83.5	16.5
Race/ethnicity				
White	65.6	34.4	77.7	22.3
Black	71.9	28.1	84.4	15.6
AIAN	51.6	48.4	61.3	38.7
Asian/PI	74.5	25.5	87.3	12.7
Hispanic	58.7	41.3	71.3	28.7
Marital Status				
Not Married	64.1	35.9	77.0	23.0
Married	68.3	31.7	79.0	21.0
Metropolitan status				
Urban	65.7	34.3	78.3	21.7
Rural	65.3	34.7	75.5	24.5
Suicide method				
Firearm	64.9	35.1	75.2	24.8
Hanging/suffocation	64.7	35.3	77.1	22.9
Poisoning	66.9	33.1	83.0	17.0
Other	70.5	29.5	83.7	16.3
On-premise density/10,000 ^d				
0	63.3	36.7	73.1	26.9
1–9	68.0	32.0	77.8	22.2
10–19	64.6	35.4	78.6	21.4
20–39	61.8	38.2	75.0	25.0
30–49	62.1	37.9	75.6	24.4
40–49	59.6	40.4	75.8	24.2
50–59	59.0	41.0	71.0	29.0
60	57.9	42.1	74.9	25.1
Off-premise density/10,000 ^d				
0	60.5	39.5	73.0	27.0
1–9	65.5	34.5	79.0	21.0
10–19	65.2	34.8	76.6	23.4

	% BAC=0 (n = 33,267)	% BAC>0 (n = 17,398)	% BAC<0.08 ^b (n = 38,491)	% BAC 0.08 (n = 10,993)
20–39	67.3	32.7	77.7	22.3
30–49	66.3	33.7	78.6	21.4
40–49	64.5	35.5	76.1	23.9
50–59	56.8	43.2	70.4	29.6
60	53.1	46.9	64.1	35.9

^aFor descriptive purposes on- and off-premise were categorized.

^bIncludes BAC=0.

Table 2
Association between off-premise density and alcohol-related suicide among male decedents.

	BAC > 0 (vs < 0)		BAC .08 (vs < .08)	
	Adjusted model (no interaction)		Adjusted model (no interaction)	
	Baseline (unadjusted) model OR (95%CI)	Full (interaction) model OR (95%CI)	Baseline (unadjusted) model OR (95%CI)	Full (interaction) model OR (95%CI)
Density	1.12 (1.06 – 1.19)*	1.05 (1.00 – 1.11)	1.11 (1.05 – 1.18)*	1.06 (1.01 – 1.12)
<21				
		0.37 (0.33 – 0.41)*		0.33 (0.29 – 0.38)*
21–49		1.03 (0.95 – 1.12)		1.03 (0.94 – 1.12)
40–49		1.00 (0.92 – 1.08)		1.01 (0.93 – 1.11)
50		0.53 (0.49 – 0.57)*		0.50 (0.46 – 0.54)*
Black		0.67 (0.61 – 0.74)*		0.58 (0.52 – 0.66)*
AIAN		1.78 (1.41 – 2.24)*		1.94 (1.54 – 2.43)*
Asian/PI		0.69 (0.53 – 0.89)*		0.61 (0.46 – 0.81)*
Hispanic		1.19 (1.05 – 1.35)*		1.28 (1.10 – 1.48)*
Married		0.83 (0.79 – 0.88)*		0.89 (0.84 – 0.94)*
Hanging/suffocation		0.91 (0.86 – 0.96)*		0.85 (0.80 – 0.91)*
Poisoning		0.90 (0.83 – 0.98)		0.63 (0.57 – 0.69)*
Other		0.73 (0.65 – 0.82)*		0.62 (0.55 – 0.71)*
Metropolitan status		1.00 (0.98 – 1.01)		1.00 (0.99 – 1.02)
Alaska		1.64 (1.26 – 2.15)*		1.53 (1.22 – 1.91)*
Colorado		1.36 (1.20 – 1.54)*		1.29 (1.14 – 1.46)*
Georgia		0.79 (0.69 – 0.90)*		0.85 (0.73 – 0.98)
Massachusetts		1.19 (1.07 – 1.32)*		1.08 (0.96 – 1.21)
New Jersey		0.33 (0.20 – 0.55)*		0.35 (0.21 – 0.56)*
New Mexico		1.23 (1.07 – 1.42)*		1.17 (1.00 – 1.37)
North Carolina		0.80 (0.73 – 0.88)*		0.91 (0.83 – 1.01)
Oregon		1.53 (1.21 – 1.95)*		0.98 (0.76 – 1.26)

	BAC>0 (vs <0)		BAC .08 (vs <.08)			
	Baseline (unadjusted) model OR (95%CI)	Adjusted model (no interaction) OR (95%CI)	Full (interaction) model OR (95%CI)	Baseline (unadjusted) model OR (95%CI)	Adjusted model (no interaction) OR (95%CI)	Full (interaction) model OR (95%CI)
Wisconsin		1.14 (1.01 – 1.28)	1.14 (1.01 – 1.28)		1.20 (1.05 – 1.36)*	1.20 (1.05 – 1.36)*
Year of death		1.01 (1.00 – 1.03)	1.01 (1.00 – 1.03)		1.03 (1.02 – 1.05)*	1.03 (1.02 – 1.05)*
Density* Black			1.15 (1.02 – 1.30)			1.12 (0.97 – 1.30)
Density* AIAN			1.36 (1.10 – 1.69)*			1.24 (1.00 – 1.53)
Density* Asian/PI			0.96 (0.59 – 1.56)			1.15 (0.66 – 2.04)
Density* Hispanic			1.26 (1.04 – 1.54)			1.21 (0.95 – 1.54)
Variance component	0.18*	0.07*	0.07*	0.15*	0.06*	0.06*
Intercept	0.55 (0.53 – 0.57)*	0.85 (0.79 – 0.92)*	0.85 (0.78 – 0.91)*	0.33 (0.32 – 0.35)*	0.53 (0.49 – 0.58)*	0.53 (0.49 – 0.58)*

Confidence intervals are 95%. AIAN = American Indian or Alaska Native, PI = Pacific Islander. Referent categories were age 30–39, white, not married, firearm method, and other participating states.

*
p < .01

Table 3
Association between on-premise density and alcohol-related suicide among male decedents.

	BAC>0 (vs. <0)		BAC .08 (vs. <.08)	
	Baseline (unadjusted) model		Adjusted model (no interaction)	
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Density	1.07 (1.03 – 1.11)*	1.05 (1.02 – 1.09)*	1.03 (0.99 – 1.07)	1.05 (1.02 – 1.09)*
<21		0.37 (0.33 – 0.42)*		0.34 (0.29 – 0.39)*
21–29		1.03 (0.95 – 1.12)		1.02 (0.94 – 1.12)
40–49		1.01 (0.94 – 1.09)		1.03 (0.94 – 1.13)
50		0.53 (0.50 – 0.57)*		0.51 (0.47 – 0.55)*
Black		0.66 (0.60 – 0.72)*		0.58 (0.51 – 0.65)*
AIAN		1.78 (1.41 – 2.25)*		1.95 (1.55 – 2.46)*
Asian/PI		0.68 (0.52 – 0.89)*		0.60 (0.45 – 0.80)*
Hispanic		1.19 (1.06 – 1.35)*		1.27 (1.10 – 1.48)*
Married		0.83 (0.78 – 0.87)*		0.88 (0.84 – 0.94)*
Hanging/suffocation		0.91 (0.86 – 0.97)*		0.86 (0.80 – 0.92)*
Poisoning		0.90 (0.84 – 0.98)		0.63 (0.57 – 0.69)*
Other		0.74 (0.66 – 0.83)*		0.63 (0.56 – 0.72)*
Metropolitan status		1.00 (0.99 – 1.01)		1.01 (0.99 – 1.02)
Alaska		1.68 (1.28 – 2.20)*		1.53 (1.23 – 1.91)*
Colorado		1.30 (1.16 – 1.47)*		1.22 (1.08 – 1.38)*
New Jersey		0.29 (0.18 – 0.48)*		0.31 (0.20 – 0.50)*
New Mexico		1.24 (1.07 – 1.43)*		1.16 (0.99 – 1.37)
North Carolina		0.87 (0.79 – 0.95)*		0.97 (0.88 – 1.05)
Oregon		1.53 (1.21 – 1.95)*		0.95 (0.74 – 1.23)
Year of death		1.01 (1.00 – 1.03)		1.03 (1.01 – 1.01)*
Variance component	0.20*	0.07*	0.16*	0.05*
Intercept	0.54 (0.51 – 0.56)*	0.83 (0.77 – 0.89)*	0.33 (0.31 – 0.34)*	0.53 (0.48 – 0.58)*

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Confidence intervals are 95%. AIAN = American Indian or Alaska Native, PI = Pacific Islander. Referent categories were age 30–39, white, not married, firearm method, and other participating states.

*
p<.01