



Original Contribution

Firearms and Suicide in the United States: Is Risk Independent of Underlying Suicidal Behavior?

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On an average day in the United States, more than 100 Americans die by suicide; half of these suicides involve the use of firearms. In this ecological study, we used linear regression techniques and recently available state-level measures of suicide attempt rates to assess whether, and if so, to what extent, the well-established relationship between household firearm ownership rates and suicide mortality persists after accounting for rates of underlying suicidal behavior. After controlling for state-level suicide attempt rates (2008–2009), higher rates of firearm ownership (assessed in 2004) were strongly associated with higher rates of overall suicide and firearm suicide, but not with nonfirearm suicide (2008–2009). Furthermore, suicide attempt rates were not significantly related to gun ownership levels. These findings suggest that firearm ownership rates, independent of underlying rates of suicidal behavior, largely determine variations in suicide mortality across the 50 states. Our results support the hypothesis that firearms in the home impose suicide risk above and beyond the baseline risk and help explain why, year after year, several thousand more Americans die by suicide in states with higher than average household firearm ownership compared with states with lower than average firearm ownership.

firearms; guns; suicidality; suicide; suicide attempts

Abbreviation: BRFSS, Behavioral Risk Factor Surveillance System.

On an average day in the United States, more than 100 Americans die by suicide; half of these suicides involve the use of firearms (1). Suicide rates, both overall and by firearms, are higher, in general, in places where household firearm ownership is more common. By contrast, rates of suicide by methods other than firearms are not significantly correlated with rates of household firearm ownership (2, 3). This pattern of higher suicide rates in places where firearms are more readily available, driven by higher firearm suicide rates, has been reported in ecological studies that have adjusted for several potential confounders, including aggregate measures of psychological distress, degree of urbanization, alcohol and illicit drug use and abuse, poverty, education, and unemployment (2–6). Household firearm ownership has also consistently been found to be a strong predictor of suicide risk in studies that use individual-level data. Every US case-control study, for example, has found that the presence of a gun in the home is a risk factor for suicide (7–20). In addition, the only large US cohort study to examine

the firearm-suicide connection found that suicide rates among California residents who purchased handguns from licensed dealers were more than twice as likely to die by suicide as were age- and sex-matched members of the general population, not only immediately after the purchase, but throughout the 6-year study period (21). Here too, the increase in suicide risk was attributable entirely to an excess risk of suicide with firearms (21).

The following observations further support the plausibility that the association between firearms and suicide is real: 1) the association is robust to adjustment for measures of psychopathology (7–16), 2) the risk extends beyond the gun owner to all household members (14, 15, 21) and persists for years after firearms are purchased (14, 15, 21), 3) the rates of psychiatric illness and psychosocial distress are similar among households with firearms versus those without firearms (15, 22–25), and 4) ecological studies of the firearm-suicide relationship, which are not subject to recall bias or to reverse

causation, yield associations similar to those observed in individual-level studies. Nevertheless, the idea that the availability of firearms plays an important role in determining a person's suicide risk and a population's suicide rate continues to meet with skepticism, the most decisive objection being that empirical studies to date have not adequately controlled for the possibility that members of households with firearms are inherently more suicidal than members of households without firearms (26).

The current study takes advantage of recently available state-level suicide attempt data to put to test, for the first time, the hypothesis proffered by critics of the empirical literature that the association between firearm ownership and suicide mortality reflects unmeasured suicidal proclivities associated with firearm ownership rather than an independent risk of death by suicide conferred by access to guns. We test this hypothesis by assessing whether the association between state-level firearm ownership and completed suicide is robust to simultaneously accounting for suicide attempt rates.

MATERIALS AND METHODS

Suicide mortality data for each state were obtained through the Centers for Disease Control and Prevention's (Atlanta, Georgia) Web-Based Injury Statistics Query and Reporting System (1). Suicide data are grouped by firearm methods (*International Classification of Diseases, Tenth Revision*, E codes X72–X74) and nonfirearm methods (*International Classification of Diseases, Tenth Revision*, E codes X60–X71, X75–X84, Y87.0, and U03). Analyses are based on mortality data among adults aggregated over the 2-year period of 2008–2009, corresponding to the time period for which contemporaneous suicide attempt data are available.

State-level data on the percentage of individuals living in households with firearms (gun prevalence) were obtained from the 2004 Behavioral Risk Factor Surveillance System (BRFSS); 2004 is the most recent year for which state-level estimates are available (27). The BRFSS, the world's largest telephone survey (with more than 200,000 adult respondents annually), is an ongoing data collection program sponsored by the Centers for Disease Control and Prevention, with all 50 states participating. A detailed description of the survey methods used by BRFSS is available elsewhere (28–30). Briefly, trained interviewers collect data on a monthly basis by using an independent probability sample of households with telephones among the noninstitutionalized US population aged 18 years or older. All BRFSS questionnaires and data are available on the Internet (www.cdc.gov/brfss). Firearm ownership information was obtained by interviewers who began the firearm section of the survey by first informing respondents that “the next three questions are about firearms. We are asking these in a health survey because of our interest in firearm-related injuries. Please include weapons such as pistols, shotguns, and rifles; but not BB guns, starter pistols, or guns that cannot fire. Include those kept in a garage, outdoor storage area, or motor vehicle.” Presence of firearms in the home was assessed by asking respondents, “Are any firearms kept in or around your home?” Firearm prevalence estimates exclude respondents who did not know or refused to answer

the BRFSS firearm questions. Firearm ownership prevalence data are also available from 2001 and 2002; the correlation between the 2004 state-level measures of firearm ownership and measures from 2002 and 2001 is nearly perfect ($\rho = 0.98$). In California, interviewers did not ask the household firearms question in 2004; we substituted the firearm prevalence estimate from the 2002 questionnaire.

State-level measures of past-year suicide attempts were obtained from the 2008 National Survey on Drug Use and Health (31). The National Survey on Drug Use and Health is a national- and state-level survey of a representative sample of the noninstitutionalized US civilian population aged 12 years or older. The National Survey on Drug Use and Health collects data on health risks related to the use of illicit drugs, alcohol, and tobacco; initiation of substance use; substance use disorders and treatment; health care; and mental health. The report from which suicide attempt data were obtained asked about suicidal thoughts and behaviors among adults only (92,264 respondents aged 18 years or older in all 50 states in the 2008 and 2009 surveys). Respondents were first asked, “The next few questions are about thoughts of suicide. At any time in the past 12 months, that is from [datefill] up to and including today, did you seriously think about trying to kill yourself?” If respondents answered that they had thought about suicide, they were then asked, “During the past 12 months, did you try to kill yourself?” Attempt data were also available separately for males, females, and adults aged 18–29 years.

Our primary outcomes were the rate of suicides per state during the 2-year study period, the rate of suicides involving firearms, and the rate of suicides involving methods other than firearms. Standard linear regression analyses were undertaken in conjunction with a bootstrapping process, in which 10,000 artificial data sets were generated to account for variability in the point estimates (as specified by the accompanying survey-based 95% confidence intervals). This was achieved by performing individual linear regressions in each artificial data set and taking the 2.5th and 97.5th percentiles of effect estimates as the boundaries for 95% confidence intervals. The data sets were created through sampling from Gaussian distributions with means and standard errors provided by the original survey estimates. Both unweighted analyses and analyses weighted by the states' populations are shown. Subgroup analyses are reported by using population-weighted regression results. The rate of suicidal acts, referred to herein as suicide attempts unless otherwise noted, is the sum of suicidal acts that are fatal (i.e., suicides) plus the far larger number of suicidal acts that are nonfatal (i.e., past-year suicide attempts from the National Survey on Drug Use and Health). Secondary stratified analyses were performed for adult men, adult women, adults aged 18–29 years, and adults aged 30 years or older.

To illustrate our main findings more concretely, we compared suicide deaths and suicide attempts during our study period in states that are the most extreme in their firearm prevalence. The group of high-prevalence states and the group of low-prevalence states are matched so that the numbers of person-years in the 2 groupings are approximately equal (i.e., the 16 states with the highest firearm prevalence are compared with the 6 states with the lowest firearm prevalence).

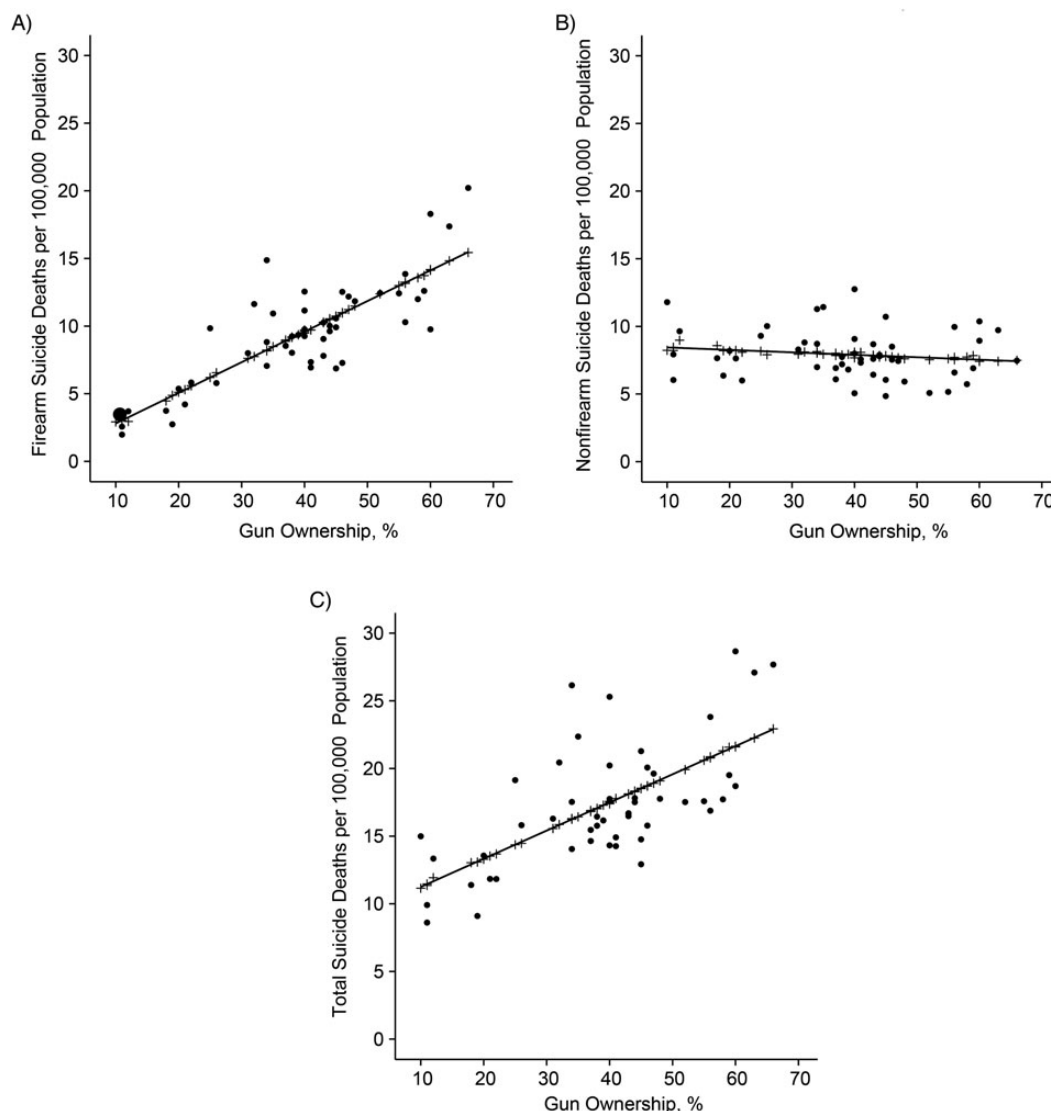


Figure 1. The visual discrepancy between the solid regression line (a model that examines the crude relationship between household firearm ownership and suicide mortality, A) by firearm suicides, B) by nonfirearm suicides, and C) overall) and a model that examines the simultaneous influence of suicide attempt and firearm ownership rates on suicide mortality (a line that can be visualized through the cross marks) is a representation of how little the association between firearm ownership and suicide mortality is affected by the covarying contribution of suicide attempt rates.

Similar mortality rate ratios were obtained when comparing the 10 states that are most extreme in firearm prevalence (not shown).

Our graphs depict the simultaneous effects of our 2 independent variables of interest, firearm ownership and suicide attempt rates, on our outcomes of interest, mortality from suicide overall (Figure 1A), from suicide involving firearms (Figure 1B), and from suicide involving all other methods (Figure 1C). The visual discrepancy between a model that examines the crude relationship between household firearm ownership and suicide mortality (the solid regression line) and a model that examines the simultaneous influence of suicide attempt and firearm ownership rates on suicide mortality (a line

visualized through the cross marks) is a representation of how much the relationship between firearm ownership and suicide mortality is affected by the covarying contribution of suicide attempt rates. The state-level measures of suicide mortality, household firearm ownership, and suicide attempt rates that were used in the primary analyses are provided in the Appendix.

RESULTS

Higher rates of firearm ownership are strongly associated with higher rates of overall suicide and firearm suicide, but not with nonfirearm suicide (Table 1). Suicide attempt rates are not significantly associated with suicide mortality rates in

Table 1. Association Between State-Level Measures of Household Firearm Ownership Prevalence^a (2004), Suicide Attempt Rates^b (2008–2009), and Suicide Mortality Rates^c (2008–2009) in the United States by Method of Suicide

Method of Suicide	Partial Correlation Coefficient ^d			Regression Coefficient ^d					
	Household Firearm Ownership		Suicide Attempt Rate	Household Firearm Ownership		Suicide Attempt Rate	Household Firearm Ownership		Suicide Attempt Rate
	Correlation Coefficient	P Value		Correlation Coefficient	P Value		Regression Coefficient	95% CI	
Firearm	0.82	0.001	–0.04	0.22	0.79	–0.33	–0.33	–2.37, 2.06	–0.56
Nonfirearm	–0.13	0.38	0.08	–0.02	0.55	0.63	0.63	–1.52, 2.14	1.14
Overall	0.65	0.001	0.02	0.21	0.88	0.30	0.30	–3.40, 3.70	0.58

Abbreviation: CI, confidence interval.

^a Household firearm ownership prevalence ranges from 10% to 66% (standard deviation, 14%).^b Suicide attempt rates range from 0.1 to 1.5% (standard deviation, 0.5%). Suicide attempt rates are not significantly associated with household firearm prevalence.^c Suicide mortality rates vary as follows: among adults, 8.6%–28.9%; firearm suicides, 2.0%–20.2%; and nonfirearm suicides, 4.9%–12.8%.^d Models are simultaneously adjusted for household firearm ownership and suicide attempt rates.

unadjusted models (correlation coefficient = -0.08 , $P = 0.60$) (data not shown) or in models that control for firearm ownership (partial correlation coefficient = 0.02 , $P = 0.89$) (Table 1). Suicide attempt rates are also not significantly associated with rates of household gun ownership (data not shown). The prevalence of household firearm ownership, which ranges from 10% to 66% across the 50 states, explains 67% of the variation in firearm suicide, 42% of the variation in overall suicide, and less than 2% of the variation in nonfirearm suicide. By contrast, suicide attempt rates, which range from 0.1% to 1.5%, explain less than 1% of the variation in rates of overall suicide, firearm suicide, and nonfirearm suicide. Indeed, suicide attempt rates are not significantly related to suicide mortality rates overall or by method, even in crude comparisons. Adjustment for suicide attempt data in regressions, therefore, has little influence on the magnitude of the associations between rates of firearm ownership and suicide mortality. For example, the partial correlation coefficient relating rates of household firearm ownership and suicide mortality in our primary analysis is 0.6 whether or not suicide attempts are included in the regression (data not shown). Likewise, regardless of whether suicide attempt rates are included in regressions, the partial correlation coefficient relating household firearm ownership and firearm suicide is 0.8 (data not shown).

Regression analyses further quantify these relationships. Suicide rates are, on average, 0.22 deaths (per 100,000 population) higher in states where firearm ownership rates are 1 percentage point higher (31). The relationship between firearm ownership and suicide rates is entirely accounted for by the relationship between firearm ownership and firearm suicides, as reflected in a β coefficient associated with firearm suicide of 0.22 (95% confidence interval: 0.18, 0.27), which is virtually identical to that for overall suicide ($\beta = 0.21$, 95% confidence interval: 0.14, 0.28); the β coefficient relating firearm ownership and nonfirearm suicide is essentially null ($\beta = -0.02$, 95% confidence interval: -0.05 , 0.02). By contrast, suicide rates are only slightly higher (0.30 deaths per 100,000 population) in states where rates of suicide attempts were 1 percentage point higher (Table 1). Because suicide attempt rates vary from 0.1 to 1.5 per 100,000 population, the maximum influence of suicide attempt rates on the suicide mortality rates observed across the 50 states is small ($0.30 \times 1.4 = 0.42$ deaths per 100,000 population on a suicide rate scale that ranges from 8.6 to 28.9 deaths per 100,000 population). By contrast, because firearm ownership prevalence ranges from 10% to 66%, the corresponding (maximum) influence of household firearm ownership on suicide rates is $0.22 \times 56 = 12.3$ deaths per 100,000 population. Weighted and unweighted analyses produce virtually identical coefficients for household firearm ownership in relationship to suicide mortality (Table 1). Likewise, the relationship between variation in suicide attempt rates and suicide mortality in both weighted and unweighted analyses is similar, nonsignificant, and materially trivial (Table 1). Secondary stratified analyses by sex and by age groupings for which suicide attempt data were available produce patterns similar to those in primary analyses (Table 2).

Although the aggregate number of people residing in the 16 high-gun ownership states and the 6 low-gun ownership states is approximately equal, and the suicide attempt rates are similar, almost twice as many adults (11,428) completed

Table 2. Associations Among State-Level Measures of Household Firearm Ownership Prevalence^a (2004), Suicide Attempt Rates^b (2008–2009), and Suicide Mortality Rates^c (2008–2009) in the United States by Method of Suicide and Sex and Age Group

Covariates by Subgroup Analysis	Firearm Suicide		Nonfirearm Suicide		Overall Suicide	
	Regression Coefficient ^d	95% CI	Regression Coefficient ^d	95% CI	Regression Coefficient ^d	95% CI
Stratified analyses of 2008–2009 suicide rates						
Males						
Household firearm ownership	0.38	0.31, 0.45	–0.04	–0.08, 0.01	0.35	0.25, 0.45
Suicide attempt rate per 100 population	–0.25	–2.92, 2.34	0.79	–1.32, 2.00	0.54	–3.60, 3.63
Females						
Household firearm ownership	0.06	0.04, 0.08	0.00	–0.03, 0.03	0.06	0.03, 0.10
Suicide attempt rate per 100 population	0.07	–0.65, 0.75	0.29	–0.97, 1.30	0.37	–1.31, 1.71
Aged 18–29 years						
Household firearm ownership	0.23	0.18, 0.29	0.06 ^e	0.01, 0.11 ^e	0.29	0.21, 0.38
Suicide attempt rate per 100 population	–0.47	–1.23, 0.87	0.21	–0.93, 1.08	–0.25	–1.84, 1.66
Aged ≥30 years						
Household firearm ownership	0.21	0.15, 0.27	–0.05	–0.09, –0.00	0.16	0.08, 0.25
Suicide attempt rate per 100 population	–0.95	–2.63, 2.07	0.21	–1.78, 1.88	–0.74	–3.86, 3.50
Weighted stratified analyses of 2008–2009 suicide rates						
Males						
Household firearm ownership	0.38	0.30, 0.44	–0.04	–0.08, 0.00	0.33	0.23, 0.43
Suicide attempt rate per 100 population	–1.25	–3.68, 2.89	1.17	–1.40, 2.28	0.08	–4.45, 4.46
Females						
Household firearm ownership	0.06	0.05, 0.08	0.00	–0.03, 0.03	0.07	0.03, 0.10
Suicide attempt rate per 100 population	–0.01	–0.64, 0.67	0.22	–0.94, 1.24	0.21	–1.23, 1.60
Aged 18–29 years						
Household firearm ownership	0.20	0.17, 0.24	0.04	–0.00, 0.07	0.24	0.18, 0.30
Suicide attempt rate per 100 population	0.29	–0.76, 0.94	0.85	–0.52, 1.12	1.14	–1.08, 1.83
Aged ≥30 years						
Household firearm ownership	0.20	0.15, 0.26	–0.04	–0.08, –0.00	0.17	0.08, 0.26
Suicide attempt rate per 100 population	–1.59	–3.22, 2.27	–0.10	–2.00, 1.97	–1.68	–4.67, 3.66

Abbreviation: CI, confidence interval.

^a Household firearm ownership prevalence ranges from 10% to 66% (standard deviation, 14%).^b Suicide attempt rates range from 0.1% to 1.5% (standard deviation, 0.5%). Suicide attempt rates are not significantly associated with household firearm prevalence.^c Suicide rates vary as follows: among adults, 8.6%–28.9%; firearm suicides, 2.0%–20.2%; and nonfirearm suicides, 4.9%–12.8%.^d Models are simultaneously adjusted for household firearm ownership and suicide attempt rates.^e After exclusion of the South Dakota outlier, the regression coefficient is 0.04 (95% CI: –0.01, 0.08).

Table 3. Suicides and Suicide Attempts in US States with the Highest and Lowest Gun Ownership Levels, 2008–2009

Population Group by State Gun Ownership Level	Person-Years	No. of Firearm Suicides	No. of Nonfirearm Suicides	Total No. of Suicides	Population With Suicidal Acts, ^e %	95% CI
High-gun ownership states ^{a,b}						
All adults	62,383,037	7,275	4,153	11,428	0.41	0.18, 0.63
Adult men	30,273,657	6,263	2,905	9,168	0.38	0.16, 0.60
Adult women	32,109,380	1,012	1,248	2,260	0.44	0.17, 0.71
Adults aged 18–29 years	13,829,694	1,303	960	2,263	1.04	0.40, 1.67
Adults aged ≥30 years	48,553,343	5,972	3,193	9,165	0.24	0.09, 0.38
Low-gun ownership states ^{c,d}						
All adults	62,447,876	1,697	4,341	6,038	0.49	0.00, 0.98
Adult men	29,810,942	1,572	3,207	4,779	0.38	–0.04, 0.79
Adult women	32,636,934	125	1,134	1,259	0.60	–0.01, 1.21
Adults aged 18–29 years	13,335,648	219	778	997	0.97	–0.01, 1.94
Adults aged ≥30 years	49,112,228	1,478	3,563	5,041	0.26	–0.06, 0.58

Abbreviation: CI, confidence interval.

^a High-gun ownership states are Alabama, Alaska, Arkansas, Idaho, Iowa, Kentucky, Louisiana, Mississippi, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, Tennessee, West Virginia, and Wyoming.

^b In high-gun ownership states, 51% of adults live in households with firearms.

^c Low-gun ownership states are Connecticut, Hawaii, Massachusetts, New Jersey, New York, and Rhode Island.

^d In low-gun ownership states, 15% of adults live in households with firearms.

^e The percent of the population that engaged in fatal and nonfatal suicidal acts over the past year.

suicide in the high-gun ownership states compared with the low-gun ownership states (6,038) (Table 3). This difference in total suicides over a 2-year period is almost entirely attributable to differences in firearm suicides (7,275 vs. 1,697), with virtually no difference in the number of nonfirearm suicides (4,153 vs. 4,341).

Figure 1 illustrates the strong association between rates of household firearm ownership and mortality from overall suicide (Figure 1A) and suicide involving firearms (Figure 1B) and the weak association between rates of firearm ownership and suicide involving methods other than firearms (Figure 1C). In addition, Figure 1 illustrates that suicide attempt rates have little influence on the relationship between firearm ownership rates and mortality from suicide overall and from suicide by firearms and correlate weakly with suicide by methods other than firearms. For example, adjustment for suicide attempt rates hardly moves the cross-hatches off the regression line linking firearm ownership and firearm suicide rates (or off the regression line linking firearm ownership to overall suicide rates), providing a visual representation of how little the observed association between suicide mortality and firearm ownership depends on confounding by suicide attempt rates. These visual renderings directly mirror results from linear regression analyses.

DISCUSSION

As in previous empirical work from individual-level (7–16, 21) and ecological studies (2–6), we found that higher rates of firearm ownership are associated with higher rates of overall suicide and firearm suicide, but not with nonfirearm suicide. Our finding that the firearm-suicide association per-

sists unabated after controlling for suicide attempt rates is consistent with previous ecological work that controlled for aggregate-level measures associated with suicidality, including rates of major depression, serious suicidal thoughts, serious mental illness, alcohol and drug dependence and abuse, urbanization, poverty, and unemployment (3, 6, 32). Moreover, our finding that suicide attempt rates do not covary with either firearm ownership or with rates of suicide suggests that, although states with higher rates of firearm ownership may differ from states with lower rates of firearm ownership, these differences do not appear to play an important role in determining the frequency with which people engage in suicidal behavior.

In the United States, where firearms are the method used in more than 50% of all suicides and where roughly 1 in 3 homes contains firearms, even small relative declines in the use of firearms in suicide acts could result in large reductions in the number of suicides, depending on what, if any, method would be substituted for firearms. Consider, for example, the fact that more than 90% of all suicidal acts with firearms are fatal, but suicidal acts with firearms constitute only 5% of all deliberate self-harm episodes. In contrast, fewer than 3% of all suicidal acts with drugs or cutting are fatal but, as a group, such acts constitute approximately 90% of all attempts (33, 34). If even 1 in 10 of the approximately 22,000 persons who attempted suicide with firearms in 2010 (the 19,932 who died and the approximately 2,000 who survived) substituted drugs or cutting, there would have been approximately 1,900 fewer suicide deaths. The potential for substantial reduction in suicide rates is apparent in our comparison of suicides in high- versus low-gun ownership states, where suicide attempt rates are similar, but the rate of suicide is twice as high in high-gun ownership states (with differences in mortality attributable

entirely to differences in suicide by firearms), with a net excess of approximately 6,000 suicides in high-gun ownership states over a 2-year period.

Our study should be considered in light of several potential limitations. First, our measure of firearm availability is household firearm ownership. This is a reasonable measure of exposure because most firearm suicides involve firearms from the victims' homes (15), but this measure does not provide potentially important information about many characteristics of firearm availability that may affect risk, such as how firearms are stored. Second, our measure of suicide attempt rates is based on survey responses, and we were unable to control for the seriousness or persistence of the suicidal intent that accompanied the reported events. On the other hand, there is no a priori reason to expect that the suicidal intent among attempters in high-gun ownership states would be different (higher) than the intent among attempters in low-gun ownership states. Consistent with this expectation, prior work has failed to find higher rates of mental illness, substance abuse or dependence, or suicidal thoughts or attempts among people living in homes with firearms compared with those living in homes without firearms (22–25). Third, firearm prevalence data in primary analyses come from the 2004 BRFSS (the latest year for which nationally representative state-level data are available), whereas mortality and suicide attempt data come from 2008–2009. The effect of this temporal discrepancy on our results is likely to be small because guns are highly durable and, as has been observed previously, the cross-sectional pattern of household firearm ownership tends to be remarkably constant over time (35). Analyses that use mortality data from 2000–2004 and firearm ownership data from 2002 or 2004, for example, produce findings identical to the second decimal place (and substantively indistinguishable from those reported by using mortality data from 2008–2009 and firearm ownership data from 2004). Fourth, our study used aggregate data for our exposures and outcomes of interest; as is always the case with analyses based on aggregate data, drawing causal inferences about individual risk factors can be problematic (36). However, our key finding—a strong association between household firearm prevalence and suicide by firearms (but not by other methods)—is likely to reflect associations observable at the individual level because findings from individual-level studies (15) indicate that the majority of suicides by firearms occur in the decedents' homes and involve firearms owned by the victims or other members of the households.

Despite these limitations, our results support the hypothesis established in prior individual-level work (7–16, 21) that the availability of lethal means is associated with risk of death by suicide above and beyond the baseline risk of suicidal behavior. Our study suggests that this additional risk is large, operates across sex and age groups, and plausibly accounts for thousands of deaths every year.

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(Appendix follows)

Appendix Table 1. Data on Suicide by Method in the United States (2008–2009), Suicide Attempts (2008–2009), and Firearm Ownership (2004) by State

State	No. of Suicides per 100,000 Population	No. of Firearm Suicides per 100,000 Population	No. of Nonfirearm Suicides per 100,000 Population	Adults in Households With Firearms, %	Suicide Attempts per 100 Population
Alabama	17.3	12.3	5.0	52	0.22
Alaska	28.8	18.4	10.4	60	0.23
Arizona	21.1	12.0	9.1	32	0.62
Arkansas	19.4	12.6	6.9	59	0.92
California	13.5	5.4	8.2	20	0.41
Colorado	22.6	11.1	11.6	35	0.42
Connecticut	11.3	3.7	7.6	18	1.01
Delaware	15.6	5.7	9.9	26	0.12
Florida	18.9	9.7	9.2	25	0.52
Georgia	14.5	9.4	5.1	40	0.11
Hawaii	14.5	3.1	11.4	10	0.21
Idaho	23.8	13.8	10.0	56	0.62
Illinois	11.9	4.2	7.7	21	0.51
Indiana	16.4	9.2	7.2	38	0.42
Iowa	15.7	7.2	8.5	46	0.32
Kansas	16.7	9.1	7.6	43	0.52
Kentucky	17.8	11.9	5.9	48	0.22
Louisiana	14.8	9.9	4.9	45	0.41
Maine	17.7	9.7	8.0	40	0.82
Maryland	11.8	5.8	6.0	22	0.31
Massachusetts	10.0	2.0	8.0	11	0.21
Michigan	15.1	7.4	7.7	41	0.81
Minnesota	14.3	7.0	7.3	41	0.81
Mississippi	17.5	12.3	5.1	55	0.42
Missouri	17.6	9.7	7.9	44	0.32
Montana	26.9	17.3	9.7	63	0.33
Nebraska	12.8	6.8	6.0	45	0.51
Nevada	25.4	14.5	11.0	34	0.53
New Hampshire	16.4	8.1	8.4	31	0.32
New Jersey	8.6	2.6	6.0	11	0.61
New Mexico	25.0	12.4	12.6	40	0.73
New York	9.2	2.8	6.4	19	0.41
North Carolina	16.0	9.3	6.7	39	0.52
North Dakota	16.5	10.0	6.4	56	0.32
Ohio	14.1	7.1	7.0	34	0.71
Oklahoma	19.9	12.4	7.5	46	0.42
Oregon	20.3	11.2	9.1	40	0.42
Pennsylvania	15.7	8.0	7.7	38	0.32
Rhode Island	13.3	3.7	9.6	12	1.51
South Carolina	16.6	10.2	6.4	43	0.42
South Dakota	18.9	9.9	9.1	60	0.42
Tennessee	19.6	12.2	7.4	47	0.32
Texas	14.6	8.5	6.1	37	0.61
Utah	21.9	10.9	11.0	45	0.52

Table continues

Appendix Table 1. Continued

State	No. of Suicides per 100,000 Population	No. of Firearm Suicides per 100,000 Population	No. of Nonfirearm Suicides per 100,000 Population	Adults in Households With Firearms, %	Suicide Attempts per 100 Population
Vermont	17.9	10.0	7.8	44	0.52
Virginia	15.4	8.5	6.9	37	0.32
Washington	17.5	8.8	8.7	34	0.72
West Virginia	17.4	11.8	5.6	58	0.72
Wisconsin	16.5	7.8	8.7	43	0.52
Wyoming	26.9	19.7	7.3	66	0.53