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Association between state minimum wage and firearm suicides in the USA, 2000–2020

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Abstract

Background: Firearm suicides constitute a major public health issue. Policies that enhance economic security and decrease community-level poverty may be effective strategies for reducing risk of firearm suicide. This study examined the association between state minimum wage and firearm suicide.

Methods: State minimum wage, obtained from Temple's Law Atlas and augmented by legal research, was conceptualised using the modified Kaitz Index and a continuous variable centred on the federal minimum wage. State-level suicide counts were obtained from 2000 to 2020 multiple-cause-of-death mortality data from the National Vital Statistics System. Log-linear regressions were conducted to model the associations between state minimum wage and firearm suicides, stratifying by demographic groups. Analyses were conducted in 2023.

Results: A one percentage point increase in a state's modified Kaitz Index was associated with a 0.3% (95% CI –0.6% to –0.0%) decrease in firearm suicides within a state. A US\$1.00 increase in a state's minimum wage above the federal minimum wage was associated with a 1.4% (95% CI

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Contributors MM-F is guarantor for this research. MM-F, CD and MC conceptualised the study. MM-F, CD and GFM aggregated and cleaned the data. CG and ADM conducted the legal epidemiology for the study. ADM led the selection of appropriate policy covariates. MM-F and CD conducted the analyses. MM-F, CD, NL and MC contributed to the writing. All authors contributed to the data analysis plan, interpretation of the results and review of the manuscript.

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–2.1% to –0.6%) decrease in firearm suicides. When stratified by quartile of firearm ownership, the modified Kaitz Index was associated with decreases in firearm suicides most consistently in the two lowest quartiles.

Conclusion: Increasing a state's minimum wage may be a policy option to consider as part of a comprehensive approach to reducing firearm suicides. These findings expand the evidence base for how economic policies may be leveraged to reduce firearm suicides.

BACKGROUND

Firearm suicides are a significant public health concern in the USA. In 2021, firearms were the most common mechanism for suicide with over 26 000 suicide deaths resulting from a firearm injury.¹ Age-adjusted rates of firearm suicide increased by 27% from 2001 to 2021.² However, disparities exist in these rates, with individuals 65 years and older, non-Hispanic white persons, and males having higher rates.³ These disparities in rates indicate that select demographic groups may disproportionately experience risk factors associated with firearm suicide. There are multiple interrelated factors at the individual, relationship, community and societal levels that may increase firearm suicide risk.^{4,5} Many communities are disproportionately impacted by these risk factors, underscoring how policy-driven solutions addressing social and economic risk factors might be leveraged to reduce suicide risk.

Research suggests that economic stressors may serve as community-level and individual-level drivers of suicide.^{3,6–10} Suicide rates historically increase during economic recessions and decrease during economic expansions, most notably among working individuals aged 25–64 years.⁸ A prior study found that counties with the highest community poverty levels had firearm suicide rates 1.3 times as high as counties with the lowest community poverty levels.³ Together, these findings suggest that policies that enhance economic security and decrease community-level poverty by providing support to individuals and families with low incomes may be an effective strategy for reducing risk of firearm suicide. One example of income support policies is minimum wage (MW) laws.

MW laws determine the lowest hourly wage most companies must pay their employees. These laws are set at the federal, state or local level. If there is no state MW law or a state's MW is lower than the federal rate (currently at US\$7.25 an hour since 2009), then employees receive the federal MW. At the end of 2021, 30 states had MWs that were higher than the federal minimum, with Washington having the highest rate of US\$15.74 an hour.¹¹ Raising the MW may increase low-wage workers' incomes and reduce the number of families living in poverty.¹²

As poverty has been identified as a structural determinant of firearm suicide risk, higher MW may serve as an important strategy for reducing firearm suicides.³ Additionally, increasing MW may help alleviate financial stress¹³ and improve life satisfaction,¹⁴ which in turn may decrease suicide risk.⁹ MW laws may also impact individuals who do not work MW jobs. For example, higher MW is associated with improved child health.¹⁵ Higher MW may improve child well-being by reducing parental stress, increasing family income and increasing time available for parenting.¹⁶

Previous research indicates that a higher MW was associated with a decrease in state-level suicide rates. One study estimated that a US\$1.00 increase in a state's real MW was associated with a 1.9% decrease in the annual state suicide rate.¹⁷ Another study found that a US\$1.00 increase in the MW was associated with a 5.9% decrease in suicide rates among individuals with a high school education or less.¹⁸ However, to our knowledge, no study to date has examined if this relationship applies to firearm suicides, accounted for the differing cost of living between states, or if the association is consistent across different populations.

As firearm injuries account for most of suicide deaths,¹ this study examined the association between state MW and firearm suicides specifically between 2000 and 2020. Analyses were stratified by decedent characteristics to examine whether associations differed by demographics and by state estimates of firearm ownership. Findings may improve our understanding of how MW may relate to suicide risk and inform potential strategies to reduce firearm suicides.

METHODS

Data source

Data on the number of firearm suicides and population estimates were obtained from 2000 to 2020 (last year bridged race and ethnicity are comparable across years) multiple-cause-of-death mortality data from the restricted-use National Vital Statistics System (NVSS) of the CDC's National Center for Health Statistics. NVSS compiles information from death certificates and codes the mortality data using the *International Classification of Disease—10th Revision* (ICD-10). Firearm suicides were defined as an ICD-10 code of X72–X74 in the underlying cause of death field. Data were aggregated to the 50-state level.

Data on MWs, conceptualised as the modified Kaitz Index (KI)^{19 20} (ie, the proportion of a state's median income earned by a full-time worker earning MW), were obtained from prior research of state-level MW.²⁰ As a sensitivity analysis, MW was also conceptualised as a 'centered MW' defined as the difference between the 2001 Consumer Price Index-adjusted state MW and the federal MW (conceptually, the centred MW takes on non-negative values and is equal to zero if the state MW was below or equal to the federal MW). Finally, a dichotomous MW was created to indicate whether a state's MW was either above the federal rate ('1') or not ('0').

Data on state firearm policies were obtained from the Johns Hopkins Center for Gun Violence Solutions as described in prior research.²⁰ These policies included state laws requiring a permit to purchase a handgun, state laws requiring a background check for private firearm purchases and state laws governing the process for issuing permits to carry a concealed handgun in public. Individual, state-level, policy variables were constructed from these data based on the state by year a particular policy was in effect, with a '1' representing ≥6 months and a '0' representing <6 months or not at all.

State-level data on household firearm ownership rates were obtained from the RAND Corporation, derived from a statistical model that uses a range of survey and administrative data sources to estimate household firearm ownership rates.²¹ A cross-sectional state-level

variable was constructed as described in a prior study representing the quartile with which each state's average firearm ownership rate from 2000 to 2016 resided as a static dummy variable (see Merrill-Francis *et al* for additional discussion).²⁰ Finally, additional data on the demographic and socioeconomic makeup of states were obtained from IPUMS USA, a data source that makes U.S. census microdata available for researchers.²² Specifically, state-by-year data from 2000 to 2020 were collected on the percent of the state population comprised of each racial/ethnic group, age group, educational attainment, and marital status. Data on the percent of the state population residing in a Metropolitan Statistical Area (MSA) were obtained from Web-based Injury Statistics Query and Reporting System (WISQARS) and data on state unemployment rates were obtained from the University of Kentucky Center for Poverty Research National Welfare Data.²³

Statistical analysis

The association between state MW was examined using log-linear regression models with a final state-year panel dataset comprising all 50 states for the years 2000–2020. A negative binomial regression model was used when there was evidence of overdispersion; otherwise, Poisson models were used.

The main model regressed firearm suicides on the KI, controlling for firearm policies, state demographic and socioeconomic characteristics, unemployment rates, year fixed effects and state fixed effects. Sensitivity analyses also included the Gini coefficient, a measure of income inequality, and the percent of the state population living in poverty.²⁴ For additional information on specific covariates, see online supplemental file. State-year population, obtained from WISQARS, was used as the model offset. The model output was used to estimate the number of firearm suicides that would have been averted in 2020 if MW was increased by US\$1.00 across all states (online supplemental file 1).

Additional log-linear models were then estimated that stratified firearm suicides by decedent demographic characteristics, including urbanicity (lived in an MSA or did not), race and ethnicity (non-Hispanic black, non-Hispanic white and Hispanic), age (10–24 years, 25–44 years, 45–64 years and 65 plus years) and sex (male and female). Model offset variables corresponded to the population estimates of the demographic group being analysed.

Additional models were analysed regressing firearm suicides on the modified KI interacted with the four firearm ownership quartile dummy variables. These model specifications included all additional covariates from the baseline model and were stratified and estimated for the same decedent demographic characteristics as the baseline model.

All models underwent several sensitivity analyses, including alternate MW conceptualisation, alternate covariate selection and the exclusion of 2020 data to explore potential idiosyncratic changes in firearm suicides that occurred during the COVID-19 pandemic. For all models, robust SEs were estimated, clustered at the state level. All data were analysed in 2023 using Stata/MP V.17.0. Analyses were also verified by a second analyst to ensure accuracy. This activity was conducted consistent with applicable federal law and CDC policy (45 CFR §46).

Patient and public involvement

No patient or public involvement.

RESULTS

The mean number of firearm suicides between 2000 and 2020 was $19\,823.4 \pm 627.1$ annually. The trend in the number of firearm suicides has been increasing since approximately 2006 (figure 1). The mean modified KI percent was 28.2 ± 0.4 annually, signifying on average, a full-time MW worker would earn over a quarter of the state's median income.

A 1 percentage point increase in a state's modified KI was associated with a 0.3% (95% CI -0.6% to -0.0%) decrease in firearm suicides (table 1). The association between the modified KI and the number of firearm suicides was robust across models which excluded data from 2020 and controlled for both the state Gini coefficient and state poverty rate. When MW was dichotomised, there was no association between having a state MW higher than the federal rate and firearm suicides. For the centred MW conceptualisation, a US\$1.00 increase in a state's MW above the federal MW was associated with a 1.4% (95% CI -2.1% to -0.6%) decrease in firearm suicides.

When stratified by decedent characteristics, the modified KI was associated with decreases in the number of firearm suicides among men (-0.3% , 95% CI -0.6% to -0.1%), non-Hispanic black decedents (-0.8% , 95% CI -1.5% to -0.1%), non-Hispanic white decedents (-0.3% , 95% CI -0.6% to -0.0%) and decedents who resided in an MSA (-0.5% , 95% CI -0.8% to -0.2%) (table 2). When stratified by decedent age group, there were reductions in firearm suicides among decedents 10–24 years (-0.9% , 95% CI -1.5% to -0.3%) and 45–64 years (-0.4% , 95% CI -0.8% to -0.1%).

A US\$1.00 increase in state MW above the federal MW was associated with reductions in firearm suicides in all groups except for among Hispanic decedents (-1.5% , 95% CI -4.0% to $+1.1\%$), residents in a non-MSA (-0.6% , 95% CI -1.8% to $+0.6\%$) and among decedents 25–44 years (-0.6% , 95% CI -1.8% to $+0.6\%$).

Results from the firearm ownership interaction models suggest that an increase in the modified KI was associated with decreases in firearm suicides among states in the lowest quartile of firearm ownership (-0.6% , 95% CI -1.0% to -0.1%) and in the second lowest quartile of ownership (-0.3% , 95% CI -0.7% to -0.0%). Furthermore, these two quartiles of firearm ownership were most consistently associated with decreases in firearm suicide attributed to changes in the modified KI across model stratifications (table 3).

DISCUSSION

A higher state MW relative to the state's median income was associated with a small 0.3% decrease in firearm suicides. This association was statistically significant even when including both a state's Gini coefficient in the model and the percent of the state population living below the federal poverty line. The small effect size could be the result of the size of change in the modified KI. A one percentage point increase in the modified KI translates to

about a US\$0.25 increase in MW. This result implies a US\$1.00 increase in MW would have been associated with 300 fewer firearm suicides in 2020.

These findings are consistent with previous research that found higher state MW was associated with reductions in suicide. A prior study found a 1.9% decrease in the annual state suicide rate, including firearm and non-firearm suicides, was associated with a US\$1.00 increase in state MW using similar suicide data sources as this study.¹⁷ Another study found effects ranging from a 3.4% to 5.9% decrease in suicide rates among different demographic groups associated with a US\$1.00 increase in state MW above the federal MW.¹⁸ Our findings may be lower than the estimates from that study as it used a more targeted population of adults with high school education or less, a different time period and examined all age-adjusted suicides as opposed to just firearm suicides. It is possible that MW is particularly impactful in some populations relative to others or the effect size of MW varies by mechanism. Future research could continue to explore the associations between different conceptualisations of MW and suicide in select populations and by additional mechanisms.

When dichotomised, state MW was not associated with firearm suicides. The dichotomous conceptualisation of MW represents the population average of all states with a MW higher than the federal, regardless of the size of the MW rate, and thus does not capture the purchasing power of MW in a state or the magnitude of MW changes over time. This null finding demonstrates the importance of conceptualising MW to capture these factors so as not to overlook underlying associations between MW and health outcomes.

When stratified by decedent characteristics, a few patterns emerged. Higher MW was consistently associated with decreases in firearm suicides among decedents who were men, non-Hispanic white, non-Hispanic black and residents of an MSA. All of these groups experience a higher rate of firearm suicide except for residents of MSAs and non-Hispanic black populations. The association between higher MW and individuals who are non-Hispanic black is consistent with prior research that found MW may reduce inequities in pay between non-Hispanic white and non-Hispanic black workers.²⁵ Rural areas have higher rates of suicide,²⁶ yet MW was associated with decreases only among decedents in an MSA. Multiple factors might explain the lack of significance among decedents in a non-MSA. For example, some types of farm work are ineligible for MW and the majority of MW workers are employed in service occupations in the leisure and hospitality industry, which may be more concentrated in denser areas.²⁷ Future research could explore the mechanisms driving these geographic and gender differences in associations and how protections for agricultural workers may be associated with firearm suicides.

Increased MW was more consistently associated with a decrease in firearm suicide among decedents between 10 and 24 years and 45 and 64 years relative to most other age groups. These associations could align with key life events, such as finishing school, achieving financial independence, or preparing to retire. Future research could explore whether age impacts this association, particularly as individuals transition across life events. Reducing suicide among middle-aged adults may reduce age-related disparities in suicide, as middle-aged adults experience higher rates of suicide.¹

While the extent to which higher MW may reduce disparities can be assessed in some populations, these data did not allow for other important stratifications for understanding the equity implications of higher MW. Although suicide impacts all communities, some populations may be disproportionately burdened by suicide but there are challenges to examining these disparities at the state level over time. For example, due to the population size being too small for meaningful analysis, this study could not assess the association between MW and suicides among non-Hispanic American Indian or Alaskan Native populations, which experience among the highest rates of suicides.²⁶ This study also could not assess the association between higher MW and suicides among individuals who are sexual or gender minorities, another group who experiences an inequitable risk of suicide as the result of adverse experiences such as discrimination.^{28 29} This is an important limitation of these data, as individuals who are sexual minorities,^{30 31} gender minorities³¹ and Indigenous peoples³² are more likely to experience economic stressors which may be impacted by higher MW. Future studies using more comprehensive data-sets can examine if policies, including MW, help protect sexual and gender minorities and Indigenous peoples who experience historic and ongoing legacies of social and structural inequities, including racism, transphobia and heterosexism from firearm suicide.

Higher MW may be more protective in states with the two lowest quartiles of firearm ownership. MW was not associated with decreases in firearm suicide among states in the top two quartiles of firearm ownership in the main model. This finding is in contrast to prior research that found that higher MW was associated with decreases in firearm homicides more consistently in states with higher rates of firearm ownership.²⁰ Future studies could continue to examine how rates of firearm ownership moderate the relationship between state MW laws and firearm suicides.

Limitations

This study has several limitations. This study examined state MW policies and did not account for local MW ordinances; therefore, these findings may not be generalisable to local MWs. Future research could explore substate geographies. Additionally, spillover effects were not assessed in this study. A states' tipped MW was also not considered in developing state MW conceptualisations; future research could examine the extent to which tipped MW rates are associated with firearm suicides. Estimates of firearm ownership were only available through 2016. As quartile of firearm ownership appeared stable throughout the available time period (2000–2016), an average was created which may have introduced measurement error. States that have a higher MW may be different than states with a lower MW, potentially due to state risk and protective factors for suicide, or other state policies that may impact other aspects of suicide risk. Models incorporated state-fixed effects and included time-variant covariates to try and control for this. The federal MW increased between 2007 and 2009. The increase in federal MW was accounted for by using the modified KI and the use of year-fixed effects. Finally, this quasi-experimental ecological study cannot determine causality and was unable to determine the mechanisms driving the estimated associations. Future studies could continue to explore the association between MW and firearm suicides, including exploring potential mechanisms and if factors (eg, sociodemographic characteristics) modify this association.

CONCLUSIONS

Higher MW was associated with a small decrease in firearm suicides. Policy-makers seeking options to reduce suicide rates may want to consider MW. This small association observed between MW and firearm suicide suggests a need for comprehensive strategies because suicide risk is driven by a variety of factors. Suicide is preventable and CDC's Suicide Prevention Resource for Action describes a range of strategies based on the best available evidence.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data availability statement

Data may be obtained from a third party and are not publicly available. Data were obtained from NCHS. More information may be found here: <https://www.cdc.gov/nchs/nvss/nvss-restricted-data.htm>.

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WHAT IS ALREADY KNOWN ON THIS TOPIC

- Prior studies have found that increased minimum wage is associated with a decrease in suicides. However, it is not known whether this association applies to firearm suicides and whether these associations are consistent across populations, conceptualisations of minimum wage and the state context.

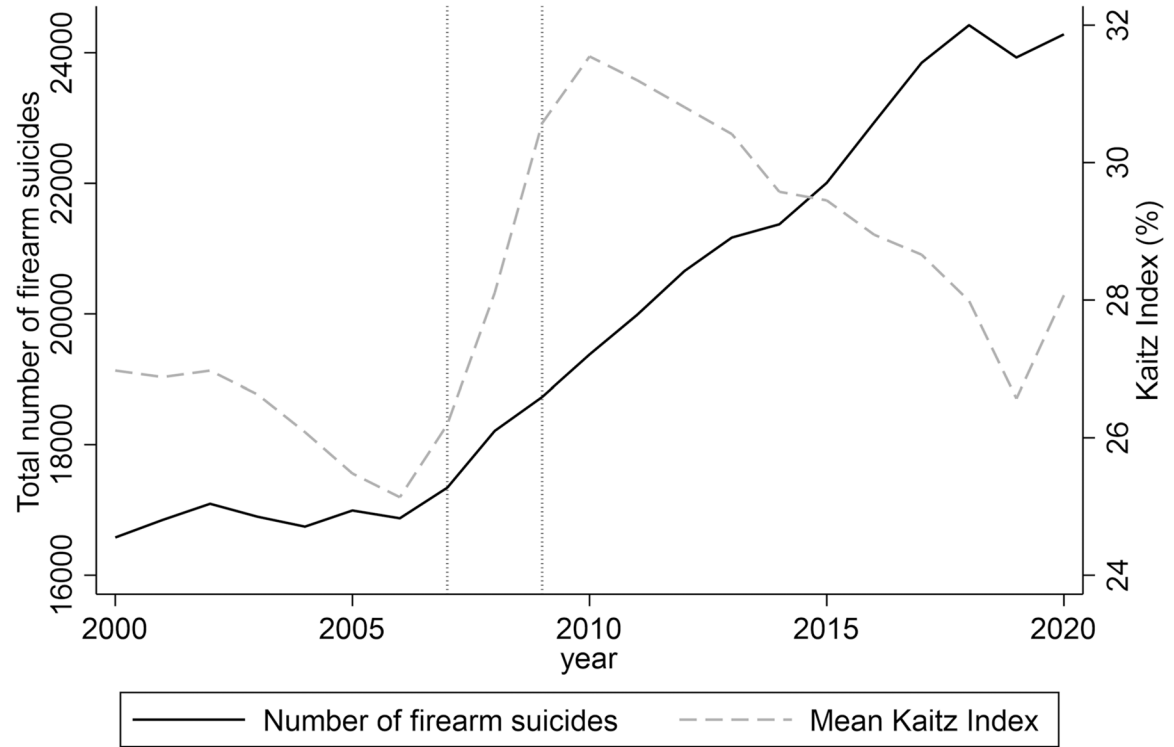
WHAT THIS STUDY ADDS

- Increasing a state's minimum wage to align more closely with a state median's income is associated with reductions in firearm suicides overall. However, it was not associated with reductions among women decedents, Hispanic decedents, decedents residing in a non-Metropolitan Statistical Area or decedent over the age of 65 years. Additionally, higher minimum wage compared with the median income is more consistently related to reductions in firearm suicides in states with the lowest estimates of firearm ownership.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE, OR POLICY

- This study contributes to the evidence base supporting the association between economic support policies and reductions in suicide. It also highlights the importance of research considering the heterogeneity of policy impacts across different populations and contexts.

Number of Firearm Suicides and Mean Kaitz Index, 2000-2020

**Figure 1.**

Number of firearm suicides and the mean state-level Kaitz Index in the 50 US states, 2000–2020 (n=1050).

Table 1

The association between state minimum wage and the number of firearm suicides^{*} in the 50-state panel dataset, 2000–2020 (n=1050)

Model[†]	Main effect percent change (95% CI)	Predicted suicides averted in 2020 from US\$1.00 increase in minimum wage (95% CI)
Main model (Kaitz Index)	-0.3[*] (-0.6 to -0.0 [‡])	300 (12 to 552)
Main model (Kaitz Index) without 2020	-0.3[*] (-0.6 to -0.0 [‡])	291 (34 to 547)
Main model (Kaitz Index) including state Gini coefficient and state poverty rate	-0.3[*] (-0.6 to -0.1)	326 (63 to 589)
Dichotomous minimum wage	-1.2 (-2.9 to +0.6)	–
Minimum wage centred around federal minimum wage	-1.4^{***} (-2.1% to -0.6%)	333 (147 to 517)

For all models, robust SEs were estimated, clustered at the state level in a negative-binomial regression as overdispersion was indicated. For additional information on how predicted suicide estimates averted were calculated, see the technical appendix.

^{*} p≤0.05,

^{**} p≤0.01,

^{***} p≤0.001.

^{*} Data from the 2000–2020 multiple-cause-of-death mortality data from the National Vital Statistics System where firearm suicides were defined as ICD-10 codes of X72–X74 in the underlying cause of death field.

[†] Additional model covariates included Permit to Purchase Policies, Comprehensive Background Check Policies, and Concealed Carry Laws, percent of population in a Metropolitan Statistical Area, percent of the state population consisting of male persons, percent of the state population consisting of non-Hispanic white persons, non-Hispanic black persons, and Hispanic persons, persons between the ages of 35 and 44 years, persons between the ages of 45 and 54 years, persons between the ages of 55 and 64 years, persons that held a high school diploma, persons who are veterans, and persons that were married, unemployment rates, year fixed effects and state fixed effects.

[‡] Due to rounding, additional digits after the 10th decimal place are not shown and appear as 0.0.

ICD-10, International Classification of Disease—10th Revision.

Table 2

Association between state-level modified Kaitz Index and the number of firearm suicides^{*} in a 50 US state panel dataset, 2000–2020 (n=1050)

Main model stratified [†]	Main effect of Kaitz Index (%) (95% CI)	Main effect of centred minimum wage (95% CI)
Stratified by sex		
Men	−0.3 [*] (−0.6 to −0.1)	−1.3 ^{**} (−2.1 to −0.5)
Women	−0.3 (−0.8 to +0.3)	−1.8 ^{**‡} (−2.9 to −0.6)
Stratified by decedent race and ethnicity		
Non-Hispanic black	−0.8 ^{**‡} (−1.5 to −0.1)	−2.7% ^{**‡} (−4.4 to −1.0)
Non-Hispanic white	−0.3 [*] (−0.6 to −0.0 [§])	−1.2 ^{**} (−1.9 to −0.5)
Hispanic	−0.7 (−1.6 to +0.3)	−1.5 (−4.0 to +1.1)
Stratified by urbanicity		
Decedent resided in an MSA	−0.5 ^{**} (−0.8 to −0.2)	−1.7 ^{***} (−2.5 to −0.9)
Decedent resided in a non-MSA [¶]	−0.0 [§] (−0.4 to +0.4)	−0.6 (−1.8 to +0.6)
Stratified by decedent age		
10–24 years	−0.9 ^{**} (−1.5 to −0.3)	−3.7 ^{***} (−5.3 to −2.0)
25–44 years	−0.1 (−0.5 to +0.4)	−0.6 (−1.8 to +0.6)
45–64 years	−0.4 [*] (−0.8 to −0.1)	−1.6 ^{**} (−2.6 to −0.6)
65 plus years	−0.3 [‡] (−0.6 to +0.1)	−1.1 ^{**‡} (−2.1 to −0.2)

For all models, robust standard errors were estimated, clustered at the state level. Stratified models excluded covariate that aligned with offset variable (eg, male decedent model used male population as model offset and excluded % of population that is male in model specification).

^{*}
p≤0.05,

^{**}
p≤0.01,

^{***}
p≤0.001.

^{*}
Data from the 2000–2020 multiple-cause-of-death mortality data from the National Vital Statistics System where firearm suicides were defined as ICD-10 codes of X72–X74 in the underlying cause of death field.

[†] Additional model covariates included Permit to Purchase Policies, Comprehensive Background Check Policies, and Concealed Carry Laws, percent of population in a Metropolitan Statistical Area, percent of the state population consisting of male persons, percent of the state population consisting of non-Hispanic white persons, non-Hispanic black persons and Hispanic persons, persons between the ages of 35 and 44 years, persons between the ages of 45 and 54 years, persons between the ages of 55 and 64 years, persons that held a high school diploma, persons who are veterans, and persons that were married, unemployment rates, year fixed effects and state fixed effects.

[‡] Indicates a Poisson regression model was estimated due to results from overdispersion tests. Unless otherwise indicated, negative binomial regression models were estimated.

[§] Due to rounding, additional digits after the 10th decimal place are not shown and appear as 0.0.

[¶] N=987.

ICD-10, International Classification of Disease—10th Revision.

Table 3

Association between state-level modified Kaitz Index and the number of firearm suicides^{*} by quartiles of firearm ownership in the 50 US state panel dataset, 2000–2020 (n=1050)

Model [†] stratified	Lowest quartile (%) (95% CI)	Second lowest quartile (%) (95% CI)	Second highest quartile (%) (95% CI)	Highest quartile (%) (95% CI)
Main model	-0.6[*] (-1.0 to -0.1)	-0.3[*] (-0.7 to -0.0 [‡])	-0.2 (-0.5 to +0.2)	-0.2 (-0.6 to +0.2)
Stratified by sex				
Men	-0.5[*] (1.0 to -0.1)	-0.4[*] (-0.7 to -0.0 [‡])	-0.1 (-0.5 to +0.2)	-0.3 (-0.6 to +0.1)
Women [§]	-0.6 (-1.8 to +0.6)	-0.4 (-1.0 to +0.2)	-0.5 (-1.4 to +0.3)	+0.3 (-0.4 to +1.1)
Stratified by decedent race and ethnicity				
Non-Hispanic black [§]	-0.4 (-1.6 to +0.9)	-1.0[*] (-1.8 to -0.1)	-0.8[*] (-1.6 to -0.0 [‡])	-0.9 (-1.9 to +0.0 [‡])
Non-Hispanic white	-0.5^{**} (-0.9 to -0.2%)	-0.3[*] (-0.7 to -0.0 [‡])	-0.1 (-0.5 to +0.3)	-0.2 (-0.5 to +0.2)
Hispanic [§]	+0.1 (-3.2 to +3.5)	-0.6 (-1.5 to +0.3)	-2.5^{**} (-4.0 to -1.0)	-1.9 (-3.9 to +0.0)
Stratified by urbanicity				
Decedent resided in an MSA	-0.7^{**} (-1.3 to -0.2)	-0.5^{**} (-0.9 to -0.1)	-0.3 (-0.7 to +0.0 [‡])	-0.2 (-0.6 to +0.2)
Decedent resided in a non-MSA [¶]	-0.3 (-1.1 to +0.4)	-0.1 (-0.5 to +0.4)	+0.3 (-0.3 to +0.9)	-0.1 (-0.6 to +0.4)
Stratified by decedent age				
10–24 years	-1.0 (-2.4 to +0.5)	-1.1^{**} (-1.8 to -0.3)	-0.6 (-1.6 to +0.4)	-0.8[*] (-1.5 to -0.0 [‡])
25–44 years	-0.3 (-1.2 to +0.7)	-0.1 (-0.7 to +0.5)	+0.0 (-0.5 to +0.6)	+0.0 (-0.5 to +0.5)
45–64 years	-1.2^{**} (-1.6 to -0.7)	-0.4 (-0.8 to +0.1)	-0.1 (-0.6 to +0.4)	-0.2 (-0.7 to +0.2)
65 plus years	-0.2 (-0.8 to +0.4)	-0.3 (-0.8 to +0.2)	-0.3 (-0.9 to +0.2)	-0.1 (-0.8 to +0.7)

For all models, robust SEs were estimated, clustered at the state level. Stratified models excluded covariate that aligned with offset variable (eg, male decedent model used male population as model offset and excluded % of population that is male in model specification).

^{*} p≤0.05,

^{**} p≤0.01.

^{*} Data from the 2000–2020 multiple-cause-of death mortality data from the National Vital Statistics System where firearm suicides were defined as ICD-10 codes of X72–X74 in the underlying cause of death field.

[†] Additional model covariates included Permit to Purchase Policies, Comprehensive Background Check Policies, and Concealed Carry Laws, percent of population in a Metropolitan Statistical Area, percent of the state population consisting of male persons, percent of the state population consisting of non-Hispanic white persons, non-Hispanic black persons, and Hispanic persons, persons between the ages

of 35 and 44 years, persons between the ages of 45 and 54 years, persons between the ages of 54 and 64 years, persons that held a high school diploma, persons who are veterans, and persons that were married, unemployment rates, year fixed effects and state fixed effects.

[#]Due to rounding, additional digits after the 10th decimal place are not shown and appear as 0.0.

[§]Indicates a Poisson model as tests indicated that the model was not over dispersed. Unless otherwise indicated, negative binomial regression models were estimated.

[#]N=987.

ICD-10, International Classification of Disease—10th Revision; MSA, Metropolitan Statistical Area.