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States' COVID-19 policy contexts and suicide rates among US working-age adults

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Abstract

Despite expectations that suicide rates would surge during the pandemic, the national suicide rate declined in the United States in 2020 before returning to pre-pandemic levels in 2021. Explanations of the decline in suicides at the national level include a "pulling-together effect" in the face of a crisis and a shorter than expected pandemic recession. However, suicide rates and the change over time in suicide rates vary substantially across US states. At various times during the pandemic states enacted physical-distancing and economic support policies that may have affected suicide rates. We examined the association between state-level physical-distancing and economic support policy contexts and suicide rates among US adults ages 25–64 years during the COVID-19 pandemic. We found that a 1-SD increase in the stringency of a state's physical-distancing policies was associated with a 5.3% reduction in male suicide rates but was not associated with female suicide rates. Economic support policies were not associated with suicide rates for the period as a whole. The results support the growing evidence that COVID-19 policies had indirect and unintended consequences beyond their direct effect on COVID-19 transmission and death, in this case to reduce suicides among working-age males.

Key words: suicide; COVID-19 pandemic; COVID-19 policies; state policies.

Introduction

Suicide is a top-10 cause of death in the United States and a major contributor to recent increases in mortality among US working-age adults.[1] Suicide rates increased for males and females across most age groups in the 2 decades preceding the COVID-19 pandemic.[2] Despite expectations that suicide rates would surge during the pandemic,[3,4] the national suicide rate declined in the United States in 2020,[5,6] followed by a return to pre-pandemic (2019) levels in 2021.[7]

Expectations that suicides would increase during the pandemic were grounded in evidence that suicide is connected to mental health disorders[8] and economic distress.[9-11] Data collected in 2020 showed increases in mental distress, depression, anxiety, suicidal ideation, substance use, and prescribing of anti-depressants and anti-anxiety medications.[12-21] Likewise, economic hardship increased, especially in the early months of the pandemic.[22,23] Mental health challenges and the perceived risk of quarantine and running out of money were particularly acute for working-age adults.[24] Yet, despite increasing mental health and economic distress during the pandemic, suicide rates declined.

Several explanations have been offered for the absence of a suicide surge. Historically, suicide rates have not increased or have declined in the immediate period following national crises in the United States (eg, September 11, 2001, attacks; natural disasters; World War II; 1918–1920 influenza pandemic).[25-29] One hypothesis is increased social cohesion—or a "pulling-together effect"—where social connections, integration, and support increase among individuals sharing a common struggle.[30] Any potentially positive effects of the pandemic on social cohesion would need to be reconciled with its adverse economic impacts. However, despite substantial research showing increases in suicides during economic recessions,[31-33] recent research suggests this historical relation may have reversed. Evidence shows that suicide rates declined in places with the largest negative employment impacts from the 2007–2009 Great Recession.[34] The pandemic recession was also shorter than expected; the National Bureau of

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Economic Research Business Cycle Dating Committee estimates the economy only contracted for 2 months (February 2020–April 2020).[35] Over the period between 2019 and 2021, on average, household debt declined, while income, savings, and wealth all increased.[36] Finally, the decline in economic activity as well as the increase in the time spent at home during the pandemic reduced air pollution,[37,38] which is positively correlated with suicide (with a biological mechanism related to increased inflammation).[39-41] Some of these factors may explain why suicide rates did not increase nationally.

National suicide trends mask considerable between-state variation. While suicides declined by 5% or more in 18 states between 2019 and 2020, they increased by at least 5% in 10 other states.[2] States enacted various policies to reduce the spread of COVID-19 that may have had unintended consequences on suicide rates and may have contributed to between-state variation. Specifically, many states introduced policies that reduced in-person interaction, including stay-at-home orders, business closures, and restrictions on gatherings. Although these policies appear to have reduced COVID-19 deaths as intended,[42] they also had unintended consequences. More robust physical-distancing policies may have increased suicide risk[43] through their effects on unemployment[44]; isolation, loneliness, and mental health problems[16]; substance use[45-48]; caregiver burden, especially for women[49]; and access to health care including mental health care.[50,51] In contrast, physical-distancing policies may have reduced suicide risk relative to pre-pandemic trends if they are associated with mechanisms such as a "pulling-together effect" or reduced air pollution. There may be other plausible mechanisms that may have reduced suicides, such as reduced access to firearms, or that people living with others spent more time with family members and less time alone when physical-distancing policies were in place.[52,53] Robust economic support policies, which were often enacted concomitantly with physical-distancing policies, may have reduced suicide risk by reducing economic distress and fear of housing loss.[54,55]

This study assessed associations between US states' COVID-19 physical-distancing and economic support policy contexts and suicide rates among US adults ages 25–64 years, thereby contributing to our understanding of pandemic-era suicide trends.

Data and methods

Data

Suicides

Monthly suicide counts for 2009 to 2022 were computed using the National Vital Statistics System restricted death certificate files.[2] Suicides were identified using the *International Classification of Diseases, Tenth Revision*, underlying cause of death codes for suicide (X60–X84, U03, Y87.0). Suicides were disaggregated by state, month, and sex for working-age adults (25–64 years), and in sensitivity checks for all adults (18+ years). Suicides were also disaggregated by method of suicide into firearm suicides (X72–X74), intentional drug poisonings (X60–X64), and all other suicides (X65–X71, X75–X84, U03, Y87.0). We disaggregate because suicide methods differ by sex and disaggregation may provide insights into potential mechanisms.

Population counts

Mid-month state population counts by age and sex from the annual Centers for Disease Control and Prevention (CDC) Bridged Race Population files[56] were linearly interpolated between counts in July of each year and merged with the death counts. Population counts for months after June 2022 were extrapolated based on the slope of the pre–June 2022 trends.

States' COVID-19 policies

States' COVID-19 policy indices came from the Oxford COVID-19 Government Response Tracker (OxCGRT).[57] The Stringency Index (SI) represents the strictness of physical-distancing policies, such as stay-at-home requirements; school, workplace, and public transportation closures; cancellation of public events; restrictions on gathering size; and restrictions on travel. The Economic Support Index (ESI) incorporates policies related to direct cash payments to people who lost their jobs or cannot work and debt/contract relief policies. Details on index components and construction are included in Table S1; average monthly values are shown in Figure S1.

Each state had a daily index value between 0 and 100, with higher values representing broader or more robust policies. We divided the indices by 10 and calculated monthly averages to make values more interpretable.[48] For context, a 10-unit (raw scale) increase in the SI is the approximate difference between the policy environment in Alabama and California on April 1, 2020, and a 10-unit decrease (raw scale) in the ESI is the approximate difference between the policy environment in Florida on April 1, 2020, and January 1, 2021.[57] The indices were merged with the mortality data contemporaneously and with a 1-month lag with the policy preceding mortality time.

Using an index that aggregates policies is useful because states often imposed sets of policies at the same time. For example, New York closed gyms, movie, theaters, and bars on March 18, 2020; imposed stay-at-home orders on March 22, 2020; and issued a mask mandate on April 17, 2020.[58] Empirically, this bundling of policies makes the identification of the effects of individual policies difficult. Moreover, it ignores the fact that people were exposed to many of these policies at the same time. The OxCGRT COVID-19 policy indices are a summary measure of all of these policies and have been shown to be highly correlated with individual behaviors during the pandemic, including an increase in the time spent at home and a decrease in the time spent at work, at retail locations, and using public transit.[57]

The relationship between policy scores and suicides was assessed at the state rather than the county level for both conceptual and methodological reasons. First, states had the primary legal responsibility for enacting COVID-19 policies.[59] Second, although many cities and counties enacted or tried to enact their own policies, there is no national database of those measures for all US counties or cities. Third, a study using a nonrandom sample of 171 counties showed that, for numerous policies, over half of included counties adopted no measures, ceding policy-setting to states.[60] Finally, because suicides were disaggregated by sex and method of suicide, monthly counts of suicides at the county level contain many zeros.

Methods

An interrupted-time-series design was used to examine the relationship between suicide rates and state-level COVID-19 policies. This approach assumes that, in the absence of COVID-19 and the policy responses to it, pre–COVID-19 trends in suicides would have continued. A 2-stage approach was implemented. In the first stage, a linear model was used to estimate pre-pandemic trends in suicide rates and generate predicted rates that would have occurred during March 2020–December 2022 in the absence of the pandemic. These extrapolated suicide rates served as the counterfactual in the second stage, where suicide rates between March 2020 and December 2022 were modeled as a linear function of the SI and ESI scores and the counterfactual suicide rates from the first stage, with additional controls for differences in the level and trends in suicides across states from March 2020.

The main estimating equations were as follows:

$$Suicide\_Rate_{smt} = \beta_0 + \beta_U Unemp\_Rate_{smt} + \gamma_s r + \theta_s + \theta_m + \mu_{smt} \text{ where } r < March\ 2020 \quad (1)$$

$$Suicide\_Rate_{smt} = \alpha_0 + \alpha_{SI} SI_{smt} + \alpha_{ESI} ESI_{smt} + \alpha_{Suicide}\widehat{Suicide\_Rate}_{smt} + \phi_s r + \delta_s + \epsilon_{smt} \quad (2)$$

$$\text{where } r \geq March\ 2020$$

In the first stage (1), $Suicide\_Rate_{smt}$ is suicides per 100 000 population for state s, month m, and year t for males or females overall and by suicide method. $Unemp\_Rate_{smt}$ is the unemployment rate in state s, month m, and year t taken from the Bureau of Labor Statistics Local Area Unemployment Statistics, $\gamma_s r$ is state-specific time trends measured in months, θ_s is state fixed effects, which account for different levels and trends in suicides across states, and month fixed effects (θ_m) control for the fact that suicide rates are seasonal and tend to peak in the late spring and early summer.[43] In the second stage (2), $\widehat{Suicide\_Rate}_{smt}$ represents a counterfactual prediction from eqn (1) extrapolated into the period from March 2020, SI_{smt} and ESI_{smt} are the stringency and economic support indices in state s in month m in year t. State-specific time trends measured in months ($\phi_s r$) and state fixed effects (δ_s) are added to account for state-specific changes in mean suicide rates and suicide trends in the pandemic period (March 2020 onward). The coefficients on SI_{smt} and ESI_{smt} thus represent the association between the policy indices and suicide rates, controlling for predicted suicide rates from the pre-pandemic period ($\widehat{Suicide\_Rate}_{smt}$) as well as post-pandemic changes in state-specific trends and state-specific fixed effects. In the Results section we interpret each 1-unit increase of SI_{smt} and ESI_{smt} as representing a 10-unit increase in the raw scale. Eqn (1) and eqn (2) were estimated separately by sex in all analyses, and also estimated separately by sex and suicide method. Regressions were weighted by population, and bootstrapped standard errors were clustered at the state level.

The timing of the association between suicide rates and policy indices was assessed in 3 ways. First, eqn (2) was estimated using a 1-month lag of the policy indices (SI_{smt-1} replaced SI_{smt} and ESI_{smt-1} replaced ESI_{smt} in eqn [2]). Second, to address the concern that suicides may predate the policies within the month when considering the contemporaneous association, eqn (2) was estimated using the average value of the SI and ESI in the last 10 days of the prior month. Finally, the policy indices in eqn (2) were interacted with a linear term in months elapsed since the start of the pandemic, which allowed the association between the policy indices and suicide rates to change over time in the period from March 2020. Using this model, the association between each policy index and the suicide rate was calculated for March 2020, December 2020, December 2021, and December 2022 to assess change over time.

The key assumption of the interrupted-time-series design is that, in the absence of COVID-19 and its policy responses, pre–COVID-19 suicide trends would have continued. In our empirical specification, this is represented by the counterfactual suicide rate $\widehat{Suicide\_Rate}_{smt}$. The principal threat to internal validity is the possibility that factors other than the policies influenced suicide rates. The adjustment in the second stage for state-specific means and state-specific linear trends accounts for many such possibilities, including differences across states in the average change in suicide rate during the pandemic and in the change in suicide trends. The 2-stage model we use is empirically equivalent to an interrupted-time-series model in which the intercept and slope of state-level trends in suicide rates can change in March 2020. However, using a 2-stage approach allows the seasonal patterns of suicide and the relationship between suicide and unemployment to be estimated in the first stage based entirely on the pre-pandemic relationships.

Four alternative specifications were also tested for sensitivity: (1) suicide rates among adults aged 18+ years; (2) adding state unemployment rates, poverty rates, and COVID-19 case rates to the second stage; (3) age-standardized suicide rates; and (4) Poisson pseudo-maximum likelihood to model counts instead of rates. Justifications for each of these specifications and results are shown in Table S2.

Results

Working-age suicide rates trended upward prior to the pandemic for males and females (Figure S2). Suicides declined in March 2020, but resumed their upward trend in 2021. Consistent with previous work, suicide rates were higher for males than females (Figure S2),[61] although the temporal patterns were similar. The seasonality of suicides was evident for both males and females. Also consistent with previous work,[61] firearm suicides were higher for males than females (Figure S3a). The temporal pattern is that firearm suicides

Table 1. Association between suicide rates and state COVID-19 policies among working-age (25–64 years) males and females.

	All suicides	
	Males (1)	Females (2)
ESI	−0.009 [−0.026, 0.010]	0.005 [−0.004, 0.014]
SI	−0.065 [−0.101, -0.036]	0.004 [−0.014, 0.020]
No. (state-month observations)	8568	8568

Values are coefficients [95% CIs] from 2-stage interrupted-time-series analysis representing the association between a 10-unit increase in ESI and SI (raw scale) and the monthly suicide rate per 100 000. The first-stage model includes controls for state-level unemployment, state-specific trends, state-specific fixed effects, and calendar month estimated prior to the pandemic. The second-stage model includes controls for state-specific trends and fixed effects in addition to policy indices and extrapolated trends from the first stage. All estimates are population-weighted and bootstrapped SEs are clustered by state.
Abbreviations: ESI, Economic Support Index; SI, Stringency Index.

declined for males in early 2020 but increased throughout 2021 and 2022 (Figure S3a). For both males and females, drug-poisoning suicides declined during the pre-pandemic period and throughout 2020, but those declines flattened in 2021 and 2022 (Figure S3b).

Among males, a 10-unit increase in the SI (raw scale) was associated with a 0.065 (95% CI: −0.101, −0.036) reduction in the suicide rate, while the ESI was not associated with the overall suicide rate (Table 1). Neither policy index was associated with the suicide rate for females. To put the magnitude of the association between SI and the male suicide rate in perspective, the SD of SI from March 2020 to December 2022 was 1.86. Applied to the estimates in Table 1, this implies that a 1-SD increase in SI would reduce the monthly suicide rate for working-age males by 0.121 per 100 000 on an overall mean of 2.30 suicides per 100 000 population, which represents a 5.3% reduction in the working-age male suicide rate.

Disaggregating by suicide method reveals that the negative association between the male suicide rate and SI was driven by firearm suicides, the most common suicide method for males (Table 2). A 10-unit increase in SI (raw scale) was associated with a 0.047 (95% CI: −0.07, −0.02) reduction in the monthly male firearm suicide rate per 100 000, representing a 7.3% decline. The association between SI and drug poisoning and other suicides among males was smaller and not statistically significant. There were no associations between economic support policies and male suicides for any method. For females, there were no large or statistically significant associations between SI or ESI and any method of suicide.

The association between SI lagged 1 month (−0.028; 95% CI: −0.05, −0.011) and in the last 10 days of the last month (−0.037; 95% CI: −0.061, −0.017), and male suicide rates (Table 3) were smaller than the contemporaneous association shown in Table 1, but still statistically significant. The 95% CIs of all 3 estimates were overlapping. As with the contemporaneous analyses, there were no associations between ESI in the last month or last 10 days of the last month and male suicides, and there were no statistically significant associations between lagged values of SI or ESI and female suicide rates.

The association between the policy indices and suicide rates changed over the course of the pandemic (Table 4). For males, there was no association between ESI and suicide in March 2020 (0.008; 95% CI: −0.023, 0.043), but by December 2022, a 10-unit increase in ESI (raw scale) was associated with a 0.031 reduction in the male suicide rate (95% CI: −0.064, −0.0010). The ESI was declining during the latter part of the pandemic (Figure S1), so the finding implies that removing economic support was associated with a higher suicide rate for males. In contrast, the association between SI and male suicides was strongest at the beginning of the pandemic (−0.088; 95% CI: −0.144, −0.047), and by December 2022, the SI was no longer associated with suicide rates for males (−0.034; 95% CI: −0.088, 0.017). For females, there was no association between either set of policies and suicides throughout the period. We interpret these findings cautiously because of overlapping CIs across months in the association between SI and ESI and suicide rates. Coefficients for the models are shown in Table S3.

Discussion

Despite fears that the COVID-19 pandemic would accelerate increases in suicides in the United States, suicide rates fell in

Table 2. Association between suicide rates and state COVID-19 policies among working-age (25–64 years) males and females, by method of suicide.

	Males			Females		
	Firearm (1)	Drug poisoning (2)	Other (3)	Firearm (4)	Drug poisoning (5)	Other (6)
ESI	−0.001 [−0.010, 0.009]	−0.002 [−0.006, 0.004]	−0.004 [−0.014, 0.007]	0.002 [−0.002, 0.008]	−0.001 [−0.005, 0.003]	0.004 [−0.001, 0.010]
SI	−0.047 [−0.070, −0.027]	−0.006 [−0.014, 0.001]	−0.013 [−0.027, 0.002]	−0.001 [−0.011, 0.009]	−0.0002 [−0.007, 0.008]	−0.0003 [−0.008, 0.006]
No.	8568	8568	8568	8568	8568	8568

Values are coefficients [95% CIs] from 2-stage interrupted-time-series analysis representing the association between a 10-unit increase in ESI and SI (raw scale) and the monthly suicide rate per 100 000 by method. The first-stage model includes controls for state-level unemployment, state-specific trends, state-specific fixed effects, and calendar month estimated prior to the pandemic. The second-stage model includes controls for state-specific trends and fixed effects in addition to policy indices and extrapolated trends from the first stage. All estimates are population weighted and bootstrapped SEs are clustered by state.
Abbreviations: ESI, Economic Support Index; SI, Stringency Index.

Table 3. Association between suicide rates and lagged COVID-19 policies among working-age (25–64 years) males and females.

	Males		Females	
	One-month lag (1)	Last 10 days of last month (2)	One-month lag (3)	Last 10 days of last month (4)
ESI	−0.004 [−0.016, 0.012]	−0.009 [−0.021, 0.007]	−0.002 [−0.008, 0.006]	0.001 [−0.006, 0.008]
SI	−0.028 [−0.050, −0.011]	−0.037 [−0.061, −0.017]	0.010 [−0.006, 0.023]	0.008 [−0.007, 0.024]
No.	8568	8568	8568	8568

Values are coefficients [95% CIs] from 2-stage interrupted-time-series analysis representing the association between a 10-unit increase in ESI and SI (raw scale) and the monthly suicide rate per 100 000. The first-stage model includes controls for state-level unemployment, state-specific trends, state-specific fixed effects, and calendar month estimated prior to the pandemic. The second-stage model includes controls for state-specific trends and fixed effects in addition to policy indices and extrapolated trends from the first stage. All estimates are population weighted and bootstrapped SEs are clustered by state.
Abbreviations: ESI, Economic Support Index; SI, Stringency Index.

Table 4. Association between suicide rates and state COVID-19 policies among working-age (25–64 years) males and females in 4 selected months.

	All suicides	
	Males (1)	Females (2)
ESI		
March 2020	0.008 [−0.023, 0.043]	0.006 [−0.010, 0.022]
December 2020	−0.002 [−0.026, 0.021]	0.006 [−0.006, 0.016]
December 2021	−0.017 [−0.033, 0.001]	0.004 [−0.004, 0.012]
December 2022	−0.031 [−0.064, −0.010]	0.003 [−0.011, 0.016]
SI		
March 2020	−0.088 [−0.144, −0.047]	0.007 [−0.014, 0.028]
December 2020	−0.073 [−0.113, −0.040]	0.003 [−0.014, 0.019]
December 2021	−0.053 [−0.091, −0.021]	−0.003 [−0.020, 0.013]
December 2022	−0.034 [−0.088, 0.017]	−0.009 [−0.033, 0.017]
No.	8568	8568

Values are marginal effects [95% CIs] from 2-stage interrupted-time-series analysis representing the association between a 10-unit increase in ESI and SI (raw scale) and the monthly suicide rate per 100 000. The first-stage model includes controls for state-level unemployment, state-specific trends, state-specific fixed effects, and calendar month estimated prior to the pandemic. The second-stage model includes controls for state-specific trends and fixed effects in addition to policy indices interacted with months since the pandemic began and extrapolated trends from the first stage. All estimates are population weighted and bootstrapped SEs are clustered by state.
Abbreviations: ESI, Economic Support Index; SI, Stringency Index.

2020 before returning to pre-pandemic levels in 2021. Previous studies have shown declines in suicide rates early in the pandemic,[62,63] but our study goes beyond documenting pandemic-era changes in suicide rates by examining the contributions of states' COVID-19 era physical-distancing and economic support policies on suicide by sex and suicide method. There are 3 main takeaways.

First, more stringent physical-distancing policies were associated with reductions in working-age male suicide rates, particularly firearm suicides, and the association was largest early in the pandemic. Physical-distancing policies were not associated with suicide rates among working-age females. We suggested several potential explanations for a negative association between physical-distancing policies and suicides, including a "pulling-together effect," a decline in air pollution, and a decrease in the opportunity for suicide. Given that we found an association between physical-distancing policies only for males and only for firearm suicides, we think the first 2 explanations are unlikely. These explanations would likely apply to all methods of suicide and to both males and females.

There are 2 possibilities of why physical-distancing policies may be particularly associated with a reduction in the opportunity for firearm suicides among males. One possibility is that these policies reduced access to firearms. However, firearm purchases soared in the early months of the pandemic[64] and, in many states and for most of the period, physical-distancing policies requiring business closures did not apply to gun shops.[65] A second possibility relates to time spent alone or with family when schools and businesses were closed. Pandemic restrictions on movement increased the time that people spent at home.[57] For people who lived alone, this translated to more time spent alone and at home,[53] each of which increases suicide risk.[52,66,67] However, people who lived with others spent more time with the people in their household,[53] which may have reduced the risk of suicide either because time spent with household members was enjoyable[68] or because suicide is less likely when others are present in the home, especially for men,[52] for whom firearm suicide is the most common method.[69] In working ages, more than 75% of adults live with others so we might expect the latter effect to dominate.[70] It was not the aim of this study to test mechanisms; we encourage future research that can explain why more stringent physical-distancing policies were associated with reductions in male firearm suicides in the early months of the pandemic.

Second, while more robust economic support policies were not associated with suicides in the whole period between 2020 and 2022, the withdrawal of economic support was associated with an increase in suicide rates for males in 2022. Our finding for the whole period is somewhat at odds with the evidence that some types of economic support policies, particularly strong eviction moratoria, were associated with a reduction in mental distress early in the pandemic.[54] However, the set of economic support policies we considered included both direct payments as well as a suite of policies for debt relief. The brevity of the recession may have also contributed to a more modest association between suicides and economic support policies. Further work could disaggregate the association between specific sets of economic support policies and suicides and investigate the difference in their association with suicide over the course of the pandemic.

Finally, associations between physical-distancing and economic support policies and suicide were consistent across models measuring contemporaneous policy effects and those measured with a 1-month lag. Given the high correlation between the policy indices in adjoining months, we were unable to distinguish lagged effects of the policies from contemporaneous effects.

This study has potential limitations. First, our conclusions rest on the assumption that extrapolated pre-pandemic trends and seasonality in suicides would have continued in the absence of the pandemic. The associations that we identify come from deviations from these extrapolated trends. Although this assumption is untestable, we allowed for state-specific changes in both the suicide level and trend after the pandemic and showed that our results are robust to including additional controls for unemployment, poverty rates, and COVID-19 case rates in the post-pandemic period. Second, our estimates on how the effect of state policies on suicides changed over the course of the pandemic are based on a linear specification, which implies that the association between suicide rates and the policies changes at a constant rate. Further disaggregation on how the association of suicide rates with COVID-19 policies changed over the course of the pandemic is beyond the scope of this paper but is an avenue for future work. Third, we examined only the contemporaneous effects of COVID-19 policies on suicide rates. These policies could operate on suicide rates with a longer lag if they caused changes in mental health over a longer period. Finally, we could not differentiate between the contributions of the policies and individuals' responses to the policies. For example, 1 reason that the association between the policy indices and suicides could change over time is if individuals responded to the same policies differently when implemented earlier vs later.

Conclusion

This study documents how states' pandemic-era physical-distancing and economic support policy contexts contributed to changes in working-age adult suicide rates. In addition to reducing COVID-19 mortality rates,[42,71] our findings suggest that physical-distancing policies may also have reduced suicides among working-age males, relative to the pre-pandemic trend. Understanding the mechanisms through which physical-distancing policies were associated with reductions in firearm suicides for males is a potential channel for future research in suicide prevention.

Supplementary material

Supplementary material is available at *Health Affairs Scholar* online.

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Conflicts of interest

Please see ICMJE form(s) for author conflicts of interest. These have been provided as supplementary materials.

Notes

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