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Zhou Fang

Utsav Nandi

Cerissa Eubanks Neely

Lei Zhang

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Demographic, Circumstantial, and Geographic Patterns of Firearm-related Homicides and Suicides in Mississippi, 2021-2023

Zhou Fang, PhD, MS

Research/Data Analyst

Office of Public Health Statistics

Mississippi State Department of Health

Jackson, Mississippi

Utsav Nandi, MD, MSCI, MSPHS

Associate Professor

Department of Emergency Medicine and Population Health Science

University of Mississippi Medical Center

Jackson, Mississippi

Cerissa Eubanks Neely, CPM

Director

Office Against Interpersonal Violence

Mississippi State Department of Health

Jackson, Mississippi

Lei Zhang, PhD, MBA

Professor

School of Nursing

University of Mississippi Medical Center

Jackson, Mississippi

Abstract

Background: Firearm violence ranks among the leading causes of death in Mississippi. Understanding its demographic, circumstantial, and geographic patterns is essential to inform prevention efforts.

Purpose: To describe demographic, circumstantial, and geographic patterns of firearm-related homicides and suicides in Mississippi during 2021–2023 using Mississippi Violent Death Reporting System (MSVDRS) data.

Methods: Percentages and crude rates of firearm-related homicides and suicides were analyzed by demographic characteristics for 2021–2023. z tests assessed rate differences between years. Chi-square (χ^2) tests compared proportions of decedents with specified precipitating circumstances for 2022 versus 2021 and 2023 versus 2021. County-level crude rates were mapped to visualize geographic disparities.

Results: Firearm-related homicides were concentrated among younger Black males, most often precipitated by arguments, crime-related activity, or intimate partner problems, with the highest

rates in the capital area and western Mississippi, particularly the Delta region. Firearm-related suicides primarily involved older White males and were frequently associated with mental health problems, depressed mood, or substance use. These deaths were most common in central, northeastern, and southwestern rural and mixed rural–suburban counties.

Conclusion: Firearm-related deaths remain a major public health concern in Mississippi, highlighting the importance of community-based prevention, mental health support, and ongoing MSVDRS surveillance to guide targeted interventions.

Keywords: circumstances; firearm-related deaths; homicide; Mississippi Violent Death Reporting System; suicide

Background

Firearm-related violence continues to represent a critical public health problem in the United States. In 2023, more than 46,000 people died from firearm injuries nationwide (Centers for Disease Control and Prevention [CDC], 2025a), and firearms have become the leading cause of death among children and teens between the ages of 1–17 years (Johns Hopkins Bloomberg School of Public Health, 2024). Because of their high lethality and widespread availability, firearms contribute substantially to the nation's high rates of homicide and suicide. Nearly 79% of homicides and more than half of all suicides in the United States involve a firearm (Kim et al., 2025). Previous studies have identified substantial demographic and geographic disparities, with homicides disproportionately affecting young Black males in urban, high-poverty areas and suicides more common among older White males in rural communities (CDC, 2024; Brookings Institution, 2023; Rees et al., 2022). Understanding these patterns is essential for identifying populations and communities most affected by firearm violence and for guiding targeted prevention strategies.

Mississippi experiences one of the highest firearm mortality rates in the United States, consistently ranking among the top five states for firearm deaths (CDC, 2025b). The state's firearm-related death rate exceeds the national average for both homicide and suicide, reflecting deep and persistent inequities across demographic, social, and geographic lines (CDC, 2025b). Despite this persistently high burden, few studies have examined statewide patterns that integrate demographic disparities, contextual factors, and geographic variation. Most available surveillance systems capture only the underlying cause of death, such as homicide or suicide, and provide limited insight into the circumstances surrounding these deaths or the communities most affected. This gap limits the evidence base needed to design targeted, data-informed prevention strategies.

To address this limitation, the Mississippi Violent Death Reporting System (MSVDRS), currently managed by the Mississippi State Department of Health (MSDH) Bureau of Injury and Violence Prevention, was launched in 2019. The MSVDRS, funded by and part of the Centers for Disease Control and Prevention's (CDC) National Violent Death Reporting System (NVDRS), is a state-based surveillance program that links data from death certificates (DC), coroner/medical examiner (C/ME) reports, and law enforcement (LE) investigations to capture detailed information on violent deaths, including homicides, suicides, legal intervention deaths, unintentional firearm injury deaths, and deaths of undetermined intent (CDC, 2022; CDC, 2025c). By integrating multiple data sources, MSVDRS documents the who, what, when, where, and why of violent deaths (Forsberg et al., 2025) and provides a more comprehensive account of firearm-related mortality than any other data source.

Using MSVDRS data from 2021 through 2023, this study describes demographic patterns, identifies commonly documented precipitating circumstances, and compares the geographic distribution of firearm homicides and suicides across Mississippi. By characterizing who is most affected and where disparities are concentrated, this analysis contributes to public health planning and violence prevention efforts, highlighting the importance of MSVDRS surveillance for guiding evidence-based interventions in the state.

Methods

This was a cross-sectional analysis of data obtained from the NVDRS database. Statewide descriptive data on demographic characteristics, manner of death, method of injury, and precipitating circumstances were obtained directly from the NVDRS Restricted Access Database (RAD) through the CDC's Secure Access Management Services (SAMS) portal. County-level firearm-related homicide and suicide death counts were extracted from the NVDRS RAD file (2019–2023 NVDRS SAS dataset) by selecting cases involving firearms as a method of injury. While MSVDRS was initiated in 2019, it did not achieve full statewide coverage until 2021; therefore, this study included data from 2021 onward to ensure completeness and consistency across all counties. County population estimates for 2021–2023 were obtained from the U.S. Census Bureau (2024). This manuscript was prepared in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline for cross-sectional studies (von Elm et al., 2008).

Case Definition

This study focused on firearm-related violent deaths, defined as fatalities in which a firearm was used as the weapon type in either a homicide or a suicide:

- Firearm-related homicides were deaths resulting from the intentional use of force or power, threatened or actual, against another person, group, or community (CDC, 2022).
- Firearm-related suicides were deaths resulting from the intentional use of force against oneself (CDC, 2022).

A complete list of definitions for other manners of violent death captured in MSVDRS (e.g., unintentional firearm, legal intervention, and undetermined intent) is provided in the Supplemental Material.

Variables and Stratification

Demographic characteristics analyzed included sex (male, female), age group (≤ 19 , 20–44, and ≥ 45 years), and race/ethnicity (non-Hispanic White, non-Hispanic Black, and other races/ethnicities).

Circumstance information is abstracted from coroner/medical examiner (C/ME) reports, law enforcement (LE) narratives, and other investigative documents following the CDC's NVDRS Coding Manual (CDC, 2022). NVDRS identifies more than 20 standard precipitating circumstances for both homicide and suicide (Forsberg et al., 2025; Fowler et al., 2015). Abstractors code circumstances only when they are explicitly documented in source records; no inference beyond written documentation is allowed. Each circumstance is coded as "yes" when described in the narrative or official reports and as "no," "not available," or "unknown" when not documented. Because documentation varies across jurisdictions, not all death records contain known circumstances, and a single death may have multiple circumstances coded. Consistent with CDC guidance that analyses of precipitating circumstances should include only deaths with at least one known circumstance, as unknown values reflect nondocumentation rather than true

negatives (CDC, 2022; Rogers & Davis, 2023), we restricted analyses accordingly and performed no imputation. Annual frequencies for each circumstance category coded as "yes" for 2021–2023 are reported in Supplemental Tables S3 and S4. For this study, circumstances were grouped into broader, logically related categories (e.g., the category of Mental Health, Substance Use Problems, and Other Addictions includes Current Diagnosed Mental Health Problem, Current Depressed Mood, Alcohol Problem, Other Substance Abuse Problem, and Other Addiction). Subcategories with small counts ($n < 5$) were combined to improve interpretability and comply with confidentiality policy.

Statistical Analysis

Crude rates (per 100,000 population) were calculated using MSVDRS death counts (numerators) and annual Mississippi population estimates (denominators) obtained from the U.S. Census Bureau. Pairwise z tests were conducted to assess year-to-year changes in crude rates, comparing 2022 versus 2021 and 2023 versus 2021. With only three data points (2021, 2022, and 2023), regression analysis lacked sufficient degrees of freedom to assess trend consistency statistically. Instead, z tests provided a more appropriate approach to detect significant year-to-year changes by demographic characteristics. The difference was considered statistically significant when $p < .05$.

For the analysis of precipitating circumstances, we used χ^2 tests of independence to test the significance of differences in the proportion of deaths with a specific circumstance, comparing 2022 with 2021 and 2023 with 2021 (reference year). The p values were derived from the test, and p values $< .05$ were considered significant.

To visualize geographic disparities in firearm-related violent deaths, county-level crude rates of firearm-related homicide and suicide were mapped using the `sf` package in R Version 4.3.2 (R Core Team, 2020) for spatial data processing and visualization. Separate maps were created for homicide and suicide, each shaded using sequential color gradients (red for homicide, orange for suicide) with rate intervals selected to highlight geographic variation. All data analyses were conducted in R Version 4.3.2 (R Core Team, 2020).

Results

Across the 3-year study period (2021–2023), firearms accounted for the vast majority of violent deaths recorded in the MSVDRS. Among all homicides, a total of 550 deaths occurred in both 2021 and 2022 and 504 deaths in 2023, while firearm involvement was documented in 487 (88.5%) in 2021, 487 (88.5%) in 2022, and 451 (89.5%) in 2023. There were 433 suicide deaths in 2021, 386 in 2022, and 432 in 2023, with 306 (71.3%), 296 (76.7%), and 318 (73.6%), respectively, involving firearms. Nearly 9 out of 10 homicides and more than two thirds of suicides from 2021 to 2023 were associated with firearm use. Tables S1 and S2 in the Supplemental Material provide a detailed breakdown of violent deaths and firearm-related violent deaths by manner, including numbers and percentages from 2021–2023. The following subsections present detailed analyses of firearm-related homicide and suicide in Mississippi during this period.

Firearm-Related Homicide and Suicide by Selected Demographic Characteristics

Table 1 summarizes demographic patterns in firearm-related homicide and suicide captured through the MSVDRS from 2021 to 2023. Overall, the crude rate of firearm-related homicide was 16.5 per 100,000 in 2021, 16.6 in 2022, and 15.3 in 2023, showing no statistically significant year-to-year change ($p > .05$). Similarly, the firearm-related suicide rate remained relatively stable at 10.4 per 100,000 in 2021, 10.1 in 2022, and 10.8 in 2023. Across all 3 years, homicide rates were substantially higher among Black males and younger adults aged 20–44 years than among their respective comparison groups. Suicide rates, however, were consistently highest among White males and adults aged 45 years and older. Pairwise z tests comparing annual crude rates indicated no statistically significant statewide change at $\alpha = .05$ in overall homicide or suicide rates between 2021 and 2022 or between 2022 and 2023. Minor subgroup fluctuations were observed during the 3-year period, including a modest rise and then decline in homicide rates among males and a slight decline followed by an increase in suicide rates for the same group. These surveillance findings highlight clear demographic disparities in firearm-related violent deaths in Mississippi. The ongoing burden of firearm-related homicide is greatest among young Black adult males, while firearm-related suicide remains most common among older White males.

Table 1

Firearm-Related Homicide and Suicide by Selected Demographic Characteristics: Mississippi Violent Death Reporting System (MSVDRS), 2021–2023

Characteristic	2021		2022		2023		<i>p</i> Value (2022 vs. 2021)	<i>p</i> Value (2023 vs. 2021)
	<i>n</i> (%)	Rate [†]	<i>n</i> (%)	Rate [†]	<i>n</i> (%)	Rate [†]		
Firearm-related homicide								
Total	487 (100)	16.5	487 (100)	16.6	451 (100)	15.3	.925	.248
Sex								
Male	406 (83.4)	28.3	416 (85.4)	29.2	384 (85.1)	26.9	.654	.476
Female	81 (16.6)	5.3	71 (14.6)	4.7	67 (14.9)	4.4	.459	.259
Age, years								
≤19	70 (14.4)	9.0	80 (16.4)	10.4	71 (15.7)	9.3	.377	.846
20–44	334 (68.6)	35.3	317 (65.1)	33.7	291 (64.5)	30.9	.554	.097
≥45	83 (17.0)	6.8	90 (18.5)	7.3	89 (19.7)	7.2	.641	.708
Race/ethnicity [¶]								
White, non-Hispanic	85 (17.3)	4.8	82 (16.8)	4.6	70 (15.5)	4.0	.783	.258

Black, non-Hispanic	398 (81.2)	34.8	396 (81.0)	34.8	376 (83.0)	33.0	1.000	.460
Other	7 (1.4)	3.7	11 (2.2)	5.8	7 (1.5)	3.5	.348	.917
Firearm-related suicide								
Total	306 (100)	10.4	296 (100)	10.1	318 (100)	10.8	.720	.637
Sex								
Male	252 (82.4)	17.6	235 (79.4)	16.5	273 (85.8)	19.1	.477	.349
Female	54 (17.6)	3.6	61 (20.6)	4.0	45 (14.2)	3.0	.572	.366
Age, years								
≤19	18 (5.9)	2.3	16 (5.4)	2.1	19 (6.0)	2.5	.791	.800
20–44	120 (39.2)	12.7	105 (35.5)	11.1	123 (38.7)	13.1	.313	.809
≥45	168 (54.9)	13.7	175 (59.1)	14.2	176 (55.3)	14.2	.740	.740
Race/ethnicity¶								
White, non-Hispanic	242 (79.1)	13.7	238 (79.9)	13.5	250 (78.6)	14.2	.872	.691
Black, non-Hispanic	59 (19.3)	5.2	56 (18.8)	4.9	61 (19.2)	5.4	.750	.836
Other	5 (1.6)	2.7	‡	2.1	6 (1.9)	3.0	NA §	.862

Note. *z* tests were used to compare crude rates between 2022 versus 2021 and 2023 versus 2021; $p < .05$ was considered statistically significant.

† Crude rates per 100,000 population.

¶ Some decedents appear in multiple race/ethnicity categories; therefore, the sum of race/ethnicity counts may exceed the total number of deaths. Decedents with unspecified race are not included, as this category is not available in the U.S. Census Bureau population estimates used to calculate crude rates.

‡ Cells with counts fewer than 5 were suppressed to protect confidentiality in accordance with the Mississippi State Department of Health small-value policy.

§ In accordance with small-cell suppression, comparisons with fewer than 5 deaths in either year were not evaluated.

Circumstances Associated with Firearm-Related Homicide and Suicide Deaths

Table 2 presents MSVDRS surveillance findings on the circumstances preceding firearm-related homicide deaths with known circumstances in Mississippi from 2021 through 2023. It should be emphasized that circumstance information was not available for every death, and individual deaths could have multiple documented circumstances. As shown in Table S3, the number of firearm-related homicide decedents with known circumstances was 206 (42.3%) in 2021, 253 (52.0%) in 2022, and 233 (51.7%) in 2023 among all firearm-related homicides. Across the 3-year period, the most commonly identified circumstances surrounding homicide deaths were argument and crime activity, followed by intimate partner problems. The proportion of homicides involving an argument remained relatively stable (39.8% in 2021, 42.9% in 2022, 41.9% in 2023), as did those related to crime activity (17.6%, 16.7%, 20.9%, respectively) and

intimate partner problems (11.3%, 11.0%, 10.0%, respectively). χ^2 tests were conducted to compare the proportions of homicide decedents with each circumstance in 2022 and 2023 compared to 2021. None of the differences reached statistical significance ($p \geq .05$), indicating that the contextual patterns of homicide decedents remained largely consistent during the study period. Although not statistically significant, a modest upward trend was observed in the proportion of homicides involving physical fight (two people; 7.1%, 8.5%, 10.7%, respectively), whereas a slight decline was noted for drug involvement circumstances (9.4%, 7.8%, 6.2%, respectively). Overall, interpersonal conflicts and criminal activity continued to be the predominant contributing factors to firearm-related homicide deaths in Mississippi from 2021 to 2023.

Table 2

Circumstances Associated with Firearm-Related Homicide Deaths: Mississippi Violent Death Reporting System (MSVDRS), 2021–2023

Variables	2021 n (%)	2022 n (%)	2023 n (%)	2022 vs. 2021		2023 vs. 2021	
				χ^2 (df)	p	χ^2 (df)	p
Total	427 (100.0)	497 (100.0)	483 (100.0)				
Mental health, substance use problems, and other addictions†	16 (4.1)	10 (2.2)	6 (1.4)	2.83 (2)	.09	5.72 (2)	.02
Intimate partner problem—homicide	30 (11.3)	35 (11.0)	29 (10.0)	0.01 (2)	.91	0.25 (2)	.62
Family or relationship problem‡	32 (8.2)	34 (7.6)	43 (9.8)	0.27 (2)	.60	0.90 (2)	.34
Physical fight (two people)	19 (7.1)	27 (8.5)	31 (10.7)	0.35 (2)	.55	2.10 (2)	.15
Argument	106 (39.8)	137 (42.9)	122 (41.9)	0.57 (2)	.45	0.25 (2)	.62
Drug involvement	25 (9.4)	25 (7.8)	18 (6.2)	0.45 (2)	.50	2.01 (2)	.16
Crime activity¶	75 (17.6)	83 (16.7)	101 (20.9)	0.35 (2)	.56	2.73 (2)	.10
Other (manner specific)§	38 (8.9)	51 (10.3)	42 (8.7)	0.33 (2)	.57	0.00 (2)	.96

Note. χ^2 = Pearson chi-square statistic; *df* = degrees of freedom; $p < .05$ was considered statistically significant.

†Circumstance category includes current diagnosed mental health problem, current depressed mood, alcohol problem, other substance abuse problem, and other addiction.

‡Circumstance category includes family relationship problem, family stressor, other relationship problem, household known to local authorities, abuse or neglect led to death, and previous perpetrator of violence in the past month.

¶Circumstance category includes precipitated by another crime, robbery, burglary, motor vehicle theft, rape, sexual assault, gambling, assault, homicide, witness intimidation/elimination, other (specify in narrative), and unknown in crime activity.

§Circumstance category includes justifiable self-defense, victim was a police officer on duty, victim was a bystander, random violence, victim used a weapon, jealousy (lover's triangle), and drive-by shooting.

Table 3 reports the number and percentage of firearm-related suicides with known circumstances in Mississippi from 2021 to 2023 along with results of χ^2 tests comparing 2022 versus 2021 and 2023 versus 2021. A full list of the original reported circumstances preceding firearm-related suicides and their annual frequencies (2021–2023) is available in Supplemental Table S4. Table S4 indicates that the number of firearm-related suicide decedents with known circumstances was 170 (55.6%) in 2021, 169 (57.1%) in 2022, and 164 (51.6%) in 2023 among all firearm-related suicides. Across the 3-year period, the most frequently documented precipitating circumstances for firearm-related suicide deaths were current diagnosed mental health problem (16.7% in 2021, 16.4% in 2022, 19.2% in 2023), current depressed mood (21.8% in 2021, 12.7% in 2022, 2.2% in 2023), substance use problems and other addictions (12.1% in 2021, 6.8% in 2022, 10.0% in 2023), and suicidality signals such as prior suicide attempts or recently disclosed suicidal thoughts/plans to commit suicide (15.5% in 2021, 22.9% in 2022, 22.0% in 2023). Mental health–related factors consistently remained prevalent contributing circumstances for firearm suicides in Mississippi during 2021–2023. χ^2 tests comparing 2022 and 2023 with 2021 showed significant differences in several circumstances associated with firearm-related suicides. Suicidality signals increased significantly in both 2022 ($\chi^2 = 6.14, p = .01$) and 2023 ($\chi^2 = 4.82, p = .03$) compared with 2021, indicating a higher proportion of suicides preceded by signs of suicidal intent (22.9% and 22.0% vs. 15.5%, respectively). In contrast, the proportion of suicides involving current depressed mood declined markedly in 2022 ($\chi^2 = 9.88, p < .05$) and 2023 ($\chi^2 = 64.30, p < .05$) relative to 2021 (12.7% and 2.2% vs. 21.8%, respectively). Smaller but statistically significant differences were also observed for substance use problems and other addictions–related circumstances in 2022 ($\chi^2 = 5.69, p = .02$) and for intimate partner problems and other manner-specific factors in 2023 ($\chi^2 = 4.21$ and $4.27, p = .04$ for both).

Table 3

Circumstances Associated with Firearm-Related Suicide Deaths: Mississippi Violent Death Reporting System (MSVDRS), 2021–2023

Variables	2021 n (%)	2022 n (%)	2023 n (%)	2022 vs. 2021		2023 vs. 2021	
				χ^2 (df)	p	χ^2 (df)	p
Total	330 (100.0)	353 (100.0)	359 (100.0)				
Current diagnosed mental health problem	55 (16.7)	58 (16.4)	69 (19.2)	0.01 (2)	.93	0.76 (2)	.38
Current depressed mood	72 (21.8)	45 (12.7)	8 (2.2)	9.88 (2)	< .05	64.30 (2)	< .05
Substance use problems and other addictions†	40 (12.1)	24 (6.8)	36 (10.0)	5.69 (2)	.02	0.77 (2)	.38
Intimate partner problem—suicide	22 (6.7)	29 (8.2)	40 (11.1)	0.59 (2)	.44	4.21 (2)	.04
Argument	19 (5.8)	23 (6.5)	28 (7.8)	0.17 (2)	.68	1.13 (2)	.29

Other relationship and life stressors†	28 (8.5)	31 (8.8)	31 (8.6)	0.02 (2)	.89	0.00 (2)	.94
Suicidality signals§	51 (15.5)	81 (22.9)	79 (22.0)	6.14 (2)	.01	4.82 (2)	.03
Contributing physical health problem	24 (7.3)	29 (8.2)	32 (8.9)	0.21 (2)	.65	0.62 (2)	.43
Other (manner specific) ¶	19 (5.8)	33 (9.3)	36 (10.0)	3.13 (2)	.08	4.27 (2)	.04

Note. χ^2 = Pearson chi-square statistic; *df* = degrees of freedom; *p* < .05 was considered statistically significant.

†Circumstance category includes current treatment for mental health or substance use/misuse problem, ever treated for mental health or substance use/misuse problem, alcohol problem, other substance abuse problem, and other addiction.

‡Circumstance category includes family relationship problem, caregiver burden, family stressor, other relationship problem, victim known to authorities, abuse or neglect led to death, history of abuse or neglect as a child, previous perpetrator of violence in the past month, physical fight (two people), and living transition/loss of independent living.

§Circumstance category includes history of suicide attempts, history of expressed suicidal thoughts or plans, history of nonsuicidal self-injury/self-harm, recently disclosed suicidal thoughts/plans to commit suicide, and left a suicide note.

¶Circumstance category includes contributing criminal legal problem, civil legal problems, job problem, financial problem, school problem, suicide of friend or family contributed to death, nonsuicide death of friend or family, and anniversary of a traumatic event.

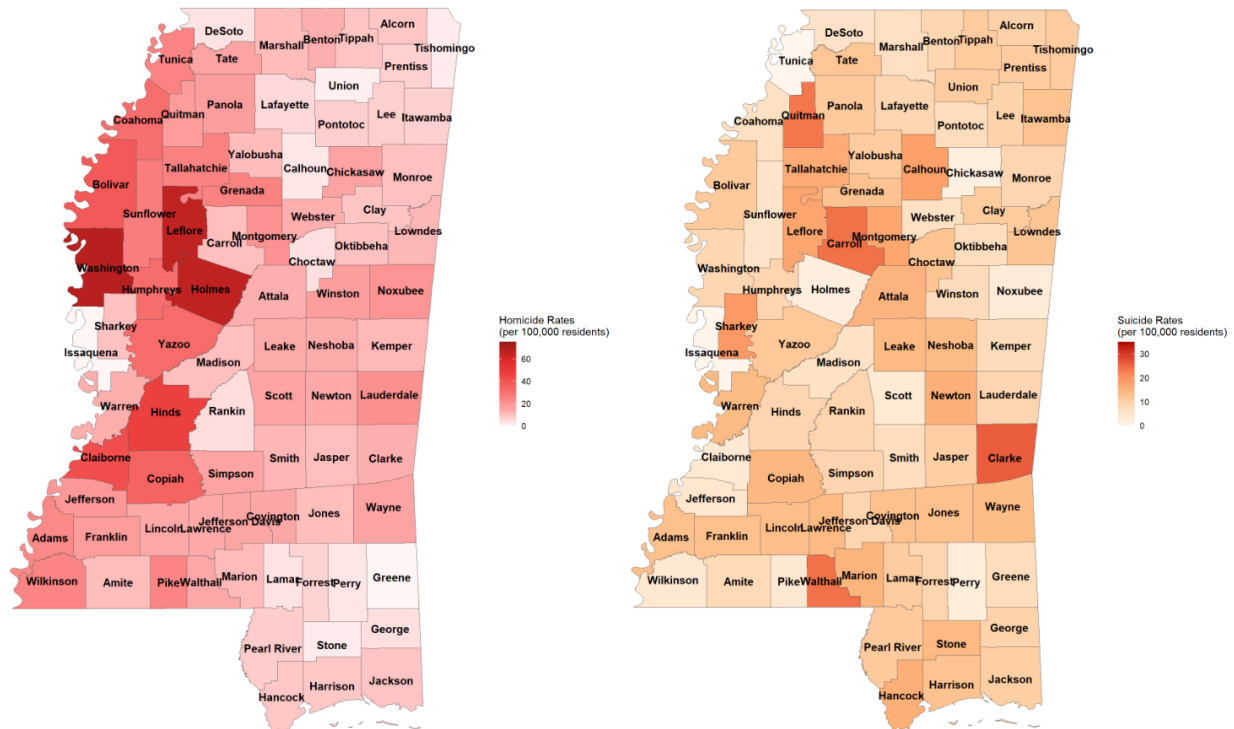
Geographic Analysis of Crude Rates for Firearm-Related Homicide and Suicide Deaths

Figure 1 displays county-level density maps of crude rates for firearm-related homicide (left) and suicide (right) deaths in Mississippi from 2021 to 2023. Crude rates reflect the county of residence of each decedent; deaths are assigned to the county where the individual lived, not necessarily where the injury or death took place. The homicide map demonstrates marked geographic disparities, with substantially higher homicide rates concentrated in the western and central Delta regions of the state. Counties such as Washington, Holmes, Leflore, and Hinds experience the highest burden of homicides (≥ 50 per 100,000). Adjacent counties, including Claiborne, Bolivar, Copiah, Yazoo, Humphreys, Coahoma, and Sunflower, also show elevated rates between 30 and 50 per 100,000. In contrast, northeastern and southeastern Mississippi counties, including Tishomingo, Alcorn, Prentiss, Union, Stone, George, and Greene, have comparatively lower homicide rates (<10 per 100,000). The distinct west-to-east gradient in the map highlights a persistent geographic divide, with the Delta region and the capital area (Hinds County) representing sustained high-risk zones for firearm-related homicide.

The suicide map shows elevated suicide rates that are more geographically dispersed, particularly across central, northeastern, and southwestern counties. The highest rates (>20 per 100,000) appear in Clarke, Carroll, Walthall, and Quitman Counties, while moderately elevated rates (15–20 per 100,000) are observed across Sharkey, Calhoun, Leflore, Montgomery, Tallahatchie, Hancock, Newton, and Attala Counties. Conversely, urban counties such as Hinds, Rankin, Madison, DeSoto, and Forrest show comparatively lower firearm suicide rates (<10 per 100,000).

Figure 1

Density Map of Crude Rates of Firearm-Related Homicide (Left) and Suicide (Right) by County: Mississippi, 2021–2023



Note. Data from Mississippi Violent Death Reporting System and U.S. Census Bureau.

Discussion

This study provides the first comprehensive analysis of firearm-related violent deaths in Mississippi between 2021–2023, revealing pronounced demographic disparities in both homicides and suicides. Consistent with national patterns, firearm homicide disproportionately affected young Black males, whereas firearm suicide was most common among older White males (CDC, 2024; GBD US Health Disparities Collaborators, 2025; Rees et al., 2022). These disparities mirror previously documented national inequities that are potentially shaped by determinants of violence such as concentrated poverty, racialized disadvantage, and limited public health infrastructure (Buggs et al., 2022; Edin et al., 2023; Kennedy et al., 1998; Randolph et al., 2024; Rowhani-Rahbar et al., 2019; Van Dyke et al., 2022).

Circumstances of Homicide and Opportunities for Violence Intervention

Interpersonal conflict and criminal activity were the most common preceding factors for homicide deaths. These findings align with national data from NVDRS showing that a large share of firearm homicide arises from arguments and conflict (34.9% of cases with known circumstances), crime (22.1%), and intimate partner violence (15%; Forsberg et al., 2025). Such

patterns support expanding community-based violence intervention strategies in Mississippi. Examples of such programs include those based on the Cure Violence model which, like Baltimore's Safe Streets program, employ credible messengers and violence interrupters to de-escalate conflicts and prevent retaliatory shootings and have demonstrated reductions in gun violence (Cure Violence Global, 2022; Ransford et al., 2025; Webster et al., 2023). Central Mississippi has noteworthy community-centered initiatives already operating in this sphere. Strong Arms of Mississippi utilizes credible messengers to mentor and support youth involved in the juvenile justice system and redirect them toward prosocial pathways (Strong Arms of Mississippi, n.d.). Operation Good Foundation is another such organization that deploys violence interrupters to mediate disputes, de-escalate potentially violent encounters, and provide broader community support (Operation Good Foundation, n.d.). These existing efforts illustrate the feasibility of expanding evidence-informed violence intervention strategies statewide.

Circumstances of Suicide and Policy Implications

Most suicide decedents were determined to have existing mental health problems, depressed mood, or a history of suicide attempts or suicidal thoughts. These circumstances are congruent with national trends as seen in NVDRS, where mental health problem (48.9%), depressed mood (27.1%), and suicidality (33.8% of decedents has a history of suicidal thoughts or plans, 28.5% left a suicide note, 19.9% had disclosed suicidal intent to another person, and 17.8% had a history of attempting suicide.) were reported as common precipitating circumstances based on coroner and medical examiner records and law enforcement reports (Forsberg et al., 2025).

Notably, the pattern of a decline in current depressed mood despite an increase in diagnosed mental health problems may reflect incomplete capture of acute mood symptoms at the time of death. NVDRS data collection relies on preexisting narrative abstraction from law enforcement reports, medical examiner reports, and death certificates (Forsberg et al., 2025). Data completeness depends on the quality and timeliness of local investigations (Roman et al., 2021). If interviews or collateral information were limited, investigators might have sufficient documentation for a mental health diagnosis but not for mood at the time of death. This can produce an apparent decline in "depressed mood" over time but not necessarily a real decrease in prevalence.

Taken together, these findings reinforce the importance of early identification and treatment of individuals in crisis in addressing suicide mortality (Mann et al., 2023; Melhelm et al., 2023; Santiago-Díaz et al., 2024). Additionally, since more than 90% of firearm suicide attempts are fatal, policies that temporarily restrict access to firearms during periods of crisis can save lives (RAND, 2024). Prior work has demonstrated that policies such as extreme risk protection orders, universal background checks, waiting periods, and minimum-age purchasing laws reduce suicide deaths (Arnold & Priestley, 2023; Fleegler et al., 2013; RAND, 2024; Swanson et al., 2015). Integrating clinical screening for mental health problems and suicidality along with policy-driven firearm access restrictions for those experiencing a crisis represent evidence-based strategies to potentially reduce firearm-related suicide deaths in Mississippi.

Geographic Disparities

A clear west-to-east gradient in firearm-related violent deaths emerged in our study, with the highest homicide rates concentrated in the Mississippi Delta and the capital region. Because county-level rates were residence-based, the spatial patterns reflect where decedents lived rather than where incidents occurred. Areas with the highest homicide deaths are also characterized by factors such as historic racial segregation, poverty, and structural disinvestment, which have been associated with firearm violence in the United States (Barrett et al., 2022; Gobaud et al., 2024; Randolph et al., 2024). In contrast, firearm suicides were most prevalent in rural and rural–suburban counties. Given the barriers to accessing healthcare services in rural areas in general as well as a less strict policy environment surrounding firearms in the state, tailored interventions such as rural behavioral health expansion and telemental health networks combined with policy advocacy regarding firearm ownership and regulation hold promise in decreasing firearm suicide in Mississippi (Giffords Law Center, n.d.; Glasser et al., 2023; Holland et al., 2018; Zhang et al., 2024).

Strengths and Limitations

This study represents the first statewide analysis of firearm-related violent deaths in Mississippi using MSVDRS data, moving beyond prior work that was limited to city-level reports or descriptive briefs (National Institute for Criminal Justice Reform, 2024; O'Quinn & Mozee, 2022). The use of MSVDRS allowed integration of multiple data sources—death certificates, law enforcement records, and medical examiner reports—providing more complete case information than mortality data alone. Finally, linking demographic and circumstance data with county-level mapping highlights geographic disparities that are not visible in statewide averages and offers actionable insights for targeted prevention.

This study has limitations. MSVDRS relies on abstraction from death certificates, medical examiner investigations, and law enforcement records, and data completeness varies by the personnel involved and the stage of the investigation. Similarly, data on mental health conditions are abstracted from coroner or medical examiner records instead of medical records and as such may not always be accurate (Forsberg et al., 2025). For example, in 2023, known circumstances were available for only 233 of 451 firearm-related homicide victims and 164 of 318 firearm-related suicide victims. Incomplete or missing circumstance variables may bias subgroup interpretation, and certain precipitating circumstances are likely underestimated (Fowler et al., 2017). This study is also limited by the current availability of MSVDRS data. As of the end of 2025, data for 2024 were still unavailable. Because NVDRS data are not released in real time, there is typically a 19-month delay (Hoffmire et al., 2025). Ongoing processes of data abstraction, verification, and data quality review result in this lag. Finally, the trends observed in this study may have been influenced in part by the COVID-19 pandemic. Several national and state-level studies reported substantial increases in firearm violence during 2020–2021 (Sun et al., 2022), associated with heightened social and economic stress, disruptions in community services, and a sharp rise in firearm purchasing (Kim, 2023; Miller et al., 2022). Although our study begins in 2021, these broader pandemic-related conditions may have continued to affect firearm violence in Mississippi during the early years of the study period.

Conclusion

This study highlights the extent and distribution of firearm homicide and suicide in Mississippi. Community violence interventions grounded in credible messenger models may reduce preventable homicide in the highest-risk regions, while expanding access to mental health services and removing access to firearms during periods of crisis may reduce suicide mortality. Continued investment in MSVDRS data collection is essential to guide data-driven public health strategies across the state. Together, these findings underscore the need for comprehensive, community-centered, clinical, and policy-based approaches to reduce the burden of firearm violence in Mississippi.

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All analyses, opinions, and conclusions presented in this work are solely those of the authors. They should not be construed as the official position or policy of, nor should any endorsements be inferred by the affiliated institutions, organizations, or funding agencies.

Correspondence

Send correspondence to Dr. Lei Zhang at lzhang2@umc.edu.

Ethics Approval

This analysis used deidentified MSVDRS data collected for public health purposes. This activity was reviewed by the Mississippi State Department of Health (MSDH) and determined not to require human subjects research review; it was conducted consistent with MSDH policy.

Declaration of Conflicting Interest

Dr. Lei Zhang is a Co-Editor of the *Journal of Public Health in the Deep South*.

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