

## Police killings of unarmed Black persons and suicides among Black youth in the US: A national time-series analysis

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### ABSTRACT

**Introduction:** Suicide deaths among Black youth in the US have increased rapidly over the past decade. Direct or vicarious racial trauma experienced through exposure to police brutality may underlie these concerning trends. **Methods:** We obtained nationally aggregated monthly counts of suicides for non-Hispanic Black and White youth (age  $\leq 24$  years) and adults (age  $> 24$  years) from the National Mortality Vital Statistics restricted-use data files provided by the Centers for Disease Control and Prevention, from 2013 to 2019. Monthly counts of Black youth suicides constituted our main outcome. We defined our exposure as the monthly counts of police killings of unarmed Black persons over 84 months (2013 to 2019), retrieved from the Mapping Police Violence database. We used ARIMA (AutoRegressive Integrated Moving Average) time-series analyses to examine whether Black youth suicides increased within 0 to 3 months following police killings of unarmed Black persons, controlling for autocorrelation and corresponding series of White youth suicides. **Results:** Suicides among Black youth increase by  $\sim 1$  count three months following an increase in police killings of unarmed Black persons (exposure lag 0 coefficient = 0.16,  $p > 0.05$ ; exposure lag 1 coefficient =  $-0.70$ ,  $p > 0.05$ ; exposure lag 2 coefficient =  $-0.54$ ,  $p > 0.05$ ; exposure lag 3 coefficient = 0.95,  $p < 0.05$ ). The observed increase in suicides concentrates among Black male youth (exposure lag 3 coefficient = 0.88,  $p < 0.05$ ).

### Introduction

Black youth have previously exhibited lower suicide rates relative to other racial/ethnic groups in the US [1]. However, in recent decades, the suicide rate among Black youth has increased more rapidly than among youth of other race/ethnicities [2–4]. Between 2007 and 2017, the suicide death rate among Black youth nearly doubled from 2.5 to 4.8 (per 100,000 population) [5]. Whereas suicides among youth increased across all racial/ethnic groups over this period in the US, the slope of increase among Black youth has outpaced those among all other racial/ethnic groups combined [5]. Over the past decade, there was a 207% rise in suicide rate among Black youth (2.7 in 2010 to 5.6 in 2020, per 100,000 population), which exceeded that among White youth (4.9 in 2020 to 6.9 in 2020, per 100,000 population) by 66% [5]. This unprecedented pattern has led to rising concerns regarding mental health among Black youth [2,3,6]. Scholars contend that structural racism may serve as a prominent and pervasive contributor to these concerning

trends [7–13]. Direct or vicarious racial trauma through exposure to police brutality forms a key facet of racism routinely faced by Black populations in the US [14–17]. Evidence suggests that police killings of unarmed Black Americans may exert a population-level adverse effect on mental health of Black populations, that, in turn, may increase suicide-related risk factors in this group [14,16–18].

Several historians contend that an essential step in addressing contemporary policing challenges faced by Black Americans is to gain a deeper understanding of the historical roots of law enforcement in America [19]. The evolution of policing in the United States varied across geographical regions, with some northern cities like Boston (MA) and New Amsterdam (NY) instituting night watch systems, while southern states relied more heavily on slave patrols [20]. Ultimately, these early forms of policing gave way to the more organized and formal law enforcement structures that exist today [20]. Research by Williams and Murphy (1990) highlights that the police, who are supposed to enforce the law, have a long history of maintaining racial hierarchy and

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enacting racial violence against Black communities [21]. This issue is compounded by documented instances of police forces collaborating with groups like the Ku Klux Klan to terrorize Black Americans [22]. Such actions represent betrayal of the fundamental duty of the police to serve and protect all citizens, and underscore the urgent need for law enforcement agencies to address and remedy these racist behaviors.

Currently, police violence in the United States results in approximately 1 death per 100,000 men annually, but this average masks a stark racial disparity: police killings account for 1.9 to 2.4 male deaths per 100,000 population per year among Black men, relative to 0.7 deaths per 100,000 White men per year [23]. Estimates project that over the life-course, one in every 1000 Black men may be killed by police [24]. Researchers and activists assert that violence against non-White persons forms a defining characteristic of the American criminal justice system [25]. Police brutality on the Black community forms a key component of anti-Black violence and racism, and portends grave health consequences in this population [26].

Exposure to racial discrimination early in life may correspond with elevated risk of poor health outcomes [27]. Studies suggest that among Black youth, exposure to racial discrimination peaks during adolescence and gradually declines through young adulthood [28,29]. Relative to Black adults, Black youth exhibit disproportionately higher adverse mental health outcomes in response to discrimination and racial violence, which indicates differentially greater psychiatric vulnerability of this age group [30]. Brain development in adolescents and young adults is marked by sensitive periods and developmental windows in which a person's environment imposes lasting effects on their brain and behavior [31]. If witnessed during this critical period, exposure to racialized violence may have lasting and harmful impacts on brain development [31]. Black youth may internalize racially targeted violence and discrimination, viewing these incidents as personal threats that, in turn, can increase emotional stress and amplify threat perception [32,33]. Threat experiences are associated with thinning of brain areas that are essential for emotional processing, decision-making, and self-perception [34–36]. Pervasive exposure to racially targeted violence and threats may result in a constant state of hypervigilance and emotional dysregulation that may impair the development of key brain regions such as the prefrontal cortex and amygdala, and induce accelerated biological aging, particularly during puberty [35–38]. Witnessing police shootings of Black individuals may induce vicarious trauma and correspond with heightened psychological distress and post-traumatic stress syndrome among Black youth [15,16,39–42]. Persistent exposure to racist violence may increase allostatic load – wear and tear on the body due to repeated stressors – and cause changes in the brain associated with a reduction in the body's ability to cope [37,43–45]. Inability to cope or recover may result in a maladaptive state, where an individual is unable to process their emotions in a healthy way [45]. Black male youth may be particularly sensitive to police violence owing to the broader demographic patterning of police murder victims, and may exhibit elevated suicidality in response to police killings of unarmed Black persons [2,3,46–48].

Exposure to racial violence may lead to anger, resentment, anxiety, helplessness, hopelessness, and fear among Black youth [29]. These responses may reduce optimism about the future, particularly among youth that, in turn, may increase the risk of suicidal ideation and suicide mortality [49–52]. Racialized social media encounters may correspond with race-related stress and maladaptive consequences among Black youth [53]. In a sample of college women, witnessing the deaths of Black persons online led to emotional fatigue, trauma, anger, depression, and paranoia [15]. Prominent race-related events, such as the killings of George Floyd, Breonna Taylor, Michael Brown and numerous others have inundated media platforms [15]. Exposure to anti-Black police violence, in conjunction with extensive news or social media coverage, may thus elevate the risk for suicidal ideation among Black youth [15, 17].

Grief is a significant emotion that Black individuals may experience

following exposure to anti-Black violence. These grief experiences differ from those of White individuals due to the disproportionate losses Black people endure because of systemic oppression. In a study of 30 Black college students, Wilson and colleagues identified six grief and trauma responses expressed by Black college students in response to anti-Black violence [46]. These include sadness, hopelessness, hypervigilance, intrusive memories, perpetual grief, and extreme tiredness [46]. Most of these responses align with symptoms of depression and posttraumatic stress disorder. Black students also reported stress exacerbated by repeated exposure to anti-Black violence through media, further intensified by derogatory comments from White individuals [46]. This combination of stress and grief that Black youth face in response to anti-Black violence may increase their risk for depression and suicidal ideation [46].

Prior research reports adverse effects of exposure to police violence on mental health among Black populations [14,16,17]. Studies indicate that anti-Black violence may exhibit substantial spillover effects, with grief and shock from police killings of unarmed Black persons rippling through the country, beyond their local region of occurrence [16,17]. However, we know of no research that has examined this relation with respect to suicide mortality among Black youth. Given their differentially greater psychiatric vulnerability to racial violence, we examine whether and to what extent, suicide mortality among Black youth increases nationally in the US within 0–3 months following police killings of unarmed Black persons, from 2013 to 2019. We also use a subset of highly public incidents of anti-Black violence (including police killings and extremist murders of Black persons) to gauge whether youth suicides exhibit stronger responses to this subset of “highly visible” incidents [17]. We hypothesize an increase in Black youth suicides within 0–3 months following police killings of unarmed Black persons, nationally across the US. Our national analyses quantify the patterning of suicides among Black youth in response to police killings of Black persons, and contribute to the current body of research that lacks evidence on the association of such exposures with adverse psychological outcomes among Black youth.

## Methods

### Data and variables

We retrieved monthly counts of suicides for non-Hispanic Black and White youth (age < 25 years, male and female) and adults (age > 24 years), 2013 to 2019 (84 months), from the National Mortality Vital Statistics restricted use data files provided by the Centers for Disease Control and Prevention using ICD 9 codes E950-E959 and ICD 10 codes X60-X84 (National Center for Health Statistics (NCHS) 2023) [54]. We defined youth as individuals under the age of 25 in accordance with recommendations by the US Department of Health and Human Services [55]. The monthly series of Black youth suicides formed our outcome. In alignment with prior research, we obtained data on monthly counts of police killings of Black persons from the Mapping Police Violence database [14,16,17,56]. We operationalized our exposure as 0–3 month lags of the monthly count of police killings of unarmed Black persons [14,56,57]. We also retrieved a subset of highly public murders of Black persons (2013–2017, 60 months) from a research article by Curtis et al (2021) to examine differentially higher sensitivity of Black youth suicides in relation to widely publicized incidents of extreme anti-Black violence [17]. Owing to our use of aggregated, publicly available, de-identified secondary data, our study was deemed exempt by The Ohio State University Institutional Review Board.

### Analysis

Population-level trends in suicide mortality exhibit strong temporal patterns, such as seasonality, cyclicity, memory from past values and lagged effects of deviations from expected values [58]. These temporal

dependencies, also referred to as autocorrelation, can induce confounding and lead to biased estimates and incorrect conclusions about the true association between an exposure and an outcome [59,60]. Failure to account for autocorrelation in time-series data may also result in underestimated standard errors of model parameters, overly optimistic confidence intervals and increased chances of Type II errors [59–62]. We used ARIMA (AutoRegressive Integrated Moving Average) time-series methods to capture temporal dependencies, address non-stationarity, and control for autocorrelation in our analyses. ARIMA models comprise the following fundamental components:

1. AutoRegressive (AR) Component: The AR component captures the autocorrelation by modeling the relationship between the current observation and its past values. The inclusion of lagged observations allows ARIMA to account for the autocorrelation structure in the time series.
2. Integrated (I) Component: The I component involves differencing the time series data to make it stationary. Stationarity eliminates trends and ensures that autocorrelation is adequately addressed.
3. Moving Average (MA) Component: The MA component accounts for short-term fluctuations and random variations in the time series. By incorporating a weighted average of past forecast errors, ARIMA can capture and control for autocorrelation in the residuals.

We used iterative pattern recognition techniques through Box-Jenkins routines to identify any AR, I and MA parameters in our outcome series and controlled for these parameters in our analysis [63]. We then examined the distribution of residuals to confirm absence of any autocorrelation in the outcome. Next, we applied the exposure (lagged by 0–3 months) to estimate whether Black youth suicides increased within 0–3 months of unit increases in monthly count of police killings of unarmed Black persons. We opted for this exposure lag structure to accommodate population-level psychiatric response windows noted in prior studies that suggest the development of PTSD, anxiety and depression symptoms in the population within 3 months following exposure to macrosocial shocks [14,16,17,64]. Our use of a brief exposure lag also limits confounding from temporally stable, long-term factors that may alter the national patterning of suicides among Black youth (e.g. policies such as the Affordable Care Act) over extended lags. Our analyses controlled for concomitant monthly series of White youth suicides to account for shared temporal patterning of suicides between Black and White populations. Our use of the series of White youth suicides in our analyses primarily served to account for shared temporal patterning of suicides among Black and White youth (e.g. seasonality, trend, drift), rather than White youth suicides serving as a “true” counterfactual or comparison group. In addition to examination of overall changes in Black youth suicides following exposure, we also explored whether any observed effects varied differentially across suicides among Black male and female youth [29]. Exploratory analyses also included examination of suicides among Black adults following police killings of unarmed Black persons, to gauge whether our results cohere with other reports of no spillover effects of this exposure (albeit localized increases have been observed) in this group [18]. Sensitivity analyses comprised (1) examination of the relation between monthly Black youth suicides and exposure to highly public incidents of anti-black violence, and (2) examination of the relation between longer exposure lags of 4, 5, 6 months and the outcome. Lastly, we conducted a falsification test where we reformulated our exposure as the monthly count of police killings of *armed* Black individuals and examined whether Black youth suicides showed any change following this, presumably non-racist, exposure. We performed ARIMA time-series analysis using software provided by Scientific Computing Associates [65].

## Results

Our study data comprised a total of 39,696 suicides among Black and

White youth from 2013 to 2019, of which Black youth suicides accounted for about 12.7% of all youth suicides (Table 1). Black youth suicides averaged 60.2 per month over our study period (Table 1). Consistent with other reports, suicide counts were substantially higher among Black and White male youth, relative to female (Table 1) [4,66]. Figure 1 shows trends in Black and White youth suicides over our study period, with both series trending upward over time. Figure 2 shows trends in suicides among Black male and female youth. Suicide trends among Black and White adults appear in Appendix Figure A.1. Figure 3 presents the monthly counts of police killings of unarmed Black persons, from 2013–2019, with this exposure averaging 3.4 per month over the study period (Table 1). Appendix Figure A.2 graphs the subset of highly public anti-Black murders from 2013–2017 (data retrieved from Curtis et al., 2021) [17].

Iterative Box-Jenkins pattern recognition routines identified an Integration parameter of 1 (i.e. differencing at lag 1, usually the case for upward trending series) and a Moving Average parameter of 1. Appendix Figure A.3 shows the distribution of our outcome residual series over 12 month lags after controlling for I(1) and MA(1) parameters, and we do not see evidence of residual autocorrelation in the monthly series of Black youth suicides following this adjustment.

Results from ARIMA time-series analysis show an increase in Black youth suicides 3 months following a unit increase in police killing of unarmed Black persons (Table 2, Model A; exposure lag 0 coefficient = 0.16,  $p > 0.05$ ; exposure lag 1 coefficient =  $-0.70$ ,  $p > 0.05$ ; exposure lag 2 coefficient =  $-0.54$ ,  $p > 0.05$ ; exposure lag 3 coefficient = 0.95,  $p < 0.05$ ). This relation concentrates among Black male youth (Table 2, Model B; exposure lag 3 coefficient = 0.88,  $p < 0.05$ ). We fail to reject the null among Black female youth suicides (Table 2, Model C). Results from exploratory analysis with Black adult suicides as the outcome show no relation between the exposure and suicides among Black adults (Appendix Table A.1). Assuming a linear relation between the exposure and outcome, these findings suggest a crude estimate of  $\sim 267$  ( $=0.95 * 281 = 266.95$ ; 0.95 is the exposure lag 3 coefficient from Table 2 Model A, and 281 is the total count of police killings of unarmed Black persons in the US over our study period) additional suicides among Black youth statistically attributable to police killings of unarmed Black persons, with the majority of these suicides concentrating among Black male youth.

Appendix Table A.2 presents results of ARIMA time-series results from our sensitivity test with highly publicized murders of Black persons as the exposure. Here, we observe an increase in Black youth suicides at exposure lags 0 and 3 (Appendix Table A.2, Model A; exposure lag 0 coefficient = 1.77,  $p < 0.05$ ; exposure lag 3 coefficient = 2.06,  $p < 0.01$ ). These effects appear distributed among Black male and female youth with suicides increasing 3 months post-exposure among Black male youth (Appendix Table A.2, Model B; coefficient = 2.09,  $p < 0.05$ ), and in the month of the exposure (i.e. exposure lag 0) among

**Table 1**  
Descriptive statistics of suicides among Black and White youth (age < 25 years), adults (age > 24 years) and police killings of Black persons in the US, 2013 to 2019.

Variables	Total count	Monthly mean (SD)
Black youth suicides	5055	60.2 (21.1)
Male	4008	47.7 (10.3)
Female	1047	12.5 (3.6)
White youth suicides	34,641	412.4 (46.1)
Male	27,515	327.6 (38.6)
Female	7126	84.8 (11.3)
Black adult suicides	14,730	175.4 (27.3)
White adult suicides	249,454	2969.7 (239.3)
Police killings of unarmed Black persons	281	3.4 (2.3)
Highly public murders of Black persons (2013–2017)	49	0.82 (1.2)
Police killings of armed Black persons	1166	13.9 (4.1)

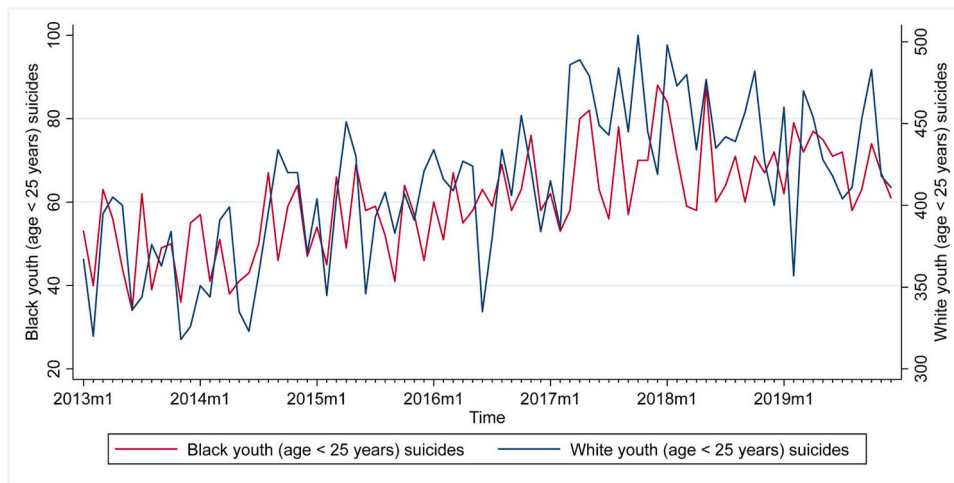


Fig. 1. Monthly counts of Black and White youth suicides in the US, 2013–2019.

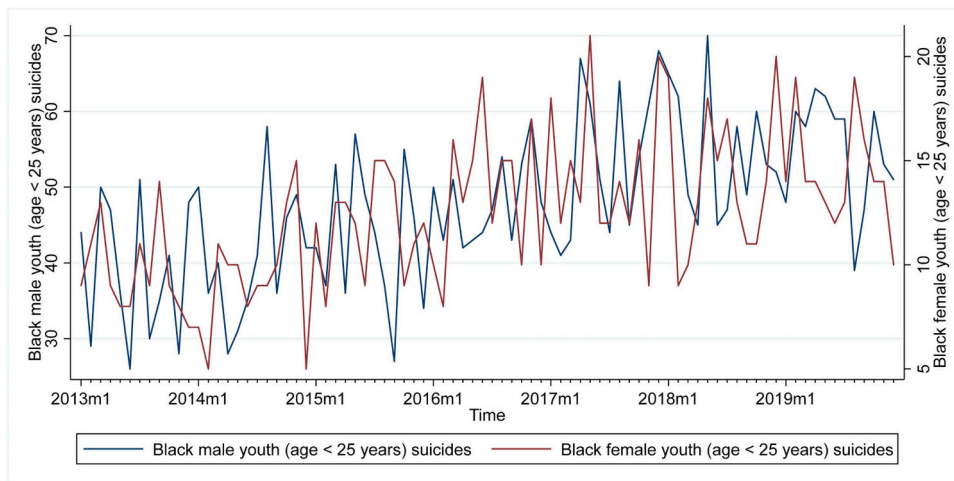


Fig. 2. Monthly counts of Black male and female youth suicides in the US, 2013–2019.

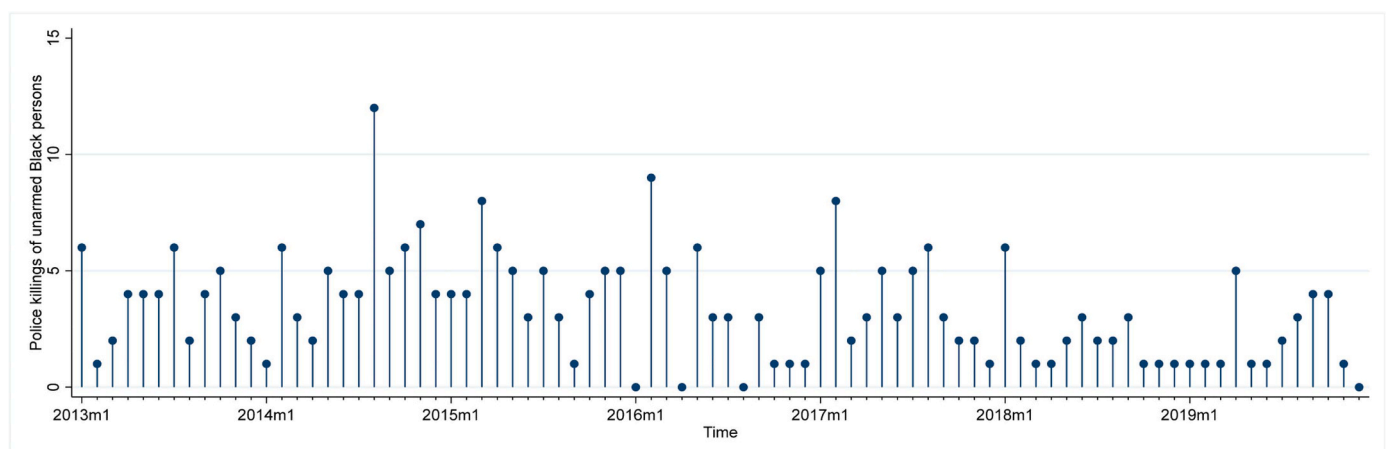


Fig. 3. Monthly counts of police killings of unarmed Black persons in the US, 2013–2019.

Black female youth (Appendix Table A.2, Model C; coefficient = 0.66,  $p < 0.05$ ). The magnitude of statistically detectable coefficients from Appendix Table A.2 appear almost twice as high relative to those in Table 2, supporting the expectation that highly publicized acts of anti-Black violence may elicit stronger psychological responses among

Black youth.

Appendix Table A.3 shows that longer lags of exposure (police killings of unarmed Black persons) do not exhibit statistically detectable relations with Black youth suicides and support 0–3 months post-exposure as the acute temporal response window for acute psychiatric

**Table 2**

Results of ARIMA time-series analyses predicting (i) suicides among all Black youth (Model A), (ii) suicides among Black male youth (Model B), (iii) suicides among Black female youth (Model C), as a function of police killings of unarmed Black persons (0–3 month lags), suicides among Whites (youth, male youth and female youth respectively per Model), and autocorrelation.

Variables	Model A: Outcome is suicides among all Black youth (age < 25 years)		Model B: Outcome is suicides among Black male youth (age < 25 years)		Model C: Outcome is suicides among Black female youth (age < 25 years)	
Police killings of unarmed Black persons	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>
Lag 0	0.16	0.46	0.10	0.44	0.09	0.17
Lag 1	-0.70	0.46	-0.65	0.43	-0.01	0.16
Lag 2	-0.54	0.44	-0.38	0.41	-0.14	0.16
Lag 3	0.95 *	0.45	0.88 *	0.42	0.06	0.16
Suicides among Whites (respective sex groups per Model)	0.09 **	0.03	0.08 **	0.03	0.03	0.03
Autocorrelation Parameters:						
I (1)	Yes, at lag 1		Yes, at lag 1		Yes, at lag 1	
MA(1)	0.89 ***	0.06	0.90 ***	0.05	0.87 ***	0.05

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ ; two-tailed test

SE= Standard Error

I= Integration

MA=Moving Average

outcomes, as noted in extant literature [14,16,17,67]. Results from our falsification test using police killings of *armed* Black persons as the exposure show no changes in Black youth suicides in relation to this presumably less-racist exposure (Appendix Table A.4).

## Discussion

Police killings of unarmed Black persons comprise an extremely violent and visible component of structural racism in the US. These acts of violence may correspond with adverse mental health consequences among Black populations, and particularly among Black youth [14,16,17]. We examined whether and to what extent police killings of unarmed Black persons precede an increase in Black youth suicides, from 2013 to 2019. Results from our time-series analyses show that suicides among Black youth increase by ~1 count (nationally) within three months following police killings of unarmed Black persons, which approximates to about 267 suicides among Black youth (~5% of total Black youth suicides over our study period) statistically attributable to this exposure. The observed increase in suicides concentrates among Black male youth and reaches nearly twice its magnitude in relation to highly publicized incidents of anti-Black violence and murders. Our findings underscore the vulnerability of Black youth who may exhibit differentially greater vulnerability to racist violence.

Strengths of our study include the use of rigorous time-series analyses that control for autocorrelation and contemporaneous White youth suicides. We use brief exposure lags of 0–3 months to estimate a proximate response, which limits confounding from stable, long-term factors and establishes temporal order (exposure precedes outcome). Our use of publicly available, national data permits replication and independent verification of our analyses. We utilize multiple sensitivity and falsification tests that support our main findings. For our findings to arise from an unobserved confounder, such a factor would have to (i) be correlated with the timing and magnitude of our exposure, (ii) not be caused by police killings of unarmed Black persons, and (iii) increase suicides only among Black youth but not among White youth within a 0–3 month window. We know of no such factor. To our knowledge, no other study has examined suicides among Black youth following police killings of unarmed Black persons, and this is the first study to provide evidence of increase in Black youth suicides following these acts of extreme, racist violence.

Limitations include that we do not have information about prior psychiatric history of suicide decedents in our data. It is plausible that our observed increase in Black youth suicides concentrates among those with pre-existing psychiatric conditions. We encourage future research to examine whether mentally ill Black youth exhibit higher risk of suicide death following exposure to police killings of Black persons. We also do not know the reason for absence of statistically detectable relations

between our exposure and suicides among Black adults. It is plausible that social antecedents of suicides may operate in fundamentally different manners among youth versus adults, particularly over the short-term following adverse exposures. For instance, during the COVID-19 pandemic in the US, youth suicides showed a substantial increase despite a decline in suicides among adults [66]. We encourage future research to examine potential reasons underlying these differences. Next, given the ecological nature of our study, we caution readers against inferring individual-level risk of suicide among Black youth, following police killings of Black persons. Lastly, we encourage researchers to examine the intricacies of Black youth's experiences utilizing an intersectional approach through the lens of gender, parental socioeconomic status, or exposure to other forms of community-level adversity in relation to suicide.

Our study contributes to the expanding body of literature on the detrimental effects of anti-Black violence, specifically police violence, on the health of Black Americans across their lifespan. The evidence is compelling: exposure to police killings of unarmed Black individuals has been consistently associated with adverse mental health among Black populations [14–18]. Building upon the foundational work of [46], who underscored the heightened risk of depression and suicidal ideation among Black youth exposed to anti-Black violence, we extend the scope of existing research by examining suicide deaths among youth in the context of both armed and unarmed killings of Black individuals [46].

Young Black men experience racism at higher frequencies and face the highest risk of death by police violence relative to all other racial/ethnic groups [24,68]. Notably, police interactions and police use of force at the neighborhood-level precede higher levels of psychological distress among Black men relative to women [69,70]. Black male youth may identify closely with victims of police violence, which may correspond with elevated suicidality in this group following direct or vicarious exposure to police brutality [46,47]. Witnessing and experiencing police violence begins early on in childhood, especially among Black male youth [71]. Police-related deaths may serve as a stark reminder of young Black males' own vulnerability to police violence [48]. Our observation of elevated suicides among Black male youth following police killings of unarmed Black persons underscores the differential vulnerability of this demographic in relation to police violence.

Prior research indicates that indirect exposure to police violence, such as through media coverage, can induce physical and psychological distress among Black Americans, including elevated depression, anxiety, and post-traumatic symptoms [16,72,73]. Viewing photographs of racial violence may elicit greater sympathetic nervous system reactivity, increased negative affect and decreased positive affect [73]. Highly publicized police violence may act as an anticipatory stressor, where fear of becoming a victim of police violence may induce depression and anxiety [40,74]. Our study not only echoes but also builds upon the

critical narrative established by previous research, shedding light on the nuanced and deeply embedded psychological impacts of police violence against Black individuals on youth within these communities.

**Data sharing plan**

Data used in this study are available upon request from the Centers for Disease Control and Prevention. Time-series analysis code used in this study will be provided by Parvati Singh upon request.

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**Author’s contribution**

Conceptualization- PS GCK; Data curation- PS, GCK, KS; Formal analysis- PS; Investigation- GCK, MG, AC, KS, PS; Methodology- PS; Project administration- GCK, MG, KS, PS; Resources- PS; Software- PS; Supervision- GCK, KS, PS; Validation- GCK, PS; Visualization- MG, AC;

**Appendix**

Roles/Writing - original draft- GCK, MG, AC, KS, PS; and Writing - review & editing- GCK, KS, PS.

**CRedit authorship contribution statement**

**Geoffrey Carney-Knisely:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Investigation, Data curation, Conceptualization. **Parvati Singh:** Writing – review & editing, Writing – original draft, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Kamesha Spates:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Investigation, Data curation. **Marquianna Griffitt:** Writing – original draft, Visualization, Project administration, Investigation. **Alexandria Crawford:** Writing – original draft, Visualization, Investigation.

**Declaration of Competing Interest**

All Authors declare no competing interests.

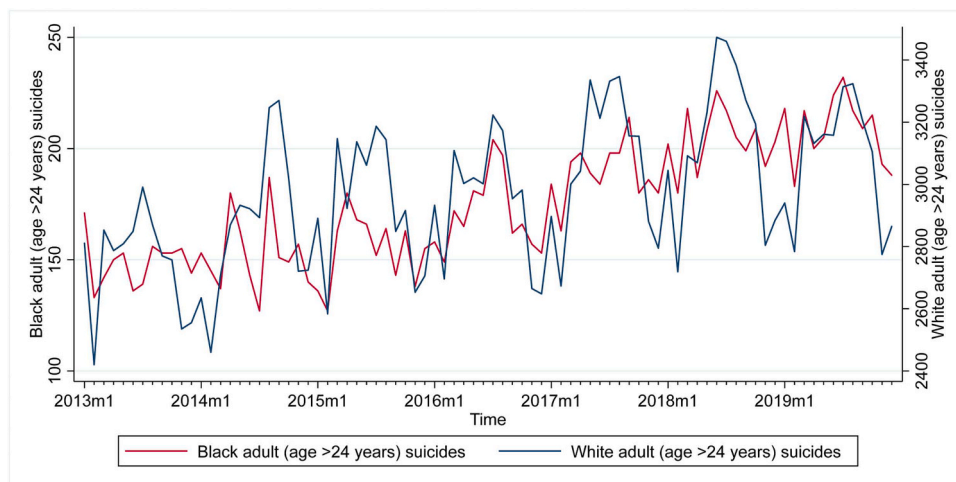


Figure A.1. Monthly counts of Black and White adult (age > 24 years) suicides in the US, 2013–2019.

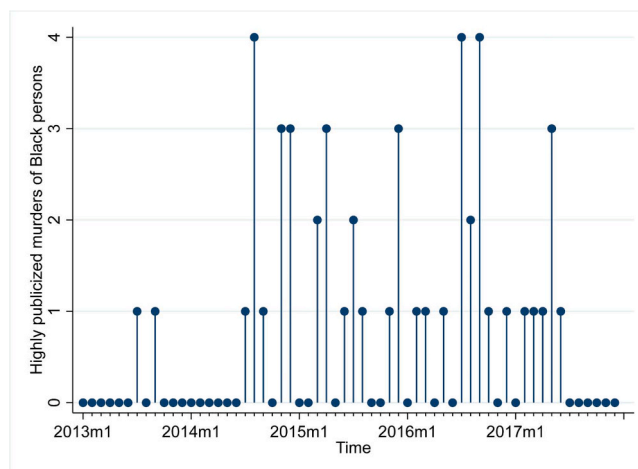
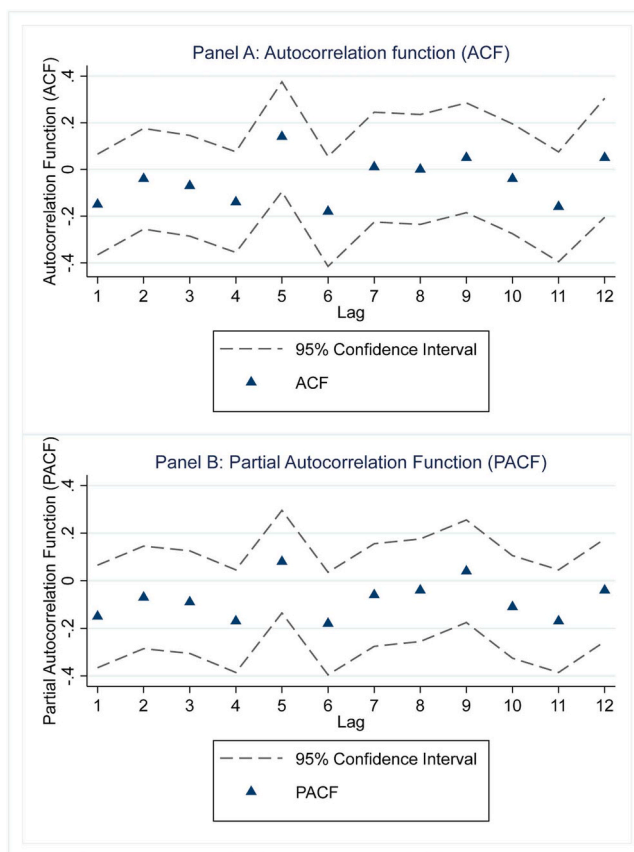


Figure A.2. Monthly counts of highly publicized murders of Black persons in the US, 2013–2017 (information taken from Curtis et al., 2021).



**Figure A.3.** Estimates and 95% Confidence Intervals of Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) after removal of autocorrelation in monthly series of Black youth suicides (first 12 lags).

**Table A.1**

Results of ARIMA time-series analyses predicting suicides among all Black adults, as a function of police killings of unarmed Black persons (0–3 month lags), suicides among White adults, and autocorrelation.

Variables	Coefficient	SE
Police killings of unarmed Black persons		
Lag 0	0.31	0.72
Lag 1	-0.22	0.72
Lag 2	0.27	0.72
Lag 3	-0.39	0.67
Suicides among White adults	0.05 ***	0.01
I (1)	Yes, at lag 1	
MA(1)	0.76 ***	0.09

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001; two-tailed test

SE= Standard Error

I= Integration

MA=Moving Average

**Table A.2**

Results of ARIMA time-series analyses predicting (i) suicides among all Black youth (Model A), (ii) suicides among Black male youth (Model B), (iii) suicides among Black female youth (Model C), as a function of highly publicized murders of Black persons (0–3 month lags), suicides among Whites (youth, male youth and female youth respectively per Model), and autocorrelation.

Variables	Model A: Outcome is suicides among all Black youth (age < 25 years)		Model B: Outcome is suicides among Black male youth (age < 25 years)		Model C: Outcome is suicides among Black female youth (age < 25 years)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Highly publicized murders of Black persons						
Lag 0	1.77 *	0.76	1.28	0.79	0.66 *	0.30
Lag 1	-1.32	0.80	-0.91	0.82	-0.09	0.31
Lag 2	0.60	0.79	0.77	0.81	0.02	0.31
Lag 3	2.06 **	0.76	2.09 *	0.79	0.33	0.30
Suicides among Whites (respective sex groups per Model)	0.14 ***	0.01	0.13 ***	0.01	0.13 ***	0.01
Autocorrelation Parameters:						
AR(5)	0.45 ***	0.12	0.41 ***	0.13	(no parameters identified)	

\* p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; two-tailed test

SE= Standard Error

AR= Autoregression

Table A.3

Results of ARIMA time-series analyses predicting (i) suicides among all Black youth (Model A), (ii) suicides among Black male youth (Model B), (iii) suicides among Black female youth (Model C), as a function of police killings of unarmed Black persons (4–6 month lags), suicides among Whites (youth, male youth and female youth respectively per Model), and autocorrelation.

Variables	Model A: Outcome is suicides among all Black youth (age < 25 years)		Model B: Outcome is suicides among Black male youth (age < 25 years)		Model C: Outcome is suicides among Black female youth (age < 25 years)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Police killings of unarmed Black persons						
Lag 4	-0.07	0.50	-0.33	0.46	0.16	0.17
Lag 5	-0.61	0.48	-0.64	0.45	-0.01	0.16
Lag 6	0.76	0.48	0.68	0.44	0.08	0.16
Suicides among Whites (respective sex groups per Model)	0.06 *	0.03	0.04	0.03	0.04	0.03
Autocorrelation Parameters:						
I (1)	Yes, at lag 1		Yes, at lag 1		Yes, at lag 1	
MA(1)	0.85 ***	0.06	0.86 ***	0.05	0.88 ***	0.05

\* p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; two-tailed test

SE= Standard Error

I= Integration

MA=Moving Average

Table A.4

Results of ARIMA time-series analyses predicting suicides among Black youth as a function of police killings of armed Black persons (0–3 month lags), suicides among Whites (youth, male youth and female youth respectively per Model), and autocorrelation.

Variables	Coefficient	SE
Police killings of armed Black persons		
Lag 0	-0.05	0.26
Lag 1	-0.17	0.26
Lag 2	-0.08	0.25
Lag 3	0.44	0.26
Suicides among White youth	0.08 **	0.03
Autocorrelation Parameters:		
I (1)	Yes, at lag 1	
MA(1)	0.88 ***	0.05

\* p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; two-tailed test

SE= Standard Error

I= Integration

MA=Moving Average

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