UNIVERSITY OF CALIFORNIA, IRVINE

Structural racism in the criminal justice system and psychiatric emergencies among Black Americans

DISSERTATION

submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in Public Health

by

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DEDICATION

To my son, Iman. I promise I will always be there for you. Thank you for making me a mom and letting me marvel at the world once again – it's an honor.

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ABSTRACT OF THE DISSERTATION

Structural racism in the criminal justice system and psychiatric emergencies among Black Americans

by

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Black Americans experience more prevalent—as well as more severe and disabling—chronic depression compared to other races/ethnicities. Suicide rates among Black youth have also increased substantially in the past two decades. Many scholars attribute a portion of race-related differences in health outcomes to structural racism. Structural racism comprises methods of reinforcing inequitable systems that societies use to foster racial discrimination. In the justice system, Black Americans have a higher likelihood of police stops, police killings, and incarceration (vs. whites) after accounting for criminality. Such racially disparate systems may have implications for mental health within the broader Black community through perceived unfair discrimination, hypervigilance, vicarious racism, and disruption of family networks and social capital. In three analytic studies, I test whether increases in (i.) police stops, (ii.) police killings of unarmed Black Americans, and (iii.) incarceration correspond with greater psychiatric help-seeking among Black Americans.

Following the New York City Stop, Question, and Frisk (SQF) policy, police stopped Black Americans at 2.5 times the rate of whites, after controlling for crime and precinct differences. I examined whether police stops following the SQF policy in New York City corresponded with greater psychiatric Emergency Department (ED) visits among Black Americans. Through

pathways of perceived unfair discrimination and hypervigilance, police stops may precede greater mental health symptoms within the Black community. Using time-series methodology to control for seasonality and other patterning, I find that police stops correspond with a 0.02 increase in psychiatric ED visits among Black Americans. Stops including frisking coincide with a 0.05 increase in psychiatric ED visits and stops including use of force show a 0.11 increase in psychiatric ED visits among Black Americans. Use of force had the greatest influence as perceived threats of physical violence towards others may incite greater psychiatric symptoms within the community.

Police are almost 3.5 times more likely to kill Black Americans than whites. Additionally, Black Americans have nearly 1.5 times the likelihood of being unarmed when killed compared to whites. I investigated whether and to what extent police killings of unarmed Black Americans precede a severe and acute mental health outcome among Black Americans: depression-related ED visits. Theories on vicarious racism and linked fate posit that individuals indirectly experience racism targeted at other persons of color. I examined the relation across 75 counties from five US states between 2013-2015. Fixed effect linear regression analyses controlled for time-invariant county factors. I also accounted for the number of hospitals and arrests for violent crimes (per 100,000 population). I find that police killings of unarmed Black Americans correspond with an 11% increase in ED visits related to depression (per 100,000 population) among Black Americans in the concurrent month and three months following the exposure.

The justice system incarcerates nearly 2.3 million individuals in the US. Black Americans comprise 40% of those incarcerated despite representing less than 15% of the population. Theoretical work postulates that mass incarceration erodes social capital and family networks within Black communities. I examine the relation between incarceration and psychiatric Emergency Department (ED) visits among Black Americans. I also estimate whether the ratio of Black American to white incarceration (an estimate of structural racism in the justice system)

corresponds with an increase in psychiatric help-seeking among Black Americans. I find that a one unit increase in incarceration (per 100,000 population) corresponds with a 1.4% increase in psychiatric ED visits (per 100,000 population) among Black Americans. Structural racism in incarceration (i.e., one unit increase in ratio Black and white incarceration) also varies positively, with a 2.2% increase in psychiatric ED visits (per 100,000 population).

Police stops, police killings of unarmed Black Americans, and incarceration have substantial adverse psychiatric implications for Black communities. A reduction in racial disparities through policies enforcing changes in policing behavior and sentencing reforms may modestly reduce adverse mental health among Black Americans. Additionally, this work adds to the emerging theoretical and empirical literature on structural racism and its presence in the justice system. Inequitable social systems may significantly influence mental health among Black Americans.

CHAPTER 1: INTRODUCTION

Scholars argue that racism remains pervasive in the United States and contributes to adverse physical and mental health among historically disadvantaged populations.[1] One theoretical framework for racism presents three different levels to evaluate health outcomes: 1) internalized; 2) personally mediated; and 3) institutionalized.[2] Internalized racism denotes the acceptance of negative messages about one's abilities and worth.[2] Personally mediated racism signifies acts of prejudice and discrimination between persons.[2] Institutionalized racism refers to differential access to goods, services, and opportunities by race that follow from formal legislation or the actions by the State that reinforce racial/ethnic biases.[2]

Critical Race Theory (CRT) asserts that institutions perpetuate racial inequality for Black Americans through social, economic, and legal disparities.[3] CRT distinguishes itself from progressive, color-blind, and civil rights approaches as they rely on the current legal system.[4] Scholars argue that although acts or prejudice play a role in racial domination, social institutions shape the system of racial domination.[5] The system subsequently continues as individuals abide by social institutions rooted in racism.[6]

In sociological theory, "The Color Line" refers to the legalized segregation and racial discrimination experienced by Black Americans from the continued division of opportunities and resources following the abolition of slavery.[7] Scholars also posit that discriminatory practices and racialized institutions develop for the subordination of People of Color communities by whites.[8] Foundational and pervasive racism within social structures shape white-dominated societies to generate wealth and support the intergenerational transmission of resources.[8] Theorists further assert that legalized structural racism did not conclude following the termination of Jim Crow laws or the Civil Rights Act of 1964.[9] Racial inequality continued through invisible pathways and practices that often appear non-racially motivated.[9]

Black American and white racial disparities exist in major sub-systems within America, including employment, education, residential segregation, housing, health care, and the criminal justice system.[10] The components, theorists argue, create an integrated system, The Race Discrimination System, through which sub-systems have reciprocal relationships and feedback loops.[10] Interrelated disparities comprise a system that produces societal-level discrimination.[10] Scholars argue that in order to develop effective remedies to racial disparities, research must recognize the overall system of racial discrimination, or 'über discrimination', and how sub-systems relate to each other.[10]

Some contend that negative racial stereotypes and beliefs, of Black Americans, influence societal policies and institutions.[1] Data examining trends in racial attitudes from the 1940s to the 21st century reveal that whites' views toward principles of equality, such as racial integration in education and voting for Black American presidential candidates, have progressed over time.[11] Views concerning decreased social distance among racial groups (i.e., interracial marriage) have also improved.[11] However, many whites show lesser support for policies that would implement equality, such as policies intended to reduce employment and housing discrimination.[11] Additionally, another study reports that many whites continue to hold negative stereotypes regarding the intelligence, determination, welfare use, and violent tendencies of Black Americans and other minority populations.[12]

Mental health among Black Americans

In the 19th century, policymakers often utilized racial disparities in health as a scientific rationale to implement discriminatory policies.[13] After the 1840 US Census, one scientific report falsified Black American 'insanity' rates.[14] The report indicated that the further North Black Americans lived, the higher the rates of Black American lunacy – implying freedom among Black Americans

corresponded with 'insanity'.[14] Early studies of mental illness among Black Americans mostly examined patients in state hospitals and did not account for racial differences in treatment options.[13] After World War II, the US improved its measurement methods by utilizing community surveys with random sampling strategies. However, the field of psychiatry had yet to standardize a diagnostic system for psychiatric illness.[13]

In the 1970s, the field progressed substantially and issued The National Institute of Mental Health Epidemiologic Catchment Area (ECA) Study.[15] This landmark study provided estimates of the prevalence and incidence of psychiatric disorders (current and lifetime) in representative samples of institutionalized and non-institutionalized persons.[15] The ECA reported that whites and Black Americans had similar rates of depressive disorders; however, Black Americans showed higher rates of anxiety disorders.[15] In 1994, the National Comorbidity Survey (NCS) surveyed psychiatric illness among a national probability sample.[16] Findings indicated that Black Americans had lower rates for depression and substance use, as compared to whites.[16] A growing body of epidemiologic work has shown that rates of psychiatric disorders remain lower or similar in Black populations when compared to whites, despite facing greater societal and economic strain.[17–19] Lower rates of mental illness, specifically depression, have led scholars to label this observation as the "Black-white mental health paradox."[17–19]

The paradox challenges expectations of stress theory, in which greater exposure to stressors and lesser access to treatment or coping resources may indicate an increased risk of adverse mental health.[18] Some studies, however, find conflicting results among subgroups of Black Americans or types of psychiatric illness.[17,20] For example, one study reports that Black women experience greater rates of lifetime post-traumatic stress disorder (PTSD) when compared to whites.[18] Previous work has also found no race-related differences in clinical diagnoses for Major Depressive Disorder when using DSM criteria, as well as a semi-structured instrument to diagnose patients.[21] Black Americans have a higher likelihood of misdiagnosis when compared

to whites.[21] Specifically, Black individuals remain 'under-diagnosed' for mood disorders due to not only differences in symptom expression but also ethnocentric bias from clinicians.[21] Additionally, in 2007, the National Survey of American Life reported that Black Americans and whites had similar rates of 12-month Major Depressive Disorder and that Black Americans led all other race/ethnicities in chronic depression.[20] Relative to whites, Black Americans rated their depression as more severe and disabling.[20]

Moreover, The Environmental Affordances Model asserts that Black populations cope with additional exposure to stressors by engaging in unhealthy behaviors including smoking, drinking alcohol, and consuming calorie-dense foods.[22] This coping purportedly leads to greater physical illness but protects against mental illness by way of physiological pathways.[22] The model contends that unhealthy behaviors block the neurologic cascade by way of the hypothalamic-pituitary-adrenocortical (HPA) axis and other biological systems.[22] The HPA axis inhibits the release of corticotropin-releasing factor from the hypothalamus and therefore limits the physiological and psychological experiences of mental distress.[22] Researchers, however, find conflicting empirical evidence to support the model when examining nationally representative samples, over time.[23]

Racism and mental health

Research indicates that exposure to discrimination corresponds with adverse health outcomes. One review of the research in 2003 finds stronger associations between discrimination and mental health as opposed to physical health.[24] Of the 32 published studies examining exposure to discrimination and adverse mental health, 25 reported a positive relation.[25] A meta-analysis and systematic review of 293 studies between 1983 and 2013 finds that self-reported racism corresponds with poorer mental health.[25] With the majority of studies on Black Americans, results indicate that race/ethnicity strongly amplifies the relation between acts of racism and adverse mental health.[25] Another review of 138 empirical studies indicates that the strongest

associations exist between self-reported racism and negative mental health outcomes, as opposed to negative physical health outcomes.[26] Longitudinal studies within the review further indicate temporal order in that self-reported racism precedes adverse mental health among individuals.[26] Further research also indicates mediating pathways between self-reported racism and adverse mental health, such as racial identity, and moderating pathways, such as psychosocial behaviors.[26,27] However, given the self-reported nature of both the exposure (acts of racism) and the outcome (mental health symptoms), scholars note the potential for spurious associations.[26] Studies included in both the meta-analysis and systematic review do not include previous mental health diagnosis as a potential confounder, which may also influence the relation between acts of racism and mental health.[25,26]

Among Black Americans, scholars find that internalized racism, or acceptance of negative beliefs about oneself, also corresponds with adverse mental health such as alcohol consumption, psychological distress, lower self-esteem, and symptoms of depression.[28,29] Several studies focus on experiences of discrimination (personally-mediated racism) and mental health.[1] In line with theories on distributive justice, which concern perceived fairness and allocation of rewards and costs, the perception of unequal treatment arguably precedes increased psychological distress.[30,31] The National Survey of Black Americans, for instance, finds that self-reported discriminatory acts in the past month correlate positively with greater psychological distress, unhappiness, and life dissatisfaction.[24]

Some social scientists assert that differences in socioeconomic status (SES) between races remain responsible for racial variations in health.[32] Large racial differences in socioeconomic status exist between racial/ethnic minorities and white populations.[32–34] For example, Black Americans have twice the unemployment rate as whites and earn 72% of full-time employment earnings.[33] Along with Hispanic populations, Black Americans are also more likely to attend

high-poverty schools with less educational resources.[33] Scholars posit that racism at the societal and institutional-level shape socioeconomic opportunities for racial/ethnic groups.[32] Health-enhancing resources from policies and systems, such as healthcare and education, remain scarce for racial/ethnic minoritized groups – creating a greater risk for lower SES.[32] Cross-sectional studies find that indicators for SES also correlate inversely with adverse mental health.[15,16,35,36] In the ECA Study, adults in the lowest SES quartile have three times the likelihood of having a psychiatric disorder.[15] Additionally, the National Comorbidity Survey finds that individuals in the lowest quartiles of income and education had twice the likelihood of psychiatric illness.[16]

The criminal justice system and mental health

The criminal justice system in the US comprises law enforcement, courts, and corrections.[37] Black Americans show a higher likelihood of arrest, conviction, incarceration, and longer prison sentences than any other race/ethnicity.[37] Scholars have previously attributed punitive drug-related policies to the racial disparity in incarceration. For drug-related offenses, Black Americans have ten times the likelihood of conviction as compared to whites.[38] Police contact remains the most common encounter within the criminal justice system, especially in adolescents.[39] Among 15-year-old urban males, 27% report encountering a police stop and 53% report witnessing and knowing someone stopped by the police.[39] Additionally, police stops in the United States remain racially patterned, with Black American and Hispanic populations disproportionately stopped by police.[39] Research also finds that police stops with Black Americans result in greater confrontation, use of force, and killings of unarmed individuals.[39]

Literature reports greater mental health symptoms among individuals and families involved in the criminal justice system.[40,41] Given the expansion of the carceral state in the US over the past 40 years, many researchers have examined how incarceration may precede adverse mental

health. One study, following incarcerated individuals over time, finds that incarceration precedes mood disorders, such as depression, bipolar disorder, and dysthymia, as well as disability among those formerly incarcerated.[42] Scholars using longitudinal data from the Fragile Families and Child Wellbeing Study report that current or recent incarceration increases the risk of depression. They also document that challenges of social and economic reintegration, after incarceration, partially explain the relation.[40]

Further research documents a relation between children and partners of incarcerated individuals and adverse mental health. Scholars using the National Longitudinal Study of Adolescent Health, which follows children through adolescence, report a positive relation between parental incarceration in childhood and depression, post-traumatic stress disorder, and anxiety during adolescence.[43] Mental disorder in children differs, however, based on paternal or maternal incarceration.[44] Studies report paternal incarceration precedes increases in externalizing and internalizing behavior among children whereas scholars find conflicting results for maternal incarceration.[43–45] A study using nationally representative data from the National Survey of American Life examined familial incarceration and mental health among Black women.[46] Their findings indicate that familial incarceration corresponds with higher levels of depression and psychological distress in Black women.[46] Moreover, analyses report that having fixed roles in the community, such as employment, attenuated the relation between incarceration and adverse mental health.[46]

Interaction with police, by way of police stop and frisks or use of force, also precedes mental health symptoms among individuals tied to the event. A longitudinal study of adolescents reports a positive relation between personal police contact and vicarious police contact with depressive symptoms.[41] This study controlled for several parental and individual characteristics, including youth delinquency, which may confound the relation between police contact and

mental health.[41,47] They find that the relationship between direct and vicarious police contact and depressive symptoms concentrates among Black Americans and women.[41] Scholars examining stressful police stops among at-risk youth, over time, report that age did not correlate with adverse mental health.[48] However, repeated police stops, stops at school, and officer intrusiveness preceded increases in emotional distress and post-traumatic stress.[48] Using population-representative data from the National Longitudinal Survey of Adolescent to Adult Health, researchers examined whether police stops preceded mental health symptoms among Black American and white young adults.[39] Encounters with police preceded increases in mental health symptoms among both race/ethnicities.[39] For Black Americans, previous criminal justice contact and criminal behavior attenuated the relation suggesting that adolescents who have frequent contact with the justice system may not have as extensive mental health symptoms.[39] Alternatively, those with previous criminality may also experience symptoms through more externalizing channels, such as violence, as opposed to internalizing characteristics such as depression and anxiety. Among whites, by contrast, past criminal behavior explained much of the relation between the exposure and outcome.[39]

Literature documents an increase in mental health symptoms following individual involvement with the criminal justice system through police encounters and incarceration.[40,41,49] Research also indicates that parental incarceration precedes greater adverse mental health among adolescents.[43,44,50] However, limited research examines the spillover effects concerning mental health, of such exposures. In the field of Economics, spillover effects — also known as externalities — occur when costs or benefits influence a third party not directly involved in the event.[51] Spillover effects may exert positive or negative influences, depending on whether costs or benefits spillover onto others.[51] Police encounters or incarceration may have negative spillover effects onto individuals not directly tied to the event, indicating population-level

changes in mental health, by way of unfair discrimination, hypervigilance, vicarious racism, the disruption of familial networks, and the erosion of social capital and control.

A few foundational studies invoke prior theory and investigate the spillover effects of police stops, police killings of unarmed Black Americans, and incarceration as they relate to mental health symptoms at higher levels of social ecology (i.e., neighborhood- or county-level). Theory and empirical findings from these studies may indicate heightened psychiatric help-seeking among Black Americans following increases in regional indicators of structural racism in the criminal justice system: 1) police stops; 2) police killings of unarmed Black Americans; and 3) incarceration.

Police stops and psychological distress

Recent literature has examined the collateral consequences of aggressive policing in communities. Sewell, Jefferson, and Lee examine the relation between neighborhood-level aggressive policing and psychological distress in New York City.[52] Past studies indicate that police stops have become chronic stressors in certain neighborhoods.[53,54] The over-policing and hyper-surveillance coupled with the repetitive nature of stops, in racial/ethnic communities, may portend greater adverse mental health. The theoretical mechanisms by which this may occur include 1) unfair discrimination; and 2) hypervigilance.

Brunson and Miller (2008) find that when policing in neighborhoods frequently escalates to frisking and use of force, residents perceive stops as discriminatory and unfair.[53] Perceived unfairness from discrimination, as evidenced by Kessler et al., correlates with psychological distress.[30] Additionally, many scholars report that residents live in a climate of fear from the

potential of criminalization.[55–58] This circumstance creates greater hypervigilance which may not only spur physiological changes but may also lead to greater anxiety and depression.[55]

In the NYC study by Sewell and colleagues (described above), the Authors utilize the Kessler-6 measure of psychological distress as their outcome.[52] As their exposure, they aggregate three measures of police stops at the neighborhood level: 1) total stops; 2) proportion of police stops including frisking; and 3) proportion of police stops including use of force. They report that overall stops do not correspond with psychological distress.[52] Neighborhood-level police stops including frisking and use of force, however, correspond with greater mental health symptoms overall, including severe feelings of nervousness and worthlessness.[52] After stratifying by gender, this relation concentrates among men as opposed to women.[52]

This study has limitations that I aim to address in my research. The Authors did not examine how police stops correspond with mental health by race/ethnicity. Black Americans comprise the majority of police stops during New York City's Stop, Question, and Frisk policy as compared to other race/ethnicities.[59] As such, this exposure may particularly influence Black American mental health through theoretical pathways such as hypervigilance and unfair discrimination. Additionally, I intend to examine whether police stops conducted during the policy may extend to more acute forms of adverse mental health, such as psychiatric help-seeking. Lastly, this study did not investigate the natural experiment that the exposure presents.[60] In 2013, a class action lawsuit found the NYPD liable for racial profiling and unconstitutional stops.[59] This ruling preceded a substantial drop in police stops, especially among Black Americans.[59] I intend to utilize the lawsuit as an exogenous shock that may precede a decrease in mental health emergencies among Black Americans.

Police killings of unarmed Black Americans and adverse mental health

Police remain 3.5 times more likely to kill Black Americans than whites, after adjusting for criminality.[61,62] Black Americans have 1.5 times the likelihood of being unarmed when killed compared to whites with similar criminal disposition.[61,62] A manuscript written by Bor and colleagues examines whether police killings of unarmed Black Americans precede increases in population-level mental health among Black Americans at the county level.[63] The Authors utilize vicarious racism as the primary theoretical mechanism by which this relation may occur.

Research suggests that individuals of color can experience racism vicariously, wherein individuals indirectly experience racism targeted at other persons of color.[41,64] Studies also suggest that Black Americans and other racial/ethnic minorities experience vicarious racism frequently.[65,66] Two studies indicate a relation between vicarious racism and adverse mental health. Mason and coauthors examined mental health among Black Americans young adults following the George Zimmerman and Trayvon Martin trial.[65] They report that racial identity intensified negative psychological reactions among Black American young adults.[65] This work suggests that components of racial identity sensitize Black Americans to incidents of racism that happen to other Black Americans, leading to negative psychological reactions when these events occur.[65] Turney (2020) also reports increases in depressive symptoms following vicarious interactions with the police, after controlling for prior mental disorder, delinquency, and impulsivity.[41] Turney reports that the relation concentrates among Black Americans and girls.[41]

Bor and colleagues (described above) utilize the Behavioral Risk Factor Surveillance System (BRFSS) from 2013-2015 for their outcome: the number of days in the previous month in which individuals reported their mental health as “not good”.[63] As their exposure, they obtained the Mapping Police Violence dataset from 2013-2015 for data on police killings of unarmed Black

Americans.[63] They found an increase in bad mental health days among Black Americans, in the general population, during the concurrent month and the month following the police killing.[67]

Using a similar theoretical framework, Curtis and colleagues assess whether public anti-Black violence corresponds with poor mental health days among Black Americans and national measures of psychological distress.[68] Public anti-Black violence included police killings of Black Americans, decisions not to indict or convict officers involved in police killings, and hate crime murders.[68] The Authors utilize interrupted time series methods to account for autocorrelation and seasonality and report that Black Americans experience 0.26 greater poor mental health days during weeks with two or more racial incidents relative to none.[68] As a falsification, they examined whether this relation held among white populations and the authors report no relation between incidents of public anti-Black violence and poor mental health days among white individuals.[68] However, when assessing national measures of psychological distress as a function of incidents of police killings of Black Americans, individually, the Authors report an inverse relation.[68] They find no relation between police killings of Black Americans and poor mental health days in the Black community.[68]

These studies include limitations. Scholars suggest that Black Americans lead all other race/ethnicities in chronic depression, with over 56% experiencing prolonged depressive symptoms.[20] I do not know whether exogenous shocks, such as police killings of unarmed Black Americans, may further exacerbate population-level mental health symptoms, requiring emergency assistance, among Black Americans. Additionally, the two studies find conflicting results when examining poor mental health days among Black persons as a function of police killings of Black Americans.[67,68] This may result from the researchers aggregating police killings of the armed and unarmed status of the individual, as the exposure, whereas Bor and colleagues examine adverse mental health resulting from police killings of unarmed Black Americans.[67,68]

Incarceration and psychiatric morbidity

The US criminal justice system comprises 2.3 million individuals, or 700 per 100,000 population.[38] Black American men have eight times the likelihood of going to prison than white men.[69] The prison boom of the 1980s and 1990s, or what scholars refer to as 'mass incarceration', specifically increased imprisonment of low-income and less educated Black American men.[69] Given this background, Hatzenbuehler and colleagues investigated whether residence in neighborhoods with high incarceration preceded greater psychiatric morbidity among non-incarcerated community members.[70] The authors invoked two primary mechanisms by which greater incarceration rates may increase adverse mental health among non-incarcerated community members: disruption of familial networks and the erosion of social capital and control.[70]

Incarceration may create strain and loss of support, both monetary and non-monetary, for families involved in the penal system.[71,72] Incarceration also contributes to the loss of working-age adults within communities, the separation of families, and the disruption of adolescent development among those with incarcerated parents.[40,69] Scholars theorize that incarceration may break down social capital and social control within neighborhoods.[73] Although various definitions exist, the Organization for Economic Co-operation and Development defines *social capital* as "…networks together with shared norms, values, and understandings that facilitate cooperation within or among groups."[74] Commonly utilized to understand crime and delinquency, *social control* refers to societal processes that regulate individual and group behavior to gain conformity to established norms or rules. Researchers in the field utilize Shaw and McKay's social disorganization theory to conceptualize the effects of incarceration on social control. This theory posits that communities with high levels of aggregate poverty, joblessness, and single-parent households do not submit to social controls.[75,76] This coheres with Durkheim

assertion that communities lacking social integration – through religion, family, community, or employment – may lack adequate social control to function adequately.[77]

A small subset of studies has examined the empirical relation between incarceration and its indirect influence on family networks, social capital, and social control.[75] Some scholars report that imprisonment reduces labor force participation and income at the individual- and county-level.[75] Prison admission rates also correspond positively with the number of female-headed household in urban counties among Black Americans as opposed to whites.[75] Qualitative work has further investigated the influence of incarceration on partners and families of male prisoners.[78] One study reports that female partners experience severe financial hardship and difficulty caring for children alone.[79] Another study examines the relation between neighborhood incarceration rates and collective efficacy and community solidarity.[80] Scholars define collective efficacy as a group's belief in their ability to organize and execute courses of action required to manage future situations.[81] Researchers find conflicting results depending on the outcome variable used. They document a positive relation between neighborhood incarceration and collective efficacy, but also report an inverse relation between neighborhood incarceration and community solidarity.[80] These conflicting results may arise in part due to the potential societal benefit in which incarceration reduces the prevalence in the community of criminally-involved persons. The ambiguity of the expected association between incarceration and community mental health, therefore, would appear to call for a two-tailed test.

Using these theories and prior empirical literature to examine incarceration and mental health among non-incarcerated community members, Hatzenbuehler and colleagues conducted four telephone surveys from 2008-2011.[70] As their exposure, they utilized prison admission rates per 1,000 adults from the Justice Atlas of Sentencing and Corrections.[70] They designated zip codes as having low or high incarceration.[70] As their outcome they obtained Patient Health

Questionnaire-9 and Generalized Anxiety Disorder-7 scales to determine depression and anxiety symptoms.[70] Their findings indicate that individuals living in neighborhoods with greater prison admission rates correspond with greater current and lifetime depression and anxiety, as compared to individuals living in neighborhoods with lower prison admission rates.[70]

Hatzenbuehler and colleagues' study, while suggestive, has limitations. Incarceration's influence on mental health may differ by race/ethnicity, given the substantial disparity in incarceration among Black Americans (vs. whites). Additionally, incarceration may precede changes in more acute forms of adverse mental health such as psychiatric help-seeking in the Black community. Lastly, incarceration has shown substantial variation over the past decade due to changes in state-level drug reform policies. Evaluation of multiple counties would leverage changes in incarceration across the US. County-level analyses may also assess whether changes in psychiatric help-seeking extend to ecological units beyond the neighborhood-level.

In Chapters 2, 3, and 4 I will utilize three indicators of structural racism in the justice system (police stops, police killings of unarmed Black Americans, and incarceration) to estimate the extent to which they vary with population-level changes in mental health emergencies in the Black community.

CHAPTER 2: NEW YORK CITY'S STOP, QUESTION, AND FRISK POLICY AND PSYCHIATRIC EMERGENCIES AMONG BLACK AMERICANS[1]

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Introduction

In 2011, the New York Police Department (NYPD) conducted 685,000 police stops under the Stop, Question, and Frisk (SQF) Policy.[82] Black and Hispanic New Yorkers accounted for more than 80% of police stops, despite comprising less than 50% of the population.[82] Although stops increased substantially under the SQF policy, 90% of stops resulted in no arrest.[82] Scholars find racial disparities in police stops with one study reporting that the NYPD stopped Black Americans at greater than two times the rate of whites, after controlling for arrests and precinct differences.[83,84] Racial disparities also exist in post-stop outcomes, such as frisking and use of force.[85] Scholars posit that police stops serve as the most common institutional source of maltreatment among Black, Indigenous, and People of Color (BIPOC) communities.[86] The racial bias in police stops therefore incites greater distrust of police and holds broader health implications in these communities.[86]

Based on Broken Windows Policing, the SQF policy directed police action against lower levels of crime to create greater social order and prevent the proliferation of more serious crimes.[87] The concept of broken windows policing, developed in 1982, utilizes empirical evidence from a 1969 experiment in which social psychology researchers placed two abandoned cars in Palo Alto, CA and Brooklyn, NY.[87] Individuals vandalized and removed parts of the car in Brooklyn almost immediately.[87] The car placed in Palo Alto, however, remained untouched until researchers began to break its windows at which point individuals also started vandalizing the car.[87] The theory claims that the juxtaposition between Brooklyn and Palo Alto illuminates the breakdown of social control within communities and posits that even communities such as Palo Alto, with residents of higher socioeconomic status, can become unstable when undesirable public behavior remains neglected.[87] This may allow for more serious crimes to flourish as property becomes abandoned, families leave, and individuals gather on street corners.[87] The Broken Windows theorists argue that the police's role remains reinforcing informal control within

communities to prevent “broken windows” rather than protecting communities and their individuals.[87]

Broken Windows theorists misconstrued findings from the original social psychology experiment in 1969 as social psychologists posited that a breakdown of social cohesion produces greater anonymity and that individuals outside the conventional social reward structure remain apathetic towards traditional social norms.[88] Additionally, a number of studies have since disproven the validity of Broken Windows theory, wherein police action against lower levels of crime does not reduce the occurrence of more violent crimes.[82,88,89] Nevertheless, as a result of Broken Windows Theory, the SQF policy allowed officers to stop, question, and search individuals under reasonable suspicion in the early 2000s.

Substantial research finds disproportionate police practices and misconduct on the Black community including surveillance, stops, disrespectful treatment, verbal abuse, police deviance, arrests, and fewer police protections.[90] Distrust in the police results from personal experiences, as well as the overall nature of policing within Black communities.[90] Scholars find that Black perceptions of unfair treatment from the police results regardless of whether police behavior meets legal standards.[91] Some qualitative research finds that proactive policing from frequent pedestrian and police stops becomes regarded as unfair and routine harassment within a community.[90] In a nationally representative study, Kessler and colleagues find that perceptions of unfairness from discrimination correspond with greater psychological distress and Major Depressive Disorder.[30] After disaggregating results by types of unfairness from discrimination, the Authors report a positive relation between being hassled by the police and Major Depressive Disorder.[30] Additionally, scholars report that residents live in a climate of fear from the potential of criminalization.[55,57,92,93] This circumstance creates greater hypervigilance in which individuals constantly assess potential threats and exhibit a state of increased alertness.[57] One study

suggests that police altercations, as opposed to community violence, result in greater hypervigilance and physiological changes such as higher blood pressure.[57] Additionally, in-depth qualitative interviews with Black men in urban cities find that following police interactions, individuals experience greater anger and sadness, psychophysiological symptoms of hypervigilance, avoidance, and dissociation, as well as concerns and fear of fatal targeting by police.[57,92] Scholars also find that youth with anticipatory stress from police violence experience greater symptoms of anxiety, depression, and post-traumatic stress disorder.[94]

Much literature examines the mental health of individuals following police stops. Longitudinal studies, following Black youth over time, find that individuals experience greater depressive and post-traumatic stress symptoms, as well as heightened anger, feeling unsafe, and emotional distress following police stops.[41,48,95,96] Additionally, one cross-sectional study reports elevated mental health symptoms among men living in neighborhoods with heightened police stops.[56] Other scholars report that individuals living in neighborhoods with greater police stops and reporting poor health show less frequent use of the Emergency Department (ED) due to "system avoidance".[97,98] Justice-involved individuals may avoid surveilling institutions that implicate criminality.[98] Another study examined police stops in New York City (NYC) during SQF and reported that neighborhood-level police stops including frisking or use of force correspond with greater mental health symptoms, including severe feelings of nervousness and worthlessness.[52]

The current literature, although suggestive, remains limited in the following ways. First, previous work is cross-sectional and therefore cannot examine whether police stops during SQF in NYC preceded greater help-seeking for psychiatric conditions—including among those not directly involved in the stop. Police stops may affect not only Black Americans who themselves are stopped, but also a broader group who senses elevated hypervigilance by the State, or heightened targeting in their community. Additionally, although scholars have previously

reported greater mental health symptoms in neighborhoods with heightened police stops during the SQF policy, I examine whether police stops may influence more acute forms of adverse mental health that require emergency psychiatric care.

Second, an examination of police stops and ED visits has previously assessed overall ED utilization rather than psychiatric help-seeking in the ED. Unlike overall ED utilization, Black Americans – despite notions of "system avoidance" – continually show disproportionate use of emergency psychiatric services.[99] Researchers find that in addition to mental health system characteristics, such as access to outpatient care, sociocultural and community characteristics play a role in the disparate use of the ED for psychiatric care.[99] Characteristics such as personal distress in disadvantaged communities and greater stigmatizing attitudes towards routine mental health treatment contribute to the overuse of the ED setting for psychiatric care by Black Americans in the US.[99] Scholars further find that untreated mental illness often results in seeking emergency care.[99] Increased police stops may especially incite greater psychiatric help-seeking by way of greater perceived discrimination and hypervigilance.

Third, previous ecological research on police stops during SQF and mental health does not examine racial/ethnic differences. At the height of the SQF policy, Black Americans in NYC comprised 52% of police stops and only 23% of the population. Hispanic populations also experienced a disproportionate number of police stops when compared to the ethnic makeup of NYC (31% of stops vs. 29% of the population), although to a much lesser extent than do Black individuals.[100] Additionally, Hispanic communities, on average, report fewer mental health concerns than do native-born Americans, often referred to as the "Hispanic Paradox."[101] This paradox has also been shown in Black populations; however, studies report that differences in symptom expression as well as underdiagnosis of mood disorders by clinicians may drive the Black-white paradox.[21,102–104] Moreover, frameworks such as the Environmental Affordances

Model posit that Black populations cope with additional exposure to stressors by engaging in unhealthy behaviors.[22] This coping leads to greater physical illness but protects against mental illness by way of physiological pathways.[22] Researchers, however, find conflicting empirical evidence to support the model when examining nationally representative samples, over time.[23] For these reasons, I focused on the relation between SQF and mental health among Black (relative to white) residents. As such, this exposure may particularly influence mental health in the NYC Black community more broadly through unfair discrimination and hypervigilance. Given that Black Americans also show the highest prevalence of chronic Major Depressive Disorder, elevated hypervigilance as a result of SQF may lead to an increase in psychiatric emergencies in this subgroup.[20]

Fourth, no research has measured the relation between SQF police stops and mental health among Black Americans following the Floyd et al. v. City of New York class action lawsuit in which police stops substantially decreased for Black and Latinx communities. The landmark ruling found the NYPD liable for violating the Fourth Amendment by conducting unreasonable searches in a racially discriminatory manner. The significant decrease in police stops following the lawsuit may coincide with changes in mental health in the Black community, while also demonstrating the influence of class action lawsuits against police in other urban localities with racially disparate police stops.

I address these limitations and extend previous literature by examining whether police stops during NYC's SQF policy correspond positively with greater psychiatric ED visits among Black Americans. I leverage month-to-month variation in police stops and psychiatric emergency department visits among Black Americans in NYC between 2006-2015. Given the study design characteristics of the analysis, results may hold particular relevance to understanding the

potentially causal role of hypervigilance and discrimination from police encounters on Black Americans' mental health.

Materials and Methods

Study Population

I retrieved the outcome, incidence of outpatient psychiatric ED visits among non-Hispanic Black Americans, from the Statewide Emergency Department Database (SEDD).[105] Under the Healthcare Cost and Utilization Project, the Agency for Healthcare Research and Quality makes SEDD available for purchase. Participating states provide information on over 99% of all outpatient ED visits through SEDD.[105] SEDD contains encounter-level information on all hospital-affiliated ED visits.[105] The psychiatric epidemiology literature consistently uses this high-quality database.[106–108] I selected the five counties within NYC which correspond with the five boroughs in the city (New York County – Manhattan, Kings County – Brooklyn, Bronx County – Bronx, Richmond County – Staten Island, and Queens County – Queens).[109] These data uniformly report county identifiers, race/ethnicity, and month of visit, allowing for time series analysis at the city-month from 2006-2015.[105] The NYPD comprises 77 police precincts within NYC that span its five boroughs.[110] Given that the SQF policy directed NYPD actions within the entire city of New York, I aggregated data to the NYC level to capture whether the policy coincided with city-level mental health sequelae among Black Americans.

Measures

I retrieved outpatient psychiatric ED visits from encounter-level diagnoses of ICD-10 codes for psychiatric disorders among Black Americans. Consistent with previous literature, I classified psychiatric ED visits using ICD-10 diagnostic codes contained within Clinical Classification Software (CCS) categories for psychiatric disorders (including mood, anxiety, conduct, behavioral disorders, self-harm, suicidal ideation, substance use, and others).[106–108] I obtained

monthly counts of psychiatric ED visits among Black and white individuals in NYC from 2006 to 2015.

For the exposure, I obtained administrative data on pedestrian police stops from 2006-2015 from the New York City Police Department's New York City – Stop, Question, and Frisk database.[111] This database enjoys widespread use in the literature.[52,83,86] The NYPD conducts multiple audits to ensure the validity of police stops.[84] Although stops may occur that police do not document, the police department incentivizes officers by having police stops serve as an indicator of productivity. These data provide stop-level information on race/ethnicity, date of stop, and post-stop outcomes.[111] I examined monthly counts of police stops and two post-stop outcomes among Black Americans: stops including frisking and use of force. Stops including frisking involve patting hands over a pedestrian's clothes and through pockets.[111] Use of force measures nine outcomes: use of officer's hands, placing a suspect on the ground, placing a suspect against the wall, drawing the officer's weapon, pointing the weapon at the suspect, using a baton, using handcuffs, using pepper spray, or using another physical object.[111] Consistent with previous literature, I examined stops including frisking and use of force independently as they provide differential and sequential levels of physical contact and violence that may uniquely coincide with adverse mental health in the broader population.[52] Additionally, in keeping with prior work on criminal justice exposures and mental health outcomes, I specified 0- to 3-month lags in which police stops may precede help-seeking among Black Americans.[67,112] Lagged dependent variables not only establish temporal order between the exposure and the outcome, but also greater context regarding the induction of mental health outcomes. Specifically, previous work utilizes a three-month induction period as adverse mental health or psychiatric help-seeking may require longer amounts of time to manifest than the concurrent month.[67,112] Justice system exposures have previously shown to correspond with mental health outcomes up to three months following the event.[67,112] Together, the NYC

psychiatric ED and police stop data created a time series of 120 months from January 2006 to December 2015.

Analysis

I test whether psychiatric ED visits increase within 0-3 months following total police stops. Previous literature has utilized an induction period of three months for mental health outcomes.[67,112] I then test psychiatric ED visits as a function of two subsets of overall police stops: 1) stops including frisking; and 2) stops including use of force. Psychiatric ED visits may exhibit patterns over time, also referred to as autocorrelation.[113,114] Autocorrelation may include trend, seasonality, or the tendency to remain elevated or depressed following high or low values.[113,114] Autocorrelation violates the assumption of correlational tests because, in this case, the expected value of psychiatric ED visits in any month would not equal the mean value of psychiatric ED visits across all months, but rather the values predicted from autocorrelation.[113,114]

To address this issue, I conducted Autoregressive, Integrated, Moving Average (ARIMA) analysis methods using Scientific Computing Associates (SCA) software.[115] I utilized the following steps, consistent with the time-series literature, to identify and remove autocorrelation:

1. I regressed monthly counts of psychiatric ED visits among whites to remove autocorrelation shared with Black Americans.[116] The use of non-Hispanic white psychiatric ED visits as a control variable adjusts for well-documented secular increases in help-seeking for psychiatric care in the US, as well as shared seasonality and other patterns in ED utilization across the two race/ethnicities.[114]
2. I used Box-Jenkins time series methods to identify and model autocorrelation in the residuals of the monthly counts of psychiatric ED visits for Black Americans.[116]

3. I added the SQF exposure variable and specified a Box-Jenkins test equation accounting for autocorrelation. I added 0–3-month lags to the exposure variable, consistent with previous research which has reported a three-month induction period.[116]
4. I estimated the following equation:

$$\mathbf{BV}_t = c + \omega 1\mathbf{WV}_t + \omega 2\mathbf{BP}_t + \omega 3\mathbf{BP}_{t-1} + \omega 4\mathbf{BP}_{t-2} + \omega 5\mathbf{BP}_{t-3} + (1-\theta B^q)/(1-\varphi B^p)\, a_t$$

Where

$\mathbf{BV}_t$ is the count of psychiatric ED visits among Black Americans in month t

c is a constant

ω1 through ω5 are effect parameters

WV is the count of psychiatric ED visits among whites in month t

$\mathbf{BP}_{t-1}$ through $\mathbf{BP}_{t-3}$ are the lagged count variable of Black American police stops in months t, t-1, t-2, t-3

θ is a moving average parameter

φ is an autoregressive parameter

B is the "backshift operator," or value of a for month t-q or at month t-p

a_t is the residual of the model at month t

5. I conducted an outlier analysis to determine whether outliers in psychiatric ED visits among Black Americans distorted the estimation by inflating standard errors and whether high or low values drive the association.

6. I conducted a sensitivity analysis in which I utilized police stops, stops including frisking, and stops including use of force that did not result in an arrest. This analysis accounts for arrests that may have resulted in psychiatric ED visits.

7. I conducted a falsification test in which I assessed whether police stops among Black Americans corresponded with increases in psychiatric ED visits among whites.

8. I estimated whether the reversal of the SQF policy, through the Floyd et al. class action lawsuit, and the subsequent decrease in police stops correspond with lesser than expected psychiatric ED visits among Black Americans. I indicated May 2012 as the starting point for SQF's reversal as the Judge residing on the case ruled it a class action lawsuit during this month. Specifically, individuals unconstitutionally stopped by the NYPD in NYC since January 2005 could claim themselves as a plaintiff in the lawsuit, making the case larger in scope than when initially filed in January 2008.[100] For the exposure, I created a binary indicator for the class action lawsuit (0; before the lawsuit, 1; after the lawsuit) for the 120 months in the time series.

The institution's Institutional Review Board deemed this study exempt owing to the use of publicly available, de-identified data. The National Institute of Mental Health (R21 MH110815) provided support for this study.

Results

Figure 2.1 plots the observed count of psychiatric ED visits among Black Americans in NYC (mean monthly count = 7,819.63; SD=2,668.10). Black Americans in NYC have a mean monthly count of 18,235.03 police stops (SD=10,621.21) with a range of 626 to 36,346 stops (Table 2.1). Figures 2.2-2.4 show the observed count of police stops, stops including frisking, and stops

including use of force among Black Americans over 120 months (January 2006-December 2015). Stops including use of force account for between 20% to 35% of all police stops (depending on the month).

As described in the *Materials and Methods*, I began my analyses by building a base model in which I estimated monthly changes in psychiatric ED visits among Black Americans as a function of the monthly changes in psychiatric ED visits among whites (Figure 2.6). The Autocorrelation Function and Partial Autocorrelation Function revealed patterning and I inserted an autoregressive parameter at lag one month to control for the observation that high or low values of ED visits were followed, albeit in diminishing amounts, with similarly high or low values one month later. After adding the police stop exposure variable, I detected high or low values in psychiatric ED visits that 'echoed' at month five and therefore inserted another autoregressive parameter at lag five months. The residuals of this equation exhibited no remaining autocorrelation, had a mean of zero, and all estimated ARIMA coefficients exceeded at least twice their standard errors. Figure 2.5 plots the residual count of psychiatric ED visits among Black Americans after removal of autocorrelation.

Table 2.2 presents results from the three final models predicting psychiatric ED visits as a function of (i.) police stops, (ii.) stops including frisking, and (iii.) stops including use of force. Total police stops coincide with an increase of 0.02 psychiatric ED visits among Black Americans in the same month [95% CI= 0.006,0.043] (Model A). Similarly, stops including frisking and stops including use of force show a positive relation with psychiatric ED visits in the same month (for frisking, coef: 0.05, [95% CI= 0.015,0.080] and for use of force, coef: 0.11, [95% CI= 0.028,0.190] (Model B&C). Results from the outlier adjusted models produced a similar inference to the original tests (Table 2.3).

To give the reader a sense of the magnitude of the relation, I estimated (from Table 2.2) the number of psychiatric ED visits among Black Americans statistically attributable to one standard deviation increase in all police stops, stops including frisking, and stops including use of force. The monthly standard deviation in the count of all stops (10,621.21) multiplied by the coefficient in Table 2.2 (0.02 at no lag) indicates 212.42 greater than expected psychiatric ED visits among Black Americans per month in which police stops for Black Americans rose by one standard deviation. Application of this increase to the mean equates to 2.72% increase in psychiatric ED visits among Black Americans in these months. Using the same method, a standard deviation increase in stops including frisking equates to a 3.78% increase, and for stops including use of force, I find a 3.71% increase in psychiatric ED visits among Black Americans.

Some police stops may result in a police-initiated psychiatric ED visit. As such, I conducted a sensitivity analysis in which I removed from the exposure variable police stops that resulted in an arrest. I then examined its relation with psychiatric ED visits. This sensitivity analysis examines whether the detected positive relation in the original test could arise from arrests that "convert" into a police-initiated psychiatric ED visit. Inference from the sensitivity analysis, however, remains essentially unchanged from the original findings (Table 2.4), which precludes the possibility that this explanation drives the results. I also estimated, as a falsification test, whether police stops among Black Americans coincided with psychiatric ED visits among whites. I find no relation between police stops, frisks, or use of force among Black Americans and psychiatric ED visits among whites during the study period (Table 2.5). Lastly, I assessed whether reversal of the SQF policy, through the Floyd et al. class action lawsuit against the NYPD, and the subsequent decrease in police stops precedes a decrease in psychiatric ED visits among Black Americans. The Floyd et al. class action lawsuit does not correspond with a decrease in psychiatric ED visits in the NYC Black community (Table 2.6).

Discussion

The NYC SQF policy increased the number of stops by 600% from 2002 to 2011. Even after adjustment for arrest rates and precinct differences, studies report that police disproportionately stopped Black and Hispanic individuals.[83,84] I examined whether police stops and stops including frisking or use of force correspond with an increase in psychiatric ED visits among Black Americans. I find that monthly police stops modestly correspond with detectable increases in psychiatric ED visits in that same month. All police stops, stops including frisking, and stops including use of force vary positively with psychiatric help-seeking for a broader population of Black Americans, much of whom are unlikely to have been directly connected to any stop and frisk event.

Theories on policing and the Black American experience offer a plausible explanation for these results. Police encounters as well as greater frisking and use of force may correspond with increased perceptions of unfair discrimination and the need for emergent psychiatric care.[30,90] This response may occur by way of greater depressive and anxiety symptoms or by an acute awareness of these existing symptoms.[30,90] My findings further support this notion in that frisking has a stronger relation than does regular stops, and stops with use of force show the strongest relation. Use of force may have the greatest mental health consequences due to perceived threats of physical violence or bodily harm to other members of the targeted group. Further research would benefit from examining whether police stops may precede greater ED visits associated with physical health such as cardiac arrest. Psychiatric ED utilization comprises visits related to various mental health diagnoses including anxiety, depression, and substance use.[117] I urge future work to develop hypotheses about diagnostic-specific responses and investigate whether a subset of these ED visits increases in months of heightened police stops. Additionally, the influence of police stops on psychiatric help-seeking and mental health symptomology may decrease over time. The study reports heightened psychiatric help-seeking

only in the concurrent month and not months following an increase in police stops. This may build on the current theoretical understanding of policing and health as the psychiatric effects remain immediate and do not last over a long period of time. Use of datasets such as the Fragile Families and Child Wellbeing Study may further examine whether this phenomenon occurs among Black youth or adults over the life course.[118]

Strengths of the study include that I measure a time-varying aspect of a plausible manifestation of structural racism, which allows us to rigorously examine the relation between police stops and a clinically meaningful health outcome (i.e., psychiatric ED visit). The associations, moreover, cannot arise from shared seasonality or a 'third variable' that exhibits autocorrelation (i.e., arrests for criminal activity), because I removed such autocorrelation from psychiatric ED visits among Black Americans. Identifying the temporal behavior of the outcome and using that as an independent variable removes the possibility that a 'third variable' drives a relation between the exposure and the outcome.[114] This method derives from the Granger-Weiner rule in which the exposure cannot cause an outcome unless it predicts the outcome better than the history of the outcome itself.[114] Adjusting for psychiatric ED visits among whites also minimizes the threat of confounding by variables that influence help-seeking of psychiatric ED visits in both whites and Black Americans.[114] Removing trends and seasonality after controlling for white ED utilization also adjusts for differences in the level of help-seeking whites and Black Americans. Additionally, I used a comprehensive dataset comprising the census of psychiatric ED visits in NYC spanning the five counties (boroughs). I also utilized clinically diagnosed psychiatric ED visits based on ICD-10 codes. Lastly, I obtained surveillance data on Black American police stops that plausibly capture the mental health effects of others in the Black community.[119,120]

Limitations include the inability to examine whether police initiated a psychiatric ED visit among individuals they stopped. Individual-level registries or information on police-initiated ED visits

may provide the data necessary to conduct such a test. Although the SEDD does not provide information on police-initiated ED visits for the state of New York, I approximated police-initiated ED visits by analyzing stops that did not result in an arrest and the possible transfer to an ED or an involuntary commitment.[105] Results remain consistent with the original findings for stops including frisking and stops including use of force. In addition, the discovered coefficients likely represent the lower bound of acute mental health in the population as not all individuals with acute symptoms seek emergency psychiatric care. Lastly, the intensity of police stops may vary by NYC borough or police precinct. Further analysis at more finely-grained geographic and spatial resolution (i.e., NYC United Hospital Funds, census tracts) may provide targeted, neighborhood-level identification of the relation between police stops and psychiatric emergencies. However, given that the SQF policy encompassed all of NYC, a policy-relevant examination of the external validity of my results appears warranted. Cities such as Los Angeles, for example, currently surveil and report racial disparities in police stops; such data, when combined with psychiatric ED data, may permit replication of this work.[121] In addition, the results may hold relevance to other urban areas as researchers find a higher prevalence of smoking, physical inactivity, and poor physical health in neighborhoods that experience more police encounters (e.g., in New Orleans).[122]

The SQF policy not only targeted racial/ethnic minoritized groups but also directed police action against men in NYC – with men constituting 88% of police stops.[84] One study also reports greater post-stop outcomes (i.e., frisking, use of force, arrests) among Black men and women than their white counterparts.[123] Although I did not have any specific hypotheses regarding the gendered component of NYC's SQF policy, I speculate that theories on intersectionality and Black feminist theory may provide further insight into heightened adverse mental health following aggressive policing.[124] Overlapping and interdependent systems of discrimination and disadvantage, resulting from intersectionality, may particularly have health implications from

policing in the Black community. Moreover, examining subgroups within the Black community that police may not have targeted (i.e., women, older adults) could assess the complexities of the spillover effects of aggressive policing practices.

Previous literature finds police killings of unarmed Black Americans precede an increase in bad mental health days and ED visits for depression among Black Americans.[67,112] The police killing of George Floyd prompted urgent calls for racial equity in policing and other systems in the US – bringing concerns of structural racism to the forefront. Researchers also report that police killings of unarmed Black Americans may serve as indicators of structural racism.[67,112,125,126] The SQF policy, and the disproportionate police stops among Black and Hispanic communities, may constitute as a structurally racist policy in the criminal justice system.

Origins of the Black Lives Matter movement began following the police killing of Trayvon Martin and the subsequent acquittal of Officer George Zimmerman in 2013. Demonstrations and protests supporting the movement have continued following police brutality and killings in later years.[127] A systematic review on the influence of protests and riots on mental health finds that a majority of studies report an increase in depression following a major protest. This relation persists regardless of personal involvement in protests, suggesting a broader influence on a community.[128] However, a few studies suggest that protests may reduce depression due to greater collective action and social cohesion.[128] These results warrant further investigation into the potential benefits of collective action and whether the Black Lives Matter protests may have a protective influence on psychiatric help-seeking.

Black American youth suicides have increased drastically in the past two decades, with certain age groups surpassing rates of whites.[129,130] Risk factors include, among others, exposure to trauma and racial discrimination.[131] A current body of literature finds that police stops precede

greater adverse mental health in youth.[41,48,95,96] However, police encounters may also influence youth suicide rates in the Black community given that psychiatric disorders remain a significant risk factor for suicide.[132] Literature also reports that youth involved in the juvenile justice system have higher rates of mental health disorders and traumatic experiences.[133,134] An important priority of subsequent research in this area involves an examination of whether racially biased and unconstitutional police encounters among Black youth may worsen various aspects of mental health in this high-risk population.

In August 2013, the Floyd et al. v. City of New York class action lawsuit found the NYPD liable for a pattern and practice of racial profiling and unconstitutional stops.[100] Following the landmark ruling, NYPD police stops declined by approximately 96%.[59] Scholars assessing whether the ruling preceded a decline in racial disparities in stops, found that Black Americans have a lower likelihood of police stops, frisks, and use of force following the 2013 ruling.[135] The study used both external and internal benchmarking methods (e.g., race of the residential population, similarly situated stops) to report that the racial composition of census tracts no longer predicted stops, frisks, or use of force rates after accounting for reported crime, socioeconomic factors, and police precincts.[135] Their analysis of similarly situated stops indicated that differences in stops by race/ethnicity declined substantially following the class action lawsuit.[135] Although studies on the Floyd et al. class action lawsuit remain limited, another study finds an inverse relation between the lawsuit's ruling and complaints for crime in NYC; however, results do not reach conventional levels of statistical detection.[136]

My analysis also does not report changes in psychiatric help-seeking following the class action lawsuit. Both studies conducted previously utilized annual data from before and after the ruling and indicated 2013 as the year in which the ruling took place.[135,136] Since my study leveraged monthly resolution, I indicated May 2012 as the month in which the lawsuit took place, given

that it became much larger in scope as a class action matter for the NYPD. The timing of the ruling remains questionable as the lawsuit spanned 2008 to 2013 with police stops peaking in 2011 and becoming class action in 2012. My inconclusive findings may also reflect the need for further investigation at more granular geographic units such as boroughs, census tracts, or NYC United Hospital Funds. Place may particularly play a role as indicated in MacDonald and colleagues' finding that racial disparities in police stops decrease following the ruling by census tract-year. Smaller units of aggregation, as opposed to a city-wide evaluation, may specifically examine areas in which police stops decreased below expected values for minoritized race/ethnicities following the ruling. Given that healthcare catchment areas in NYC do not overlap with police precincts, this assessment may require geographic weighting and other advanced place-based methodologies.

Table 2.1. Characteristics of monthly psychiatric Emergency Department visits, police stops, stops including frisking, and stops including use of force among Black Americans in New York City, 2006-2015.

Variable	Mean (SD)
Psychiatric ED visits among Black Americans	7,819.63 (2,668.10)
Psychiatric ED visits among whites	5,729.63 (1,795.80)
Police stops among Black Americans	18,235.03 (10,621.21)
Police stops including frisking among Black Americans	10,179.66 (5,907.63)
Police stops including use of force among Black Americans	4,035.29 (2420.24)

Figure 2.1. Count of psychiatric Emergency Department visits among Black Americans over 120 months in New York City, 2006-2015.

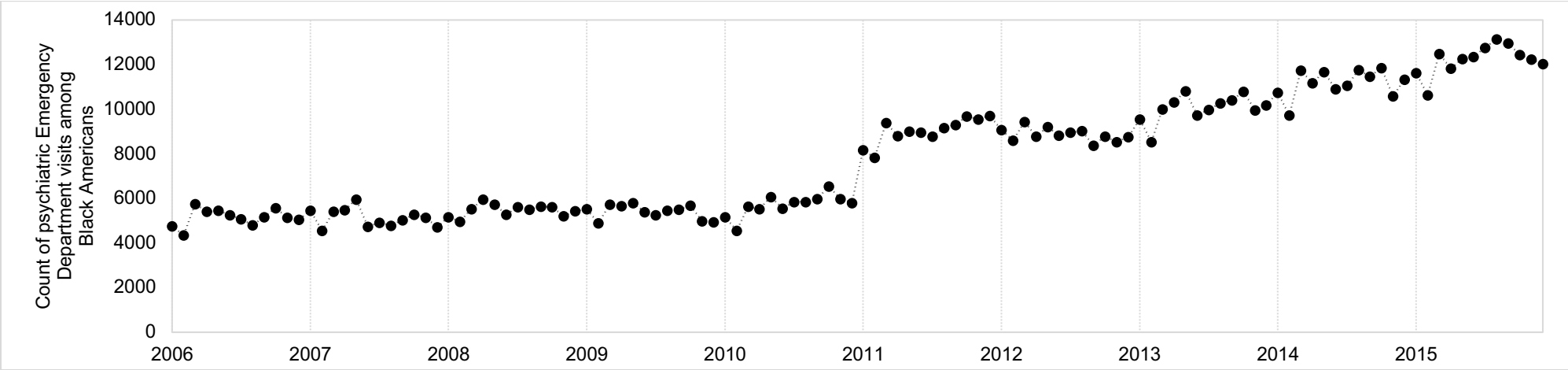

Figure 2.2. Count of total police stops among Black Americans over 120 months in New York City, 2006-2015.

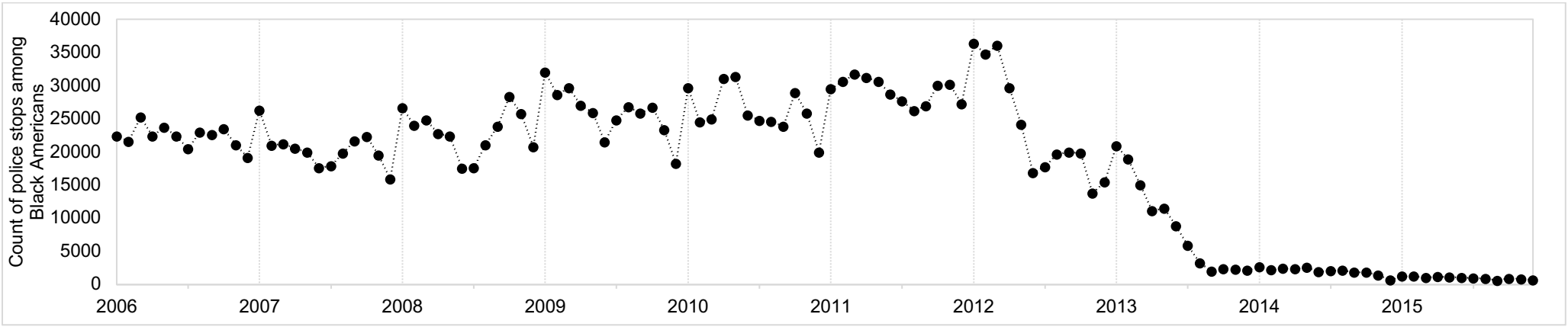

Figure 2.3. Count of police stops including frisking among Black Americans over 120 months in New York City, 2006-2015.

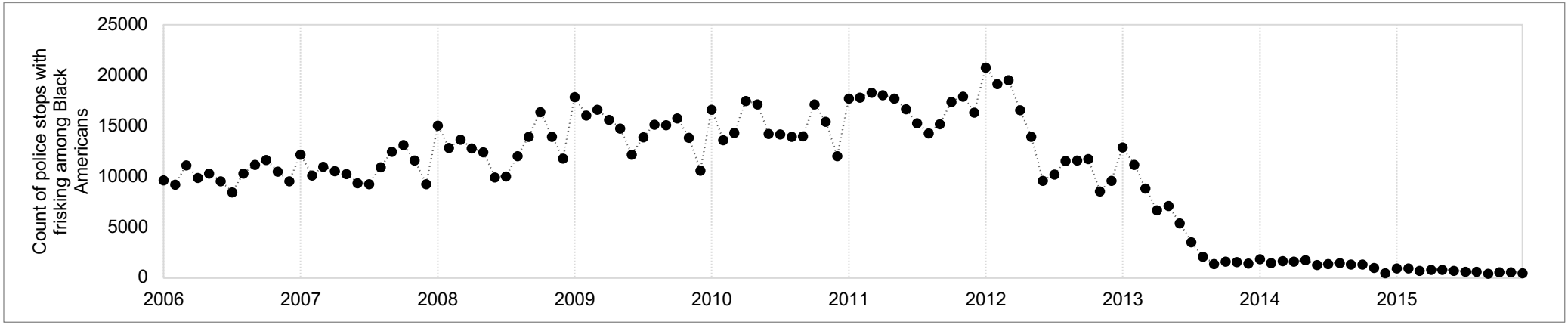

Figure 2.4. Count of police stops including use of force among Black Americans over 120 months in New York City, 2006-2015.

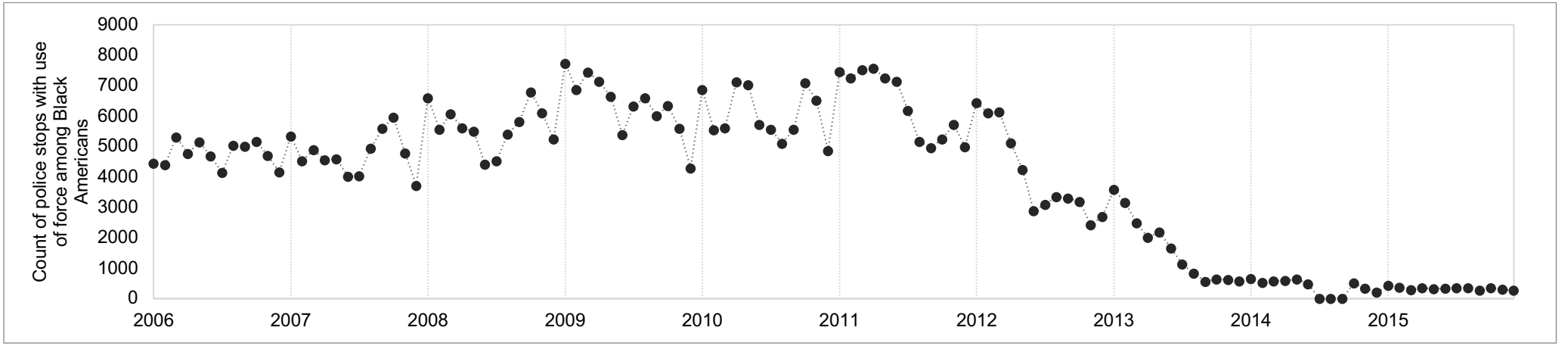

Table 2.2. Time-series results predicting the psychiatric Emergency Department visits among Black Americans in New York City from 2006-2015, as a function of police stops, stops including frisking, and stops including use of force among Black Americans.

	Model A Police Stops		Model B Stops Including frisking		Model C Stops Including Use of force	
Parameter	**Point Estimate**	**(95% CI)**	**Point Estimate**	**(95% CI)**	**Point Estimate**	**(95% CI)**
Police stops at t	0.024	(0.006,0.043)*	0.048	(0.015,0.080)**	0.1087	(0.028,0.190)**
at t+1	-0.009	(-0.026,0.008)	-	-	-	-
at t+2	-0.001	(-0.020,0.017)	-	-	-	-
at t+3	0.001	(-0.017,0.020)	-	-	-	-
Psychiatric ED visits among whites at t	1.307	(1.218,1.395)**	1.260	(1.169,1.351)**	1.269	(1.174,1.364)**
Autoregressive parameter (AR) at t-1	0.770	(0.638,0.902)**	0.820	(0.701,0.939)**	0.837	(0.722,0.953)**
Autoregressive parameter (AR) at t-5	0.292	(0.096,0.487)**	0.301	(0.107,0.495)**	0.278	(0.083,0.473)**

*p<0.05; **p<.001

Figure 2.5. Residual count of psychiatric ED visits among Black Americans in New York City, 2006-2015, with mean=0, after controlling for psychiatric ED visits among whites and removal of autocorrelation. First four months lost to time-series modelling.

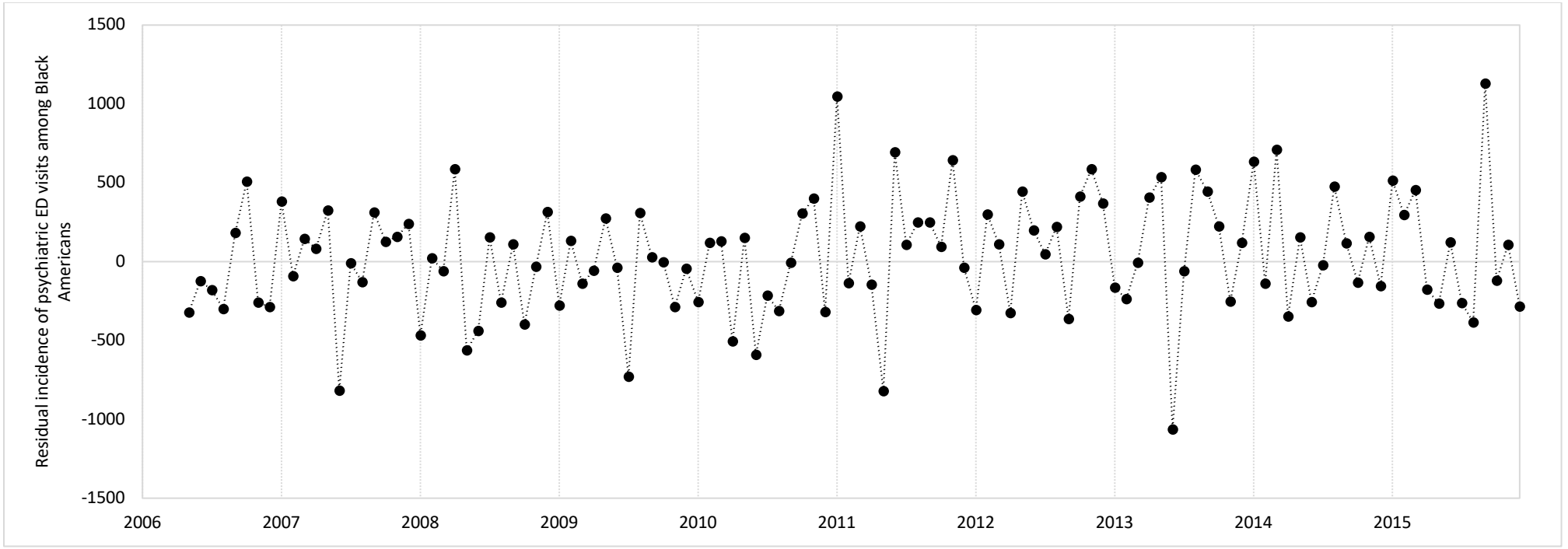

Figure 2.6. Count of psychiatric Emergency Department visits among whites over 120 months in New York City, 2006-2015.

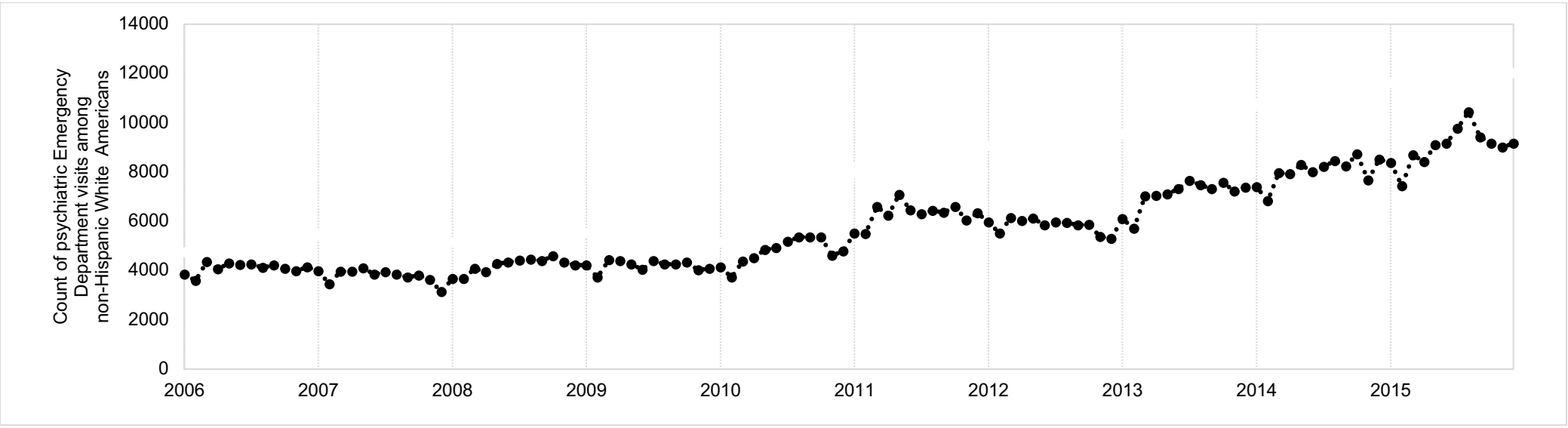

Table 2.3. Outlier-adjusted time series results predicting psychiatric Emergency Department visits among Black Americans in New York City from 2006-2015, as a function of police stops, stops including frisking, and stops including use of force among Black Americans.

	Model A Police stops		Model B Stops including frisking		Model C Stops including use of force	
Parameter	**Point Estimate**	**95%CI**	**Point Estimate**	**95%CI**	**Point Estimate**	**95%CI**
Police stops at t	0.016	(0.001,0.030)*	0.025	(.007,0.043)**	0.058	(0.013,0.102)*
at t+1	-0.005	(-0.019,0.008)	-	-	-	-
at t+2	0.003	(-0.011,0.017)	-	-	-	-
at t+3	-4E-04	(-0.015,0.014)	-	-	-	-
Psychiatric ED visits among whites at t	1.234	(1.193,1.274)**	1.221	(1.183,1.259)**	1.222	(1.185,1.260)**
Autoregressive parameter (AR) at t-1	0.629	(0.476,0.781)**	0.635	(0.486,0.785)**	0.425	(0.276,0.574)**
Autoregressive parameter (AR) at t-5	0.320	(0.133,0.507)**	0.313	(0.129,0.497)**	0.309	(0.124,0.493)**

*p<0.05; **p<.001

Table 2.4. Time series results predicting psychiatric Emergency Department visits among Black Americans in New York City from 2006-2015, as a function of police stops, stops including frisking, and stops including use of force that did not result in an arrest.

	Model A Police stops		Model B Stops including frisking		Model C Stops including use of force	
Parameter	**Point Estimate**	**95%CI**	**Point Estimate**	**95%CI**	**Point Estimate**	**95%CI**
Police stops at t	0.025	(0.006,0.045)*	0.050	(0.031,0.070)**	0.120	(0.029,0.211)**
at t+1	-0.010	(-0.028,0.008)	-	-	-	-
at t+2	-0.001	(-0.020,0.019)	-	-	-	-
at t+3	0.002	(-0.018,0.021)	-	-	-	-
Psychiatric ED visits among whites at t	1.306	(1.217,1.395)**	1.272	(1.183,1.360)**	1.273	(1.181,1.366)**
Autoregressive parameter (AR) at t-1	0.771	(0.639,0.903)**	0.817	(0.697,0.937)**	0.834	(0.717,0.950)**
Autoregressive parameter (AR) at t-5	0.291	(0.095,0.487)**	0.301	(0.107,0.494)**	0.278	(0.084,0.483)**

*p<0.05; **p<.001

Table 2.5. Time series results predicting psychiatric Emergency Department visits among white in New York City from 2006-2015, as a function of police stops, stops including frisking, and stops including use of force among Black Americans.

	Model A Police stops		Model B Stops including frisking		Model C Stops including use of force	
Parameter	**Point Estimate**	**95%CI**	**Point Estimate**	**95%CI**	**Point Estimate**	**95%CI**
Police stops at t	0.002	(-0.012,0.015)	0.002	(-0.023,0.026)	0.004	(-0.056,0.064)
at t+1	-0.004	(-0.017,0.009)	-0.011	(-0.035,0.013)	-0.023	(-0.081,0.036)
at t+2	0.007	(-0.007,0.020)	0.013	(-0.011,0.036)	0.027	(-0.031,0.086)
at t+3	-0.012	(-0.025,3.40E-4)	-0.022	(-0.045,0.002)	-0.047	(-0.103,0.010)
Psychiatric ED visits among Black Americans at t	0.475	(0.388,0.561)**	0.473	(0.385,0.561)**	0.477**	(0.389,0.565)
Moving Average parameter (MA) at t-1	0.263	(0.079,0.446)*	0.262	(0.079,0.446)*	0.245*	(0.062,0.428)
Autoregressive parameter (AR) at t-6	-0.363	(-0.554,-0.172)*	-0.358	(-0.549,-0.166)*	-0.354*	(-0.545,0.162)

*p<0.05; **p<.001

Table 2.6. Time series results predicting psychiatric Emergency Department visits among whites in New York City from 2006-2015, as a function of the Floyd et al. class action lawsuit filed against the NYPD in May 2012.

Parameter	Point Estimate	95%CI
Floyd et al. class action lawsuit at t	417.590	(-282.004,1117.184)
at t+1	-3.912	(-719.053,711.228)
at t+2	-22.931	(-743.270,697.409)
at t+3	228.244	(-468.336,924.823)
Psychiatric ED visits among whites at t	1.309	(1.237,1.382)**
Autoregressive parameter (AR) at t-1	0.716	(0.579,0.853)**
Autoregressive parameter (AR) at t-5	0.242	(0.046,0.438)*

*p<0.05; **p<.001

CHAPTER 3: EMERGENCY DEPARTMENT VISITS FOR DEPRESSION FOLLOWING POLICE KILLINGS OF UNARMED BLACK AMERICANS[2]

[2] This article was published in Social Science & Medicine, 269, Das, A., Singh, P., Kulkarni, A.K., Bruckner, T.A., Emergency Department visits for depression following police killings of unarmed African Americans, 113561, Copyright Elsevier Ltd. (2020).

Introduction

Since 2015, police in the United States have killed approximately 5,400 individuals.[61,62] Annually, about 1,000 people die from police shootings.[61,62] Police are almost 3.5 times more likely to kill Black Americans than whites, after adjusting for criminality.[62,126] Additionally, Black Americans have almost 1.5 times the likelihood of being unarmed when killed compared to whites.[61,62] The recent video footage of George Floyd's death, while being subdued by police officers, has brought much media and popular attention to this issue.

Various forms of institutional oppression toward Black Americans have persisted over the course of US history. After the Civil Rights movement, origins of Critical Race Theory (CRT) emerged to transform the ideas of race, racism, and power.[6] Established in the legal field during the 1980s, CRT asserts that institutions perpetuate racial inequality, for Black Americans, through social, economic, and legal disparities.[6] CRT distinguishes itself from progressive, color-blind, and civil rights approaches as they rely on the current legal system and support integration of racial/ethnic groups into broader social systems.[137] Rather than assimilation, CRT focuses on power relations between groups and the oppression of groups of color.[138] The theory posits that advancement of groups of color (through court decisions or legal changes) only occurs when benefiting whites in power.[138]

Scholars argue that although acts of prejudice play a role in racial domination, social institutions shape the system of racial domination.[5] Systemic racism theory posits that structural inequities drive wealth-generating resources for white Americans, allowing for the intergenerational transmission of resources and materials within white communities.[8] Elite whites, therefore, maintain the racial hierarchy and continue the cycle of oppression through oppressive social systems.[8] As with historical acts of lynching, police killings of unarmed Black Americans remain

features of a racialized America that has normalized such patterns of oppression in the criminal-legal system, specifically.[6] Theorists and empirical scholars have argued that police killings of unarmed Black Americans may serve as an indicator of structural racism.[125,126]

Mesic and colleagues report that, across states, measures of structural racism strongly predict the Black-white disparity in unarmed police shootings. Ross further finds that racial bias occurs in police killings more often in urban counties. Research also suggests that individuals of color can experience racism vicariously, wherein individuals indirectly experience racism targeted at other persons of color.[64] Several studies suggest that Black Americans and other racial/ethnic minorities experience vicarious racism frequently.[65,66] Similarly, the theory of linked fate captures personalized emotions following acts of racial violence towards others in the Black community through ethno-racial identification. One study reports that perceptions of linked fate correspond with greater depressive and anxiety symptoms among Black Americans.[119]

One study examined the relationship between vicarious racism and mental health after the highly publicized police killing of Trayvon Martin.[65,139] Their research indicates that racial identity sensitized Black youth to race-related violence toward other Black Americans, which positively correlated with depressive symptoms.[65] Scholars also report that two or more incidents of public anti-Black violence in a week (i.e., police killings of Black Americans, decisions not to indict or convict officers involved in police killings, and hate crime murders) correspond with greater poor mental health days among Black individuals.[68] The survey scholars utilized defines poor mental health days as “days with stress, depression, and problems with emotions.” [68] However, after stratifying results by type of anti-Black violence, they do not report increases in poor mental health days in the Black community as a function of police killings among Black Americans.[68] Additionally, the study reports an inverse relation between police killings of Black residents and psychological distress.[68] Conversely, a separate ecological study finds that

counties with police killings of unarmed Black Americans correspond positively with self-reported adverse mental health days (stress, depression, emotional problems) among Black Americans a few months after the killings.[67]

The above work, while suggestive, is limited in the following ways. First, much literature on racism and adverse mental health focuses on individual-level exposures rather than structural racism.[140,141] Individual-level exposures include internalized or personally-mediated racism which encompass accepting negative messages about one's own worth and acts of prejudice, respectively.[2] Structural racism, however, captures dimensions of racism embedded in social, legal, and economic institutions.[2] Although examination of individual-level factors has advanced knowledge of health inequities, it ignores the broader ecological context of racism embedded in societal institutions.[140] Additionally, facets of structural racism may have a stronger relation to population health, given its widespread influence on historically disadvantaged communities.[140]

Second, previous ecological literature finds conflicting results regarding whether police killings of unarmed Black Americans correspond positively with adverse mental health days.[67] It does not, however, examine whether the exposure precedes increases in help-seeking for psychiatric conditions, such as depression. Additionally, scholars suggest that Black Americans lead all other race/ethnicities in chronic depression, with over 56% experiencing prolonged depressive symptoms.[20] I do not know whether exogenous shocks, such as police killings of unarmed Black Americans, may further exacerbate population-level depressive symptoms, requiring emergency assistance.

I address these limitations and extend previous work by examining whether police killings of unarmed Black Americans correspond positively with Emergency Department (ED) visits related to depression among Black Americans. I examine 331,171 outpatient ED visits related to

depression in 75 counties from five states between 2013-2015. Results from this study may hold particular relevance to understanding the ecology of unarmed Black American police killings as it relates to ED visits for depression among Black Americans.

Methods

Study Population

I retrieved the dependent variable, psychiatric ED visits for depression among non-Hispanic Black Americans (per 100,000 population), from the Statewide Emergency Department Database (SEDD). The SEDD is made available for purchase by the Agency for Healthcare Research and Quality (AHRQ) under the Healthcare Cost and Utilization Project (HCUP).[105] States that participate in HCUP provide information on over 99% of all outpatient ED visits through SEDD. This high-quality database enjoys widespread use in psychiatric epidemiological research.[106,107,142] I selected states included in SEDD that uniformly report county identifiers, race/ethnicity per ED visit, and month of visit, allowing longitudinal analysis over the study period of interest at the county-month resolution. These inclusion criteria yielded the following state-years: Arizona, Kentucky, North Carolina, New Jersey, and New York, from 2013 to 2015 (i.e., 36 months per state).

Study Measures

I retrieved psychiatric ED visits pertaining to depression using visit-level diagnoses based on ICD-10 codes for all types of depression and mood disorders (Appendix Table A.1).[143] For ED visits with mental health or substance use as the primary diagnosis, surveillance studies from the past two decades find that depression ED visits constitute the third largest proportion of visits.[117] I aggregated a total of 331,171 depression-related ED visits among Black Americans by county-month, and converted these counts to population prevalence estimates (per 100,000

population) using race-specific population denominators obtained from the US Census Bureau's Population Estimates database.[144]

I retrieved data on police killings of unarmed Black Americans from the Mapping Police Violence (MPV) database by county-month for the study regions and time period.[62] The MPV database contains information on police killings obtained from crowdsourcing of reports (media and others), which overcomes the limitations of under-reported administrative datasets.[62] Police killings reported in the MPV undergo validation through triangulation with official police records, news reports, social media references, and obituaries. The reliability of these data are further evidenced by their utilization in extant research.[67,125] In keeping with prior work that utilizes the MPV dataset, I specified, as the exposures, 0- to 3-month lags of whether one or more police killings of Black Americans occurred in a county-month (binary indicator; 1 = Yes, 0 = No). Lags allow for examination of whether the exposure precedes the outcome while also capturing whether the outcome has an induction period that manifests at a later time period than the concurrent temporal resolution measured in the analyses. According to previous work, exogenous criminal justice exposures may coincide with changes in health up to three months following the event.[67] I also obtained information on police killings of armed Black Americans from the MPV to utilize as a sensitivity test, by county-month (binary indicator; 1 = Yes, 0 = No). Given that metropolitan counties account for over 96% of police killings of unarmed Black Americans in these data, I restricted the analysis to metropolitan counties (Appendix, Table A.2). These restrictions yielded a final analytic sample of 75 counties over 36 months (i.e., 2,700 county-months from 2013- 2015).

Arrest rates may confound the analysis in that greater incidence of violent crime (e.g., homicide, assault) may correspond with higher ED visits for depression as well as heightened police activity and police killings in a county.[145] To control for this plausible endogeneity, I retrieved

data on arrests for violent crimes reported per county-month from one of the most extensively used, publicly available crime statistics repository in the US – the Uniform Crime Records (UCR) database.[146–148] The UCR is made available through the Federal Bureau of Investigation's UCR Program and provides information on arrests for violent crimes by nearly all law enforcement agencies at the county-level, per month.[149] I converted monthly arrest counts to population prevalence estimates (per 100,000 population) and utilized this arrest rate as a control variable in the analysis.

Analysis

I test whether police killing of unarmed Black Americans precedes an increase in ED visits for depression among Black Americans. I use 0- to 3-month lags of the exposure (police killing of unarmed Black Americans) and estimate the following model using Ordinary Least Squares (OLS) regression analysis:

$$Y_{c,m} = \beta_0 + \beta_1 X_{c,m0} + \beta_2 X_{c,m-1} + \beta_3 X_{c,m-2} + \beta_4 X_{c,m-3} + \beta_5' H_{c,m} + \beta_6' A_{c,m} + \beta_7' \boldsymbol{County_c} + \beta_8' \boldsymbol{Month_j} + \beta_9' \boldsymbol{Year_k} + \beta_{10}' \boldsymbol{State_s} * Linear\ time + \varepsilon_{c,m}$$

- Equation 1

where:

$Y_{c,m}$ is the population rate of ED visits for depression (per 100,000 population) among Black Americans in county *c* during month *m*. $X_{c,m0}$, $X_{c,m-1}$, $X_{c,m-2}$ and $X_{c,m-3}$ are 0, 1, 2 and 3 month lags (respectively) of exposure X (police killing of unarmed Black Americans), for the concurrent month (*m0*) to 3 month lag (*m-3*), in county *c*. β_1, β_2, β_3 and β_4 are the key coefficients of interest in the analysis.

$H_{c,m}$ is the number of Emergency Departments (or reporting hospitals) within a county *c*, during month *m*, that report data on depression-related ED visits. Inclusion of this control variable accounts for changes over time in ED visits following closure or opening of EDs.

$A_{c,m}$ is the population rate of arrests for violent crimes (per 100,000 population) in county *c*, during month *m*. Inclusion of this control variable accounts for heightened crime or police activity in a county-month.

$\boldsymbol{County_c}$ is the vector of indicator variables for individual counties (county fixed effects).

$\boldsymbol{Month_j}$ is the vector of month indicators that control for seasonality in ED visits for depression.

$\boldsymbol{Year_k}$ is the vector of year indicators that control for year-specific changes in ED visit rates (e.g., policy changes such as the Affordable Care Act) across all counties.

$\boldsymbol{State_s} * Linear\ time$ is the vector of state-specific (*s*) linear time trend (1 to 36 months) that accounts for unobserved factors which trend linearly over the study period.

$\varepsilon_{c,m}$ is the heteroscedasticity-robust standard error term to account for correlated residual errors.

The model specification (Equation 1) controls for several sources of potential confounding. First, I include county fixed effects. The use of county fixed effects forces within-county identification of the relation between outcome and exposure and accounts for time-invariant attributes of a county that may correspond with police killings as well as depression-related ED visits. Second, I included indicators for month in order to control for seasonality in depression-related ED visits. Previous literature finds seasonal patterns in psychiatric ED visits such as increased visits at the beginning of each calendar year.[150,151] I also specified year fixed effects to control for year-specific factors (e.g., policy changes such as the Affordable Care Act) that may correspond with an increase or decrease in depression-related ED visits. Third, I include arrests for violent

crimes (per 100,000 population) to control for heightened criminal or police activity. Scholars suggest heightened criminal activity (as measured by arrests) corresponds with adverse mental health symptoms and may also correspond with increased police killings.[152,153]

I also conducted two sensitivity tests. First, I re-estimated Equation 1 and specified 0- to 6-month lags of the exposure to examine the potential of an extended elevation of ED visits for depression or any seasonality. Second, I used as the exposure (X) a binary indicator of police killings of armed Black Americans (0- to 3-month lags, other covariates specified identical to Equation 1). This additional analysis gauged whether police killings of armed Black Americans correspond with depression-related ED visits. This sensitivity test examined whether any changes in depression-related ED visits observed in the main analysis also correspond with an exposure that reflects (relatively) lower racial targeting of Black Americans. Lastly, I conducted a falsification test to examine whether police killings of unarmed Black Americans corresponded with depression-related ED visits among non-Hispanic whites.

I also conducted an exploration of whether police killings of unarmed Black Americans coincided with greater ED visits for other mental health diagnoses such as anxiety-related visits, substance use, as well as overall psychiatric ED visits. According to surveillance studies, substance use, and anxiety-related diagnoses comprise a substantial portion of psychiatric ED visits overall.[117] Consistent with previous literature, I classified ED visits using ICD-10 diagnostic codes contained within Clinical Classification Software (CCS) categories for psychiatric disorders (including mood, anxiety, conduct, behavioral disorders, self-harm, suicidal ideation, substance use, and others).[106–108] I conducted all analyses in Stata SE version 16.0.

Results

ED visits for depression (per 100,000 population) among Black Americans average about 100 per county per month, with the highest (mean) rates observed for Kentucky and lowest for New York (Table 3.1). Out of a total of 26 county-months with police killings of unarmed Black Americans, New York state accounts for 13 (i.e., 50%) and Kentucky reports zero.

Figure 3.1 shows the ED visits for depression (per 100,000 population) over time, averaged per county, per month in the study sample. This upward trend aligns with secular increases in ED visits for psychiatric conditions reported in the literature.[154] The sharp increase in ED visits around March 2015 arises from increases in the number of (new) hospitals included in the SEDD from that period onwards (based on monthly counts of hospitals reporting to SEDD). Figure 2 shows the monthly trend in occurrence of police killings of unarmed Black Americans. Within the study region, I observe an average of 5 to 7 months per year (2013-2015) with at least one police killing of an unarmed Black American.

Table 3.2 presents the results from OLS fixed effects regression analyses predicting log-transformed ED visits for depression (per 100,000 population) as a function of 0-, 1-, 2- and 3-month lags of police killings of unarmed Black Americans. I use a log transformed outcome for analysis as this variable shows a skewed distribution (Figure 3.3). Regression results indicate an increase of approximately 11% in depression-related ED visits at 0 and 3 months after the police killing of unarmed Black Americans in a county ($p<0.05$). Sensitivity tests show that this pattern does not persist beyond exposure lag 3, demonstrating that the finding does not result from autocorrelation (Table 3.3). Depression-related ED visits among Black Americans also show no relation to police killings of armed Black Americans (Table 3.4). This indicates that the findings do not persist without a racism-related indicator of the exposure, the unarmed status of the individual (Table 3.4). The falsification test shows police killings of unarmed Black

Americans do not correspond with depression-related ED visits among whites (Table 3.5). Exploration of ED visits related to diagnoses for all psychiatric conditions, substance use, and anxiety also show no relation to police killings of unarmed Black Americans (Table 3.6).

Discussion

Police kill unarmed Black Americans at 3.5 times the rate of unarmed whites.[126] Vicarious racism plays a role in the adverse mental health experienced by Black Americans following police killings.[64,65] In this study, I examined the relation between unarmed Black American police killings and ED visits for depression (per 100,000 population). I find that unarmed Black American police killings correspond with an 11% increase in ED visits for depression per 100,000 population among Black Americans in the concurrent month and three months after the police killing.

Strengths of this study include the use of a comprehensive statewide dataset comprising the census of ED visits for depression spanning five states from regions including the Northeast, South, and West.[155] I used clinically diagnosed ED visits for depression based on ICD-10 codes.[143] The MPV database comprises three of the most comprehensive police killing databases in the country and undergoes further quality control to ensure completeness of the data.[62] As opposed to other databases, it also utilizes consistent definitions for armed status.[62] The longitudinal analyses, which span three years (36 months), establish precise temporal order (exposure precedes the outcome) and account for county, month, and year fixed effects. These fixed effects control for variations across place, time, and seasonality in help-seeking for depression in the ED. I also controlled for other time-varying confounders, such as number of hospitals as well as arrest rates for violent crime that may influence the variation in the outcome and exposure. Taken together, the use of high-quality data, longitudinal study design, and fixed effects-based analytic approach offer strong reliability and validity to this study.

Limitations of the study could include residual confounding by unmeasured factors. Such an unmeasured factor would have to correlate positively with ED visits for depression and with police killings of unarmed Black Americans, not be captured by county-specific time-invariant fixed effects, and also not be accounted for by seasonality (month fixed effects) and temporal changes/trends (year fixed effects, linear time trends). I know of no such factor. Second, prior literature reports that Black Americans rely on EDs for psychiatric care at disproportionately higher rates relative to other race/ethnicities.[99] Owing to data limitations within the SEDD, I am unable to differentiate between emergent versus routine/non-emergent ED visits in the analysis. I contend that the increase in ED visits for depression observed in the analyses arises from emergent visits as I do not have *a priori* expectations of why routine/non-emergent ED visits would respond, within 0 to 3 months, to police killings of unarmed Black Americans. However, future research may extend the present study and examine differences by emergent versus non-emergent psychiatric ED visits, among Black Americans, following this exposure. Lastly, whereas many scholars have used the MPV database in research, data on police killings remains crowd-sourced and likely under-reported, given the censuring of official police data provided by states and local departments.[67,125] The findings may therefore represent the lower bound of the reported association.

In alignment with previous literature, this study suggests that police killings may exacerbate depressive symptoms and adverse mental health among Black Americans, provoking an ED visit for depression.[67] The increase in ED visits for depression in the concurrent month and three months after the police killing underscores the possibility that individuals may experience police killings as traumatic events. In 2007, Carter proposed the Theory of Race-Based Traumatic Stress in which individuals who face racial discrimination experience symptoms similar to post-traumatic stress.[156,157] Symptoms include adverse mental health such as depression and

anxiety, in addition to avoidance, reactivity, and cognitive changes.[158] Additionally, post-traumatic stress symptoms usually begin three months after the event occurs.[158] This theory warrants further empirical investigation into whether police killings precede increased diagnosis of post-traumatic stress in Black Americans.

The study's findings and previous literature on adverse mental health symptoms may not fully capture changes in population-level help-seeking following police killings of unarmed Black Americans. While EDs serve as safety nets, particularly for acute, episodic mental health emergencies, individuals may also opt to seek care in non-ED settings following exposure to ambient stressors. Community Health Centers, primary care physicians, or other mental health professionals may experience increases in Black American patients seeking help following police killings. An exploration of other health systems may provide insight into other mental health sequelae and/or potential changes in help-seeking among Black Americans. Additionally, individuals may internalize or externalize adversity.[159] Those internalizing adversity experience symptoms of anxiety, depression, or somatizations.[159] Externalization includes hostility or aggression, which may lead to heightened crime, arrest rates, or involuntary psychiatric holds/examinations for danger to self or others.[159,160] This speculation warrants further refinement and empirical testing.

In 2014, the UN Committee Against Torture criticized the United States for its failure to evaluate use-of-force by its police following the uncovering of race- and sexuality-based brutality.[126] They specifically noted the lack of 1) statistical data on allegations of police brutality; and 2) information on the result of investigations undertaken after those allegations.[126] Unlike many official police sources, several current, public-access, crowd-sourced projects do not censure police killing data.[126] Investigations regarding police killings and the subsequent acquittals of police officers involved in highly publicized cases have led to public unrest, movements such as

Black Lives Matter, and the 2014 President's Task Force on 21st Century Policing.[161,162] Although limited research examines whether these developments or future movements have changed racial bias in policing, the mental health implications of such racial bias remain understudied.

The frequency of police killings, as well as the racial bias associated with these killings, have remained consistent over the past five years.[61,62] Researchers, community organizations, and policy experts suggest several avenues for preventing police killings of unarmed Black Americans, including: 1) terminating "broken windows" policing for minor crimes and activities; 2) ceasing profiling based on race/ethnicity and "stop and frisk" procedures; and 3) establishing alternative approaches to mental health crises than policing.[163] Researchers also find that implementing consistent supervisory meetings between officers and sergeants corresponds with more measured responses to incidents on the street.[164]

Video footage of police killings has become widespread through technological improvements such as camera phones, police dashboard/body cameras, and the internet.[165] Extensive media coverage of collective traumas (traumatic events that affect an entire society),[166] however, may trigger psychological distress.[167] A study on the Boston Marathon bombings in 2013 found that repeated media exposure to collective traumas corresponded with higher acute stress.[167] Additionally, researchers found higher stress levels among those who watched media coverage when compared to those directly exposed (at or near) the bombing.[167] The field concerned with structural racism and health would benefit from understanding the extent to which media coverage of police killings or other social and information pathways adversely affect Black Americans.

Black Americans have less access to mental health care than do whites and delay seeking care more often than other race/ethnicities.[168,169] When seeking care, Black Americans utilize the ED for psychiatric care at a greater rate.[169] Scholars attribute less help-seeking to low access, poor quality of care when accessed, socio-cultural barriers to help-seeking, and racial discrimination within the healthcare system.[99] Black Americans also have stronger beliefs about racial discrimination in healthcare than do other race/ethnicities and, as a result, prefer Black American physicians.[170] Other research indicates that increases in health care providers in underserved communities correspond with greater health care access for minorities, decreased discrimination, improved patient-provider communication, and improved patient quality and satisfaction outcomes.[171] As Black youth suicide rates steadily increase nationwide, increased access to mental health care for this population may be particularly beneficial. [129] In addition, given that depression remains a strong risk factor for suicidal ideation and self-harm, further research should evaluate whether elements of structural racism may correspond with suicides among Black youth.[172]

Table 3.1: Descriptive attributes of study covariates across 75 counties (5 states: AZ, KY, NJ, NY, NC), over 36 months (2013-2015).

Variables	**Statistics**
ED visits for depression (per 100,000 population) among Black Americans per county-month	Mean (SD)
Overall	100.25 (10.10)
Arizona	84.95 (18.28)
Kentucky	128.05 (19.18)
New Jersey	104.82 (11.81)
New York	74.17 (6.10)
North Carolina	102.18 (8.95)
County-months with police killings of unarmed Black Americans	N (%)
Overall	26 (100)
Arizona	4 (15.38)
Kentucky	0 (0)
New Jersey	5 (19.23)
New York	13 (50.00)
North Carolina	4 (15.38)

Figure 3.1: Trend in ED visits for depression among Black Americans (per 100,000 population) across 75 counties (5 states: AZ, KY, NC, NJ, NY), over 36 months (2013-2015).

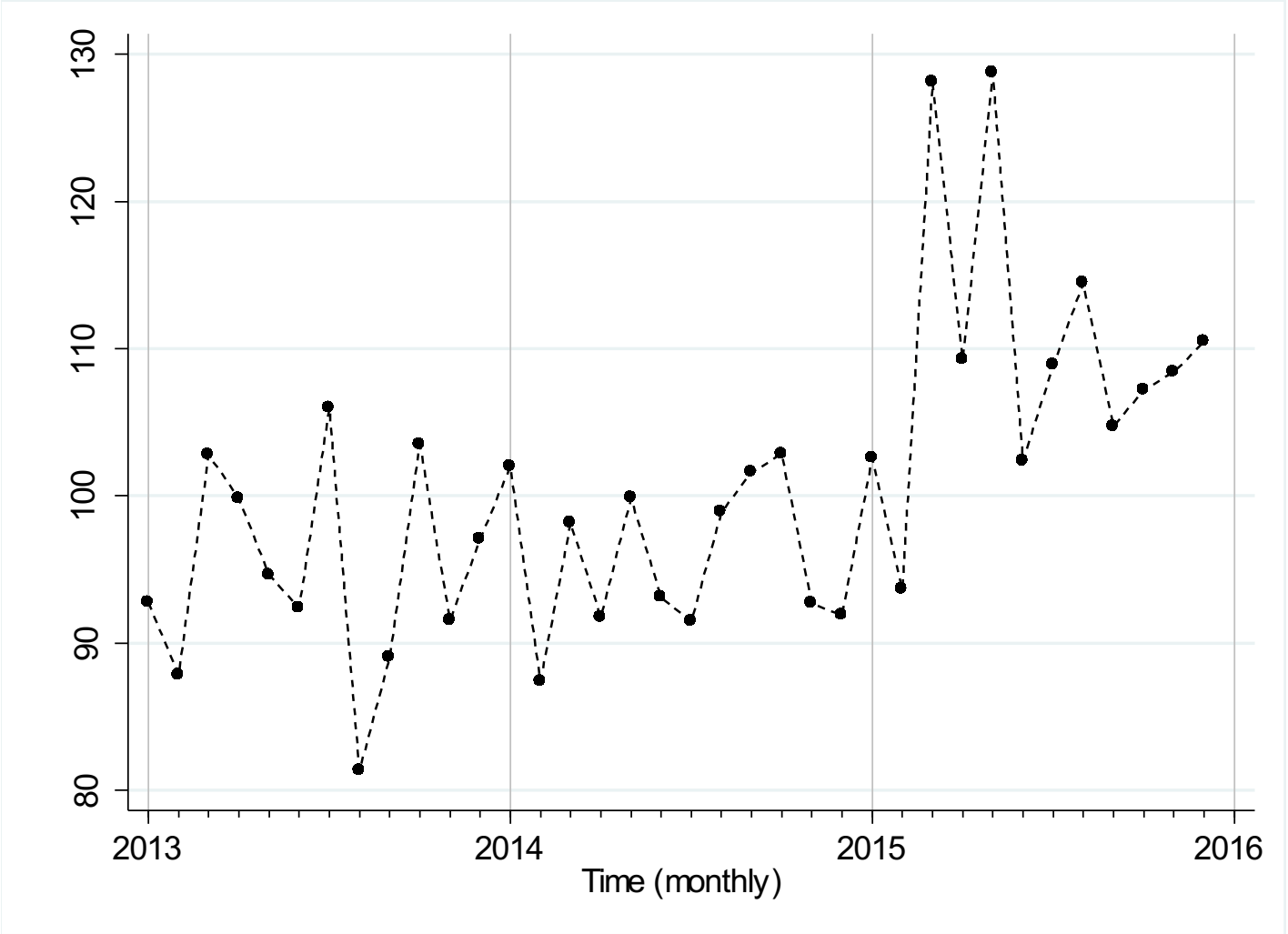

Figure 3.2: Monthly police killings of unarmed Black Americans over 36 months (2013-2015) aggregated for 75 counties (5 states: AZ, KY, NC, NJ, NY)

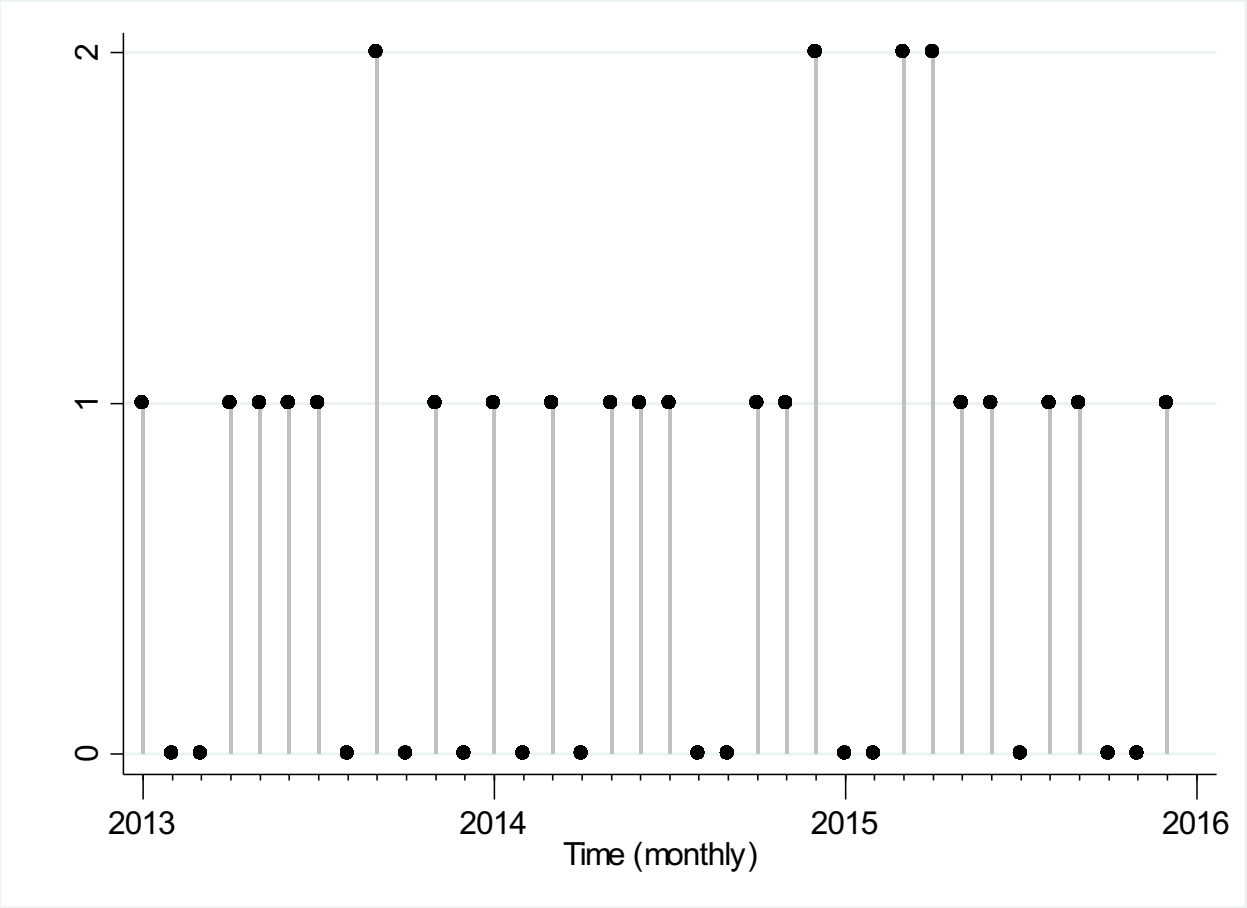

Figure 3.3 Frequency distribution of ED visits for depression among Black Americans (per 100,000 population) across 75 counties (5 states: AZ, KY, NC, NJ, NY), over 36 months (2013-2015).

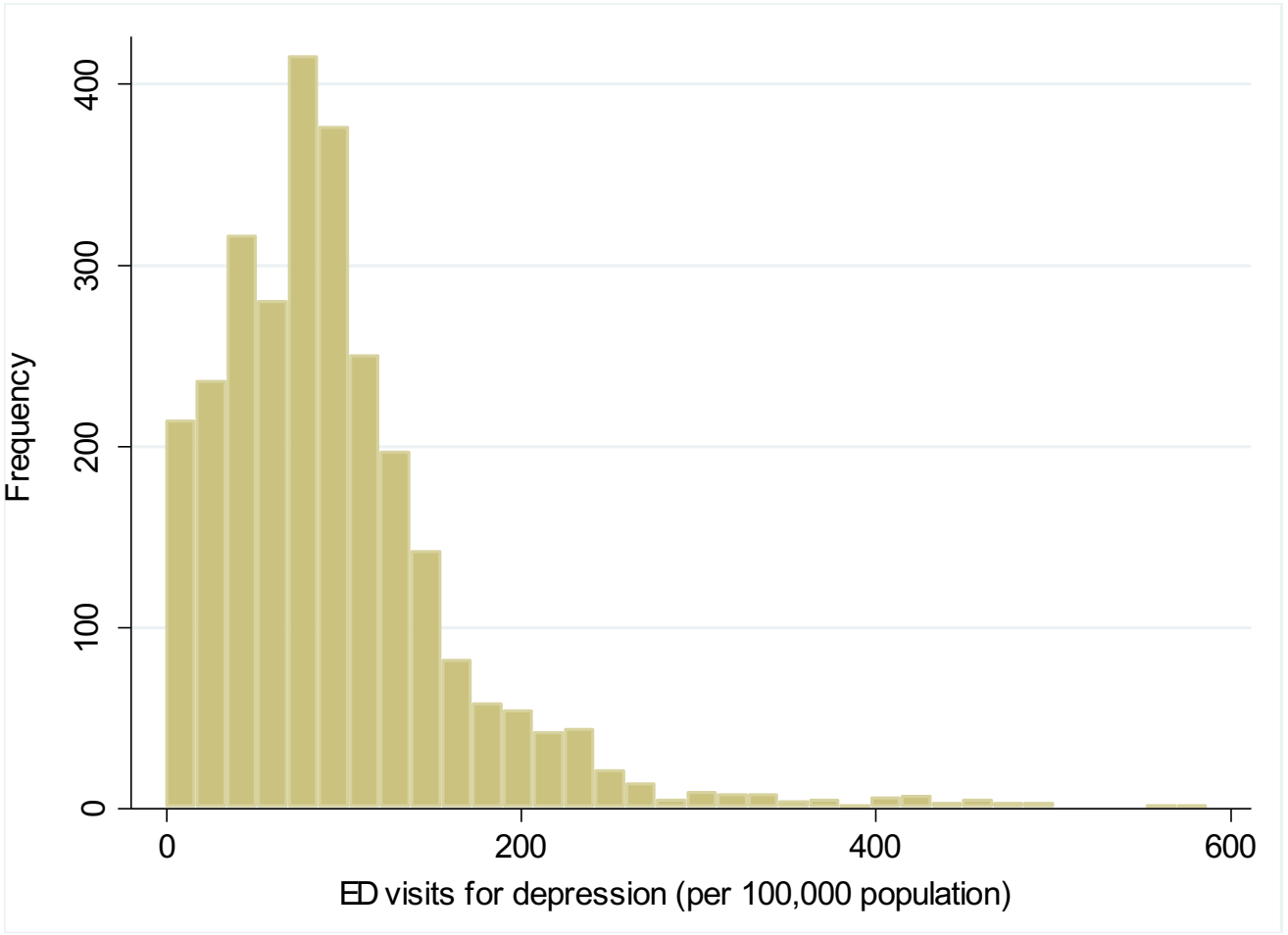

Table 3.2: OLS fixed effects regression results predicting log transformed ED visits for depression (per 100,000 population) among Black Americans as a function of 0- to 3-month lags of police killing of unarmed Black Americans.

Covariates	**Coefficient**	**SE[a]**
Police killing of unarmed Black Americans (reference = No)		
Month lag 0	0.11*	0.05
Month lag 1	0.05	0.04
Month lag 2	0.09	0.05
Month lag 3	0.11*	0.04
Number of EDs/hospitals reporting to SEDD	0.17*	0.07
Arrests for violent crime (per 100,000 population)	80.69	248.30
Month (reference: January)		
February	-0.08*	0.04
March	0.03	0.04
April	0.02	0.04
May	0.05	0.04
June	0.02	0.04
July	0.04	0.05
August	-0.01	0.06
September	4.85E-3	0.06
October	6.09E-4	0.06
November	-0.07	0.07
December	-0.06	0.07
Year (reference: 2013)		
2014	-0.02	0.10
2015	-0.06	0.16
State linear time trends (State*Month-Year) (reference: Arizona)		
Kentucky	0.01	0.01
North Carolina	0.01	0.01
New Jersey	0.01	0.01
New York	0.01	0.01

*p<0.05; ** p<0.01; *** p<0.001

[a]Robust standard errors

Table 3.3 OLS fixed effects regression results predicting log transformed ED visits for depression (per 100,000 population) among Black Americans as a function of 0- to 6- month lags of police killing of unarmed Black Americans.

Covariates	**Coefficient**	**(SE)[a]**
Police killing of unarmed Black Americans (reference = No)		
Month lag 0	0.09	(0.06)
Month lag 1	0.04	(0.05)
Month lag 2	0.07	(0.05)
Month lag 3	0.10*	(0.04)
Month lag 4	0.08	(0.05)
Month lag 5	-0.01	(0.05)
Month lag 6	-0.00	(0.05)
Number of EDs/hospitals reporting to SEDD	0.15*	(0.07)
Arrests for violent crime (per 100,000 population)	42.28	(274.58)
Month (reference: January)		
February	-0.09*	0.04
March	0.02	0.04
April	0.01	0.04
May	0.07	0.05
June	0.02	0.05
July	0.02	0.05
August	-0.02	0.05
September	-0.01	0.06
October	-0.01	0.06
November	-0.08	0.06
December	-0.07	0.07
Year (reference: 2013)		
2014	-0.05	0.10
2015	-0.09	0.16
State linear time trends (State*Month-Year) (reference: Arizona)		
Kentucky	5.41E-3	8.72E-3
North Carolina	2.88E-3	0.01
New Jersey	7.20E-3	7.90E-3
New York	0.01	7.64E-3

*p<0.05; ** p<0.01; *** p<0.001

[a] Robust standard errors

Table 3.4: OLS fixed effects regression results predicting log transformed ED visits for depression (per 100,000 population) among Black Americans as a function of 0 to 3 month lags of police killing of armed Black Americans.

Covariates	**Coefficient**	**(SE)[a]**
Police killing of unarmed Black Americans (reference = No)		
Month lag 0	0.01	(0.05)
Month lag 1	0.04	(0.04)
Month lag 2	-0.00	(0.04)
Month lag 3	0.01	(0.05)
Number of EDs/hospitals reporting to SEDD	0.16*	(0.07)
Arrests for violent crime (per 100,000 population)	66.38	(248.28)
Month (reference: January)		
February	-0.08*	0.04
March	0.03	0.04
April	0.02	0.04
May	0.05	0.04
June	0.03	0.04
July	0.04	0.05
August	-7.91E-3	0.06
September	7.38E-3	0.06
October	1.47E-3	0.06
November	-0.07	0.06
December	-0.06	0.70
Year (reference: 2013)		
2014	-0.02	0.10
2015	-0.05	0.16
State linear time trends (State*Month-Year) (reference: Arizona)		
Kentucky	7.54E-3	8.50E-3
North Carolina	5.71E-3	0.01
New Jersey	4.65E-3	0.01
New York	9.65E-3	0.01

*p<0.05; ** p<0.01; *** p<0.001
[a]Robust standard errors

Table 3.5: OLS fixed effects regression results predicting log transformed ED visits for depression (per 100,000 population) among whites as a function of 0- to 3-month lags of police killing of unarmed Black Americans.

Covariates	**Coefficient**	**SE[a]**
Police killing of unarmed Black Americans (reference = No)		
Month lag 0	0.04	0.04
Month lag 1	0.05	0.03
Month lag 2	3.61E-3	0.05
Month lag 3	0.04	0.04
Number of EDs/hospitals reporting to SEDD	0.04	0.02
Arrests for violent crime (per 100,000 population)	9.11E-5	1.09E-3
Month (reference: January)		
February	-0.11***	0.02
March	0.05	0.02
April	0.03	0.03
May	0.10**	0.03
June	0.03	0.04
July	0.03	0.04
August	0.03	0.04
September	0.03	0.04
October	-0.02	0.04
November	-0.07	0.05
December	-0.02	0.05
Year (reference: 2013)		
2014	0.04	0.06
2015	0.03	0.10
State linear time trends (State*Month-Year) (reference: Arizona)		
Kentucky	4.50E-3	9.74E-3
North Carolina	7.65E-3	0.02
New Jersey	4.11E-4	6.53E-3
New York	4.78E-4	6.10E-3

*p<0.05; ** p<0.01; *** p<0.001

[a]Robust standard errors

Table 3.6: OLS fixed effects regression results predicting log transformed ED visits for all psychiatric conditions, substance use, and anxiety (per 100,000 population) among Black Americans as a function of 0- to 3-month lags of police killing of unarmed Black Americans.

	Psychiatric ED visits		Substance use ED visits		Anxiety ED visits	
Covariates	**Coefficient**	**SE[a]**	**Coefficient**	**SE[a]**	**Coefficient**	**SE[a]**
Police killing of unarmed Black Americans (reference = No)						
Month lag 0	0.04	0.05	-0.08	0.07	0.07	0.05
Month lag 1	0.04	0.05	-0.09	0.08	0.05	0.05
Month lag 2	0.06	0.05	2.06E-3	0.11	0.07	0.04
Month lag 3	0.04	0.05	6.20E-3	0.11	0.07	0.04
Number of EDs/hospitals reporting to SEDD	0.10*	0.05	0.15**	0.06	0.11*	0.05
Arrests for violent crime (per 100,000 population)	189.06	139.76	101.46	277.14	240.15	300.73
Month (reference: January)						
February	-0.13***	0.03	-0.08	0.05	-0.06	0.04
March	2.84E-03	0.03	0.06	0.04	0.06	0.04
April	0.07	0.04	0.26***	0.04	0.05	0.03
May	0.12***	0.03	0.26***	0.04	0.10**	0.04
June	0.08**	0.03	0.27***	0.05	0.09	0.04
July	0.13***	0.03	0.32***	0.04	0.13***	0.03
August	0.11**	0.04	0.29***	0.05	0.10	0.04
September	0.14**	0.04	0.28***	0.05	0.10*	0.04
October	0.12**	0.04	0.88***	0.06	0.07	0.05
November	0.04	0.05	0.78***	0.06	0.02	0.05
December	0.13**	0.05	0.83***	0.07	0.03	0.05
Year (reference: 2013)						
2014	0.15*	0.06	0.09	0.06	0.05	0.06
2015	0.34**	0.10	0.67***	0.12	0.11	0.10
State linear time trends (State*Month-Year) (reference: Arizona)						
Kentucky	-0.01	0.01	-2.72E-3	7.25E-4	-1.32E-4	6.79E-3
North Carolina	0.01	0.01	0.03**	8.66E-3	5.92E-3	8.96E-3
New Jersey	-4.84E-3	0.01	0.01	6.42E-3	5.62E-3	5.56E-3
New York	-3.61E-3	4.95E-3	2.70E-3	6.06E-4	8.94E-4	5.09E-3

*p<0.05; ** p<0.01; *** p<0.001

[a] Robust standard errors

CHAPTER 4: INCARCERATION AND PSYCHIATRIC EMERGENCY DEPARTMENT VISITS AMONG BLACK AMERICANS

Introduction

In 2020, the US incarcerated nearly two million individuals.[173] With a rate of 573 per 100,000 population, incarceration in the US exceeds that of any other nation.[38] Black Americans have an incarceration rate of 2,306 per 100,000 population as opposed to whites with a rate of 450 per 100,000 population.[38] Additionally, one in three Black men can expect to go to prison in their lifetime.[38]

In the 1970s, the US government declared a 'War on Drugs' to reduce illicit drug use and crime. These measures included the creation of the federal Drug Enforcement Agency (DEA) and the introduction of policies that required mandatory minimum sentencing for drug-related activity.[174] Well-documented racial bias in the justice system that followed disproportionately imprisoned communities of color, specifically among young, Black men of lower education levels.[69,174–176] Racial disparities in drug arrests, harsher sentencing, and mandatory minimums brought on by the 1986 Anti-Drug Abuse Act for crack cocaine, as opposed to powder cocaine, further exacerbated racial/ethnic disparities in incarceration.[174,177,178] Crack cocaine use concentrated in low-income communities that comprised many Black Americans, whereas affluent whites often used the more expensive powder cocaine.[177] Implementation of the mandatory minimum resulted in the same five-year prison sentence for possession of five grams of crack cocaine, as opposed to 500 grams of powder cocaine. This policy increased the average drug sentencing among Black Americans from 11% greater than white populations to 49% greater.[174,177]

Mass incarceration refers to the concentration of imprisonment among Black Americans as well as the consistency in which it has become a normal stage within the life course in the Black community.[175,179] Theorists also suggest that as with slavery and segregation, the US government utilizes mass incarceration as an instrument for racialized oppression.[180,181]

Incarceration may therefore serve as an indicator for structural racism within the justice system.[10,181,182]

Previous work indicates that incarceration has contributed to restructuring households as well as infringing on social networks in the Black community.[69,73,175,183] Two ethnographies conducted in Washington DC and New York City document that incarceration strains family relationships, depletes financial resources, and leads to greater social and emotional isolation for the family of the incarcerated person.[184,185] Moreover, recent data from 2018 show that families who experience parental incarceration have a higher likelihood of disadvantage prior to the event.[186] Incarceration then amplifies the existing disadvantage for families in the subsequent years.[186] Although scholars assert that moderating factors such as mental illness, addiction, or intimate partner violence may provide relief for families upon incarceration, the majority of families, by and large, experience further disadvantage following incarceration.[186] Lastly, social network studies also report that children with incarcerated parents participate in more antisocial peer networks by befriending peers who exhibit less academic success and greater delinquency.[187,188]

Scholars theorize that social networks create the foundation for social capital – defined as networks with shared norms, values, and understandings that facilitate cooperation within or among groups.[73,74] Incarceration removes an individual from a household and therefore breaks strong ties within the family network.[73,189] Incarceration of a family member may also reduce the potential for weak ties formed through employment or community activities for family members, partners, or children of those incarcerated.[73,189] Given the substantial proportion of incarcerated men from low-income Black communities, scholars find that women in these communities often do not replace strong ties after losing their incarcerated male partners.[69,73] This circumstance may lead to permanently broken, strong ties with the incarcerated family member or significant

monetary and time investments in maintaining the ties.[73] Additionally, scholars assert that weak ties create bridges from family units to other social networks – thereby building social capital.[73] Men in prison do not have the opportunity to create connections to beneficial job- or community-related networks for their families, thereby reducing the overall capacity for social capital in these communities.[73] Although empirical findings in this area remain limited, one study reports that incarceration varies inversely with community attachment and organizational participation.[80]

Research that invokes Durkheim's theory on social isolation and psychological well-being consistently reports that social ties have salutary benefits on mental health.[189–191] Scholars contend that relationships between humans comprise three layers that collectively influence psychological well-being: 1) intimate ties (familial ties); 2) network relations (close relatives and friends); and 3) community participation (participation in voluntary activities or religious organizations).[191,192] Although weak ties such as community participation do not provide greater personal interaction, theorists posit that they nonetheless enhance psychological well-being.[192] Empirical work on network analysis in this area finds that outer layers support inner layers, such that greater community participation makes it possible to create closer relationships with relatives and friends.[192]

Individual-level studies utilizing longitudinal data and rigorous methodologies report that familial incarceration precedes adverse mental health among children and partners of those incarcerated.[45,193,194] Scholars theorize that forced separation from a parent, material deprivation from loss of financial support, and compromised parent relationships can harm children's social and emotional well-being following parental incarceration.[195] Two studies using the Fragile Families and Child Well-Being Study find greater physically aggressive behaviors and problematic externalizing behaviors among children following paternal incarceration, specifically.[195,196] Another study that leverages panel data from the National Longitudinal Study

of Adolescent Health reports a positive relation between parental incarceration in childhood and depression, post-traumatic stress disorder, and anxiety during adolescence.[43] These studies, however, utilize self-reported behavioral and mental health symptoms, which may encounter confounding due to recall or response bias. In addition, Wakefield and colleagues employ three different data sources and report greater externalizing and internalizing behavior among children following paternal incarceration.[45] Their study also finds greater racial disparities in childhood behavioral problems as a function of the increased risk of Black paternal incarceration (1990 incarceration rates) as compared to simulated incarceration rates from the 1970s or no incarceration.[45]

A smaller body of work empirically assesses the mental health of women following incarceration of their male partners.[194,197] A study using nationally representative data from the National Survey of American Life examined familial incarceration and mental health among Black women.[46] Their findings indicate that familial incarceration corresponds with higher levels of depression and psychological distress in Black women.[46] Moreover, analyses report that having fixed roles in the community, such as employment, attenuated the relation between incarceration and adverse mental health.[46] Another longitudinal study using the Fragile Families and Child Wellbeing Study examined whether recent partner incarceration among women corresponded with their own drug, alcohol, and cigarette use.[197] Using both linear probability models and propensity score matching, the Authors find a positive relation between partner incarceration and drug use.[197] Furthermore, this relation concentrates in Black women and women who previously lived with their incarcerated partners.[197]

At the population level, scholars report a multitude of adverse health outcomes, including preterm birth, sexually transmitted disease, cardiovascular disease, mortality, mental health, as well as changes in health service utilization that correspond positively with county and state-

level incarceration.[70,182,198–202] In an ecological study conducted between 1999 and 2015, researchers report greater odds of preterm birth among Black and white women living in counties with the highest quintile of jail incarceration compared to women living in the lowest quintile of jail incarceration in the US.[182] As a measure of structural racism that leverages elements of the Ecosocial theory, the Authors also test whether the difference in county jail incarceration among Black and white populations corresponds with greater preterm birth among women.[182] This test examines whether the racial/ethnic inequities in incarceration contribute to similar inequities reported in preterm birth. The study finds that the difference in county jail incarceration coincides with greater preterm birth among both Black and white women in the highest quintile of incarceration when compared to the lowest quintile of incarceration.[182] Additionally, one study reports increased Emergency Department (ED) visits per 1,000 residents as a function of a greater proportion of former inmates within a state after controlling for between-state heterogeneity.[198] Theoretically, the researchers argue that having a greater proportion of former inmates results in an increased number of uninsured individuals that utilize the ED for healthcare services.[198] They support this hypothesis using results from individual-level data, but also report the "spillover effects" of former incarceration on the broader population in aggregate-level analyses examining within-state changes in ED visits.[198]

Of most relevance to my analysis, Hatzenbuehler and colleagues assess mental health among individuals living in neighborhoods with heightened incarceration.[70] Substantial work on incarceration and mental health previously focused on the mental health of those formerly incarcerated or family members of incarcerated individuals.[70] This study, by contrast, reports the first ecological test of community-level incarceration and the mental health of those not directly tied to incarceration.[70] Surveying a panel of individuals over four waves, the scholars utilized clinically valid and reliable measures of depression and anxiety to assess mental health changes over time.[70] Individuals living in neighborhoods with greater prison admission rates in

Detroit have a higher likelihood of current and lifetime Major Depressive Disorder and Generalized Anxiety Disorder than those living in neighborhoods with lower prison admission rates after accounting for individual and neighborhood characteristics.[70] Sensitivity analyses controlling for personal contact with the justice system do not change inference from the original test.[70]

The current literature on this topic remains limited in the following ways. First, previous work does not examine whether incarceration corresponds with greater psychiatric help-seeking, such as seeking emergency care due to acute mental health needs. Although studies have shown increases in adverse mental health and ED utilization following current and former incarceration, respectively, further examination of psychiatric ED visits may indicate greater mental health service needs in communities with heightened incarceration. Second, studies do not assess whether racial/ethnic inequities in incarceration coincide with greater adverse mental health in Black Americans. Previous work finds a relation between racial/ethnic inequities in incarceration and preterm birth, suggesting that justice-related indicators for structural racism may also precede changes in adverse mental health.[182] Third, previous studies do not assess adverse mental health as a function of incarceration at the county level. The long-arm of incarceration may contribute to adverse mental health in populations beyond the neighborhood, as studies have found changes in birth outcomes, sexually transmitted diseases, and mortality as a function of incarceration within counties.[182,199–201] Counties may serve as a critical level of aggregation due to county-level policies, jail administration, and litigation. Fourth, there are only a limited set of ecological analyses that would inform theory linking incarceration and adverse mental health through the potential erosion of social capital and breakdown of family networks. Any discovered ‘indirect effect’ of incarceration could have implications for psychiatric help-seeking beyond the individuals and families of those incarcerated.

I address these limitations and extend previous literature by examining whether incarceration corresponds positively with psychiatric ED visits among Black Americans. I use annual variation in psychiatric ED visits among Black Americans as a function of incarceration and the ratio of Black to white incarceration in 404 counties in the US between 2006-2015. Results may hold particular relevance to understanding the ecology of the justice system and its potential to exacerbate acute mental health needs in the Black community beyond expected levels.

Methods

Study Population

I obtained the outcome, psychiatric ED visits among non-Hispanic Black Americans (per 100,000 population) from the Statewide Emergency Department Database (SEDD).[105] The Agency for Healthcare Research and Quality (AHRQ) makes SEDD available for purchase under the Healthcare Cost and Utilization Project (HCUP).[105] Participating states contract with HCUP to make visit-level data available for purchase from all hospitals with an ED.[105] Following cross-validation with American Hospital Association surveys, SEDD provides 99% of all ED visits for participating states.[105] Much epidemiologic and healthcare services research utilizes this high-quality database.[106,107,112] This study comprised counties from ten US states that report county identifiers and year of visit. States in the study sample included Arizona, California, Florida, Kentucky, Maryland, Massachusetts, New Jersey, New York, North Carolina, and Rhode Island from 2006-2015. These years represent the longest consecutive series of SEDD-providing states with complete race/ethnicity data.

Study Measures

The aggregate county-year prevalence of psychiatric ED visits among Black Americans is the outcome variable. I classified an ED visit as psychiatric if any visit-level diagnosis (from diagnostic codes 1 to 25) corresponded with a psychiatric ICD-10 code according to Clinical

Classification Software categories developed by the AHRQ.[203] I aggregated a total of 8,740,370 psychiatric ED visits among Black Americans by county-year and converted these counts to population prevalence estimates (per 100,000 population) using race-specific county-level population denominators from the US Census Bureau's Population Estimates database.[204] Although these outcome data provide the opportunity for monthly resolution, in order to link estimates to the exposure of interest, I aggregated psychiatric ED visits annually. Additionally, I aggregated the outcome at the county level due to the fact that policies, health services, and funding that may influence processes of EDs often operate at the county-level. ED data at the county level also allowed for geographic linkage to the exposure of interest.

For the exposure, I retrieved data on annual prison and jail incarceration (per 100,000) among Black and white populations from the Vera Institute of Justice "In Our Own Backyard" (IOB) Incarceration Trends dataset.[205] IOB provides county-level data on incarcerated populations by race/ethnicity in prisons and jails.[205] Incarceration within counties, rather than states, may hold particular relevance to policies deployed by judges, prosecutors, and police at the county level.[205] Vera Institute of Justice validated estimates by comparing state-level findings to the Bureau of Justice Services National Prisoner Statistics Program.[206] Previous epidemiologic literature has also utilized this dataset to examine health outcomes as a function of incarceration.[182,199,200] Using race-specific county-year population denominators from the US Census Bureau's Population Estimates database, I converted prison and jail population counts to population prevalence estimates (per 100,000 population) for Black Americans and whites.[204] I then averaged prison and jail population prevalence estimates (per 100,000 population) to calculate incarceration prevalence estimates (per 100,000 population). I used the ratio of non-Hispanic Black to non-Hispanic white incarceration as a proxy for structural racism in the justice system. The ratio reflects the multiplicative difference in incarceration between Black and white populations, which ranges from five to more than seven times greater for Black populations

within a county-year. Additionally, previous comprehensive measures of structural racism have utilized the ratio of incarceration between Black and white populations to examine health disparities and the justice system.[207,208] However, because previous work has also utilized the difference in incarceration between the race/ethnicities as a measure of structural racism, I used a difference measure as a sensitivity check for my analyses.[182] Both constructs have limitations as counties with incarceration rates at the extremes (i.e., high or low) may have similar measures of structural racism in incarceration. The fixed effects analyses should nevertheless capture the changes in the ratios and differences over time (rather than measure their absolute values).

Violent crime or increased arrests within counties may influence both the exposure and outcome. Previous work finds that individuals living in areas with higher crime rates have a greater likelihood of depression and anxiety disorders compared to individuals living in lower crime areas.[209] Arrests for violent crimes within counties may also lead to incarceration below or above expected levels. Following arrest, the government charges and then convicts individuals of crimes at either the state- and/or federal level.[210] Charge-level data remain limited among state offenses; however, in 2006 the Bureau of Justice Statistics reported that state governments sentenced 73% of convicted felons to prison or jail.[211] In the same year, only 57% of misdemeanors went on to sentenced incarceration.[211] Among federal offenses, approximately 44% of arrests received charges in 2019.[210] In my linked dataset, I find a modest, inverse correlation between arrests for violent crimes and incarceration, which parallels figures reported by the Bureau of Justice Statistics.[210,211] As such, I utilized data on arrests for violent crimes from the Uniform Crime Reporting (UCR) database as a control variable.[212–214] The Federal Bureau of Investigation (FBI) provides UCR data with information on arrests for violent crime from 18,000 participating city, county, university, tribal, and federal law enforcement agencies.[215] As a publicly available dataset, UCR remains one of the most extensively used

crime repositories in the US.[215] I converted annual arrest counts to population prevalence estimates (per 1,000 population) and utilized this estimate as a covariate. I also controlled for county-level factors that may confound the relation between incarceration or psychiatric ED visits over the study period. These covariates included county-level factors such as number of hospitals reporting visits (i.e., closure or opening of EDs) and other socioeconomic determinants of mental health and crime, including percent unemployed and percent below the federal poverty line.[216–218]

Analysis

I linked county aggregates of psychiatric ED visits and incarceration with other county-level covariates using Federal Information Processing Standards (FIPS) codes.[109] This linkage yielded a total analytic sample of 404 counties, from ten states, between 2006-2015 (i.e., 4,040 county-years). Psychiatric ED visits showed a right-skewed distribution, in that more than half of the county-years (2,095) exhibited psychiatric ED visits (per 100,000 population) between one and 5,000 (Figure 4.1). I, therefore, log-transformed the outcome to approximate a normal distribution and minimize the influence of outliers (Figure 4.2).[219] I tested whether psychiatric ED visits (per 100,000 population) increase following greater incarceration (per 100,000 population) among Black Americans using Ordinary Least Squares (OLS) linear regression analysis. Additionally, I examined whether the ratio of Black to white incarceration (an estimate of structural racism) corresponds with greater psychiatric ED visits.

I used county-year arrests (per 1,000 population), number of hospitals reporting visits, percent unemployed, and percent below the federal poverty line as control variables. I also incorporated year indicators to reduce confounding from annual factors (i.e., policies associated with drug reform or the Affordable Care Act) that may precede changes in incarceration or psychiatric emergency care during the study period.

I begin with the following model using OLS regression analysis with a fixed effects specification:

$$Y_{c,y} = \beta_0 + \beta_1 X_{c,y} + \beta_2' H_{c,y} + \beta_3' A_{c,y} + \beta_4' U_{c,y} + \beta_5' P_{c,y} + \beta_6' \boldsymbol{County_c} + \beta_7' \boldsymbol{Year_k} + \varepsilon_{c,m}$$

where:

$Y_{c,m}$ is the population prevalence of psychiatric ED visits (per 100,000 population) among Black Americans in county *c* during year *y*.

$X_{c,y}$ is the exposure X incarceration (per 100,000 population), for the concurrent year *y*, in county *c*. β_1 is the key coefficient of interest in the analysis.

$H_{c,y}$ is the number of Emergency Departments (or reporting hospitals) within a county *c*, during year y, that report data on psychiatric ED visits. Inclusion of this control variable accounts for changes over time in ED visits following closure or opening of EDs.

$A_{c,y}$ is the population prevalence of arrests for violent crimes (per 1,000 population) in county *c*, during year *y*. Inclusion of this control variable accounts for changes in arrests in a county-year.

$U_{c,y}$ is the proportion of unemployed individuals in county *c*, during year *y*. Inclusion of this control variable accounts for the socioeconomic determinants of mental health and criminal justice involvement.

$P_{c,y}$ is the proportion of individuals below the federal poverty line in county *c*, during year *y*. Inclusion of this control variable accounts for the socioeconomic determinants of mental health and criminal justice involvement.

$\boldsymbol{County_c}$ is the vector of indicator variables for individual counties (county fixed effects).

$\boldsymbol{Year_k}$ is the vector of year indicators that control for year-specific changes in ED visit rates (e.g., policy changes such as the Affordable Care Act) across all counties.

$\varepsilon_{c,y}$ is the heteroscedasticity-robust standard error term to account for correlated residual errors.

A fixed effects model specification controls for time-invariant county-level characteristics that may influence the exposure or the outcome such as access to healthcare.[220] The panel structure of the data may lead to more strongly correlated prevalence estimates within counties than across counties.[221] As such, this specification forced within-county measurement by removing mean values for each county and examining year-to-year changes.[152,153]

I also conducted three sensitivity tests. First, I re-estimated the models and adjusted for outliers below the 5th or 95th percentile in the outcome. This adjustment determines whether extreme values in psychiatric ED visits drove any discovered association with incarceration (per 100,000 population) among Black Americans. Second, I assessed the sensitivity of results to log-transformation of the dependent variable. Third, I examined psychiatric ED visits among Black Americans as a function of an additional measure of structural racism: the difference in incarceration (per 100,000 population) between Black and white individuals within a county. Multiple measurements of structural racism, as used by previous scholars, may illuminate differences in the theoretical understanding of this growing literature.[182,222,223]

As falsification checks, I conducted the following two tests: 1) whether incarceration among whites corresponds with changes in psychiatric ED visits among whites; and 2) whether the ratio of Black: white incarceration coincides with changes in psychiatric ED visits among whites. Given that incarceration in the US concentrates in low-income Black communities, I may not find any relation between incarceration and psychiatric ED visits among whites. However, the erosion of social capital and breakdown of family networks may also exist in white communities, leading to increases in psychiatric ED visits. I conducted all analyses using Stata SE 16.0. The University of California, Irvine, Institutional Review Board approved this study (#20195613).

Results

The study sample shows an average of 10,350.92 psychiatric ED visits per 100,000 population per county-year among Black Americans (Table 4.1). Incarceration among Black Americans averages 24.33 per 100,000 population per county-year (Table 4.1). As seen in Table 4.1, the ratio of Black to white incarcerated populations has a mean value of 6.16 over the study period. Figure 4.3 plots psychiatric ED visits (per 100,000 population) among Black Americans in the test counties over time. Consistent with previous literature, psychiatric ED visits show a secular increase from 2006-2015.[107,154] Figure 4.4 plots incarceration (per 100,000 population) among Black Americans over the study period. Figure 4.5 shows the ratio of Black to white incarceration by county-year. The decrease in incarceration among Black Americans coheres with current population-level trends in the US. However, Black Americans still remain overrepresented in the US carceral system.[224]

Table 4.2 shows results from linear fixed effects regression analysis examining log-transformed psychiatric ED visits (per 100,000 population) as a function of incarceration (per 100,000 population) among Black Americans. One additional incarceration (per 100,000 population) corresponds with a 1.4% increase in psychiatric ED visits (per 100,000 population) among Black Americans in that county-year (coef=0.014, SE=0.005, $p<0.001$) (Table 2). Table 4.3 reports the relation between the ratio of Black to white incarceration (i.e., a gauge of structural racism in incarceration) and psychiatric ED visits (per 100,000 population) among Black Americans. Structural racism in incarceration coincides with a 2.2% increase in psychiatric ED visits (coef=0.022, SE=0.011, $p<0.05$) (Table 4.3).

I assessed three sensitivity tests: 1) outlier adjustment (Table 4.4); 2) sensitivity of results to log-transformation of the dependent variable (Table 4.5); and 3) utilizing the difference of prison

incarceration between Black and white populations (by county year) as a measure of structural racism (Table 4.6). Inference from the sensitivity analyses for outlier adjustment and the difference in prison incarceration between Black and white populations remain robust to the original findings. I find no relation between incarceration and psychiatric ED visits among Black Americans (per 100,000 population) prior to log transformation, showing that the results appear sensitive to the functional form (i.e., log transformation) of the exposure variable. Skewed values below the 5th percentile drive the null result prior to log transformation. Counties from all ten states in the analyses comprise outliers in the non-log transformed outcome variable, with approximately the same number of rural and urban counties.[225] Lastly, I find no relation between incarceration among whites and psychiatric ED visits among whites (Table 4.7). The ratio of Black to white incarceration also does not correspond with psychiatric ED visits among whites (Table 4.8).

Discussion

Black Americans comprise 40% of the incarcerated population but only 13% of the US population.[38] The breakdown of networks and community from overrepresentation in the carceral system may incite greater psychiatric morbidity in the broader Black population. Fixed effects methods indicate a modest, positive relation at the county-year level between incarceration and psychiatric ED visits among Black Americans. I also find that annual deviations in the intensity of incarceration among Black Americans relative to white individuals (measure of structural racism) correspond positively with psychiatric help-seeking among Black Americans.

My findings may cohere with the theoretical underpinnings of incarceration's influence on the broader population not necessarily connected directly to the incarcerated person. Incarceration

removes individuals from family and social networks, eliminating financial or supportive contributions to households, as well as participation in communities.[69,73,175,183,226] As evidenced by previous literature, social ties, both strong and weak, have substantial benefits for mental health.[189–191] Theorists and empirical scholars have also compared the influence of the carceral system in the US to acts of forced migration.[227] This body of work indicates that social destabilization, resulting in the removal of specific groups, has preceded changes to gender ratios in certain regions as well as the breakdown of social cohesion.[227] Such disruption may change social norms established within communities that help prevent disease.[227] Loss of groups of individuals from mass incarceration, specifically Black men with lower educational backgrounds, results in the forfeiture of monetary and familial support for numerous networks.[69] Disruption of such networks, through elimination of male role models, partners, and children, further exacerbates distress in already disadvantaged communities.[99,186,228] Although my study does not directly assess whether social capital and family networks mediate or moderate the relation between incarceration and acute mental health, further work would benefit from such an understanding. Well-established stigmatizing attitudes towards routine mental health treatment and untreated mental illness may also result in use of the ED for psychiatric care in the Black community.[99]

I find that structural racism in incarceration may have a modestly greater influence on psychiatric help-seeking than the prevalence of incarceration among Black Americans (1.4% vs. 2.2% increase). This finding highlights the prominence of differential access to opportunities among Black Americans and whites due to legislation and actions by the criminal justice system, such as disparities in drug arrests or crack cocaine sentencing. [2,177,178] In turn, these actions reinforce racial/ethnic biases that contribute to adverse health in Black populations.[2,207] These findings offer credence to the often invisible systemic factors that contribute toward racial biases in the criminal justice system and the “indirect effects” on those not directly involved in

the system. I also find no relation between structural racism in incarceration and psychiatric ED visits among whites. This coheres with the broader literature that suggests that indicators for structural racism either do not correspond with or have salutary benefits to health outcomes among white Americans.[207] Lastly, my analyses consistently report a decrease in psychiatric ED visits as a function of greater arrests for violent crime. This finding coheres with previous studies conducted on the concept of 'transinstitutionalization' of mental illness from psychiatric hospitals to the justice system. Reductions in public psychiatric hospitals and beds following deinstitutionalization in the US have led to increases in arrests and incarceration, even after accounting for unemployment and poverty.[229,230] Further work would benefit from better understanding the pathways by which inpatient stays and ED visits for psychiatric conditions may function in relation to incarceration.

Strengths of the analysis include the use of comprehensive, state-wide datasets for psychiatric, depression, and anxiety ED visits. I also utilized clinically diagnosed ICD-10 codes for psychiatric ED visits. The fixed effects specification accounted for time-invariant characteristics at the county-level. Year indicators also controlled for exogenous shocks that may have altered psychiatric ED utilization or incarceration, such as the Affordable Care Act or drug reform policies. I also accounted for potential confounders, such as heightened arrests for violent crimes and fluctuations in county-level socioeconomic factors that may correspond with the exposure or the outcome. My findings contribute to the growing literature on structural racism and health, operationalized as the ratio of incarceration among Black and white individuals within a county-year. Extending previous work on neighborhood incarceration and mental health, my findings also suggest that the long-arm of incarceration influences psychiatric help-seeking within counties by race/ethnicity.

This study has limitations. My findings do not comprise the prevalence of psychiatric conditions in the population, as not all individuals seek psychiatric care in the ED. Therefore, the results may represent the lower bound of psychiatric conditions in the population. Additionally, data limitations prevent examination of the exposure and the outcome in all US counties. However, my study sample includes states from each of the four regions in the US and comprises 20% of the country's population.[231] The results also appear sensitive to log-transformation of the dependent variable, psychiatric ED visits. Outlier counties below the 5th percentile prior to log-transformation of the outcome drive these null results. Log-transformation, however, more closely approximates the assumption for linear regression in that residuals follow a normal distribution, while also preventing outliers from driving the relation between the exposure and the outcome.[220] Further investigation of differences in outlier counties and states may provide greater insight into shared characteristics driving these results.

Additionally, the IOB dataset (created from the National Corrections Reporting Program) provides incarceration data on the county in which courts impose a sentence, which may differ from the county of residence.[206] This may impede use of theories on the breakdown of family networks and social capital as incarcerated populations within counties may consist of individuals who reside in other counties within the same state. The Federal Bureau of Prisons considers several factors when determining an inmate's designation following conviction: level of security, programming needs (i.e., substance use treatment), bed availability, as well as primary residence.[232] Specifically, the Federal Bureau of Prisons prioritizes placement in institutions that remain reasonably close to anticipated home release locations, subject to other factors.[232] Jails and prisons may also function differently, in this regard, in that cities, local districts, and counties operate jails, whereas states and federal governments manage prisons. Measurement of within-county changes over time in this study, however, may control for time-invariant characteristics such as types of facilities located within counties and their subsequent

programming and security for inmates. This may not account for confounding due to the introduction of new prisons within localities; however, sources report that states have slowed building new prisons since the industry expanded significantly between 1990-2005 (prior to the study period of 2006-2015).[233,234] One study finds that approximately 35% of individuals live within 100 miles of their designated prison; however, limited research exists on whether patterns differ for jails given their localized jurisdiction.[235] Use of both prison and jail incarceration in this study, however, may provide the most inclusive evaluation of within-county changes. Availability of more fine-grained data with information on county of residence would allow for a more rigorous analysis of the pathways by which incarceration weakens family networks and social capital.

Suicides have increased substantially in the past two decades, becoming the second leading cause of death among Black youth aged 13 to 19 years. Suicide rates among certain Black age groups have surpassed those of whites.[129,130] Previous work reports that familial incarceration precedes greater adverse mental health among children.[43,193] One study finds that racial bias in parental imprisonment corresponds with increased mental health disparities in adolescents.[45] Given the significant racial disparity in parental incarceration, with one in ten Black youth having an imprisoned parent, an evaluation of incarceration and suicide among Black youth may uncover underlying ecological risk factors contributing to the current rise and disparity in suicides.[236]

Since 2010, California, New York, and other states have implemented policies reclassifying drug possession from felonies to misdemeanors.[237] Felony convictions for drug possession impose burdens on communities of color, in particular.[178] Black Americans remain three- to four times more likely to get arrested for illegal drugs, as opposed to whites, after controlling for criminal disposition.[178] California's Proposition 47 (The Safe Neighborhoods and Schools Act in 2014)

reclassified low-level drug and property crimes from felonies to misdemeanors and reinvested funds into community mental health and substance use programs, substantially influencing populations of color.[238] Scholars find that Proposition 47 has not only preceded a decrease in prison populations, but also shown a decline in racial/ethnic disparities in drug arrests.[238,239] Further research would benefit from evaluating whether drug reform policy and the subsequent reduction in incarceration may have salutary benefits to broader community mental health among racial/ethnic minorities.

Racial disparities in incarceration capture one facet of criminal justice within the broader racial discrimination system.[10] Theorists posit that residential location, education, health, housing, credit markets, labor, as well as justice subsystems comprise a reciprocating, integrated system.[10] Although evaluating structural racism in incarceration allows for directed policy change, such as state-level drug reform, populations released from prison or jail may continue to face barriers within housing and labor markets. These barriers may subsequently lead populations back to the justice system, also known as the “revolving door of the justice system.” The reinforcing nature of these subsystems has prompted researchers to create multidimensional measures for structural racism, incorporating racial disparities within each facet.[207,208,240] Findings report that comprehensive measures correspond with adverse health outcomes in the Black community.[207,208] Research on psychiatric help-seeking as a function of inclusive structural racism measures may also provide the context necessary to better understand racialized inequality in health.

Figure 4.1 Frequency distribution of psychiatric ED visits among Black Americans (per 100,000 population) across 404 counties (10 states: AZ, CA, FL, KY, MA, MD, NJ, NY, RI, NC), over 10 years, 2006-2015.

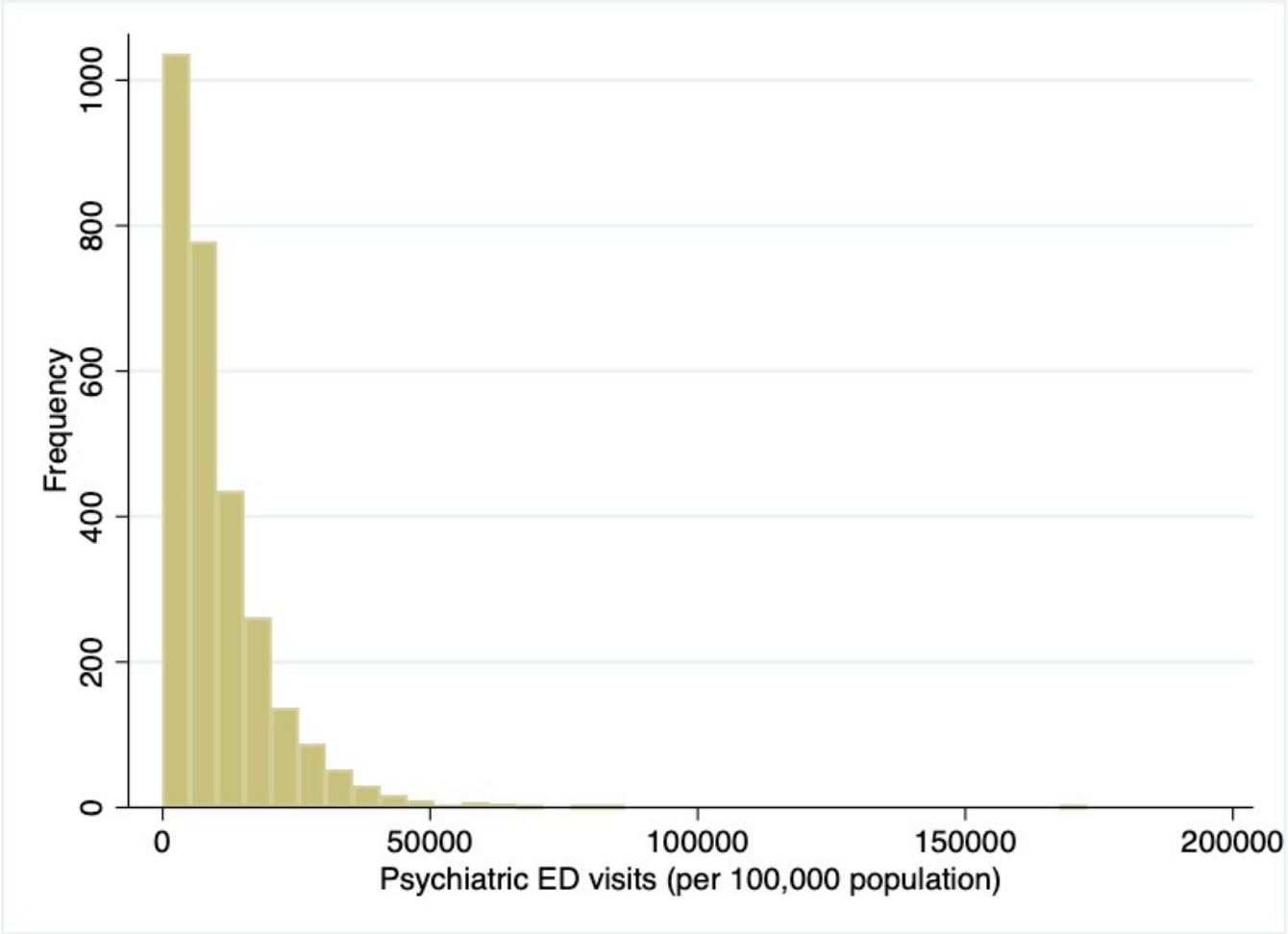

Figure 4.2 Frequency distribution of psychiatric ED visits among Black Americans following log-transformation (per 100,000 population) across 404 counties (10 states: AZ, CA, FL, KY, MA, MD, NJ, NY, RI, NC), over 10 years, 2006-2015.

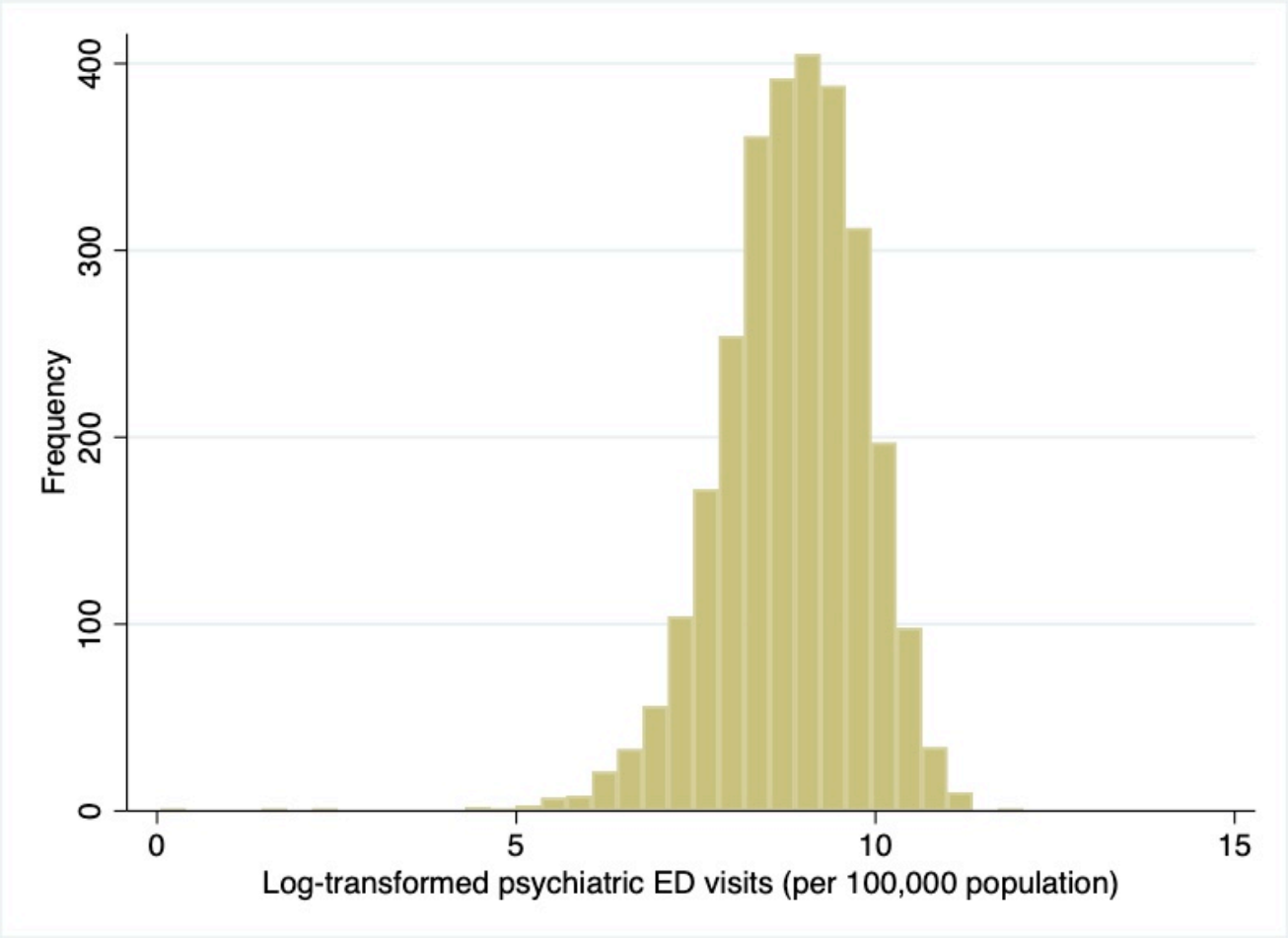

Table 4.1. County-level emergency department, incarceration, and socioeconomic characteristics of 404 counties from ten US states[a], 2006-2015.

Variable	Mean (SD)
Psychiatric ED visits among Black Americans (per 100,000 population)	10,350.92 (10,074.39)
Incarceration among Black Americans (per 100,000 population)	18.99 (11.56)
Black:white incarceration ratio	6.16 (3.96)
Arrests (per 1,000 population)	6.25 (9.57)
Percent unemployed (%)	7.85 (3.01)
Percent below the federal poverty line (%)	15.99 (6.16)
Number of hospitals	123.90 (969.44)

[a]Counties from the following states: Arizona, California, Florida, Kentucky, Massachusetts, Maryland, New Jersey, New York, Rhode Island, and North Carolina

Figure 4.3. Psychiatric ED visits per 100,000 population among Black Americans from 404 counties in ten US states, 2006-2015.

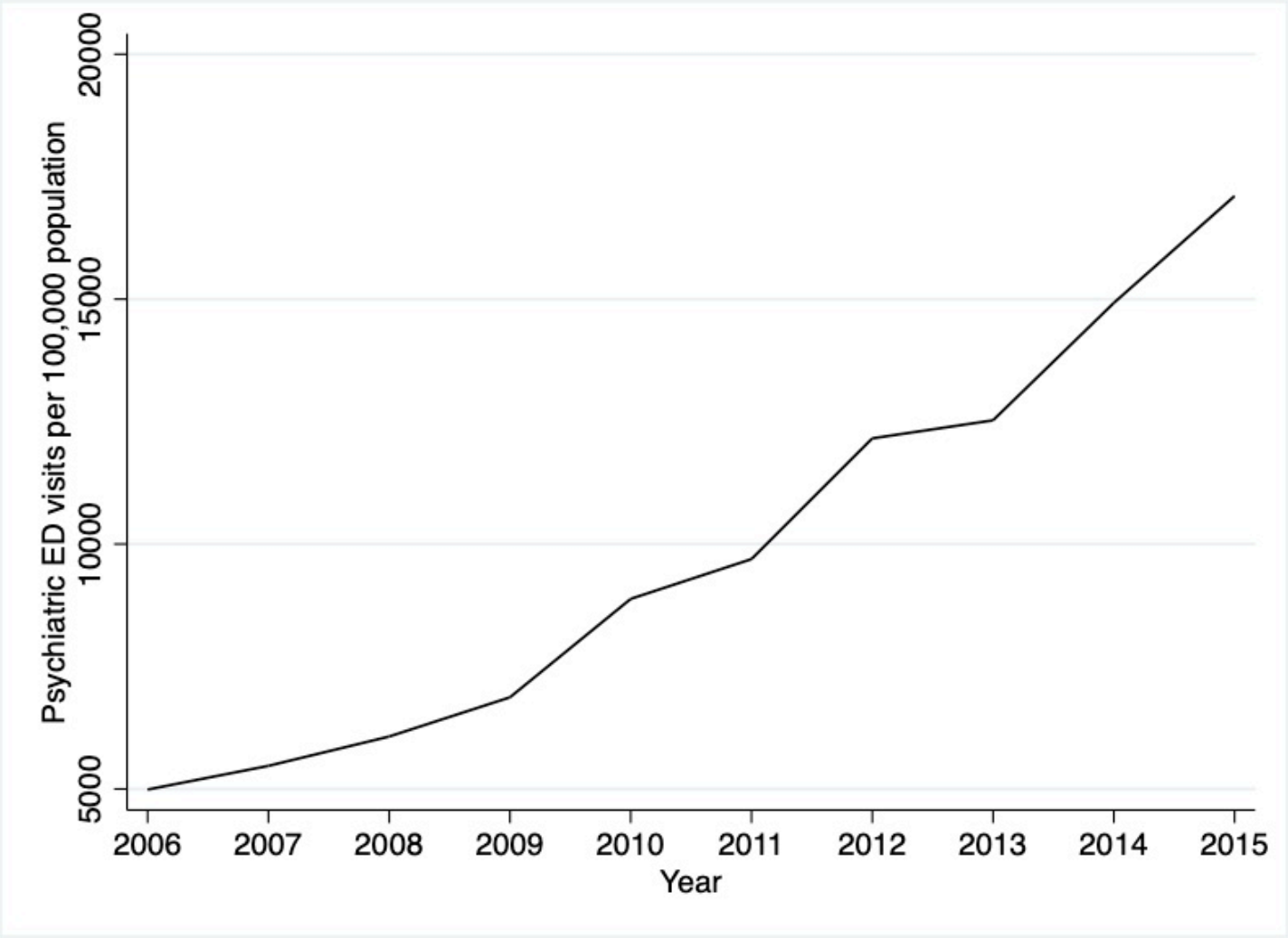

Figure 4.4. Incarceration per 100,000 population among Black Americans in 404 counties from ten US states, 2006-2015.

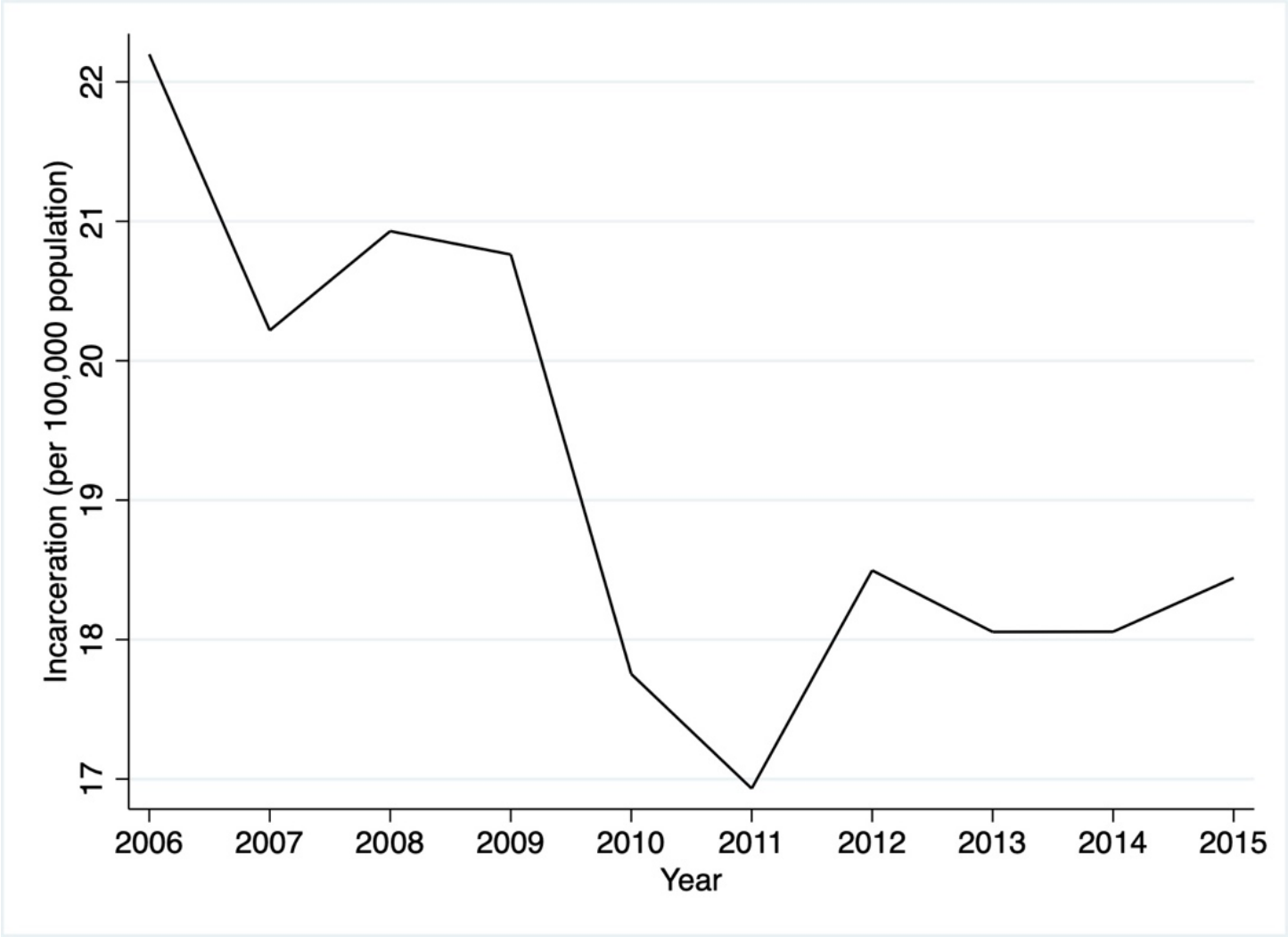

Figure 4.5. The ratio of incarceration of Black Americans to white individuals in 404 counties from ten US states, 2006-2015.

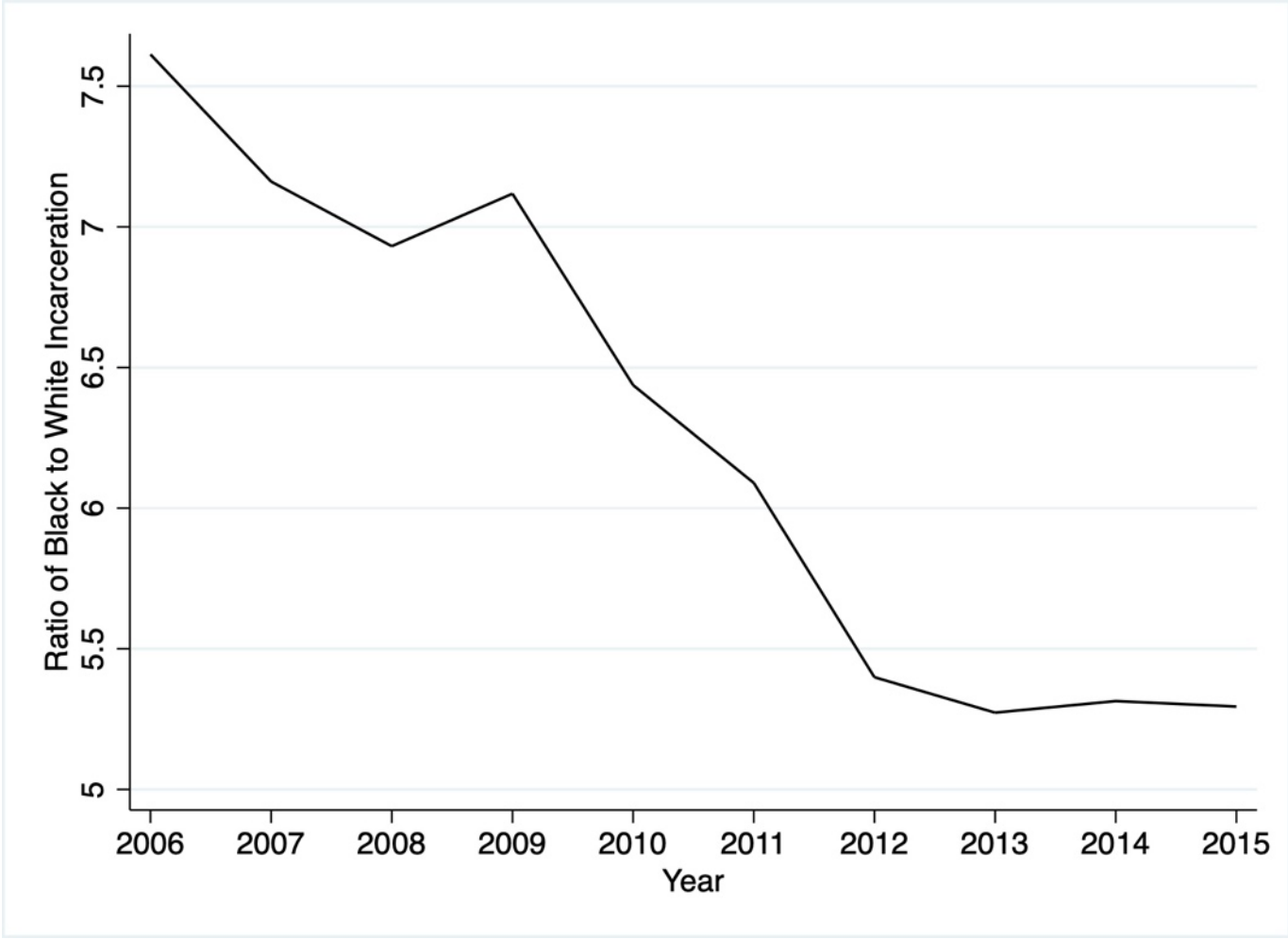

Table 4.2. Ordinary Least Squares fixed effects regression results predicting log transformed psychiatric ED visits (per 100k population) among Black Americans as a function of incarceration among Black Americans (per 100k population) in 404 counties from ten US states, 2006-2015.

Covariate	**Psychiatric ED visits**	
	Coefficient	**Standard Error**[a]
Incarceration among Black Americans (per 100,000 population)	0.014***	0.005
Arrests (per 1,000 population)	-0.003***	0.001
Percent unemployed (%)	0.005	0.015
Percent below the federal poverty line (%)	0.003	0.008
Number of hospitals	2.657E-4	2.035E-4
Year (reference: 2006)		
2007	-0.016	0.043
2008	0.139**	0.057
2009	0.342****	0.092
2010	0.467****	0.103
2011	0.598****	0.099
2012	0.741****	0.092
2013	0.824****	0.082
2014	0.999****	0.074
2015	1.141****	0.075
N	2,360	

*p<0.1; **p<0.05, ***p<0.01 ****p<0.001
[a]Robust standard errors

Table 4.3. Ordinary Least Squares fixed effects regression results predicting log transformed psychiatric ED visits (per 100k population) among Black Americans as a function of the ratio of incarceration of Black Americans to whites in 404 counties from ten US states, 2006-2015.

Covariate	**Psychiatric ED visits**	
	Coefficient	**Standard Error[a]**
Ratio of incarceration of Black Americans to whites	0.022**	0.011
Arrests (per 1,000 population)	-0.003***	0.001
Percent unemployed (%)	0.004	0.015
Percent below the federal poverty line (%)	0.001	0.008
Number of hospitals	2.687E-4	2.085E-5
Year (reference: 2006)		
2007	-0.016	0.043
2008	0.146**	0.056
2009	0.347****	0.091
2010	0.470****	0.101
2011	0.594****	0.097
2012	0.740****	0.090
2013	0.822****	0.081
2014	0.998****	0.073
2015	1.142****	0.074
N	2,356	

*p<0.1; **p<0.05, ***p<0.01 ****p<0.001
[a]Robust standard errors

Table 4.4. Outlier-adjusted linear fixed effects regression results predicting log transformed psychiatric ED visits (per 100k population) among Black Americans as a function of incarceration among Black Americans (per 100k population) in 404 counties from ten US states, 2006-2015.

Covariate	Psychiatric ED visits	
	Coefficient	**Standard Error[a]**
Incarceration among Black Americans (per 100,000 population)	0.009**	0.004
Arrests (per 1,000 population)	-0.003***	9.554E-4
Percent unemployed (%)	-0.003	0.014
Percent below the federal poverty line (%)	-3.952E-4	0.008
Number of hospitals	1.662E-4	1.386E-4
Year (reference: 2006)		
2007	0.013	0.027
2008	0.180****	0.041
2009	0.360****	0.082
2010	0.467****	0.089
2011	0.586****	0.085
2012	0.689****	0.079
2013	0.759****	0.070
2014	0.917****	0.061
2015	1.054****	0.066
N	2,108	

*p<0.1; **p<0.05, ***p<0.01 ****p<0.001
[a]Robust standard errors

Table 4.5. Ordinary Least Squares fixed effects regression results predicting psychiatric ED visits (per 100k population) without log transformation among Black Americans as a function of incarceration among Black Americans (per 100k population) in 404 counties from ten US states, 2006-2015.

Covariate	**Psychiatric ED visits**	
	Coefficient	**Standard Error[a]**
Incarceration among Black Americans (per 100,000 population)	6.507	60.50
Arrests (per 1,000 population)	-35.631****	8.373
Percent unemployed (%)	-61.097	161.713
Percent below the federal poverty line (%)	9.408	72.128
Number of hospitals	1.223	1.091
Year (reference: 2006)		
2007	-606.796**	307.284
2008	828.193**	350.075
2009	2474.000**	893.849
2010	2922.206**	982.485
2011	4073.241****	930.771
2012	5551.775****	858.937
2013	6349.788****	764.806
2014	8459.444****	648.733
2015	9635.266****	771.269
N	2,108	

*p<0.1; **p<0.05, ***p<0.01 ****p<0.001
[a]Robust standard errors

Table 4.6. Ordinary Least Squares fixed effects regression results predicting log transformed psychiatric ED visits (per 100k population) among Black Americans as a function of the difference in incarceration between Black Americans and whites in 404 counties from ten US states, 2006-2015.

Covariate	Psychiatric ED visits	
	Coefficient	**Standard Error[a]**
Difference in incarceration between Black Americans and whites (population per 100,000)	0.015***	0.005
Arrests (per 1,000 population)	-0.003***	0.001
Percent unemployed (%)	0.005	0.015
Percent below the federal poverty line (%)	0.003	0.008
Number of hospitals	2.659E-4	2.033E-4
Year (reference: 2006)		
2007	-0.016	0.0427
2008	0.141**	0.057
2009	0.345****	0.092
2010	0.473****	0.103
2011	0.605****	0.099
2012	0.753****	0.092
2013	0.834****	0.082
2014	1.011****	0.074
2015	1.152****	0.076
N	2,357	

*p<0.1; **p<0.05, ***p<0.01 ****p<0.001
[a]Robust standard errors

Table 4.7. Ordinary Least Squares fixed effects regression results predicting log transformed psychiatric ED visits (per 100k population) among whites as a function of incarceration among whites (per 100k population) in 404 counties from ten US states, 2006-2015.

Covariate	Psychiatric ED visits	
	Coefficient	**Standard Error[a]**
Incarceration among whites (population per 100,000)	-0.020	0.024
Arrests (per 1,000 population)	-0.001	0.001
Percent unemployed (%)	0.001	0.015
Percent below the federal poverty line (%)	0.002	0.010
Number of hospitals	4.082E-4	2.515E-4
Year (reference: 2006)		
2007	-0.022	0.054
2008	0.193****	0.054
2009	0.341****	0.095
2010	0.436****	0.107
2011	0.552****	0.103
2012	0.665****	0.094
2013	0.718****	0.087
2014	0.885****	0.072
2015	0.965****	0.078
N	2,519	

*p<0.1; **p<0.05, ***p<0.01 ****p<0.001
[a]Robust standard errors

Table 4.8. Ordinary Least Squares fixed effects regression results predicting log transformed psychiatric ED visits (per 100,000 population) among whites as a function of the ratio of incarceration among Black Americans to whites in 404 counties from ten US states, 2006-2015.

Covariate	Psychiatric ED visits	
	Coefficient	**Standard Error[a]**
Ratio of incarceration of Black Americans to whites	0.010	0.014
Arrests (per 1,000 population)	-0.002**	8.819E-4
Percent unemployed (%)	-0.004	0.015
Percent below the federal poverty line (%)	0.006	0.010
Number of hospitals	3.788E-4	2.399E-4
Year (reference: 2006)		
2007	0.010	0.051
2008	0.197****	0.055
2009	0.359****	0.093
2010	0.457****	0.105
2011	0.572****	0.102
2012	0.672****	0.097
2013	0.714****	0.091
2014	0.870****	0.079
2015	0.971****	0.080
N	2,369	

*p<0.1; **p<0.05, ***p<0.01 ****p<0.001
[a]Robust standard errors

CHAPTER 5: CONCLUSION

Summary of Main Findings

Black Americans have a higher likelihood of police stops, police killings, and incarceration as opposed to non-Hispanic whites after accounting for differences in criminality. Such racial disparities may represent indicators of structural racism in the criminal justice system. Social, economic, and legal pathways have perpetuated such disparities, normalizing their occurrence over time. Inequities in the criminal justice system may have broader mental health implications for minoritized communities at large. Previous work finds greater mental health symptoms following direct exposure to police and incarceration. Ecological work also reports an increase in depression and anxiety symptoms among Black populations — not directly tied to the event — following increases in police stops, police killings of unarmed Black Americans, and incarceration. My research extends previous literature and evaluates whether these indicators of structural racism in the criminal justice system precede increases in psychiatric emergencies among Black Americans.

In Chapter 2, I examine the NYC SQF policy and assess whether police stops, stops including frisking, and stops including use of force vary positively with psychiatric emergencies among Black Americans. I evaluate theories on hypervigilance from policing while also addressing confounding due to trends, seasonality, and memory by utilizing ARIMA methods. I find that police stops correspond with a 0.02 increase in psychiatric ED visits among Black Americans. Stops including frisking coincide with a 0.05 increase in psychiatric ED visits and stops including use of force show a 0.11 increase in psychiatric ED visits among Black Americans. In Chapter 3, I evaluate whether police killings of unarmed Black Americans precede increases in psychiatric emergencies in the Black population by way of vicarious racism and linked fate.

This study measures within-county changes over time and accounts for time-invariant characteristics that may influence the exposure or the outcome. I report that police killings of unarmed Black Americans correspond with an 11% increase in ED visits related to depression (per 100,000 population) among Black Americans in the concurrent month and three months following the exposure. In Chapter 4, I assess whether year-to-year changes in incarceration vary positively with year-to-year changes in psychiatric emergencies among Black Americans through the breakdown of familial networks and social capital. I find that a one-unit increase in incarceration (per 100,000 population) corresponds with a 1.4% increase in psychiatric ED visits (per 100,000 population) among Black Americans. Structural racism in incarceration (i.e., one unit increase in ratio Black and white incarceration) also varies positively with a 2.2% increase in psychiatric ED visits (per 100,000 population).

My three analytical studies add to the current research in several ways. First, I extend the previous literature and find increases in a more acute form of mental health among Black populations, psychiatric emergencies, as a function of police stops, police killings of unarmed Black Americans, and incarceration. Greater psychiatric help-seeking at emergency departments suggests the need for greater access and availability of more routine mental health care options, such as care at Community Health Centers. More comprehensive insurance coverage and increases in the number of providers that can deliver psychiatric care may also buffer the influence. Unlike previous work, this research also investigates criminal justice and mental health relationships by race/ethnicity. Given the disproportionate rates of police stops, police killings, and incarceration among Black populations, evaluation of mental health outcomes by race/ethnicity reveals pathways to health equity through public policy or behavioral interventions. This research also evaluates psychiatric emergencies among Black Americans as a function of indicators of structural racism in the criminal justice system through methodology that reduces confounding from time trends, seasonality, and time-invariant characteristics by

measuring within-county changes over time. Lastly, my work enhances the current theoretical and empirical use of structural racism indicators by utilizing criminal justice measures that not only show substantial racial disparities, but also specify the additive and multiplicative differences between non-Hispanic Black and non-Hispanic white populations.

Black communities experience greater psychiatric help-seeking following increases in police stops, police killings of unarmed Black Americans, and incarceration. Reduction in the racial disparity in policing and incarceration may reduce the acute, adverse mental health experienced by Black populations. Findings also demonstrate that racial inequities in one social system, criminal justice, correspond with inequities in another social system, healthcare. Intersystem influences further exemplify the reach of racism at the institutional level. Policies enforcing changes in policing behavior or sentencing reforms, as well as greater access and availability of psychiatric care, may provide the pathways necessary to better achieve health equity.

Strengths and Limitations

Strengths of this work include use of exposures that span the continuum of the criminal justice system – from police stops to incarceration – to comprehensively capture the racial bias present in policing. Police encounters begin with a stop that may result in a police killing or the eventual incarceration of individuals. The racial bias in policing, however, remains persistent in police traffic stops, juvenile arrests, drug arrests, jail time after arraignment, prison sentences, probation revocation, as well as disenfranchisement. These features may also contribute to the overall psychiatric morbidity of Black Americans in the broader population, which these studies may not have captured.

Previous work in this area utilizes self-reported mental health symptomology, as opposed to the objectively-defined clinical diagnoses for psychiatric conditions that my research utilizes. Self-report for mental health measures may suffer from error due to cognitive processes, social desirability, and survey conditions. Additionally, much work in the area of criminal justice and mental health remains at the individual level, examining the direct exposure to police or incarceration and its influence on the mental health of those same individuals. Individual-level studies do not rule out the possibility of reverse causality as behaviorally disordered individuals may elicit attention from the police resulting in a greater number of police stops, police killings, or incarceration. Population-level research, however, reduces the possibility of reverse causation and evaluates the role of policing and incarceration as ambient exposures, given that population-level changes in mental health likely do not cause greater policing. Additionally, my use of monthly lags in Chapters 2 and 3 assesses changes in psychiatric help-seeking among Black Americans following police encounters. This establishes temporal order between the exposure and the outcome. I did not use lags in Chapter 4 because my study utilized annual, county-level incarceration prevalence estimates. I would not expect annual changes in incarceration to coincide with fluctuations in psychiatric ED visits among Black Americans in the following years.

Psychiatric emergencies may constitute urgent and non-urgent visits. Individuals may utilize the ED for non-urgent care if they do not have access to routine or outpatient mental health care. A shortage of psychiatric service delivery or a lack of insurance coverage may result in individuals using the ED for psychiatric care. Although the data I utilized for these studies did not provide information on urgency, future research would benefit from understanding changes in both types of psychiatric emergencies. Increases in non-urgent psychiatric emergencies may indicate the need for greater access and availability of psychiatric care due to criminal justice exposures for targeted locations. Additionally, previous psychiatric diagnoses may result in differential help-

seeking behavior at the population level; however, the ED data I have utilized does not provide information on psychiatric history. Psychiatric histories would elucidate whether criminal justice exposures preceded an increase in psychiatric help-seeking for newly developed psychiatric conditions, as opposed to maintenance of existing or underlying conditions. Clinical datasets that provide patient histories may allow for such examination; however, they may not provide the census of ED visits.

Lastly, my studies do not evaluate psychiatric help-seeking as a function of police stops, police killings of unarmed Black Americans, and incarceration by gender or age. Although I did not have specific hypotheses regarding gender or age, I encourage future work to examine these characteristics. Given that younger, Black men experience policing and incarceration more often than other genders or age groups, this subgroup may specifically experience greater psychiatric morbidity due to theoretical pathways such as hypervigilance or vicarious racism.

Health and Policy Implications

Long-term health implications of racial bias in the justice system may raise theoretical concepts such as 'weathering' in which consistent stress from discrimination and poverty contribute to worse health outcomes among minoritized communities.[241] Increased mortality may also result from such chronic stress as life expectancy has seen a greater decline among Black and Hispanic populations as opposed to white populations in recent years – albeit the COVID-19 pandemic significantly contributed to this decline.[241] Additionally, Black youth populations have also seen substantial increases in suicide mortality.[131] Consistent maltreatment from the justice system may drive greater maladaptive coping mechanisms, such as substance use, rumination, and self-injury, without the proper community initiatives or health education.[242] Adaptive coping strategies, such as emotion regulation, stress reduction activities, and cognitive behavioral

changes, would require either greater consistent access to care or community health programs targeted towards such strategies.[242]

In 2014, President Barack Obama established the President's Task Force on 21st-Century Policing to identify ways in which policing can reduce crime while also building public trust. The task force issued recommendations under building trust and legitimacy, policy and oversight, technology and social media, community policing and crime reduction, officer training and education, and officer safety and wellness. The task force also urged the President to create a national task force supporting community-based initiatives addressing poverty, education, health, and safety.

Following the police killing of George Floyd and the global attention given to racial inequities at the institutional level, the US Congress introduced the George Floyd Justice in Police Act of 2021.[243] The bill aims to address policing accountability by banning chokeholds and no-knock warrants, lowering the criminal intent standard for law enforcement misconduct, requiring officers to obtain uniform training on racial profiling and implicit bias, as well as mandating data collection with a national registry of misconduct as well as stops and use of force.[243] Although the bill passed in the House of Representatives in March of 2021, the Senate has still not reached an agreement on the Act in 2023.[243] However, bills passed at the state and local levels, including those in California, New Orleans, and Chicago, have required law enforcement agencies to collect data on police stops.[121,122,244] As demonstrated by New York City's Stop, Question, and Frisk Policy, evidence of racial/ethnic disparities in police stops, may provide the impetus necessary for policy change and salutary health.[135]

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APPENDICES

Table A.1. List of ICD 10 codes used for identifying ED visits diagnosed with depression [245]

ICD 10 code	Description
F0630	Mood disorder due to known physiological condition, unspecified
F0631	Mood disorder due to known physiological condition with depressive features
F0632	Mood disorder due to known physiological condition with major depressive-like episode
F0633	Mood disorder due to known physiological condition with manic features
F0634	Mood disorder due to known physiological condition with mixed features
F3010	Manic episode without psychotic symptoms, unspecified
F3011	Manic episode without psychotic symptoms, mild
F3012	Manic episode without psychotic symptoms, moderate
F3013	Manic episode, severe, without psychotic symptoms
F302	Manic episode, severe with psychotic symptoms
F303	Manic episode in partial remission
F304	Manic episode in full remission
F308	Other manic episodes
F309	Manic episode, unspecified
F310	Bipolar disorder, current episode hypomanic
F3110	Bipolar disorder, current episode manic without psychotic features, unspecified
F3111	Bipolar disorder, current episode manic without psychotic features, mild
F3112	Bipolar disorder, current episode manic without psychotic features, moderate
F3113	Bipolar disorder, current episode manic without psychotic features, severe
F312	Bipolar disorder, current episode manic severe with psychotic features
F3130	Bipolar disorder, current episode depressed, mild or moderate severity, unspecified
F3131	Bipolar disorder, current episode depressed, mild
F3132	Bipolar disorder, current episode depressed, moderate
F314	Bipolar disorder, current episode depressed, severe, without psychotic features
F315	Bipolar disorder, current episode depressed, severe, with psychotic features
F3160	Bipolar disorder, current episode mixed, unspecified
F3161	Bipolar disorder, current episode mixed, mild
F3162	Bipolar disorder, current episode mixed, moderate
F3163	Bipolar disorder, current episode mixed, severe, without psychotic features
F3164	Bipolar disorder, current episode mixed, severe, with psychotic features
F3170	Bipolar disorder, currently in remission, most recent episode unspecified
F3171	Bipolar disorder, in partial remission, most recent episode hypomanic
F3172	Bipolar disorder, in full remission, most recent episode hypomanic
F3173	Bipolar disorder, in partial remission, most recent episode manic
F3174	Bipolar disorder, in full remission, most recent episode manic
F3175	Bipolar disorder, in partial remission, most recent episode depressed
F3176	Bipolar disorder, in full remission, most recent episode depressed
F3177	Bipolar disorder, in partial remission, most recent episode mixed
F3178	Bipolar disorder, in full remission, most recent episode mixed

F3181	Bipolar II disorder
F3189	Other bipolar disorder
F319	Bipolar disorder, unspecified
F320	Major depressive disorder, single episode, mild
F321	Major depressive disorder, single episode, moderate
F322	Major depressive disorder, single episode, severe without psychotic features
F323	Major depressive disorder, single episode, severe with psychotic features
F324	Major depressive disorder, single episode, in partial remission
F325	Major depressive disorder, single episode, in full remission
F328	Other depressive episodes
F3281	Premenstrual dysphoric disorder
F3289	Other specified depressive episodes
F329	Major depressive disorder, single episode, unspecified
F330	Major depressive disorder, recurrent, mild
F331	Major depressive disorder, recurrent, moderate
F332	Major depressive disorder, recurrent severe without psychotic features
F333	Major depressive disorder, recurrent, severe with psychotic symptoms
F3340	Major depressive disorder, recurrent, in remission, unspecified
F3341	Major depressive disorder, recurrent, in partial remission
F3342	Major depressive disorder, recurrent, in full remission
F338	Other recurrent depressive disorders
F339	Major depressive disorder, recurrent, unspecified
F340	Cyclothymic disorder
F341	Dysthymic disorder
F348	Other persistent mood [affective] disorders
F3481	Disruptive mood dysregulation disorder
F3489	Other specified persistent mood disorders
F349	Persistent mood [affective] disorder, unspecified
F39	Unspecified mood [affective] disorder
R4586	Emotional lability

Table A.2. Count (N) and percentage (%) of county-months reporting police killing of unarmed Black Americans in metropolitan and non-metropolitan counties in 5 US states (AZ, KY, NC, NY, NY), 2013-2015.

County type	N	%
Metropolitan counties	26	96.30
Non-metropolitan counties	1	3.70