A State-Level Examination into Structural Racism and Racialized Disparities in Sexually Transmitted Infections

Megan Evans
Max Planck Institute for Demographic Research

Lauren Newmyer
Bowling Green State University

Abstract: The population health literature recognizes structural racism as a fundamental determinant of racialized health disparities. However, the role of structural racism in the continued persistence of racialized disparities in sexually transmitted infections (STIs) has not been investigated despite Black Americans' disproportionate experience of STIs in comparison to the prevalence among White Americans. Past research has largely investigated individual racial/ethnic identity as an individual-level factor predictive of STIs, failing to engage with the multitude of racially structured contexts which likely shape STI rates. This study combines multiple datasets, including data from the Centers for Disease Control and Prevention, the American Community Survey, and the Current Population Survey, to conduct a state-level analysis investigating the role of structural racism in contributing to Black-White racialized disparities in STIs between 2010 and 2020. Random effects spatial autoregressive models suggest that structural racism contributes to Black-White racialized disparities in STIs. This research contributes to literatures on structural racism and population health by better understanding how racialized state-level institutions shape the contraction of infections. The results have important implications for understanding states as institutional actors relevant for patterns of population health and the geography of racism.

Key Words: Sexually Transmitted Infections, Structural Racism, Racial and Ethnic Disparities, United States

1. Introduction

Sexually transmitted infections (STIs) are currently at record high levels in the United States (U.S.). The CDC estimates that one out of five people experienced an STI in 2018, costing the healthcare system approximately $16 billion in treatment and management (Centers for Disease Control and Prevention, 2021). These infections impose not only an onerous financial cost on the nation, but also inflict consequential health circumstances for the individuals who contract them such as repeat infections, long-term health issues, or infertility (Newton & McCabe, 2008; Tolnay, 1989; Trottier & Franco, 2006; Ward & Rönn, 2010). While the proliferation of STIs in the U.S. is spurred by changes in contraceptive use, STI prevention and treatment funding, and income inequality, among a multitude of other factors (Leichliter et al., 2020; Leichliter et al., 2022; Tanne, 2022), it is still unclear what factors drive the unequal exposure and contraction of STIs among certain racial and ethnic minority populations.

There is a strong and persistent racial patterning of STI exposure, contraction, and treatment (Adimora & Schoenbach, 2005; Adimora, Schoenbach, & Doherty, 2006; Harling et al., 2014; Leichliter et al., 2020, 2022). Racialized inequalities in STIs are most prevalent between Black and White Americans, with Black Americans having a higher likelihood of experiencing STI exposure and contraction than White Americans (Leichliter et al., 2022). Past research documenting these disparities has largely investigated individual-level factors such as sexual behavior, contraceptive access, and healthcare access (Adimora & Schoenbach, 2005; Harawa et al., 2011). However, an individualistic approach fails to engage with and feature the core role structural racism performs in creating and maintaining disparities in population health (Brown, Hargrove, Homan, & Adkins, 2023; Brown, Kamis, & Homan, 2022; Brown & Homan,

2022; Brown & Homan, 2022; Hardeman, Homan, Chantarat, Davis, & Brown, 2022; Homan, Brown, & King, 2021; Hummer, 2023).

An individualistic approach is unable to address the multitude of contextual factors, particularly racially structured contexts, which funnel down to shape an individual's risk of contracting an STI. Structural racism likely shapes an individual's risk of STI contraction through multiple pathways such as shaping dating opportunities, access to sexual health care and education around sexual health, and one's comfortability in accessing sexual health care. Although research on STIs has considered how individuals' residential location contributes to their risk of exposure and contraction (Ellen et al., 2004; Jennings et al., 2005; Jennings et al., 2012; Jennings et al., 2010), focused geographical interventions often fail to depress local STI rates (Rothenberg et al., 2005). Thus, recent research highlights the need to look beyond residential locations to understand how STIs spread (Newmyer, Evans, & Graif, 2022). A growing body of literature also suggests that states are important institutional actors in explaining demographic and population health outcomes (Brown et al., 2022; Montez, Hayward, & Zajacova, 2019; Montez & Zajacova, 2013). States' policy contexts are likely very important in shaping racialized STI patterns as they govern access to resources and opportunities, especially those regarding education and access to sexual healthcare, as well as racial oppression.

Our study investigates the geography of structural racism with a particular focus on the contraction of STIs. We seek to better understand how indicators of structural racism explain state-level racialized Black and White differences in STIs. We follow recent work by Brown and colleagues (2022; 2023) that measures structural racism as a latent construct scale to better represent its multifaceted, interconnected, and institutional nature. We combine multiple data sources, which include the Centers of Disease Control and Prevention's reports of 2010-2020

STI counts of chlamydia, gonorrhea, and syphilis by state, the American Community Survey, and the Current Population Survey, to provide an investigation into the structural determinants of STIs over the past decade. We employ random-effects spatial autoregressive models to examine how state-level structural racism shapes the disparate STI patterns of Black and White Americans. This research contributes to literatures on structural racism and population health by demonstrating the importance of states as institutional actors in shaping racialized inequality in the contraction of sexually transmitted infections.

2. Background

2.1 Structural Racism and Population Health

Across most domains of population health, Black Americans are disadvantaged in comparison to White Americans, dying earlier and having a higher prevalence of (co)morbidities and disability (Geruso, 2012; Hummer, 2023). After the declines in life expectancy attributed to COVID-19, life expectancy at birth for Black Americans is a striking 5.8 years shorter than White Americans (Arias & Xi, 2022; Hummer, 2023; Woolf et al., 2021). The broader population health literature identifies structural racism as a fundamental determinant of persistent racialized health disparities (Brown et al., 2023; Brown & Homan, 2022; Hummer, 2023). Moving beyond an essentialized, biological notion of race and ethnicity, demographers and population health scholars recognize that race and ethnicity are sociohistorical constructs representative of exploitation and oppression (Bonilla-Silva, 1997; Martinez et al., 2023; Ray, 2022; Williams, 2012).

Racism is a social system varying across time and place, embedded in government and politics, the health care system, education, the economy, the media and broader culture, and the criminal justice system (Bonilla-Silva, 1997, 2021; Hummer, 2023; Ray, 2022; Williams,

Lawrence, & Davis, 2019). Thus, structural racism is best understood as multi-sectoral and systemic (Bonilla-Silva, 1997, 2021), leading Black Americans to experience unequal exposure to risks as well as access to material and psychological resources (Brown & Homan, 2022). This unequal exposure can extend from institutional and governmental policies biased against Black Americans (Anderson, 2017; Korver-Glenn, 2018; Owens, 2020; Rothstein, 2017), to racial inequalities in income, wealth, and access to health-promoting resources and opportunities (Shapiro, 2004; Sharkey, 2013), to racially biased medical professionals and medical teaching philosophies (Arnett, Thorpe, Gaskin, Bowie, & LaVeist, 2016; Gaskin, Dinwiddie, Chan, & McCleary, 2012; Hannah-Jones, 2021; Nelson, 2002; Vaughan Sarrazin, Campbell, Richardson, & Rosenthal, 2009), and to actual physical and physiological violence against Black individuals (Roberts, 2016). Structural racism has been linked to racialized health disparities in infant mortality (Wallace, Crear-Perry, Richardson, Tarver, & Theall, 2017), COVID-19 mortality (Brown et al., 2022; Siegel et al., 2022), maternal health (Crear-Perry et al., 2021), and myocardial infarction (Lukachko, Hatzenbuehler, & Keyes, 2014), among several other mental and physical health outcomes (Hummer, 2023; Williams et al., 2019). In sum, a wealth of literature demonstrates the link between structural racism and racialized disparities in population health.

Simultaneously, with the growing body of research linking structural racism to population health, there are continued efforts on understanding how to best conceptualize and measure structural racism (Brown & Homan, 2022; Homan et al., 2021; Hummer, 2023). Scholars are still in the early stages of the complex task of adequately measuring the multi-sectoral, systemic nature of structural racism. While some scholars have used multiple measures simultaneously to represent different institutional aspects of structural racism (e.g., Chantarat, Van Riper, &

Hardeman, 2022; Lukachko et al., 2014), more recent work by Brown and colleagues have created a single latent scale that represents structural racism across multiple domains (Brown & Homan, 2022; Brown et al., 2022). In this study, we build on past work from Brown et al. (2022; 2023) by replicating their state-level measure of structural racism to investigate whether its relationship to population health extends to racialized disparities in sexual health.

2.2 Structural Racism and Sexually Transmitted Infections

The role of structural racism in the continued persistence of racialized disparities in STIs has not been investigated despite Black Americans' disproportionate experience of STIs in comparison to White Americans. Racialized STI patterns are consistent with a long history of disadvantage and structural racism, including racially segregated sexual networks (Liljeros et al., 2003), the hyper sexualization of Black bodies (Gilmore & Somerville, 1994; Lichtenstein et al., 2005), unequal access to healthcare (Kirby et al., 2006; Nelson, 2002), and medical experimentation with Black bodies (Arnett et al., 2016; Lichtenstein, 2008).

Research has shown that state-level contexts contribute to reproductive and sexual health outcomes (Crear-Perry et al., 2021; Hawkins et al., 2020; Redd et al., 2021; Srinivas et al., 2022). Individuals' sexual and reproductive health outcomes are shaped through a state's role in forming and maintaining culture that can encourage or reduce beneficial health behaviors (Malhotra, Amin, & Nanda, 2019), as well as directly through policy related to healthcare access and education (Crear-Perry et al., 2021; Goyal, Brooks, & Powers, 2020; Hawkins et al., 2020; Redd et al., 2021). For example, state's policies on access to reproductive health services such as abortion have also been linked to limited access to health care that can help treat and prevent STIs (Srinivas et al., 2022). School-based sex education is also shaped by state policy which can lead to higher STI rates in areas without adequate curriculum (Vivancos et al., 2013).

A states' role in shaping reproductive and sexual health in conjunction with structural racism encourages disparate sexual and reproductive health outcomes by race. Black women, in particular, have a long history of reproductive mistreatment in the U.S. (Roberts, 2016). State-level reproductive and sexual health policy limiting access to care often further disadvantages racial and ethnic minority women (Goyal et al., 2020; Redd et al., 2021). Although research has documented these disadvantages, it is still relatively unknown whether and how structural racism shapes Black-White disparities in sexual health outcomes, particularly STIs.

Though it is beyond the purview of this paper to investigate the specific mechanisms linking structural racism to individual contraction of STIs, there are many macro- to micro-level pathways which may exist. Structural racism shapes an individual's environment, societal interactions, and interpersonal relations that could lead to the contraction of STIs. Structural racism can play a role in shaping the micro-level sexual relationship choices one makes as both physical and social racial segregation leads to the racial segregation of sexual networks physically, but also through social norms on dating (Bearman, Moody, & Stovel, 2004; Laumann & Youm, 1999; Liljeros et al., 2003). Limited variation in romantic partnerships could increase STI risk. In environments with high levels of racism, Black individuals may have a lower propensity to seek out sexual health care due to the hyper sexualization of their bodies (Gilmore & Somerville, 1994; Lichtenstein et al., 2005) and fear of how a doctor might perceive their need for health care. However, even when Black individuals seek out healthcare they may be more likely to be dismissed by healthcare workers or not given the same quality of treatment (Nelson, 2002). Moreover, racial segregation and concentrated disadvantage means Black residents often live further away from quality health care (Arnett et al., 2016). A lack of sexual healthcare could lead Black individuals to not receive treatment for STIs or learn about prevention techniques,

which could increase the presence of STIs in the population. Additionally, due to residential segregation, Black individuals are subjected to lower quality public school systems with fewer resources (Owens, 2020) which may lead to lower quality education around sexual health and STI prevention. In sum, it is likely that structural racism shapes individuals' social and romantic relationships as well as their access and use of health care and education around sexual health, which can have ramifications for STI prevalence.

3. Methods

3.1 Data

We combine multiple datasets to investigate the relationship between structural racism and racialized disparities in state-level sexually transmitted infections. The Centers for Disease Control and Prevention (CDC) (2010-2020) provides data on the number of STI cases in each state by race, gender, age, and infection. Following guidance established by Brown and colleagues (Brown & Homan, 2022; Brown et al., 2022), we create a latent state-level structural racism scale combining multiple data sources including the Current Population Survey (CPS) and its Voting Supplement, American Community Survey (ACS), and the Uniform Crime Report (UCR). The CPS (2010 to 2020) provides us with information on racialized disparities in education, unemployment, poverty, and homeownership. The Voting Supplement from the 2008, 2012, 2016, and 2020 presidential elections provides us with data on racialized disparities in voter turnout. The UCR (2010 to 2020) provides data on racialized disparities in arrests. The ACS 5-year estimates (2008-2012, 2013-2017, and 2018-2022) at the census tract and state level provides us with population data which allows us to create a dissimilarity index of segregation. We assign the 2008 to 2012 ACS to represent state-level dynamics in 2010, the 2013 to 2017

ACS to represent state-level dynamics in 2015, and the 2018 to 2022 ACS for 2020. We interpolate the years in between (i.e., 2011 to 2014 and 2016 to 2019). The ACS also provides us with population controls including the demographic and socioeconomic composition of the state. We also use the micro-data from the ACS 1-year estimates to obtain household-level data on interracial marriages for each year between 2010 and 2020. Like other analyses of structural racism, we exclude 13 states from our analysis due to insufficient information on the states' Black population (Brown et al., 2022). Though 13 states are excluded, 99% of the U.S. Black population lives within the states included in the final analytic sample. We also include the District of Columbia in our analysis which gives us a final sample size of 38 geographic locations with 11 years of observations (n=418).

3.2 Measures

3.2.1 Sexually Transmitted Infections

Our dependent variable is the state-level Black/White racialized disparity in rates of sexually transmitted infections. We measure STI rates by totaling the reported number of gonorrhea, chlamydia, and syphilis cases in each state divided by the respective populations (sourced from the Census) multiplied by 100,000. The Black/White disparity in STIs is created by taking the Black STI rate and dividing it over the White STI rate.

3.2.2 Latent Measure of Structural Racism

The primary independent variable in our analysis is a latent scale of structural racism. We replicate Brown et al.'s (2022) state-level latent measure of structural racism to capture its multifaceted, interconnected, and institutional nature. Using an established measure allows us to build on this past research by further investigating the relationship between structural racism and population health. The latent construct uses seven measures to captures structural racism in five

different domains: criminal-legal, education, economic, housing, and political. The measures include B/W ratio of arrest rates, W/B ratio of college completion rates, B/W ratio of unemployment rates, B/W ratio of poverty rates, W/B ratio of homeownership rates, W/B ratio of voting rates, and the Black-White dissimilarity index of racial residential segregation. All measures are calculated at the state level. Apart from arrest rates and the dissimilarity index, these measures are sourced from the CPS. The arrest data is sourced from the UCR, and the ACS total population data is used to create rates, while the dissimilarity index is created using total population at the census tract level from ACS 5-year estimates data. Given 5-year estimates are necessary to create the dissimilarity index and we assign the ACS 5-year estimates to 2010, 2015, and 2020, we only use these three years to create our structural racism measure and then interpolate the construct for the years in-between.

To replicate Brown et al.'s (2022) measure we use a confirmatory factor analysis (CFA) to capture the systemic and often unobserved nature of structural racism. Our CFA loads each structural racism dimension onto a single factor and allows for correlated errors based on both theoretical considerations and post-estimation assessments of the correlation matrix. We assess model fit using chi-square, RMSEA, BIC, CFI, TLI, and SRMR. Like Brown and colleagues (Brown et al., 2022) the best fit to the data comes from allowing W/B homeownership rates and W/B voting rates to be correlated as well as B/W arrest rates and B/W unemployment rates. Given the slightly different structure of our data, however, we obtain the best model fit by also allowing W/B college completion rates and W/B homeownership rates to be correlated as well as B/W arrest rates and the dissimilarity index ($p > chi2 = 0.374$, RMSEA = 0.027, BIC = 1037.942, CFI = 0.994, and SRMR = 0.047). We standardize our final structural racism measures for interpretability, where the mean is 0 and a standard deviation is 1.

3.2.3 Other State-Level Measures

We account for several potential confounders including the logged total population, the percent Black, a standardized Gini coefficient, and the percent in poverty. We also include a measure representing the racialized social relations in the state, the percentage of Black-White interracial marriages. The prevalence of interracial marriages may be representative of more acceptance of Black Americans among White populations and may be indicative of less social and physical segregation between the Black and White population. Finally, we account for which region the state resides in: Northeast, Midwest, South, and West. Descriptive statistics are presented in Table 1.

[Table 1 here]

3.3 Analytical Plan

Our analysis uses random-effects spatial autoregressive models. Spatial models allow us to account for the spatial dependence which exists in our state-level dependent variables, Black/White ratio of rates of sexually transmitted infections. We incorporate a spatial error term for our dependent variable to model unaccounted for spatial autocorrelation present in the data. Preliminary spatial analyses indicate that a spatial error model is appropriate for our analysis. As our data is longitudinal, we use random effects models to investigate heterogeneity across U.S. state observations. This method essentially allows us to model unmeasured variables through the inclusion of a random intercept for each U.S. state in our data. We apply random effects models as we are interested in both between and within variation over time among states (Firebaugh, Warner, & Massoglia, 2013).

4. Results

4.1 Racialized Trends in STIs

Figure 1 presents the rates of sexually transmitted infections in the U.S. between 2010 and 2020. Figure 1a shows the total STI rate in blue, which can be interpreted using the y-axis on the left, and the Black/White (B/W) STI rate ratio in red, which can be interpreted using the y-axis on the right. The figure demonstrates that the total STI rate rose by approximately 300 infections (per 100,000 individuals) between 2010 and 2019. While the rate of infected individuals declined slightly between 2019 and 2020, the CDC reports STIs have once again been on the rise since the COVID-19 pandemic began (Tanne, 2022). The figure also simultaneously demonstrates that as overall STI rates rose, the racialized disparity in STIs decreased during this period; however, the disparity rose once again between 2018 and 2020. Figure 1b helps clarify the concurrent rise in STIs and decline in racialized disparities. The blue line represents the White STI rate and can be interpreted using the y-axis on the left, while the red line reflects the Black STI rate and can be interpreted using the y-axis on the right. Figure 1b indicates both the Black and White STI rate increased between 2010 and 2020. The rate of increase, however, was much steeper among the White population in comparison to the low initial rate. The descriptives presented in Figure 1 suggests that understanding structural drivers of STIs is warranted given the persistence of racialized disparities, increasing STI rates, and varying trends by race.

[Figure 1 here]

4.2 Geography of Structural Racism and STIs

To demonstrate the spatial dependence present in our dependent variable, Figure 2 presents maps visualizing the state-level distribution of the total STI rate, Black and White STI rate, and the Black/White STI rate ratio for the last year of observation in our study, 2020. The maps present STI rates by quartile where the states in the highest quartile of STI rates are colored deep red and the states in the lowest quartile of STI rates are colored deep blue. Figure 2 clearly showcases

that STIs are highest in the Midwest and South, and lowest in the Northeast and West. Figure 2b also suggests that racialized disparities in STIs are highest in the Midwest, though they are also high in the Northeast despite the lower overall STI rate. A comparison of Figure 2c and d indicates slight variation in which states are in the highest and lowest quartiles of STI rates for the Black and White populations.

[Figure 2 here]

4.3 Spatial Autoregressive Models

Table 2 presents the results from the state-level random-effects spatial autoregressive models investigating the relationship between structural racism and racialized disparities in STIs between 2010 and 2020. Model 1 presents a bivariate investigation into the relationship between state-level latent structural racism and the B/W STI rate ratio. Model 2 includes controls for state-level sociodemographic and population dynamics.

[Table 2 here]

The results suggest that structural racism contributes to the continuation of racialized disparities in STIs in both the bivariate model and the adjusted model. In the bivariate model (model 1), a standard deviation increase in the latent structural racism scale is associated with an increase in a state's B/W STI ratio of 1.4, which suggests that structural racism increases the racialized disparity in STIs. This result persists even in the fully adjusted model (model 2), where we continue to see a significant and positive relationship with a slight decrease in the magnitude of the association between structural racism and the B/W STI ratio.

Figure 3 presents the predicted B/W STI rate ratio by latent structural racism from the fully adjusted model (model 2) to aid in the interpretability of the results. States with values of

latent structural racism one standard deviation below the mean have a predicted 7.4 Black residents who have contracted an STI for every 1 White resident per 100,000. In contrast, states with values of latent structural racism one standard deviation above the mean have a predicted 9.4 Black residents with an STI for every 1 White resident per 100,000, and states two standard deviations above the mean have a predicted 10.4 Black residents with an STI for every 1 White resident per 100,000. Overall, figure 3 helps illuminate that Black-White racialized disparities in exposure and contraction of STIs is quite high across all states. However, states that score the highest on the scale of latent structural racism have an additional 3 Black residents for every 100,000 who are unequally exposed to and contract an STI in comparison to states that score the lowest on the scale of latent structural racism.

[Figure 3 here]

In the fully adjusted model, results also suggest that an increase in the state's Black population increases the B/W STI rate ratio. Interestingly, we find that an increase in state-level income inequality, reflected by the Gini coefficient decreases the B/W STI rate disparity. These findings suggest that states with more income inequality have less inequality between Black and White residents in terms of their exposure and contraction of STIs. Results also suggest that a one percentage point increase in the number of Black-White interracial marriages is associated with a decrease in the Black/White STI rate ratio. These results are striking and show the largest magnitude association in the model besides the regional variation of the state. Lastly, there is a significant spatial error term. A significant spatial error terms indicates that there continues to be unexplained spatial autocorrelation present in the data. This finding suggests that there are features not accounted for in the final model which make states that are geographically next to each other more similar to one another in their B/W STI rate disparity.

5. Discussion

STIs are an important concern for population health, as their rates continue to rise at record levels (Leichliter et al., 2022; Tanne, 2022), and they contribute to long-term health issues for the populations who contract them (Newton & McCabe, 2008; Tolnay, 1989; Trottier & Franco, 2006; Ward & Rönn, 2010). As with many population health concerns in the United States, exposure to and contraction of sexually transmitted infections is racially patterned (Leichliter et al., 2020). STI rates among Black Americans are five to eight times higher than rates among White Americans (Centers for Disease Control and Prevention, 2021; U.S. Department of Health and Human Services, 2020). Despite knowledge of the racialized trends in STIs, scholars have yet to investigate the structural mechanisms and racially structured contexts that shape unequal exposure to STIs among marginalized racial and ethnic groups.

Past research has largely taken an individual approach to understand racialized differences in sexual behaviors, networks, and healthcare access (Adimora & Schoenbach, 2005; Harawa et al., 2011; Laumann & Youm, 1999; Sweeney & Raley, 2014). However, it is now widely acknowledged in social science and population health research that an individual-level approach to understanding racial and ethnic disparities is inadequate for understanding the complex institutional and population level dynamics which contribute to persistent racialized disparities (Bonilla-Silva, 2021; Brown et al., 2022; Brown & Homan, 2022; Evans & McDonald, 2023; Hummer, 2023). Our study advances work by Brown et al. (2022) by its application of a theoretically informed measure of structural racism to highlight the role state-level structural racism may play in Black-White racialized disparities in STIs.

Findings indicate that structural racism is significantly related to unequal exposure to and contraction of STIs between Black and White individuals. At the state-level, latent structural

racism is associated with an increase in the Black/White STI rate ratio. While the Black/White STI rate ratio is high on average, where 8.4 Black Americans contract an STI for every 1 White American per 100,000, higher levels of structural racism led to a higher predicted Black/White disparity in STIs. Thus, Black residents experience worse sexual health outcomes compared to White residents in states with more racism embedded in their institutions. In investigating another health outcome connected to latent structural racism, our study contributes to the literature identifying the damaging consequences of structural racism for population health (Hummer 2023) and provides support for scholars theorizing the link between racism and sexual health (Prather, Fuller, Marshall, & Jeffries, 2016; Thompson et al., 2022). Our findings also contribute to the research identifying states as racializing institutional actors shaping unequal population health outcomes (Brown et al., 2022; Bruch, Rosenthal, & Soss, 2019; Montez et al., 2019) likely through access to resources and opportunities, policy decisions, and social norms. States are legal and political units that play a role in shaping environments that either inhibit or encourage structural racism through policy that shapes both racial inequality and reproductive healthcare access. These policies can shape individuals' sexual health and behavior by limiting their access to care (Goyal et al., 2020; Redd et al., 2021), shaping their sexual education curriculum (Vivancos et al., 2013), and influencing whether individual's feel comfortable using sexual health services (Gilmore & Somerville, 1994; Kirby et al., 2006; Lichtenstein et al., 2005), all of which have important implications for STI prevalence.

Our results also show that high rates of interracial marriage are associated with decreased racialized disparities in Black/White STI rates. These results suggest that more positive Black-White social relations can decrease the sexual health disadvantages that lead to racialized disparities in STIs. Findings regarding interracial marriages and declines in racialized disparities

in STIs have implications for understanding the relationship between assortative mating patterns, racialized sexual networks, and cross-race social relations with the perpetuation of racialized disparities in STIs. Racially segregated sexual networks can contribute to sexually transmitted infections among Black Americans (Adimora & Schoenbach, 2005; Liljeros et al., 2003), through their production of limited sexual partnering options in comparison to the typical sexual networks of White Americans (Bearman et al., 2004). Our results build on this past research by suggesting that decreasing racial segregation in sexual networks might also reduce racialized patterns of STIs.

While our study sheds light on the relationship between structural racism and racialized STI patterns, our study is not without limitations. In being a state-level analysis, we are unable to investigate how state-level factors shape individual-level STI rates. This is an important area for future research as state-level factors might interact with individual-level factors that shape sexual and reproductive health care access and use (Freitas Goes et al., 2021; Goyal et al., 2020; Newmyer & Frisco, 2023). There are also other levels which may influence the relationship between structural racism and STIs at the neighborhood, school, and interpersonal relationship level. Future analysis should consider applying multi-level analysis to investigate how macro-, meso-, and micro-level factors interact to shape racialized STI patterns. Additionally, our analysis only investigates Black-White racialized disparities in STI patterns, but CDC estimates indicate that other racial and ethnically marginalized populations experience disproportionate risk of exposure and contraction of STIs in comparison to their White counterparts (Centers for Disease Control and Prevention, 2021). Further analyses are needed to theorize and analyze the structural mechanisms shaping disparate STI rates among other racial and ethnic groups.

Though we replicate Brown and colleagues (2022) approach to measuring structural racism there may be certain components of structural racism related to sexual health we do not capture in this measure. We encourage population health scholars to continue to work on identifying the multi-sectoral and systemic nature of structural racism (Brown & Homan, 2022; Brown & Homan, 2022; Hardeman et al., 2022; Hummer, 2023). Future research should also look more closely at policy changes related to reproductive healthcare access and education programs regarding sexual health to investigate whether they shape racialized state-level STI rates.

Overall, our results shed light on the multi-sectoral, systemic, and hidden nature of structural racism and its role in explaining persistent racialized disparities in patterns of population health. However, our findings indicate that there continues to be unmeasured social, structural, or cultural phenomena that contribute to the geography of racialized disparities in STIs beyond structural racism. Further research is needed to better understand the multiple factors, including macro-, meso-, and micro-level, that shape racialized geographic patterns of STIs, as well as other sexual health outcomes.

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Tables

Table 1. Descriptives Statistics, N=418

	Mean/Prop.	Min.	Max.
STI Rates per 100,000			
Total Rate	1178.10	90.83	2948.38
Black Rate	1812.15	17.61	4560.33
White Rate	231.35	21.21	476.85
Black/White Ratio	8.40	.13	20.11
Latent Structural Racism	.00	-1.14	2.19
Structural Racism Indicators			
B/W Arrest Rate	3.13	.88	12.01
W/B College Completion Rate	1.63	.69	3.78
B/W Unemployment Rate	1.93	.21	7.23
B/W Poverty Rate	2.36	.79	6.22
W/B Homeownership Rate	1.68	1.05	4.38
W/B Voting Rate	1.28	.73	2.94
Dissimilarity Index	.61	.44	.78
State-Level Covariates			
Total Population, Logged	15.53	13.31	17.49
Percent Black	14.18	2.84	50.37
Gini Inequality, Standardized	.08	-1.97	3.37
Percent in Poverty	14.22	9.02	22.29
Percent of Marriages Black-White	.58	.24	1.86
Geographic Region			
Northeast	.16		
Midwest	.26		
South	.45		
West	.13		

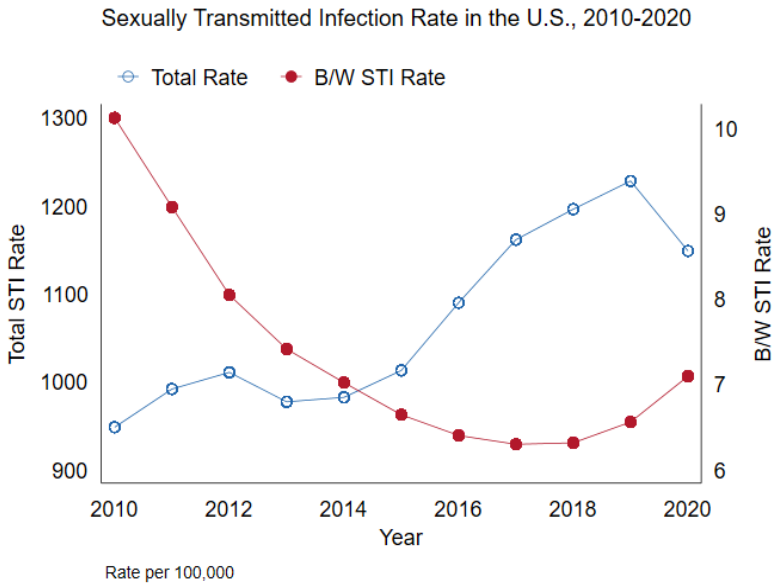
Note: Mean/prop. statistics are averaged across the 2010-2020 period. The data covers the 37 continental states with a Black population of at least 50,000 and Washington D.C. This sample is consistent with studies of structural racism as it contains over 99% of the U.S. Black population.

Table 2. Random-Effects Spatial Autoregressive Models Predicting State-Level Black/White STI Rate Ratio per 100,000 between 2010 and 2020, N=418

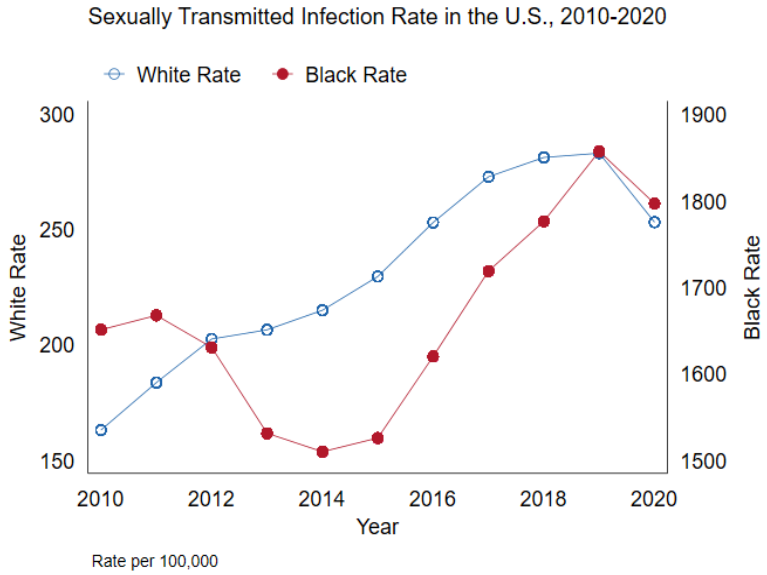
	Model 1		Model 2	
	b	SE	b	SE
Latent Structural Racism	1.4***	(.28)	1***	(.31)
State-Level Covariates				
Total Population, Logged			.36	(.38)
Percent Black			.17**	(.053)
Gini Coefficient, Standardized			-2.1***	(.57)
Percent in Poverty			.15	(.12)
Percent of Marriages Black-White			-4.1***	(.95)
Region (ref. Northeast)				
Midwest			-5***	(1.3)
South			-5.8***	(1.4)
West			-5.8***	(1.3)
Constant	8.4***	(.37)	5.3	(6.4)
Spatial Error Variance Parameter	.58***	(.039)	.37***	(.078)
Pseudo R-Squared	0.127		0.376	
AIC	1699		1661	
BIC	1720		1713	

Note: The data covers the 37 continental states with a Black population of at least 50,000 and Washington D.C. This sample is consistent with studies of structural racism as it contains over 99% of the U.S. Black population. The Wald test of spatial autocorrelation is significant at p<.05. The spatial matrix for the spatial error term uses the Queen 1 criterion. * p<.05, ** p<.01, *** p<.001

Figures



a)



b)

Figure 1. Rates of Sexually Transmitted Infections in the U.S. between 2010 and 2020 **a)** Overall and **b)** by Race

Note: The data covers the 37 continental states with a Black population of at least 50,000 and Washington D.C. This sample is consistent with studies of structural racism as it contains over 99% of the U.S. Black population. In panel A, the total STI rate in blue, should be interpreted using the y-axis on the left; the B/W STI rate ratio in red should be interpreted using the y-axis on the right. In panel B, the blue line represents the White STI rate and should be interpreted using the y-axis on the left; the red line reflects the Black STI rate and should be interpreted using the y-axis on the right.

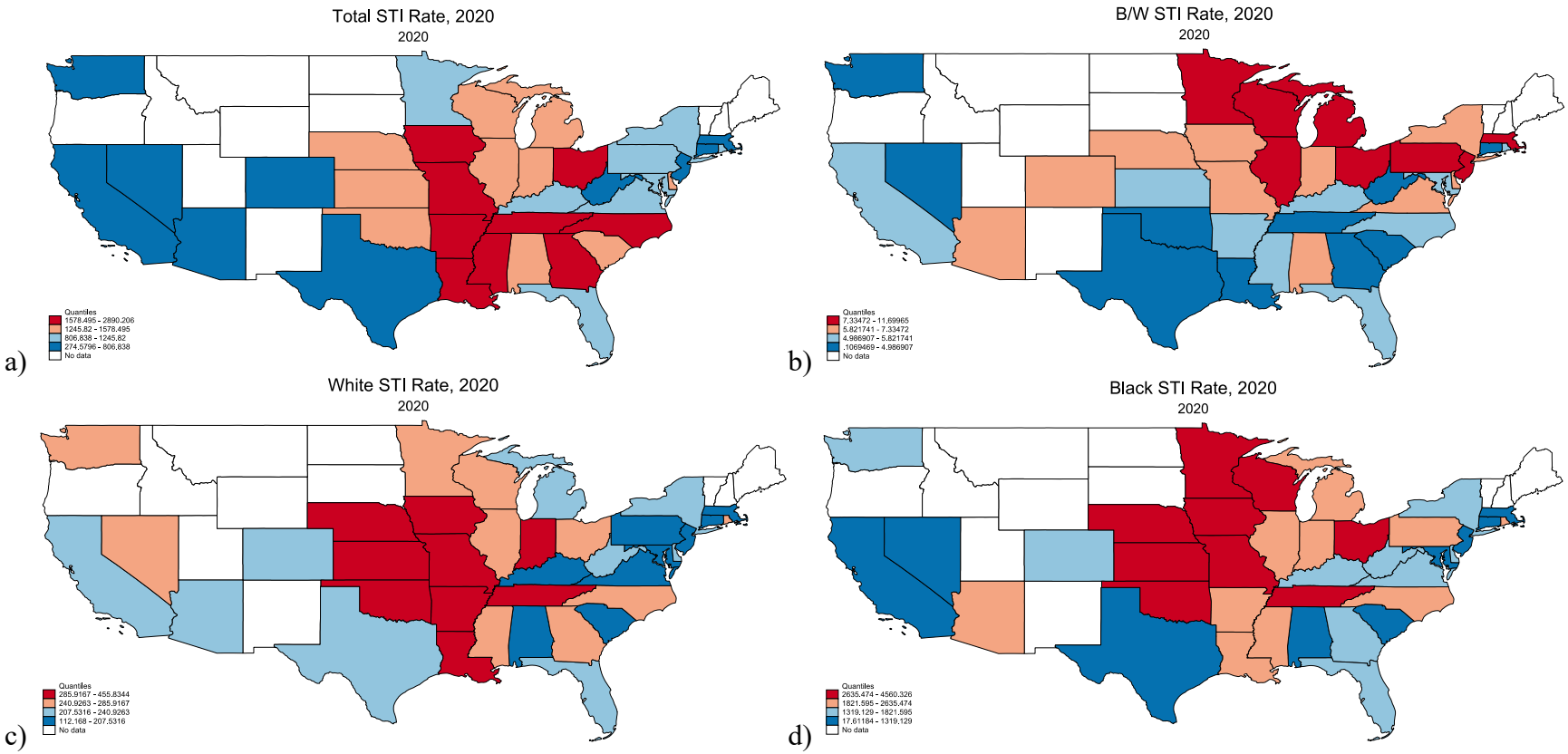


Figure 2. Maps of State-Level Variation in Rates of Sexually Transmitted Infections in the U.S. in 2020 by Quartiles **a)** Overall, **b)** Black/White Ratio, **c)** for the White Population, and **d)** for the Black Population

Note: The data covers the 37 continental states with a Black population of at least 50,000 and Washington D.C. This sample is consistent with studies of structural racism as it contains over 99% of the U.S. Black population.

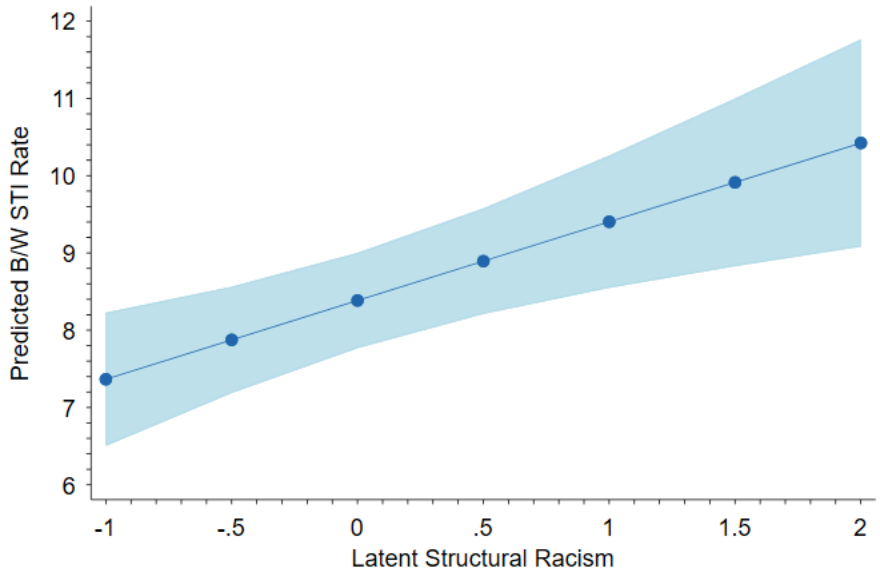


Figure 3. Latent Structural Racism and Predicted B/W STI Rate Ratio per 100,000.

Note: The figure is produced using the fully specified random-effects spatial autoregressive model presented in Table 2. The latent structural racism measure is standardized to a mean of 0 and a one standard deviation of 1. The data covers the 37 continental states with a Black population of at least 50,000 and Washington D.C. This sample is consistent with studies of structural racism as it contains over 99% of the U.S. Black population.