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# Institutional Racism and Health: a Framework for Conceptualization, Measurement, and Analysis

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## Abstract

Despite growing interest in the health-related consequences of racially discriminatory institutional policies and practices, public health scholars have yet to reach a consensus on how to measure and analyze exposure to institutional racism. The purpose of this paper is to provide an overview of the conceptualization, measurement, and analysis of institutional racism in the context of quantitative research on minority health and health disparities in the United States. We begin by providing definitions of key concepts (e.g., racialization, racism, racial inequity) and describing linkages between these ideas. Next, we discuss the hypothesized mechanisms that link exposure to institutional racism with health. We then provide a framework to advance empirical research on institutional racism and health, informed by a literature review that summarizes measures and analytic approaches used in previous studies. The framework addresses six considerations: (1) policy identification, (2) population of interest, (3) exposure measurement, (4) outcome measurement, (5) study design, and (6) analytic approach. Research utilizing the proposed framework will help inform structural interventions to promote minority health and reduce racial and ethnic health disparities.

**Keywords** Institutional racism · Structural racism · Measurement · Framework · Health disparities

While most prior research on racism and health has focused on interpersonal racism, public health scholars have begun

to explore the ways in which institutional policies and practices—both historic and contemporary—contribute to minority health and health disparities [1, 2, 3, 4, 5, 6]. This trend in public health scholarship reflects a broader societal shift toward thinking about racism as a structural problem rather than solely as an interpersonal phenomenon. The purpose of this paper is to provide an overview of the conceptualization, measurement, and analysis of institutional racism in the context of quantitative research on minority health and health disparities in the United States. Building on recent papers calling for greater conceptual clarity, increased consideration of historical context, and enhanced methodologic rigor in this area of research [7, 8, 9, 10], we begin by providing definitions of key concepts, such as racialization, racism, and racial inequity, and explaining linkages between these ideas. Next, we discuss the hypothesized mechanisms that link exposure to institutional racism with health. Finally, we propose a framework to guide methodologic considerations for future studies, informed by a literature review of measures and analytic approaches used in prior research on institutional racism and health.

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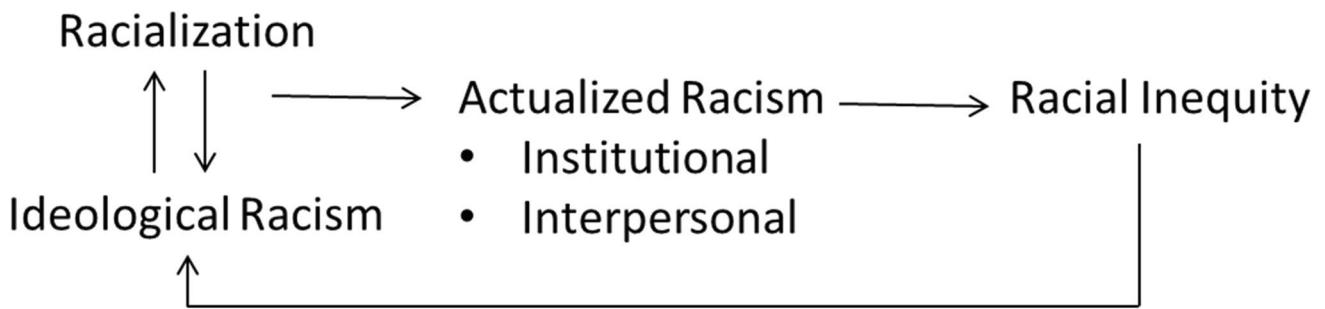


Fig. 1 Conceptual model linking racialization to racial inequality via ideological and actualized racism

## Framing the Problem

### Definitions and Conceptual Model

Although studies examining institutional racism as a determinant of health have become increasingly common in recent years for reviews, see 2, [11, 12, 13], conceptual ambiguity remains widespread. Thus, we begin by defining relevant concepts. First, *racialization* refers to the social construction of racial categories, such as White, Black, Latino,<sup>1</sup> and Asian [14, 15, 16]. While racial categories vary across place and time, they are typically based on phenotypic characteristics, such as skin color, eye shape, and hair texture, that reflect differences in continental ancestry [17]. Importantly, phenotypic differences are commonly believed to reflect other important differences between the so-called races, including differences in intelligence and morality [17]. Thus, in racialized social systems, the process of racial differentiation is inextricably intertwined with the process of racial stratification (i.e., the hierarchical ranking of people according to race), which results in differential access to power and other resources [18, 19].

We use the general term *racism* to refer to both the ideology of racial superiority/inferiority (i.e., *ideological racism*, including internalized racism<sup>2</sup>), as well as the resulting inequitable treatment of individuals according to race (i.e., *actualized racism*). We distinguish between two forms of actualized racism: institutional and interpersonal. *Institutional racism* refers to racially discriminatory policies and practices<sup>3</sup> embedded in social institutions such as the government, the economy, the education system, the healthcare

system, religious institutions, the family, and the media. Institutional racism is said to be systemic [20] or structural [2, 21] when it operates as a system across multiple interconnected institutions. *Interpersonal racism* refers to discriminatory treatment by race among individual actors. Finally, *racial inequity* refers to inequitable, or unjust, outcomes by race, including inequities in education, economic mobility, and health outcomes. Relationships among these concepts are shown in Fig. 1.

### Racism and Health: Mechanisms

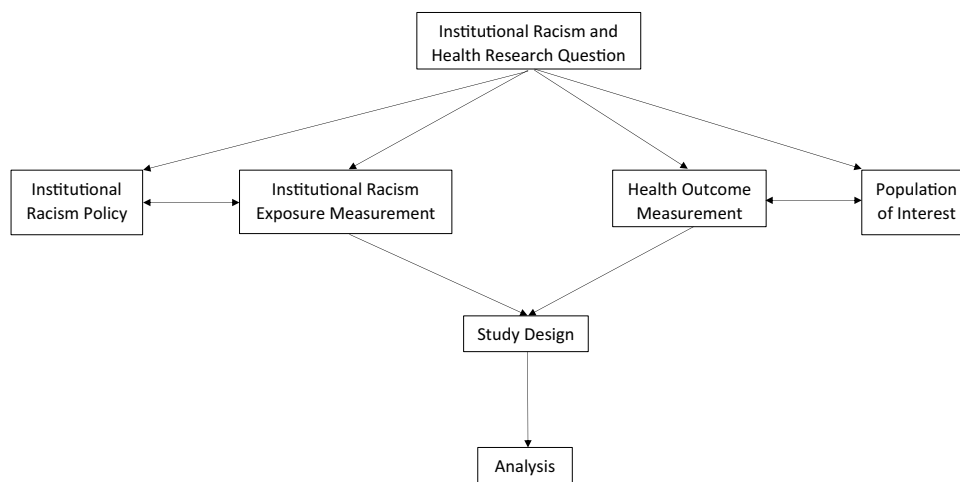
Racism may negatively impact health through both psychosocial and material pathways. For example, the internalization of ideological racism could affect mental health (e.g., depression, anxiety) by decreasing self-esteem among members of stigmatized minority groups [22, 23], while repeated exposure to acts or threats of interpersonal racism could affect mental and physical health by triggering chronic activation of physiologic stress response systems [24]. Institutional racism is hypothesized to negatively affect health and well-being through material pathways by shaping access to health-promoting resources [25, 26]. For example, the institutional practice of redlining drove residential segregation and depressed home values and homeownership rates in minority neighborhoods [27]. By restricting where Black families could live, redlining contributed to overcrowding, which was then used as a rationale for demolishing homes in Black communities to make way for interstate highways [27]. Along with dividing minority communities, the highways contributed to environmental injustice by increasing air pollution [28]. Additionally, while not explicitly racist, programs such as the GI Bill, which was designed to provide resources such as higher education and mortgage lending to those returning after World War II, had disparate impacts by race because the program relied upon racist institutional policies, including redlining and racially discriminatory college admissions processes [27]. Though redlining is no longer legal, residential segregation is firmly entrenched in the United States and is a powerful determinant of access to

<sup>1</sup> While the US government classifies Latino as an ethnic group rather than a racial group, we include it in this list to acknowledge that Latinos have been historically racialized as non-White through legislation, immigration enforcement practices, and media framing.

<sup>2</sup> Internalized racism is a specific type of ideological racism in which members of stigmatized racial or ethnic groups accept negative stereotypes about their own group.

<sup>3</sup> In the post-Civil Rights era, institutional policies or practices are considered racially discriminatory if they result in inequitable outcomes by race, regardless of intent.

**Fig. 2** Conceptual framework to guide institutional racism and health research



a broad range of health-promoting resources, including education, employment, housing, and healthcare [29]. In addition to its effects on material pathways, restricted access to socially valued resources resulting from institutional racism may further harm health through psychosocial mechanisms, such as perceived injustice or feelings of hopelessness [30].

While redlining is the most often cited racially discriminatory policy in health research, it is not the only racist policy or set of policies that have affected non-White populations in the USA. Other examples include the seizure of American Indian lands [31], Reconstruction era Black Codes/vagrancy laws [32], Jim Crow/American Apartheid policies [33], failure of Congress to protect Black Americans from lynching [34], exclusion of specific occupations in the receipt of social security benefits [35], internment of specific ethnic groups [36], the War on Drugs [32], removal of desegregation orders in public education [37], and public charge rules [38], among many others. It is important to note that institutional policies, including some of those listed above, are often enacted by individual agents of institutions, such as judges, poll workers, and police officers, who may or may not also engage in acts of interpersonal racism when interacting with racial or ethnic minorities. Thus, while we can distinguish between ideological, interpersonal, and institutional racism *conceptually*, they operate simultaneously and interactively, making it difficult to disentangle the effects of various forms of racism *empirically*.

## Framework for Advancing Institutional Racism and Health Research

In this section we discuss key considerations in advancing institutional racism and health research. As shown in Fig. 2, the framework outlines six conceptual and analytic considerations when empirically examining questions on institutional racism and health: (1) institutional racism policy

identification, (2) population of interest, (3) institutional racism exposure measurement, (4) health outcome measurement, (5) study design, and (6) analytic approach. This framework aligns with research calling for a historical/contextual and theoretical link between historical racist policies and contemporary health outcomes [7, 8, 9, 10, 39], strong measurement of institutional racism [8, 9], and methodological approaches that can strengthen the causal evidence base [9]. However, this framework builds on previous work [9, 10] by incorporating and focusing on research methods such as linking the network of policies that created a racially disparate impact in resources, the exposure and outcome measurement, matching the timing and geographic region of the policy and outcome, and the design of the research. This framework for the study of institutional racism allows for modern racist policies (e.g., Muslim bans, modern voting restrictions, attacks on “Critical Race Theory”) and changing definitions of race (e.g., person of Hispanic/Latinx or Middle Eastern nationalities forming new racial groups), and is broad enough to incorporate research on any racial or ethnic group.

To inform our framework, we conducted a systematic literature review, building on a recent review by Groos and colleagues [12], to summarize and critically assess current approaches to the measurement and analysis of institutional racism in quantitative health research. The Groos et al. review [12] includes articles published between January 1, 2007 and December 31, 2017. The authors searched PubMed and EMBASE databases to identify studies that included the terms “structural racism,” “systemic racism,” “institutional racism,” and/or “institutionalized racism” in the title or abstract.<sup>4</sup> Out of 255 abstracts identified in the search, 20 met the authors’ inclusion criteria: original research,

<sup>4</sup> An important limitation of the search strategy, as noted by Groos et al., is that papers must have included the terms structural racism, systemic racism, institutional racism, or institutionalized racism in the title or abstract. It is likely that many more health-related papers measured similar constructs but failed to label them using these key terms.

conducted in the United States, explicitly measured an indicator of structural racism, included a health-related outcome, full-text available, and used quantitative methods. Given growing interest in research on institutional racism in recent years, we conducted an updated search using the methods described in Groos et al. [12]. As shown in Figure S1, we identified 36 additional papers published between January 1, 2018 and December 15, 2020 that met the authors' inclusion criteria. Table 1 summarizes the 20 papers included in the Groos et al. [12] systematic review, as well as the 36 papers from our updated search.

BN performed the initial review of each abstract to determine whether the paper met the Groos et al. [12] inclusion criteria. Next, BN extracted information on the measures used, domains examined, levels of measurement for exposures and outcomes, racial and ethnic groups examined, analytic approaches, and links to policy. A second coauthor (T.A or K.A) then reviewed each paper to verify the accuracy of the information. In the event of a disagreement, a third coauthor reviewed the paper, and all three coauthors involved in the literature review met to make a final determination about the information in Table 1.

### Identifying Institutional Racism Policies

Making the links between policy and exposure measurement explicit can help advance empirical research on institutional racism and health. First, the closer research is tied to the harm of specific policies, including the enactment and the enforcement of policies, the stronger the evidence base for eliminating racist policies. Second, even if the exposure measurement is not explicitly tied to a specific policy, researchers can provide the past and present policy context of an institutional racism measure. This is important because, historically, institutional racism was enacted through overtly racist policies that were later modified to be covertly racist “color-blind” policies. Recently, scholars have emphasized the importance of better understanding and articulating the policy context in the measurement of institutional racism. For example, Dennis et al. provide a framework that details major periods of structural discrimination in the USA, including specific policies and domains that have affected different racial/ethnic populations [10]. Hardeman et al. also highlight the importance of understanding the historical context to better understand how structural racism impacts health [8].

When policies can be measured directly, researchers can consider both the impact of the enactment of a policy as well as the potential for differential enforcement. For example, the Reagan Administration did not adequately enforce all aspects of the Civil Rights Act, such as employment discrimination [93], which may be important to consider when examining the impact of the

policy over different time periods. However, we also recognize that it is not always possible to make direct links between historic policies that have laid the foundation for racial inequities, especially in cases when the legacy of past policies is omnipresent and difficult to measure or disentangle from concurrent policies. Nonetheless, by strengthening the theoretical linkage between specific policies and institutional racism exposure measurement in our framing of the research and interpretation of results, we can improve the quality of research.

In our literature review, few articles mentioned specific policies that form their basis of exposure measurement, and even fewer explicitly incorporated policies in their analyses. For example, only 15 out of 39 papers that used area-level indicators of institutional racism included more than a cursory discussion of discriminatory policies or practices related to the indicator(s), while 13 papers included a minimal or generic discussion of policy, and 11 papers did not discuss policy at all. Out of 18 papers that included at least one individual- or family-level indicator of institutional racism, only four included a detailed discussion of discriminatory policies or practices related to the indicator(s), while two included a minimal or generic discussion of policy, and 12 did not discuss policy at all. It is noteworthy that three of the four papers with detailed policy discussions were in the immigration domain, where overtly discriminatory policies remain legal. Only one paper that used individual- or family-level indicators of institutional racism directly measured exposure to a discriminatory policy [76].

### Population of Interest

The population of interest should be well defined. Researchers must decide whether to take a minority health approach, in which people who identify as a specific racial/ethnic group are the focus of the analysis [94], or to compare differences in exposure to or effect of discriminatory policies for different racial/ethnic groups. Studies that include a single racial/ethnic group in the analytic sample are appropriate when the focus is on understanding the health effects of varied exposure to institutional racism for racial or ethnic minorities or when the focus is on identifying potential moderation in causal mechanisms between institutional racism and health. These kinds of analyses acknowledge that the experience of institutional racism can vary within the same racial/ethnic group, either in exposure or in moderating variables that mitigate its health effect. For instance, exposure to institutional racism may vary by geographic location, such as among Hispanic populations who reside in states that differ in their immigration enforcement policies. Researchers could also identify how coping strategies, such as social support through extended family or “fictive kin”

**Table 1** Summary of institutional racism measures used in quantitative health research published between January 1, 2007 and December 31, 2020

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Albert et al. [40]*	Three questions asking whether respondent had ever been treated unfairly on the job, in housing, and by the police because of their race	Economics and labor, housing, criminal justice	Individual	Mortality	Individual	Black	No, single race	No
Baptist et al. [41]	Household income, primary-care physician, urban residence	Economics and labor, healthcare, housing/segregation	Individual	COVID-19-related disparities	Individual	Black, Hispanic, and White	No	No
Bell et al. [42]	Black-White ratios of median income, percent living below the poverty line, percent who completed a 4-year college degree, percent unemployed, and percent homeowners	Economics and labor, education, housing	County	Obesity and number of grocery stores and fast-food restaurants	County	All groups in county	Yes	Detailed
Bell and Owens-Young [43]	Black-White ratios of median income, percent who completed a 4-year college degree, percent unemployed, and percent homeowners	Economics and labor, education, housing	County	Self-rated health	County	All groups in county	No	Detailed

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Benms et al. [44]	1937 Home Owner's Loan Corporation (HOLC) map neighborhood grade to indicate their desirability for investment (A–D)	Housing/segregation	Neighborhood	Number of gunshot victims	Neighborhood	All groups in neighborhood	No	Detailed
Blanco et al. [45]	Index of dissimilarity, Black and White	Housing/segregation	County level	Pancreatic cancer-related outcomes	Individual level	Black and White	Yes	Detailed
Blebu et al. [46]	Proportion of foreign-born Blacks, proportion of Black residents, neighborhood deprivation	Housing, economics and labor	Census tract	Pre-term birth	Census tract	Foreign-born Black	No, single race	No
Chambers et al. [47]*	Dissimilarity index, delta index, isolation index, felony incarcerations, and racial composition of county board of supervisors, Black and White	Housing/segregation, criminal justice, political participation/representation	County	Adverse birth outcomes	Individual	Black and White	Yes	Minimal/generic
Chambers et al. [48]	Index of Concentration at the Extremes (ICE) (ICE race, ICE income, ICE race + income), Black and White	Housing/segregation and labor	Zip code	Pre-term birth and infant mortality	Individual	Black	No, single race	Minimal/generic

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Collin et al. [49]	Odds of mortgage loan denial inside versus outside Census tract and Black-White disparity in odds of mortgage loan denial in Census tract	Housing/segregation	Census tract	Breast cancer mortality	Individual	Black and White	Yes	Minimal/generic
Coogan et al. [50]	Five questions asking whether respondent had ever been treated unfairly on the job, in housing, by the police, at school, or in a healthcare setting because of their race	Economics and labor, housing, criminal justice, education, health-care	Individual	Subjective cognitive function	Individual	Black	No, single race	No
Das et al. [51]	Police killings of unarmed Black people	Criminal justice	County	Depression-related emergency department visits by Black residents	County	Black	No, single race	Minimal/generic
Do et al. [52]	Black-White metropolitan segregation ( $D$ -index to measure evenness and $P$ -index to measure isolation)	Housing/segregation	Metropolitan area	Psychological distress	Individual	Black and White	Yes	No



Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Dougherty et al. [53]	Housing dissimilarity index, school dissimilarity index, White-Black high school graduation ratio, Black-White incarceration ratio, Black-White poverty ratio, White-Black primary care ratio, and Black-White ambulatory care ratio	Housing/segregation, education, criminal justice, economics and labor, healthcare	County	Body mass index	Individual	Black and White	Yes	No
Gee [54]*	Redlining index of mortgage discrimination and index of dissimilarity, Chinese American and White	Housing/segregation	Census tract	Self-rated health	Individual	Chinese American	No, single race	Detailed
Glass et al. [55]	Experiences of Discrimination Scale	Healthcare, economics and labor, housing, education, criminal justice	Individual	Alcohol use disorder severity	Individual	Black, Asian, Hispanic, and American Indian	Yes	No
Greer et al. [56]*	Institutional racism subscale of the Index of Race-Related Stress – Brief Version (IRRS-B)	Social institutions	Individual	Adherence to hypertension treatment	Individual	Black	No, single race	No
Greer and Spalding [57]*	Institutional racism subscale of the Index of Race-Related Stress – Brief Version (IRRS-B)	Social institutions	Individual	Psychological symptoms	Individual	Black	No, single race	No

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Hahn [58]	Limited access to social determinants of health index (LASDI) for Blacks and Black-White social determinant inequity index (SDII)	Education, criminal justice, housing, economics and labor, political participation/representation	State	Black self-rated health and Black mortality	State	Black	No, single race	Minimal/generic
Ibragimov et al. [59]	Number of Black people killed by police	Criminal justice	Metropolitan statistical area (MSA)	Rate of STI for Black residents	MSA	Black	No, single race	No
Jacoby et al. [60]*	Color category from the 1937 HOLC redlining map for 2010 Census tracts	Housing/segregation	Census tract	Firearm assaults and violent crimes	Census tract	All groups in Census tract	No	Detailed
Knopov et al. [61]	Index of dissimilarity and isolation index, Black and White	Housing/segregation	State	Black-White firearm disparity ratio	State	Black and White	No, outcome is disparities	Minimal/generic
Krieger et al. [62]	1938 HOLC map neighborhood grade (A–D)	Housing/segregation	Neighborhood	Pre-term birth	Individual	Black, White, Asian, Hispanic, and Other	No	Detailed
Krivo et al. [63]*	Socioeconomic disadvantage index, racial/ethnic composition (Black, White, and Latino), and Black-White index of dissimilarity	Economics and labor, housing/segregation	Census tract	Violent crime rate	Census tract	Black and White	Yes	No

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Lu et al. [64]	Three questions asking whether respondent had ever been treated unfairly on the job, in housing, and by the police because of their race	Economics and labor, housing, criminal justice	Individual	Telomere length	Individual	Black	No, single race	No
Lukachko et al. [65]*	Black-White ratios of: percent aged 18 + registered to vote, voted, and elected to the state legislature; percent aged 16 + in the civilian labor force, employed, in executive or managerial positions, and in professional specialties; percent aged 25 + with a bachelor's degree; percent incarcerated, felony disenfranchised, and serving a death sentence	Political participation/representation, economics and labor, education, criminal justice	State	Myocardial infarction	Individual	Black and White	Yes	Detailed
Martinez et al. [66]	Household fear of deportation	Immigration	Family	Proinflammatory cytokines	Family	Mexican-origin	No, single race	Detailed
Matoba et al. [67]	Black-White disparity in odds of mortgage loan denial	Housing/segregation	Census tract	Pre-term birth	Individual	Black	No, single race	Detailed

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
McCluney et al. [68]*	Opportunities for advancement at work, work recognized, autonomy, decision freedom, training support, supportive management	Economics and labor	Individual	Self-rated health, cognitive functioning, and mean arterial pressure	Individual	Black and White	Yes	Detailed
Mendez et al. [69]*	Black-White disparity in odds of mortgage loan denial	Housing/segregation	Census tract	Pregnancy-related factors	Individual	Black and White	No	Detailed
Mendez et al. [70]*	Black-White disparity in odds of mortgage loan denial	Housing/segregation	Census tract	Perceived stress	Individual	Black and White	Yes	Minimal/generic
Mendez et al. [71]*	Black-White disparity in odds of mortgage loan denial	Housing/segregation	Census tract	Pre-term birth	Individual	Black and White	Yes	Minimal/generic
Mesic et al. [72]	State racism index combining index of dissimilarity, isolation index, and Black-White ratios of incarceration rate, proportion without a college degree, proportion in poverty, median household income, proportion renters, proportion not in the labor force, and proportion unemployed	Housing/segregation, criminal justice, education, economics and labor	State	Black-White disparities in fatal police shootings of unarmed people	State	Black and White	No, outcome is disparities	Minimal/generic

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
O'Brien et al. [73]	The difference in the adult earnings of Black and White children born to families at the same income level (the racial opportunity gap)	Economics and labor	County	Racial mortality gap	County	Black and White	No, outcome is disparities	No
Owens-Young and Bell [74]	Black-White ratios of median income, percent who completed a 4-year college degree, percent unemployed, and percent homeowners	Economics and labor, education, housing	County	Black infant mortality rate, White infant mortality rate, Black-White gap in infant mortality rate	County	Black and White	Yes	No
Pabayayo et al. [75]	Black state legislature representation and Black-White ratios of proportion registered to vote, voted, in the civilian labor force, employed, in management, with a bachelor's degree, sentenced to death, and incarcerated	Political participation/representation, economics and labor, education, criminal justice	State	Infant and neonatal mortality	Individual	Black and White	Yes	Detailed
Patler and Laster Pirtle [76]*	Deferred Action for Childhood Arrivals (DACA) status	Immigration	Individual	Psychological well-being	Individual	Hispanic	No, single race	Detailed
Popescu et al. [77]	Dissimilarity index, Black and White	Housing/segregation	Core-Based Statistical Areas (CBSA)	Black-White mortality gap	CBSA	Black and White	No, outcome is disparities	Detailed
Poulson et al. [78] <sup>†</sup>	Index of dissimilarity, Black and White	Housing/segregation	County	Colorectal cancer-related outcomes	Individual	Black and White	Yes	Detailed

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Poulson et al. [79] <sup>b</sup>	Black-White index of dissimilarity, Black and White	Housing/segregation	County	Breast cancer-related outcomes	Individual	Black and White	Yes	Detailed
Poulson et al. [80] <sup>c</sup>	Index of dissimilarity, Black and White	Housing/segregation	County	Prostate cancer-related outcomes	Individual	Black and White	Yes	Detailed
Sabo et al. [81] <sup>*</sup>	Prevalence and type of perceived ethnoracial profiling, frequency and location of sightings of immigration officials, and direct encounters with immigration officials	Immigration	Individual	No health outcome	No health outcome	Mexican descent	No, single race	Detailed
Scott et al. [82] <sup>*</sup>	Scale assessing experiences of racism and homophobia	Social institutions	Individual	Reports of delayed HIV testing	Individual	Black	No, single race	No
Seaton [83] <sup>*</sup>	Collective/institutional racism subscale of the Index of Race-Related Stress (IRRS)	Social institutions (not listed)	Individual	Self-esteem and depressive symptoms	Individual	Black	No, single race	No
Siegel et al. [84]	Index of dissimilarity, Black and White	Housing/segregation	City	Black-White ratio of the rates of fatal police shootings	City	Black and White	No, outcome is disparities	No
Simons et al. [85]	Education, household income, neighborhood disadvantage, and perceived racial discrimination	Education, economics and labor, housing, social institutions	Individual and neighborhood	GrimAge index of accelerated aging	Individual	Black	No, single race	Minimal/generic
Tackett et al. [86]	Residential segregation index, Black and White	Housing/segregation	County	Pediatric atopic dermatitis severity	Individual	White and Black	Yes	No
Thomas et al. [87]	Experiences of discrimination scale	Social institutions (not listed)	Individual	Allostatic load and self-rated health	Individual	Black	No, single race	No

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Thomas et al. [87]	Experiences of discrimination scale	Social institutions (not listed)	Individual	Telomere length	Individual	Black	No, single race	No
Vines and Baird [88]*	Individual and group experiences of racism subscales of the Telephone-Administered Perceived Racism Scale (TPRS)	Social institutions	Individual	Level of concern for children about racism	Individual	Black	No, single race	No
Wallace et al. [89]*	Black-White ratios of percent employed, with a bachelor's degree, and incarcerated	Economics and labor, education, criminal justice	State	Small for gestational age	Individual	Black and White	Yes	Minimal/generic
Wallace et al. [89]*	Black-White ratios of proportion with a bachelor's degree, proportion unemployed, proportion employed in professional occupations, median household income, incarceration rate, and juvenile custody rate	Economics and labor; education, criminal justice	State	Infant mortality rate	State	Black and White	Yes	No
Williams et al. [90]	Dissimilarity index and isolation index, Black and White	Housing/segregation	Hospital reference regions	Stillbirth	Individual	Black and White	Yes	Minimal/generic

Table 1 (continued)

Study	Institutional racism measure(s)	Institutional racism domain(s)	Level(s) of institutional racism measurement	Outcome measure(s)	Level(s) of outcome measurement	Racial/ethnic group(s) in the analytic sample	Examined effect modification	Explicit link to policy in text
Wong et al. [91]	Index of dissimilarity and Black-White gaps in the unemployment rate, the labor force non-participation rate, the poverty rate, the percent living in rental housing, the percent of single-parent households, the percent without a college degree, median household income, and the incarceration rate	Housing/segregation, economics and labor, family, education, criminal justice	City	Race-specific homicide rates and Black-White disparities	City	Black and White	Yes	No
Z	Workplace stress (role overload, vocational strain, and discrimination)	Economics and labor	Individual	Physical and depressive symptoms	Individual	Black and Hispanic	No	Minimal/generic
Zhou et al. [92]*	Racial bias in mortgage lending index, residential redlining index, and the Black location quotient	Housing/segregation	Zip code	Colorectal cancer survival	Individual	Black and White	Yes	Minimal/generic

\* Article included in the Groos et al. (2018) systematic review.



networks, mitigate the health risks of institutional racism within Black Americans [95].

In contrast, studies on the extent to which differences in exposure to or effect of discriminatory policies or practices contribute to racial/ethnic health disparities require analytic samples with more than one racial/ethnic group. For example, a multi-racial/ethnic population would be needed to determine the differential impact of a specific criminal justice policy on health outcomes across racial/ethnic groups. Multi-racial/ethnic populations are also needed to test hypotheses on whether institutional racism can actually benefit Whites while being detrimental to racial/ethnic minorities [65, 70, 89, 96].

In our literature review, we found that just over one third of papers took a minority health approach, examining a single racial/ethnic group, while approximately two thirds of papers took a health disparities approach, examining two or more racial/ethnic groups. Of the 21 papers that took a minority health approach, 17 included Black respondents only, three included Hispanic respondents only, and one included Chinese American respondents only. Of the 35 papers that took a health disparities approach, 27 included Black and White respondents, one included Black and Hispanic respondents, and seven included multiple racial/ethnic groups. Just 23 of the 35 papers that included more than one racial/ethnic group examined effect modification by race, which is important for understanding group differences in vulnerability to institutional racism. While neither the minority health approach nor the health disparities approach is inherently superior, we recommend that researchers employing a health disparities approach include as many racial/ethnic groups as possible and examine effect modification by race if the study is adequately powered to test interactions.

Finally, whether studies focus on a single racial/ethnic group or multiple groups, to best define their population of interest, researchers should also consider the timing and historic context of the research question (related to the policy discussion above, and *Timing of Exposure Measurement*, below). For example, policy impacts may compound across an individual's life course, resulting in greater health impacts for older individuals, and may also compound across generations, resulting in the intergenerational transmission of poor health, beginning at birth. In addition, for specific racial/ethnic groups, immigration wave and immigration generation may be important considerations when defining the population of interest for a given study.

### **Institutional Racism Exposure Measurement**

Improving exposure measurement for institutional racism is a key component of our framework. Below we consider

five elements to specify for measures: (1) single vs. multiple domains, (2) area vs. individual level, (3) direct vs. proxy, and (4) timing of measurement.

#### **Single vs. Multiple Domains**

Institutional racism is considered structural or systemic when multiple institutions work together to produce and sustain a racist system [2, 10, 20, 21, 97]. As such, researchers must first determine whether to examine the relationship between one institutional domain, or multiple domains, and health. To capture the systemic, largely latent (i.e., covert and not directly observable) nature of structural racism, researchers should consider ways to incorporate multiple domains into their work.

The 56 papers from the literature review included measures of institutional racism in seven domains: criminal justice, economics and labor, education, healthcare, housing/residential segregation, immigration, and political participation/representation. Just over half of the papers measured institutional racism in a single domain, while slightly less than half included measures across multiple domains—an approach that is more consistent with the conceptualization of institutional racism as a “race discrimination system” that operates across many domains [20]. Housing-related measures, including residential segregation, were the most commonly used indicators of institutional racism (37 papers), followed by measures in economics and labor (22 papers), criminal justice (15 papers), education (13 papers), healthcare (4), political participation/representation (4), and immigration (3). We recommend that researchers focusing on a single domain identify causal mechanisms within that domain that impact health, while researchers examining measures from multiple domains incorporate theoretical and analytic approaches (e.g., latent models) that treat the measures as part of a connected system as opposed to discrete systems.

Complementary to focusing on a single or multiple domains is determining whether a single or multiple indicators will be used to represent a particular domain. Measurement approaches that combine multiple indicators across multiple domains have the potential to capture the systemic nature of institutional racism [2, 20, 21] but may obscure the effects of individual policies or practices that greatly influence health. In our literature review, we found that 17 papers included a single indicator of institutional racism, while 11 included multi-item scales assessing experiences of discrimination within institutional settings, and 28 included multiple indicators of institutional racism, either within a single domain or across multiple domains. We recommend using multiple indicators when trying to capture a more comprehensive measure of institutional racism that may be related to multiple historical policies, and thus difficult to

isolate as a single policy measure (e.g., arrests, encounters, and probations to measure institutional racism in the criminal justice system). A single indicator may be appropriate when trying to isolate the effect of a specific policy or practice (e.g., presence/absence of a drug policy or drug-related arrests after implementation of a drug policy).

### Area-Level vs. Individual-Level Measures

The level of exposure measurement is also critical. Researchers may consider measurement at the area level (e.g., state or Census tract) or individual level. In most cases, to capture the structural nature of institutional racism, we recommend using area-level exposure measures rather than individual-level measures, such as experiences of discrimination in institutional settings. There may be exceptions where the individual-level exposure represents a structural policy, such as immigration status for individuals from different countries, but these exceptions should consider the policies that led to the individual-level status.

When considering area-level measures, the *geographic level* of enactment or enforcement of the racially discriminatory policy should ideally match the geographic level of the exposure to minimize exposure misclassification. For example, if exposure is operationalized as racial disparities in police use of force, and policing policies regarding use of force are primarily made at the district or city level, then exposure should be measured at the district or city level rather than the county or state level. Other specific policies, such as voting rights restrictions, are often at the state level.

In our literature review, we found that 39 of the 56 papers we reviewed included at least one area-level measure of exposure to institutional racism, which is consistent with the conceptualization of institutional racism as a macro-level phenomenon. Area-level indicators in the housing/residential segregation domain included contemporary measures of residential segregation, such as the index of dissimilarity, the isolation index, and the index of concentration at the extremes [45, 46, 47, 48, 52, 53, 54, 61, 63, 69, 70, 71, 72, 77, 78, 79, 80, 84, 86, 90, 91, 92]; historical measures of residential segregation based on Home Owner's Loan Corporation (HOLC) redlining maps [44, 60, 62]; and contemporary measures of mortgage discrimination and redlining [49, 54, 67, 69, 70, 71, 92]. These measures were assessed at a variety of geographic levels, including HOLC-defined neighborhoods, Census tracts, zip codes, metropolitan areas, counties, and states. Other area-level measures of institutional racism included Black-White inequities in the domains of economics and labor, criminal justice, education, and political participation/representation [42, 43, 46, 47, 53, 58, 63, 72, 73, 74, 75, 85, 89, 91, 97, 98]. These measures were assessed at the city, county, and state levels. In the criminal justice domain, two recent studies used the number

of police killings of Black people in the county [51] and metropolitan statistical area [59] as an indicator of institutional racism. The measurement of area-level racism at different geographic scales makes it challenging to compare results across studies but may be justified based on theoretical or policy considerations. Thus, we recommend that researchers using area-level measures provide an explicit rationale for the geographic level examined.

Seventeen of the papers we reviewed included at least one individual-level measure of exposure to institutional racism. Most of these studies asked respondents to report experiences of discrimination in multiple institutional settings, such as schools, workplaces, and the criminal justice system [40, 50, 55, 56, 57, 64, 68, 82, 83, 87, 99, 100]. One study asked parents to report concerns about their children's exposure to racism in institutional settings [88], while two studies used individual-level characteristics like income and access to healthcare as indicators of exposure to institutional racism [41, 85]. Studies in the immigration domain included individual-level measures of immigration status [76] and reports of sightings and interactions with immigration officials [81] as indicators of exposure to institutional racism, while one study measured fear of deportation at the family level [66].

We note that it is not possible at the individual level to distinguish between experiences of institutional racism and experiences of interpersonal racism that occur within an institutional setting. For example, if an individual responds "yes" to the question, "Were you ever treated unfairly during the job hiring process because of your race?" it is hard to determine to what extent this unfair treatment was due to institutional policies/practices (e.g., institutional practice of asking job candidates about their conviction history — because non-Whites are disproportionately more likely to have a conviction history compared to Whites, this practice precludes non-Whites from having a fair chance at employment) versus interpersonal racism (e.g., an employer choosing not to call back non-White applicants for a job interview because of their subconscious bias that non-White persons are less competent or less professional than White persons, despite laws in place that make it illegal for an employer to discriminate based on someone's race/ethnicity). The distinction between experiences of institutional racism and experiences of interpersonal racism that occur within an institutional setting is important to make in order to sufficiently address racism, which requires a multi-level approach. For instance, within employment, efforts to address interpersonal racism (e.g., anti-racism training for employers) may prevent individual employers from discriminating against non-White employees. However, without institutional policies in place (e.g., an amendment to the Civil Rights Act that prevents employers from discriminating against people with criminal records or requiring employers to delay a criminal background check until after an offer is made or addressing racism

within the criminal justice system), non-White persons will not have a fair chance at employment and will continue to face institutional racism within employment and its subsequent health impacts. It is also not possible to determine the extent to which an individual's education or income is the result of exposure to discriminatory policies or practices. Thus, we recommend against using such measures to assess exposure to institutional racism.

### Direct vs. Proxy Measures

Another consideration is the use of direct or proxy measures of exposure to discriminatory policies or practices. In some cases, direct measures of exposure to specific policies may be preferable to strengthen the connection to a health outcome. For proxy measures, researchers must clearly articulate the conceptual link between institutional policies, whether historic or contemporary, and the exposure measurements. For example, a direct measure of a policy exposure would be living in a state with restrictive voter ID laws, whereas a proxy measure in the political participation/representation domain could be the Black:White ratio of the population proportion who voted in the last presidential election. In the immigration domain, a direct measure may be living in a county where local law enforcement work closely with immigration enforcement (e.g., Secure Communities [101]), whereas a proxy measure could be fear of deportation.

In our literature review, we found that, with the exception of three papers that used HOLC maps to measure exposure to a specific racially discriminatory policy [44, 62, 102], the studies in Table 1 that used area-level indicators of institutional racism relied on proxy measures, rather than direct measures of exposure to discriminatory policies or practices. Given the challenges inherent in measuring institutional racism in an era of color-blind policies, researchers have increasingly come to rely on measures of racial inequality in domains, such as education or political participation/representation, as proxies for exposure to institutional racism. Though rarely stated explicitly, the rationale for this approach is that contemporary racial inequalities are the result of discriminatory policies and practices and, therefore, are a reasonable proxy for exposure to the policies and practices themselves. Explicitly linking policies to proxy measures is crucial to support the claim that racial/ethnic inequalities in specific domains are due to institutional factors rather than individual choices. Recent work by Agenor et al. provides a template for considering specific state-level policies in different institutional domains, which can be examined in future health studies [103].

### Timing of Exposure Measurement

Lastly, researchers should consider the *timing* of their exposure measures within the context of the disease processes

for their health measures. *Historic timing* is critical in linking exposure to health outcomes. As researchers, in order to provide the strongest evidence for causal inference, we must ensure that the timing of the policy precedes specific health outcomes in ways that allow for any latency period in disease progression [104]. For example, prior empirical studies have incorporated administrative data on school quality from the Jim Crow South and linked it with later life cognitive functioning [105, 106]. The historic timing of policies has further implications for measurement, as more proximal events will be easier to measure directly. For example, it may be easier to link recent immigration policies that vary across states in their design and implementation [107] to acute health outcomes (e.g., birth outcomes, heart attacks) than to link older policies like the 1984 Immigration Reform and Control Act to chronic health outcomes. It is useful to consider a few specific questions when thinking about the timing of exposure measurement: are contemporary exposure measure(s) appropriate to adequately capture the link between policy and the health outcome? Are historic measures during a particular period of the life course more appropriate? And, accordingly, are intergenerational measures needed to capture the relevant exposures for specific health outcomes? For example, sensitive periods, such as gestation, may require a particular timing for specific birth outcomes, as in research that examines the timing of immigrant raids during different trimesters of pregnancy on low birth weight [108].

### Health Outcome Measurement

As in other areas of epidemiologic research, health outcomes are best measured at the individual level. Area-level health outcome data, analyzed in an ecologic framework, can provide initial evidence on the extent to which institutional racism measures affect health, but cannot be used to identify causal relationships [109]. Area-level health outcome measurement may mask the influence of the exposure on the health outcome for different racial/ethnic minority populations, depending on the distribution of race/ethnicity in a particular Census tract, state, or other geographic area. Moreover, measuring health outcomes at the individual level allows for an examination of effect modification of the institutional racism-health relationship by race/ethnicity, to help elucidate differences in the relationships across racial/ethnic populations.

### Study Design

The study design will be determined by the type of data a researcher has, as well as the level of exposure and outcome measurement. Ecologic studies examine associations

between area-level exposures and area-level outcome measures. Multi-level study designs can be used when the exposure measurement is at the area level, and the outcome measurement is at the individual level. Individual-level study designs are needed when both the exposure and outcome are measured at the individual level. Because institutional racism is a contextual phenomenon, the strongest study designs will be multi-level in nature to enable researchers to estimate the contextual effects of area-level institutional racism on individual-level health.

Study designs may be purely observational or quasi-experimental. Observational studies examine the relationship between existing exposures and outcomes, based on observed patterns within or between populations. When longitudinal observational data are available, researchers should take a counterfactual approach to isolate the impact of structurally racist policies over time and as they operate within and across domains to produce racial disparities in health. For instance, causal mediation approaches that model time-varying relationships between variables allow researchers to treat “race” as part of the time-varying reciprocal or mutually reinforcing processes of racialization and racial discrimination within and across various socioeconomic, political, and cultural systems [110]. These approaches also allow researchers to decompose racial health disparities into different types of cumulative life course effects of institutional racism including unobserved racism (i.e., operating through unmeasured pathways), racial discrimination (i.e., the effect of an underlying system that first racialized individuals and then discriminated against them based on those racial categories), and emergent discrimination (i.e., system-wide race discrimination arising from pervasive racial disparities collectively across multiple domains). For a detailed discussion of these approaches, see Graetz et al. [110]. Quasi-experimental designs take advantage of an intervention, such as a policy change, that disrupts the ongoing pattern of health [111]. In quasi-experimental designs, in contrast to experimental designs, the researcher does not define the intervention. However, quasi-experimental designs can enhance causal inference if adequate comparison groups can be identified to represent a counterfactual comparison of what would have happened if the intervention had not occurred [111]. Recent examples include evaluating the impact of immigration raids or the 2017 Executive Order of the travel ban targeting individuals from Muslim majority countries [108, 112].

In our literature review, we found examples of multi-level, ecologic, and individual-level study designs. Among papers that included at least one area-level measure of institutional racism, 22 were multi-level studies, while 17 were ecologic studies. In both the multi-level and ecologic studies, institutional racism was measured at the group level (e.g., the state-level Black:White ratio of felony disenfranchisement).

This is appropriate given that discriminatory policies and practices are a property of institutions, not individuals. In the ecologic studies, health outcomes were also measured at the group level, despite being a property of individuals. The lack of individual-level data necessary to control for confounding can introduce bias when estimating the contextual effect of institutional racism on health in ecologic studies [113]. Thus, we recommend that researchers use multi-level study designs when possible. We also found 16 papers that measured exposures and outcomes at the individual level, and one paper that measured exposure and outcome at the family level. As discussed in detail above, we recommend against measuring institutional racism at the individual level due to challenges inherent in measuring a macro-level phenomenon at the individual level.

### Analytic Approaches

Finally, analytic approaches must incorporate the specific aspects of exposure and outcome measurement and study design. An important decision point will be whether to model indicators of institutional racism separately or together; the former allows researchers to better identify specific policies that matter for health, while the latter better captures the systemic nature of multiple interconnected policies. If the latter approach is chosen, researchers must decide if they want to pre-specify institutional racism domains of interest (e.g., criminal justice, economics and labor) or use data reduction techniques to generate profiles of institutional racism. One approach for pre-specifying indicators within given domains is confirmatory factor analysis (CFA), where each domain is treated as a latent construct. CFA is used to understand how each individual indicator of institutional racism loads onto the latent construct of the specified domain. CFA can also be used to generate single summary measures of institutional racism, as in a recent paper by Dougherty et al. [53]. Other data reduction techniques, such as latent class analysis, may be useful to generate profiles of institutional racism without pre-specifying domains of interest.

Importantly, if examining institutional racism and health through a health disparities lens, effect modification of the relationship by race/ethnicity should be incorporated. For example, if researchers are examining the relationship between redlining and cardiovascular disease, testing for effect modification by race/ethnicity will help the research community understand if redlining affected the health of Black individuals only and/or to a greater extent than White individuals, as we would hypothesize given the targeting of the policy. As highlighted in our review, testing for effect modification of the relationship between institutional racism and health by race/ethnicity has not always been incorporated into recent research. Testing these types of hypotheses are essential to provide evidence for differential effects of policy.

## Conclusion

In this paper we defined key concepts relevant to the study of institutional racism and proposed a framework for advancing institutional racism and health research, supported by a review of recent literature examining the relationship between institutional racism and health. We hope this framework will inform future examination of the impacts of institutional racism on health, and that it will help promote the consideration of structural interventions to improve minority health and to reduce and eliminate health disparities [114].

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## References

- Hicken MT, et al. Racial inequalities in health: framing future research. *Soc Sci Med*. 2018;199:11–8.
- Bailey ZD, et al. Structural racism and health inequities in the USA: evidence and interventions. *Lancet*. 2017;389(10077):1453–63.
- Gee GC, Ford CL. Structural racism and health inequities: old issues, new directions. *Du Bois Rev*. 2011;8(1):115–32.
- Williams DR, Mohammed SA. Racism and health I: pathways and scientific evidence. *Am Behav Sci*. 2013;57(8). <https://doi.org/10.1177/0002764213487340>
- Williams DR, Mohammed SA. Racism and health II. *Am Behav Sci*. 2013;57(8):1200–26.
- Williams DR, Lawrence JA, Davis BA. Racism and health: evidence and needed research. *Annu Rev Public Health*. 2019;40:105–25.
- Braveman A, et al. Systemic and structural racism: definitions, examples, health damages, and approaches to dismantling. *Health Aff (Millwood)*. 2022;41(2):171–8.
- Hardeman RR, et al. Improving the measurement of structural racism to achieve antiracist health policy. *Health Aff*. 2022;41(2):179–86.
- Adkins-Jackson B, et al. Measuring structural racism: a guide for epidemiologists and other health researchers. *Am J Epidemiol*. 2022;191(4):539–47.
- Dennis AC, et al. Looking back to leap forward: a framework for operationalizing the structural racism construct in minority and immigrant health research. *Ethn Dis*. 2021;31(Suppl):301–10.
- Hardeman RR, et al. Naming institutionalized racism in the public health literature: a systematic literature review. *Public Health Rep*. 2018;133(3):240–9.
- Groos M, et al. Measuring inequity: a systematic review of methods used to quantify structural racism. *J Health Disparities Res Pract*. 2018;11(2):13.
- Castle B, et al. Public health's approach to systemic racism: a systematic literature review. *J Racial Ethn Health Disparities*. 2019;6(1):27–36.
- Omi M, Winant H. *Racial formation in the United States*. 3rd ed. New York: Routledge; 2015.
- Massey DS. Racial formation in theory and practice: the case of Mexicans in the United States. *Race Soc Probl*. 2009;1(1):12–26.
- Menjívar C. The racialization of “illegality.” *Daedalus*. 2021;150(2):91–105.
- Smedley A, Smedley BD. Race as biology is fiction, racism as a social problem is real — anthropological and historical perspectives on the social construction of race. *Am Psychol*. 2005;60(1):16–26.
- BonillaSilva E. Rethinking racism: toward a structural interpretation. *Am Sociol Rev*. 1997;62(3):465–80.
- Williams DR, Lawrence JA, Davis BA. Racism and health: evidence and needed research. *Annu Rev Public Health*. 2019;40:105–25.
- Reskin B. The race discrimination system. *Ann Rev Sociol*. 2012;38(1):17–35.
- Gee GC, Hicken MT. Structural racism: the rules and relations of inequity. *Ethn Dis*. 2021;31(Suppl 1):293–300.
- Smedley BD. The lived experience of race and its health consequences. *Am J Public Health*. 2012;102(5):933–5.
- Gale MM, et al. A meta-analysis of the relationship between internalized racial oppression and health-related outcomes. *Couns Psychol*. 2020;48(4):498–525.
- Goosby BJ, Cheadle JE, Mitchell C. Stress-related biosocial mechanisms of discrimination and African American health inequities. *Ann Rev Sociol*. 2018;44(1):319–40.
- Phelan JC, Link BG. Is racism a fundamental cause of inequalities in health? *Ann Rev Sociol*. 2015;41:311–30.
- Jones C. Levels of racism: a theoretic framework and a gardener's tale. *Am J Public Health*. 2000;90(8):1212–5.
- Rothstein R. *The color of law: a forgotten history of how our government segregated America*. New York: Liveright; 2017.
- Lane HM, et al. Historical redlining is associated with present-day air pollution disparities in U.S. cities. *Environ Sci Technol Lett*. 2022;9(4):345–350.
- Williams DR, Collins C. Racial residential segregation: a fundamental cause of racial disparities in health. *Public Health Rep*. 2001;116(5):404–16.
- Clark R. Significance of perceived racism: toward understanding ethnic group disparities in health, the later years, in *Critical Perspectives on Racial and Ethnic Differences in Health in Late Life*, N. Anderson, R. Bulatao, and B. Cohen, Editors. 2004, National Academies Press Washington DC.

31. Grande S, Red pedagogy: Native American social and political thought. 2004, Lanham, MD: Rowman & Littlefield.
32. Alexander M, Jim TN, Crow: mass incarceration in the age of colorblindness. Revised Edition, editors. New York, NY: The New Press; 2010.
33. Massey DS, Denton NA, and S American Council of Learned, American apartheid [electronic resource]: segregation and the making of the underclass/Douglas S. Massey, Nancy A. Denton. 1993: Harvard University Press University of Michigan, Michigan Publishing.
34. Equal Justice Initiative. Lynching in America: confronting the legacy of racial terror. 3rd ed. AL: Equal Justice Initiative Montgomery; 2017.
35. Perea JF. The echoes of slavery: recognizing the racist origins of the agricultural and domestic worker exclusion from the National Labor Relations Act. *Ohio State Law J.* 2011;72:95–138.
36. Roosevelt FD. Executive Order 9066. Washington: D. C; 1942.
37. Reardon SF, et al. Brown fades: the end of court-ordered school desegregation and the resegregation of American public schools. *J Policy Anal Manag.* 2012;31(4):876–904.
38. Kaiser Family Foundation, Proposed changes to “public charge” policies for immigrants: implications for health coverage. Washington, D.C; 2018.
39. Gee GC, Hicken MT. Structural racism: the rules and relations of inequity. *Ethn Dis.* 2021;31(Suppl. 1):293–300.
40. Albert MA, et al. Perceptions of race/ethnic discrimination in relation to mortality among Black women: results from the Black Women’s Health Study. *Arch Intern Med.* 2010;170(10):896–904.
41. Baptist A, et al. Asthma disparities during the COVID-19 pandemic: a survey of patients and physicians. *J Allergy Clin Immunol Pract.* 2020;8(10):3371–3377.e1.
42. Bell CN, Kerr J, Young JL, Associations between obesity, obesogenic environments, and structural racism vary by county-level racial composition. *Int J Environ Res Public Health.* 2019;16(5):861.
43. Bell CN, Owens-Young JL. Self-rated health and structural racism indicated by county-level racial inequalities in socioeconomic status: the role of urban-rural classification. *J Urban Health : Bull N Y Acad Med.* 2020;97(1):52–61.
44. Bennis M, et al. The impact of historical racism on modern gun violence: redlining in the city of Louisville. *KY Injury.* 2020;51(10):2192–8.
45. Blanco BA, et al. The impact of residential segregation on pancreatic cancer diagnosis, treatment, and mortality. *Annals of Surgical Oncology.* 2021;28(6):3147–55.
46. Blebu BE, et al. An examination of preterm birth and residential social context among Black immigrant women in California, 2007–2010. *J Community Health.* 2019;44(5):857–65.
47. Chambers BD, et al. Testing the association between traditional and novel indicators of county-level structural racism and birth outcomes among black and white women. *J Racial Ethn Health Disparities.* 2018;5(5):966–77.
48. Chambers BD, et al. Using index of concentration at the extremes as indicators of structural racism to evaluate the association with preterm birth and infant mortality—California, 2011–2012. *J Urban Health : Bull N Y Acad Med.* 2019;96(2):159–70.
49. Collin LJ, et al. Neighborhood-level redlining and lending bias are associated with breast cancer mortality in a large and diverse metropolitan area. *Cancer Epidemiol Biomarkers Prev.* 2021;30(4):799.
50. Coogan P, et al. Experiences of racism and subjective cognitive function in African American women. *Alzheimers Dement (Amst).* 2020;12(1):e12067.
51. Das A, et al. Emergency Department visits for depression following police killings of unarmed African Americans. *Soc Sci Med.* 2021;269:113561.
52. Do D, Locklar LRB, Florsheim P. Triple jeopardy: the joint impact of racial segregation and neighborhood poverty on the mental health of black Americans. *Soc Psychiatry Psychiatr Epidemiol.* 2019;54(5):533–41.
53. Dougherty GB, et al. Measuring structural racism and its association with BMI. *Am J Prev Med.* 2020;59(4):530–7.
54. Gee GC. A multilevel analysis of the relationship between institutional and individual racial discrimination and health status. *Am J Public Health.* 2008;98(9 Suppl):S48–56.
55. Glass JE, Williams EC, Oh H. Racial/ethnic discrimination and alcohol use disorder severity among United States adults. *Drug Alcohol Depend.* 2020;216:108203.
56. Greer TM, Brondolo E, Brown P. Systemic racism moderates effects of provider racial biases on adherence to hypertension treatment for African Americans. *Health Psychol.* 2014;33(1):35–42.
57. Greer TM, Spalding A. The role of age in understanding the psychological effects of racism for African Americans. *Cultur Divers Ethnic Minor Psychol.* 2017;23(4):588–94.
58. Hahn RA. Access to social determinants of health and determinant inequity for the black population in US states in the early twenty-first century. *J Racial Ethnic Health Disparities.* 2021;8(2):433–8.
59. Ibragimov U, et al. Police killings of Black people and rates of sexually transmitted infections: a cross-sectional analysis of 75 large US metropolitan areas, 2016. *Sex Transm Infect.* 2020;96(6):429–31.
60. Jacoby SF, et al. The enduring impact of historical and structural racism on urban violence in Philadelphia. *Soc Sci Med.* 2018;199:87–95.
61. Knopov A, et al. The role of racial residential segregation in black-white disparities in firearm homicide at the state level in the United States, 1991–2015. *J Natl Med Assoc.* 2019;111(1):62–75.
62. Krieger N, et al. Structural racism, historical redlining, and risk of preterm birth in New York City, 2013–2017. *Am J Public Health.* 2020;110(7):1046–53.
63. Krivo LJ, Peterson RD, Kuhl DC. Segregation, racial structure, and neighborhood violent crime. *AJS.* 2009;114(6):1765–802.
64. Lu D, et al. Perceived racism in relation to telomere length among African American women in the Black Women’s Health Study. *Ann Epidemiol.* 2019;36:33–9.
65. Lukachko A, Hatzenbuehler ML, Keyes KM. Structural racism and myocardial infarction in the United States. *Soc Sci Med.* 2014;103:42–50.
66. Martínez AD, Ruelas L, Granger DA. Household fear of deportation in relation to chronic stressors and salivary proinflammatory cytokines in Mexican-origin families post-SB 1070. *SSM - Population Health.* 2018;5:188–200.
67. Matoba N, et al. Mortgage discrimination and preterm birth among African American women: an exploratory study. *Health Place.* 2019;59:102193.
68. McCluney CL, et al. Structural racism in the workplace: does perception matter for health inequalities? *Soc Sci Med.* 2018;199:106–14.
69. Mendez DD, Hogan VK, Culhane J. Institutional racism and pregnancy health: using Home Mortgage Disclosure act data to develop an index for Mortgage discrimination at the community level. *Public Health Rep.* 2011;126(Suppl 3):102–14.
70. Mendez DD, Hogan VK, Culhane JF. Stress during pregnancy: the role of institutional racism. *Stress Health.* 2013;29(4):266–74.

71. Mendez DD, Hogan VK, Culhane JF. Institutional racism, neighborhood factors, stress, and preterm birth. *Ethn Health*. 2014;19(5):479–99.
72. Mesic A, et al. The relationship between structural racism and black-white disparities in fatal police shootings at the state level. *J Natl Med Assoc*. 2018;110(2):106–16.
73. O'Brien R, et al. Structural racism, economic opportunity and racial health disparities: evidence from U.S. counties. *SSM - Population Health*, 2020; 11:100564.
74. Owens-Young J, Bell CN. Structural racial inequities in socioeconomic status, urban-rural classification, and infant mortality in US counties. *Ethn Dis*. 2020;30(3):389–98.
75. Pabayo R, et al. Structural racism and odds for infant mortality among infants born in the United States 2010. *J Racial Ethn Health Disparities*. 2019;6(6):1095–106.
76. Patler C, Laster Pirtle W. From undocumented to lawfully present: do changes to legal status impact psychological well-being among latino immigrant young adults? *Soc Sci Med*. 2018;199:39–48.
77. Popescu I, et al. Racial residential segregation, socioeconomic disparities, and the White-Black survival gap. *PLoS One*. 2018;13(2):e0193222.
78. Poulson M, et al. The impact of racial residential segregation on colorectal cancer outcomes and treatment. *Annals of surgery*. 2021;273(6):1023–30.
79. Poulson MR, et al. Residential racial segregation and disparities in breast cancer presentation, treatment, and survival. *Ann Surg*. 2021;273(1):3–9.
80. Poulson MR, et al. The impact of racial residential segregation on prostate cancer diagnosis and treatment. *BJU Int*, 2021;127(6):636–644.
81. Sabo S, et al. Everyday violence, structural racism and mistreatment at the US-Mexico border. *Soc Sci Med*. 2014;109:66–74.
82. Scott HM, et al. Peer social support is associated with recent HIV testing among young black men who have sex with men. *AIDS Behav*. 2014;18(5):913–20.
83. Seaton EK. The influence of cognitive development and perceived racial discrimination on the psychological well-being of African American youth. *J Youth Adolesc*. 2010;39(6):694–703.
84. Siegel M, et al. The relationship between racial residential segregation and black-white disparities in fatal police shootings at the city level, 2013–2017. *J Natl Med Assoc*. 2019;111(6):580–7.
85. Simons RL, et al. The effects of social adversity, discrimination, and health risk behaviors on the accelerated aging of African Americans: further support for the weathering hypothesis. *Soc Sci Med*. 2021;282:113169.
86. Tackett KJ, et al. Structural racism and its influence on the severity of atopic dermatitis in African American children. *Pediatr Dermatol*. 2020;37(1):142–6.
87. Thomas MD, et al. Racial discrimination and telomere length in midlife African American women: interactions of educational attainment and employment status. *Ann Behav Med*, 2021;55(7):601–611.
88. Vines AI, Baird DD. Stress of caring for children: the role of perceived racism. *J Natl Med Assoc*. 2009;101(2):156–60.
89. Wallace M, et al. Separate and unequal: structural racism and infant mortality in the US. *Health Place*. 2017;45:140–4.
90. Williams AD, et al. Racial residential segregation and racial disparities in stillbirth in the United States. *Health Place*. 2018;51:208–16.
91. Wong B, et al. Differences in racial disparities in firearm homicide across cities: the role of racial residential segregation and gaps in structural disadvantage. *J Natl Med Assoc*. 2020;112(5):518–30.
92. Zhou Y, Bermanian A, Beyer KM. Housing discrimination, residential racial segregation, and colorectal cancer survival in southeastern Wisconsin. *Cancer Epidemiol Biomarkers Prev*. 2017;26(4):561–8.
93. Days DSI. Turning back the clock: the Reagan administration and civil rights. *Harv C R-C L L Rev*. 1984;19:309.
94. Duran DG, Pérez-Stable EJ. Novel approaches to advance minority health and health disparities research. *Am J Public Health*. 2019;109(S1):S8–10.
95. Geronimus A. Clashes of common sense: on the previous child care experience of teenage mothers-to-be. *Hum Organ*. 2008;51(4):318–29.
96. Krieger N. Methods for the scientific study of discrimination and health: an ecosocial approach. *Am J Public Health*. 2012;102(5):936–44.
97. Ford CL. Racism: science and tools for the public health professional. Washington, DC: American Public Health Association. 2019. pages cm.
98. Wallace ME, et al. Joint effects of structural racism and income inequality on small-for-gestational-age birth. *Am J Public Health*. 2015;105(8):1681–8.
99. Zambrana RE, et al. Workplace stress and discrimination effects on the physical and depressive symptoms of underrepresented minority faculty. *Stress Health*, 2021;37(1):175–185.
100. Thomas MD, et al. Differential associations between everyday versus institution-specific racial discrimination, self-reported health, and allostatic load among black women: implications for clinical assessment and epidemiologic studies. *Ann Epidemiol*. 2019;35:20-28.e3.
101. Cox AB, Miles TJ. Policing immigration. *U Chi L Rev*. 2013;80:87.
102. Jacoby SF, et al. The enduring impact of historical and structural racism on urban violence in Philadelphia. *Soc Sci Med*. 2017.
103. Agénor M, et al. Developing a database of structural racism-related state laws for health equity research and practice in the United States. *Public Health Rep*. 2021;136(4):428–40.
104. Krieger N. Measures of racism, sexism, heterosexism, and gender binarism for health equity research: from structural injustice to embodied harm—an ecosocial analysis. *Annu Rev Public Health*. 2020;41:37–62.
105. Crowe M, et al. Indicators of childhood quality of education in relation to cognitive function in older adulthood. *J Gerontol A Biol Sci Med Sci*. 2013;68(2):198–204.
106. Walsemann KM, et al. Race inequity in school attendance across the Jim Crow South and its implications for black-white disparities in trajectories of cognitive function among older adults. *J Gerontol: Series B*. 2022;gbac026.
107. De Trinidad Young ME, Wallace S. Included, but deportable: a new public health approach to policies that criminalize and integrate immigrants. *Am J Public Health*. 2019;109(9):1171–76.
108. Novak NL, Geronimus AT, Martinez-Cardoso AM. Change in birth outcomes among infants born to Latina mothers after a major immigration raid. *Int J Epidemiol*. 2017;46:839–49.
109. Rothman KJ, Greenland S, Lash TL. *Modern epidemiology*, vol. 3. Wolters Kluwer Health/Lippincott Williams & Wilkins Philadelphia. 2008.
110. Graetz N, Boen CE, Esposito MH. Structural racism and quantitative causal inference: a life course mediation framework for decomposing racial health disparities. *J Health Soc Behav*. 2022;63(2):232–49.

111. White H, Sabarwal S. Quasi-experimental design and methods, in methodological briefs: impact evaluation. UNICEF Office of Research: Florence. 2014.
112. Samari G, et al. The Muslim Ban and preterm birth: analysis of U.S. vital statistics data from 2009 to 2018. *Soc Sci Med.* 2020;265:113544.
113. Greenland S. Ecologic versus individual-level sources of bias in ecologic estimates of contextual health effects. *Int J Epidemiol.* 2001;30(6):1343–50.
114. Brown AF, et al. Structural interventions to reduce and eliminate health disparities. *Am J Public Health.* 2019;109(S1):S72–8.

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