

SEPARATE AND UNEQUAL: RESIDENTIAL SEGREGATION AND BLACK HEALTH DISPARITIES

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There are well-known Black-White disparities in adverse birth outcomes, health behaviors, and chronic diseases such as asthma, diabetes, and hypertension. These disparities hold across socioeconomic status and have remained stable for the past 50 years despite efforts to reduce them. This theoretical review argues that such disparities may be largely a function of residential segregation, ie, the separate and unequal neighborhoods in which most Blacks and Whites reside irrespective of their socioeconomic status. We review evidence that Black neighborhoods have significantly poorer healthcare facilities staffed by less competent physicians, higher environmental exposures, and poorer built environments than do White neighborhoods, and we argue that these neighborhood disparities are 3 pathways through which segregation contributes to health disparities. We summarize the research needed on the role of segregation in health disparities and emphasize the hypothesis that these may be differences between Whites and segregated Blacks alone. (*Ethn Dis.* 2009; 19:179–184)

Key Words: Health Disparities, Blacks, Segregation, Neighborhoods

INTRODUCTION

Disease and death are not randomly distributed in the United States but vary by ethnicity and socioeconomic status (SES). Ethnic minority and low-SES populations exhibit disparities in chronic disease morbidity and mortality in a patterned, predictable manner that is empirically well-documented and hence represents both a scientific and a moral challenge.^{1,2} Black health disparities are particularly challenging in their magnitude, scope, and persistence despite efforts to reduce them.² For example, the prevalence of asthma among Black adults and children is significantly higher than among their White counterparts, irrespective of SES.³ Likewise, diabetes prevalence and mortality rates among Blacks have been twice those of Whites for many years, irrespective of SES.⁴ Disparities in cardiovascular disease (CVD) incidence and mortality are similar, with Black CVD mortality rates 2–3 times those of Whites for the past 40 years,⁵ and hypertension accounts for 50% of that disparity.⁶ Likewise, Blacks exhibit higher incidence of most cancers, and higher mortality from all cancers than Whites.⁷ Similarly, adverse birth outcomes (eg, low birthweight) are 2–3 times higher among Blacks than among Whites, irrespective of SES.⁸ Disparities in health-risk behaviors (eg, diet and physical activity) also persist⁹ and contribute to disparities in obesity.¹⁰ Moreover, disparities in the quality of treatment for diabetes, hypertension, and other diseases have been stable for decades, even when controlling for SES.¹¹

Eliminating these disparities is a priority goal of the National Institutes of Health.² Progress toward that goal has been slow, however, and hampered in part by the absence of an etiologic model of disparities that explains both

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their scope and their persistence across Black SES levels.² This theoretical review presents such a model, one that focuses on a largely neglected variable: residential segregation. Although segregation has been gaining attention as a possible contributor to Black health disparities,¹² only 1 article described pathways through which segregation might play such a role.¹³ This review expands on the prior one by detailing the empirical evidence for 3 separate pathways through which segregation contributes to, and indeed may account for, the disparities summarized above.

RESIDENTIAL SEGREGATION

Residential segregation refers to the geographic separation of Whites from ethnic minorities in residential areas.^{14,15} The most commonly used measure of segregation, the dissimilarity or segregation index (SI), is available in census datasets. SI indicates the differential distribution of Blacks (or other minority group) vs Whites across the neighborhoods of a city. SI ranges from 0 (a fully integrated city) to 100 (a totally segregated city) and is interpreted as the percentage of Blacks (or Whites) who would have to move to achieve citywide integration. SI data indicate that 60%–80% of the Black (or White)

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Table 1. Dissimilarity/Segregation Index (SI) for 20 US Cities, 2000

Atlanta	68.8	Dallas	64.4	Las Vegas	47.4	Newark	83.4
Birmingham	77.4	Denver	66.2	Los Angeles	70.5	Philadelphia	76.9
Boston	68.8	Detroit, MI	86.7	Milwaukee	84.4	St. Louis	78.0
Chicago	83.6	Houston, TX	71.8	New Orleans	74.7	San Francisco	65.6
Cleveland	79.7	Indianapolis	75.5	New York	84.3	Washington	66.2

Source: [http://www.censuscope.org](http://www.censusscope.org).

population (70% on the average) would have to move to a different neighborhood to integrate most US cities.¹⁴ For example, Table 1 displays SI data for 20 US cities in 2000. As shown, 83.6% of the Black population of Chicago would have to move to integrate that city, as would 86.7% of Blacks in Detroit, 84.3% of Blacks in New York City, and 70.5% of Blacks in Los Angeles. A high SI (>61) means that irrespective of their representation in a city's population, most Blacks live in mostly Black neighborhoods and most Whites in mostly White neighborhoods.

Although many minority groups are segregated, the segregation levels of Blacks are significantly higher than those of others.^{14,15} Moreover, Blacks are more likely than other minorities to be hypersegregated, ie, to reside in mostly Black neighborhoods that are surrounded by similar neighborhoods in the centers of cities.¹⁶ Approximately 70% of the Black population resides in segregated Black neighborhoods, and 40%–50% reside in hypersegregated neighborhoods.^{16,17} This "American Apartheid"¹⁸ does not reflect a Black preference to live in Black neighborhoods¹⁹ but instead is primarily the outcome of discriminatory housing practices;^{20,21} 2–10 million cases of such housing discrimination occur each year.²⁰ Such discrimination holds across Black SES and tends to most strongly affect high-SES Blacks who try to purchase homes in affluent, White suburbs.^{22,23} This means that racial segregation does not mirror SES segregation. For example, if the Black and White populations of Saint Louis, Missouri, were distributed across neigh-

borhoods by SES alone, the SI would be 11 rather than 78.²³

Thus, irrespective of individual-level SES, most Blacks and Whites reside in segregated neighborhoods. These neighborhoods are not simply separate but also are unequal in health relevant ways. Three of these ways are the lower quality of healthcare, higher environmental exposures, and the poorer built environments of segregated Black neighborhoods.

NEIGHBORHOOD DISPARITIES IN HEALTHCARE QUALITY

Blacks and Whites alike seek health care in the communities in which they reside. Because they reside in separate communities, they receive care in 2 different sets of facilities, staffed by 2 different sets of physicians.²⁴ These facilities and physicians are unequal, such that segregated Blacks (irrespective of SES) receive poorer healthcare than Whites.^{24–27}

For example, hospitals in Black neighborhoods have fewer technological resources (eg, imaging technology) and fewer specialists (eg, cardiac surgeons, oncologists), which results in missed opportunities for early intervention in cancers and a tendency to diagnose and treat symptoms rather than underlying diseases.^{24,25} Hospitals in Black neighborhoods also have higher negligent adverse events (ie, problems caused by treatment) and infant and adult mortality rates (for Blacks and Whites alike) than do hospitals that serve mostly Whites.^{24–27} Moreover, physicians in

healthcare settings with mostly Black patients are less likely to be board certified than are those in settings for mostly White patients (the physicians in both settings are mostly White).²⁵ Because board certification is a validated measure of physician competence,²⁸ physicians in medical settings for Blacks are less competent than those in settings for Whites.^{24,25,28} Indeed, physicians in Black medical settings are less knowledgeable about cancer prevention and screening, are less likely to follow screening recommendations for cancers and other chronic diseases, provide poorer management of diabetes and hypertension, and are significantly less likely to advise dietary modification and smoking cessation than those in White medical settings.^{29,30} The poorer healthcare received by segregated Blacks contributes to disparities in diabetes, hypertension, CVD, asthma, adult and infant mortality, quality of treatment, cancer stage at diagnosis, obesity, and health behaviors such as low cancer screening, low smoking cessation, and poor diet.²⁴

NEIGHBORHOOD DISPARITIES IN ENVIRONMENTAL EXPOSURES

Air pollution contributes causally to CVD incidence and mortality; hence, residing in areas with high levels of air pollution is strongly associated with increased CVD incidence and death, even when controlling for SES and smoking.³¹ Likewise, exposure to air pollution contributes to asthma³² and to adverse birth outcomes such as low birthweight.^{33,34} Exposure to persistent organic pollutants (POPs) (such as dioxins and pesticides) likewise plays a strong role in chronic disease. Specifically, studies consistently have found that exposure to POPs plays a causal role in diabetes; diabetes prevalence and hospitalization rates increase directly

with serum levels of POPs, days of exposure to POPs, and proximity to waste sites.^{35,36} Exposure to POPs also contributes significantly to CVD³⁷ and hypertension,³⁸ even among people who exercise frequently and have healthy diets and low rates of smoking.³⁸ Moreover, some POPs directly contribute to prostate, lung, and other cancers.³⁹ Finally, exposure to POPs is associated with up to a 5-fold increase in adverse birth outcomes.⁴⁰

National and regional studies have highlighted dramatic ethnic disparities in environmental exposures as a result of the deliberate placement of polluting factories and toxic waste dumps in minority neighborhoods.^{41,42} Environmental exposures in minority neighborhoods are 5–20 times higher than those in White neighborhoods,⁴³ even after controlling for neighborhood SES.^{44,45} Segregated Black neighborhoods are characterized by higher exposures to air toxics and to mercury, arsenic, sulfur dioxide, lead, and other known carcinogens.^{43–47} Hence, Black-White disparities in asthma may in part reflect excess exposure to air toxics in segregated Black neighborhoods.^{42,48} Similarly, high exposure to POPs may in part account for diabetes disparities.^{42,45} Likewise, adverse birth outcomes largely may be a function of segregated Black women's excess exposures to both POPs and air toxics.⁴⁷ Indeed, such outcomes (eg, low birthweight, preterm birth) are significantly higher among Black women who reside in segregated neighborhoods than in those who reside in integrated neighborhoods, irrespective of neighborhood SES.^{8,17}

In addition to neighborhood disparities in outdoor exposures, data highlight similar disparities in indoor exposures because of substandard housing in many segregated Black neighborhoods.⁴⁹ Such housing is characterized by high exposure to nitrogen dioxide (from stoves), carbon monoxide (from heating systems), and organic pollutants (emitted by polyvinyl chloride flooring).

These indoor exposures contribute to asthma,⁵⁰ diabetes,⁵¹ and adult mortality,⁵² even after controlling for SES, smoking, and crowding.

Because exposure to such environmental hazards plays a significant role (and in many cases, a causal) role in asthma, diabetes, hypertension, CVD, adverse birth outcomes, cancers, and mortality among Blacks and Whites alike, the excess exposures in segregated Blacks neighborhoods no doubt contribute to Black-White disparities in those health outcomes.^{42,45–48}

NEIGHBORHOOD DISPARITIES IN THE BUILT ENVIRONMENT

Neighborhood built environments contribute to health behavior and generally account for more of variance than do individual-level factors such as health knowledge and beliefs.⁵³ Aspects of the built environment—from recreational facilities to tobacco outlets and supermarkets—provide cues for behaviors such as physical activity,⁵⁴ diet,^{54,55} and cigarette smoking.⁵⁶ Of the many differences between the built environments of Black vs White neighborhoods, we highlight disparities in access to fast food, supermarkets, and recreational facilities.

Higher Access to Fast Food

Fast food is notoriously high in fat, cholesterol, and calories, and its consumption is strongly associated with high fat intake, obesity, and insulin resistance.⁵⁷ High access to fast food outlets is associated with its increased consumption and thus with increased body mass index and obesity among Blacks and Whites alike.^{57,58} For example, in a study of 714,054 people residing in neighborhoods that vary in number of fast food places, neighborhood fast food outlet density was strongly associated with residents' BMI.⁵⁹ Similarly, every 1 SD increase

in the density of fast food outlets is associated with a 7% increase in overweight and obesity.⁶⁰

Segregated Black neighborhoods contain 2–3 times more fast food outlets than do White neighborhoods of comparable SES;⁶¹ these outlets contribute to Blacks' consuming more fast food than Whites,^{54,57,62} which in turn contributes to Black disparities in obesity and diabetes.^{54,57,58,62}

Lower Access to Supermarkets and Fresh Fruit and Vegetables

Eating fresh fruit and vegetables helps prevent chronic conditions such as obesity, CVD, diabetes, and cancers.¹ Chain supermarkets stock significantly more fresh fruits and vegetables and a wider variety of them and also offer them at significantly lower prices than do small markets.^{54–55} Hence, neighborhood availability of supermarkets is associated with higher fruit and vegetable consumption as well as with lower rates of obesity, diabetes, and other conditions.^{55,63,64} Indeed, the role of access to supermarkets is stronger for Blacks than for Whites: fruit and vegetable consumption increases by 32% among Blacks and by 11% among Whites with each supermarket in their neighborhoods.⁵⁵ Likewise, Blacks who shop at supermarkets eat more fruits and vegetables than do Blacks who shop at small markets.⁶⁵

Studies have found that Black neighborhoods contain fewer supermarkets than do White neighborhoods of matched SES.^{66–68} One study examined the distribution of supermarkets in a nationwide sample of 28,059 zip codes and their 280 million residents. Across neighborhood SES, White neighborhoods had 2–3 times more supermarkets than Black neighborhoods.⁶⁶ Other studies have found that Black neighborhoods contain 2–3 times fewer supermarkets (and 2–4 times more convenience stores and fast food restaurants) than do White neighborhoods of comparable SES.^{63,65,67,68}

Lower Access to Recreational Facilities

Physical activity contributes to health, and inactivity is associated with obesity, diabetes, hypertension, CVD, and cancers.^{1,64} There is a strong relationship between neighborhood recreational resources and physical activity levels.^{54,70} Such resources are not equally distributed across communities. Instead, segregated Black neighborhoods contain fewer recreational outlets than do White neighborhoods.^{71,72} For example, in a study in North Carolina, New York, and Maryland, Black neighborhoods (across neighborhood SES) were 3 times more likely than White neighborhoods to lack recreational facilities; 70% of Black (vs 38% of White) census tracts had none.⁷¹

Given the increased access to fast food and lower access to supermarkets and recreational facilities in segregated Black neighborhoods, it is not surprising that BMI increases with segregation; every 1 SD increase in Black segregation is associated with a 0.423 increase in Black body mass index and a 14% increase in Blacks' odds of being overweight.⁶⁹

THEORIZED PATHWAYS, CURRENT AND NEEDED RESEARCH

The literature reviewed indicates that the paths from these 3 neighborhood disparities to health disparities are both direct and indirect, as shown in Figure 1. As detailed previously, disparities in healthcare quality and in environmental exposures both contribute independently to Black adult and infant mortality, adverse birth outcomes, and chronic disease (eg, diabetes, hypertension, CVD). Similarly, disparities in healthcare quality and in the built environment both contribute independently to poor health behaviors such as low physical activity. Given that 2 different neighborhood factors play a role in each outcome, residential segregation not only contributes to, but indeed may account for,

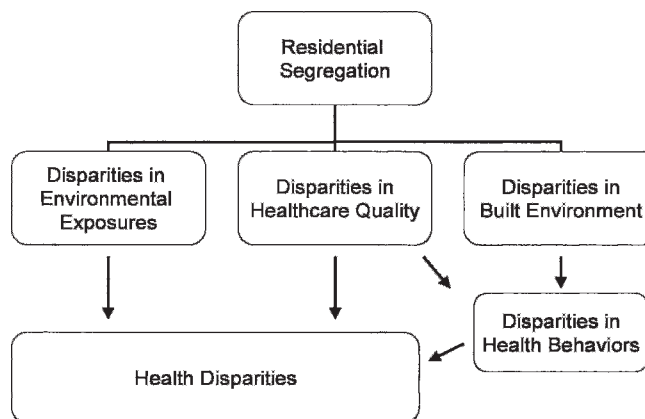


Fig 1. Three-factor model of segregation and Black health disparities

Black-White disparities in chronic disease, health behaviors, mortality, and adverse birth outcomes; such disparities may be differences between Whites and segregated Blacks alone. Data on segregation and health disparities provide preliminary support for this hypothesis.

Current and Needed Research

Although segregation characterizes the lives of most Blacks, there are few studies of its role in health disparities.¹² Moreover, most studies focused on Black-White disparities in infant and adult all-cause mortality.⁷³ These found that infant and adult mortality rates among segregated (SI >60 or >70) Blacks are 2–5 times higher than those of Whites even when controlling for SES, whereas there are no Black-White differences in adult or in infant mortality rates for low-segregated Blacks (SI <50). The effect of segregation on mortality holds for Blacks but not Whites; living in a segregated Black neighborhood predicts increased mortality for Blacks, but living in a segregated White neighborhood is not associated with increased mortality for Whites.⁷³ Unfortunately, these mortality studies appear to be the only studies of segregation and Black-White disparities.¹² However, several studies compared high- and low-segregated Blacks; these focus on segregation and Black health rather than on Black-White health disparities. Each of these studies found that

the health and health behavior of high-segregated Blacks is significantly poorer than that of their low-segregated cohorts of matched SES. For example, high-segregated Blacks exceed their low-segregated counterparts in prevalence of prostate cancer,⁷⁴ CVD incidence and mortality,⁷⁵ adverse birth outcomes,^{8,17} obesity,⁶⁹ prevalence of cigarette smoking,^{76,77} and levels of physical inactivity.⁷⁸

The paucity of research on segregation and health disparities highlights the need for additional studies. Most needed are studies of the possible role of segregation in Black-White disparities in asthma, diabetes, hypertension, cancer (stage at diagnosis, mortality), and health behavior (eg, diet, cancer-screening). Studies that use multilevel modeling to control for both neighborhood and individual-level SES would be most beneficial, given that current studies

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tended to control for only one of these. Likewise, multilevel studies that control for individual-level risk factors (eg, health insurance, racial discrimination) and test the theorized neighborhood mediators presented here would clarify the pathways from segregated neighborhoods to health disparities.

CONCLUSION

In the past decade of research, poor health and problematic health behaviors have been understood as mostly a function of poor environments and problematic neighborhoods.⁵³ Unfortunately, such research rarely has focused on the role of segregated Black neighborhoods in Blacks' poor health and in health disparities.¹² This review summarizes 3 Black-White disparities in neighborhood context and argues that these are a few of many pathways through which segregation contributes to Black-White health disparities. Black and White neighborhoods are separate and unequal in a manner that may explain the separate, unequal health profiles of Blacks and Whites—particularly because most Blacks reside in mostly Black neighborhoods irrespective of their individual-level SES. Thus, Black-White health disparities might be better understood and eliminated by focusing, not on Black people and cultures, but on Black places and contexts.

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