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Investigating Racial, Ethnic, and Neighborhood Disparities in Access to Safe Hospital Care in Washington, DC

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February 2025

Racial and ethnic disparities in the delivery of safe hospital care are long-standing (AHRQ 2023; Gangopadhyaya 2021a, 2021b; Gangopadhyaya et al. 2023; Hasnain-Wynia et al. 2007; Okoroh, Uribe, and Weingart 2017; Shen et al. 2016). Several studies have documented substantial disparities in patient safety across hospitals and states and offer a broad perspective on potential drivers of health inequities (AHRQ 2023; Barnato et al. 2005; Dimick et al. 2013; Gangopadhyaya 2021a; Ly et al. 2010). Although such studies shed light on geographic factors in determining access to safe hospital care (i.e., state-level differences in hospital quality, health care policy, and access to care), these studies typically do not hold fixed local constraints such as available public transportation, residential proximity to high-quality hospitals, and other factors that greatly determine which hospital patients select. Fewer studies have focused on health inequities in localized settings such as single cities or counties, and, as a result, the evidence on potential local drivers of inequities in health outcomes is relatively limited (Glazer et al. 2021).

To address this gap in our understanding of drivers of patient safety disparities, this study investigates rates of adverse safety events across hospitals in Washington, DC, from 2017 to 2020. We examine rates of adverse safety events overall and investigate differences across three racial and ethnic groups: white non-Hispanic (hereafter white) patients, Black non-Hispanic (hereafter Black) patients, and Hispanic patients.

- Across DC hospitals, Black patients experience a 37.3 percent higher incidence of adverse safety events relative to white patients, but there were no significant differences between Hispanic and white patients.
- There are no significant differences in rates of adverse safety events within DC hospitals between Black and white patients. In other words, Black and white patients treated at the same DC hospital could expect similar risks of adverse safety events.
- Instead, Black-white disparities in patient safety in DC appear to be driven by unequal access to the safest hospitals. About 37.7 percent of white patients in DC accessed the hospital with the best safety record, compared with only 3.7 percent and 8.4 percent of Black and Hispanic patients, respectively.
- About two-thirds (66.9 percent) of white patients accessed the three hospitals with the best safety records in DC, while less than one-third (29.9 percent) of Black patients accessed the same three hospitals.

Examining unequal access to safe hospital care within a city presents opportunities for local policymakers and stakeholders to assess how to best redirect limited resources to improve equitable hospital care citywide. Within DC, racial residential segregation functions as a structural determinant of health, as it produces racial and ethnic differences in access to safe hospitals, yielding disparate patient safety outcomes. Therefore, reducing racial disparities in patient safety within DC requires increased funding and support for all hospitals to emulate the patient care practices of better-resourced, safer hospitals.

Hospital and Insurance Factors in Patient Safety Disparities

Safe hospital care is a core pillar of quality care; hospitals seeking to deliver high-quality care must endeavor to minimize adverse safety events, also called "never-events" because they are preventable (Mitchell 2008). Notably, adverse safety events should not be influenced by patients' underlying health conditions before admission or by demographic characteristics. Instead, such events represent avoidable illnesses or injuries acquired during a hospital stay. An example of an adverse safety event is a patient contracting sepsis after an otherwise routine and successful surgery.

In this section, we review both hospital and insurer factors that contribute to racial and ethnic disparities in patient safety. Factors that contribute to disparities in safe hospital care can be categorized into two types: across-hospital factors (i.e., factors that affect which hospitals patients use) and within-hospital factors (factors that affect the type of care received in hospitals).

Racially segregated neighborhoods are a product of long-standing plans, policies, and practices that have systematically denied equal opportunity to disadvantaged populations (Greene, Turner, and Gourevitch 2017). Several studies have found that disparities in health care are related to individuals' race and ethnicity and their communities' racial and ethnic composition (e.g., Gaskin et al. 2012b; Lin et

al. 2023). Race-based residential segregation maintains unequal neighborhoods, with high-quality providers more likely to be in areas with more privileged groups (Steil and Arcaya 2023). Conversely, for disadvantaged communities, residential segregation and differential access to neighborhood amenities become across-hospital factors that can impose barriers to high-quality hospitals, contributing to disparities in adverse safety events (Chandra, Kakani, and Sacarny 2020; Roux et al. 2001). Gangopadhyaya (2021a) used discharge records across 26 states in 2017 and found that Black patients were significantly less likely to be admitted to the safest hospitals relative to white patients.

Within-hospital factors, such as provider discrimination based on a patient's racial and ethnic background, gender, and insurance coverage, may influence differences in the quality of care delivered to distinct patient groups admitted to the same hospital. Gangopadhyaya (2021b) found that Black hospital patients have significantly higher rates of adverse safety events relative to white patients, even when admitted to the same hospital. Previous studies have also found that discriminatory practices among providers, physicians, and nurses help widen the gap in safe hospital care (Mateo and Williams 2020; Nong et al. 2020; Smedley, Stith, and Nelson 2003). The systematic separation of provider teams within hospital systems may also result in patients not receiving equal care, attention, and resources (Hollingsworth et al. 2021).

Moreover, insurers reimburse hospital services at different rates, with private insurers paying higher rates than Medicare and Medicaid (Seldon 2020). Differences in payment rates can incentivize hospitals to deliver differential care to patients based on payer type, especially if providing safe, high-quality care is more costly (Smedley Stith, and Nelson 2003). Indeed, Medicaid patients have higher rates of adverse safety events and worse patient safety outcomes than privately insured patients (Gangopadhyaya 2024; Spencer, Gaskin, and Roberts. 2013). Because Black and Hispanic patients are underrepresented by private insurance and overrepresented by Medicaid, insurance type may represent a major mechanism through which racial and ethnic disparities in patient safety emerge.

DC Health and Neighborhood Characteristics

Overall, DC health outcomes are similar to national averages. As of 2019, life expectancy at birth in DC is 78.0 years compared with 78.8 years nationally, and 13.5 percent of adult DC residents self-report poor or fair health versus 11.2 percent nationally (Arias et al. 2022; Government of the District of Columbia 2022; Kochanek, Xu, and Arias 2020).[1] Uninsured rates, however, are lower in DC (3.5 percent) relative to the national estimates (10.9 percent) (Tolbert, Drake, and Damico 2023).[2] This is attributable to relatively high employer coverage and Medicaid eligibility for low-income adults in DC: nondisabled adults in households earning income at or below 215 percent of the federal poverty level are eligible for Medicaid, and the income limits are higher for parents and pregnant women. These income limits are much higher than most states that opted to expand Medicaid to low-income adults under the Affordable Care Act.[3]

However, when separating health outcomes in DC by race, Black people have substantially worse outcomes relative to white people. The difference in Black-white life expectancy in DC has widened in recent years relative to the rest of the country (Roberts, Reither, and Lim 2020). In 2019, rates of

diabetes were eight times higher, and rates of high blood pressure were two times higher for Black residents than for white residents (Government of the District of Columbia 2022).[4] However, nationally, rates of diabetes were 1.7 times higher, and rates of high blood pressure were 1.4 times higher for Black residents compared with white residents (Sekkarie et al. 2024). In 2018, infant mortality was nearly five times higher for Black than for white infants in DC, while infant mortality was over two times higher for Black relative to white infants nationally (Ely and Driscoll 2020).

Within DC, exclusionary practices and policies have created and sustained racially segregated neighborhoods along with disparate racial and ethnic health and economic outcomes (e.g., life expectancy, infant mortality, education, employment, income) (Asch and Musgrove 2017; Kijakazi et al. 2016; King, Morenoff, and House 2011; King et al. 2022). DC is divided into eight municipal units known as wards. Relative to majority-white wards, majority-Black wards have lower property values and gaps in resources that support health and well-being. In 2019, the median household income in majority-white Ward 3 was $128,670, but only $35,245 in majority-Black Ward 8.[5] Similarly, 3.1 percent of residents in Ward 3 lived below the federal poverty level compared with 43.0 percent of residents in Ward 8.[6] In 2020, only three full-service grocery stores were available for the combined 161,503 residents in majority Black Wards 7 and 8, while Ward 3 had 16 full-service grocery stores for its 84,869 residents.[7] Additionally, the closure of two major hospitals and specialty care services lines between 2019 and 2023 in majority Black Wards 5 and 8 restricted access to convenient and timely care (King et al. 2022).

Data

To investigate differences in the delivery of safe hospital care within DC, we acquired complete hospital discharge records from the state inpatient databases processed by the Agency for Healthcare Research and Quality (AHRQ) for its Healthcare Cost and Utilization Project. We examined DC discharge records from 2017 to 2020. These data represent the universe of patient discharge records for DC and include information on patient age, sex, racial and ethnic background, insurer type, diagnostic condition, and procedure codes.

AHRQ patient safety indicators (PSIs) are clinically validated measures of injuries or illnesses patients acquire unrelated to the primary diagnoses that initiated their hospital admission (Romano et al. 2009). Using AHRQ-developed software (version 2022) to track PSIs, we identified discharge records reporting at least 1 of 11 adverse safety events. Therefore, the adverse safety events measured by PSIs represent events all hospitals should seek to minimize.

Our primary measure of patient safety is the overall rate of adverse safety events, which indicates the likelihood of at least 1 of the 11 events occurring. We categorized these 11 measures as either general or surgical adverse safety events (table 1). The rate of general adverse safety events indicates the presence of at least 1 of 4 general adverse safety events—those most patients are at risk for in hospital settings. The rate of surgical adverse safety events indicates the presence of at least 1 of 7 surgery-related adverse safety events, those occurring during or shortly after surgical procedures.

TABLE 1

Selected Patient Safety Indicators, by Category

General
Pressure ulcer
Iatrogenic pneumothorax
Central venous catheter-related bloodstream infection
In-hospital fall-associated fracture
Surgical
Postoperative hemorrhage or hematoma
Postoperative acute kidney injury requiring dialysis
Postoperative respiratory failure
Perioperative pulmonary embolism or deep vein thrombosis
Postoperative sepsis
Postoperative wound dehiscence
Abdominopelvic accidental puncture or laceration

Source: Agency for Healthcare Research and Quality, State Inpatient Databases for DC, 2017–20, https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.

Notes: The 11 measures selected are used by the Centers for Medicare and Medicaid Services in evaluating the Hospital-Acquired Condition Reduction Program. For more information on calculating patient safety indicators, see "Patient Safety Indicator Measures," AHRQ, https://qualityindicators.ahrq.gov/measures/psi_resources.

We applied several sample restrictions to our analysis. We restricted the patient sample to DC adult residents and excluded all patients under age 19 because PSIs are measured only for adult patients. We also removed discharges from two of nine DC hospitals. For one hospital, the Healthcare Cost and Utilization Project erroneously reported the race and ethnicity of all patients as Hispanic. Another hospital with approximately 120 discharges annually was excluded after we restricted our sample to hospitals with at least 600 discharges of adults during the sample period. Removing both hospitals led to the removal of 17,643 discharges, representing about 9.05 percent of all adult discharges reported in DC during this period. Additionally, to ensure that zip code–level measures were reliable and to better determine the relationship between access to safe care and zip code contextual factors, such as racial and ethnic composition and income, we restricted zip codes in our sample to those with at least 400 discharges from 2017–20 (i.e., zip codes that had approximately 100 discharges annually). This decision led to the removal of 2,053 discharges, representing about 1 percent of all adult discharges in DC over this period.

Methods

To assess variation in access to safe hospitals within DC, we conducted our analyses on three levels: zip code–level discharges, patient-level discharges, and hospital-level discharges. At the zip code level, we assessed whether racial or ethnic composition is associated with the quality of care received by patients residing in DC zip codes. We construct zip code measures of average median income and racial and ethnic population shares from zip code tabulation areas of the 2016–20 five-year American Community Survey.

Our patient-level analysis focused on racial and ethnic disparities in patient safety while examining disparities by insurer type. In our assessment of racial and ethnic disparities, we defined white patients as the comparison group and compared differences in rates of adverse safety events between Black and white patients, as well as between Hispanic and white patients. In our assessment of payer disparities, we defined patients whose primary payer was private insurance as the comparison group and compared differences in rates of adverse safety events between Medicaid-insured and privately insured patients, as well as between Medicare-insured and privately insured patients.

For each hospital in this study, we calculated the unadjusted rate of adverse safety events and the share of racial and ethnic groups using each hospital to analyze hospital access and quality. We examined unadjusted overall differences in adverse patient safety events, but we recognize that some patient populations may differ in ways that affect susceptibility to adverse safety events (e.g., patients with complex needs may have longer hospital stays, which increase exposure to adverse events). Therefore, we also assessed differences after adjusting for patient age and gender, indicators for primary payer type (in racial and ethnic disparities analyses), and indicators for patient racial and ethnic background (in insurance disparities analyses). Several of these controls could drive underlying disparities in access to safer hospitals, and controlling for them could underreport total disparities.

Limitations

This study has several limitations. First, there is the potential for misclassification of patients' race and ethnicity. We classify patients' race and ethnicity based on information directly reported in the hospital discharge records; however, the source and quality of this information can be inconsistent and inaccurate (Hasnain-Wynia and Baker 2006). Although comparisons between patients' race and ethnicity reported in discharge data and self-reported census data indicate high match rates between 86 and 90 percent (Zingmond et al. 2015), we recognize the potential for misclassification of patient race and ethnicity in our analysis when we do not use self-reported race and ethnicity data.

Second, although PSIs are clinically validated measures of patient safety, certain patient groups may be more likely to experience an adverse safety event than others in ways not controlled for in our regression estimates. For example, underlying medical conditions unrelated to primary diagnosis may influence the likelihood or severity of adverse safety events. Patients with complex conditions could undergo more procedures and longer hospital stays, both of which could place one at higher risk of exposure to adverse safety events (Slonim et al. 2007).

Finally, we do not observe hospitalizations in Maryland or Virginia among patients who reside in DC. If the DC patients who use hospitals in these other states are systematically different from all other DC patients, this could affect some of our findings.

Results

We begin our analysis by presenting evidence on the geographic distribution of racial and ethnic groups by DC zip code and then by calculating the rate of adverse safety events for patients in these zip codes.

Demographic Characteristics of DC Zip Codes

Table 2 displays rates of adverse safety events, discharges, shares of racial and ethnic groups, and average median household income for each observed DC zip code. Figures 1 and 2 show maps of DC zip codes by quartiles of racial and ethnic composition and rates of adverse safety events.

TABLE 2

Washington, DC, Zip Codes by Patient and Demographic Characteristics, 2017–20

Zip code	Rate of adverse safety events	Discharges	Population	Percent			Average median income
				Non-Hispanic white	Non-Hispanic Black	Hispanic	
20001	4.12	14,075	47,022	41.2	39.0	9.2	$89,852
20002	3.81	20,748	65,893	40.9	46.6	6.8	$73,716
20003	2.68	7,091	31,933	59.8	27.1	6.4	$99,639
20005	5.43	2,944	12,965	54.0	16.9	17.1	$73,063
20007	1.95	4,094	27,079	74.2	5.0	10.7	$102,663
20008	3.58	5,021	29,633	70.3	8.2	12.4	$91,720
20009	3.07	10,732	52,428	59.5	17.4	13.9	$89,718
20010	2.97	9,754	34,472	37.9	24.3	29.2	$72,212
20011	3.03	22,787	68,837	15.7	55.7	23.5	$61,377
20012	5.96	4,028	16,881	22.6	55.0	17.7	$75,047
20015	2.46	3,255	16,147	71.6	8.2	11.4	$127,137
20016	2.25	5,773	34,473	72.1	6.7	9.5	$116,925
20017	3.86	6,476	20,676	26.2	59.1	8.2	$64,848
20018	3.65	8,768	20,399	11.9	75.1	8.5	$52,274
20019	4.00	26,491	63,394	1.2	93.4	3.4	$34,630
20020	4.39	20,960	56,670	3.0	90.6	3.5	$33,924
20024	3.51	4,275	13,771	45.2	40.1	6.9	$63,695
20032	4.16	13,935	42,499	7.5	85.7	3.9	$32,659
20036	0	714	5,629	75.5	3.7	8.8	$70,740
20037	2.61	3,071	14,857	65.9	6.7	12.0	$68,131

Sources: Discharge data come from Agency for Healthcare Research and Quality, State Inpatient Databases for DC, 2017–20, https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp. Zip code demographic characteristics come from the American Community Survey's five-year zip code tabulation area estimates, 2016–20.
Notes: Rate of adverse safety events is calculated per 1,000 at-risk discharges.

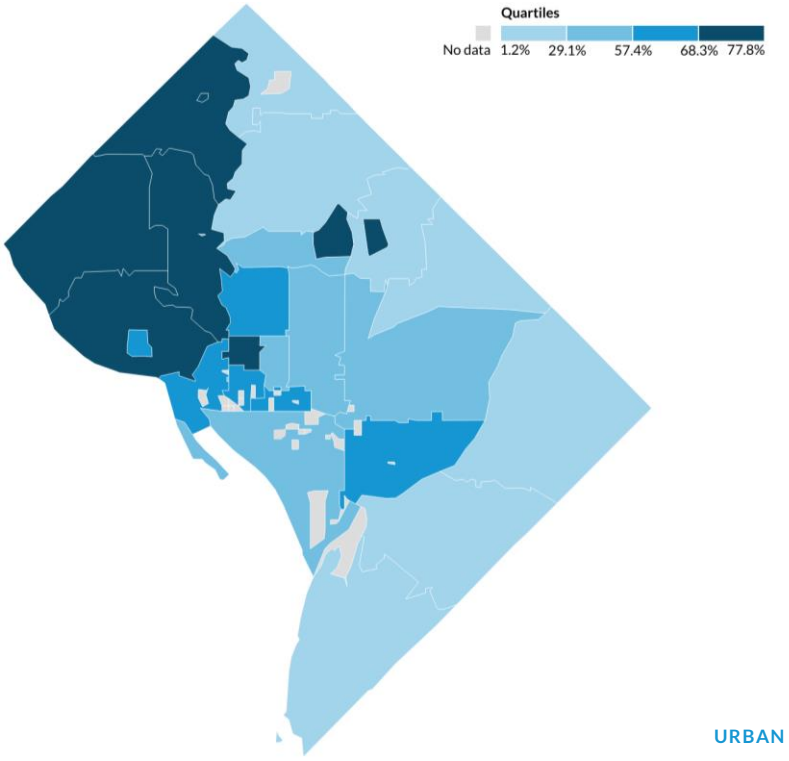
As seen in figure 1, DC exhibits stark geographic divisions by race and ethnicity. Zip codes that have the largest white population shares are in Northwest DC, while zip codes with the largest Black population shares are in Northeast and Southeast DC (i.e., in figure 1, panel a, the population of Quartile 4 zip codes is 68.7 percent to 77.8 percent white, and in figure 1, panel b, the population of Quartile 4 zip codes is 55.0 percent to 93.4 percent Black). Zip codes with the largest Hispanic population shares are in northern DC (i.e., in figure 1, panel c, the population of Quartile 4 zip codes is 12.4 percent to 29.2 percent Hispanic). However, the geographic pattern for Hispanic residents is weaker than that of white and Black residents.

FIGURE 1

Washington, DC, Zip Codes by Racial and Ethnic Composition, 2017–20

Percentage of population

a. Non-Hispanic white



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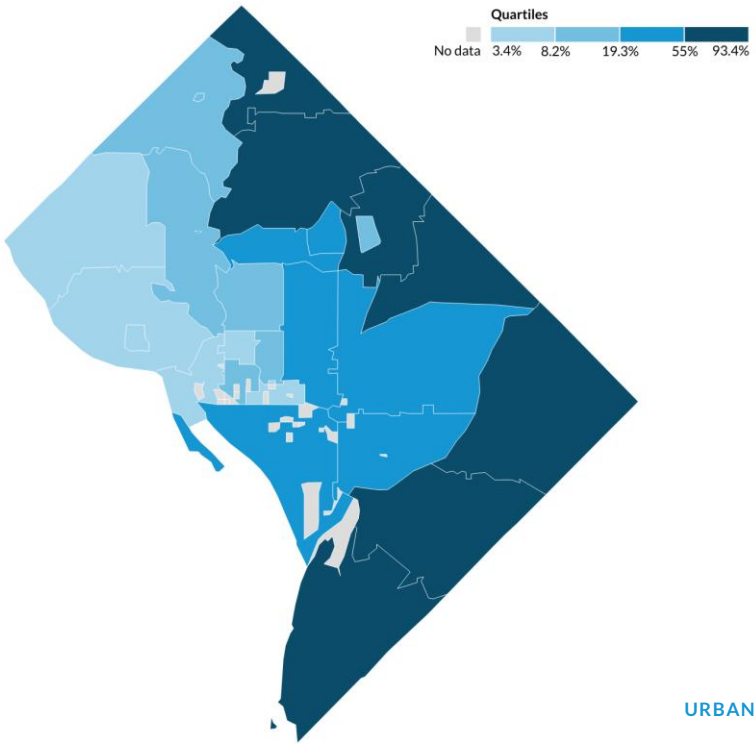
b. Non-Hispanic Black



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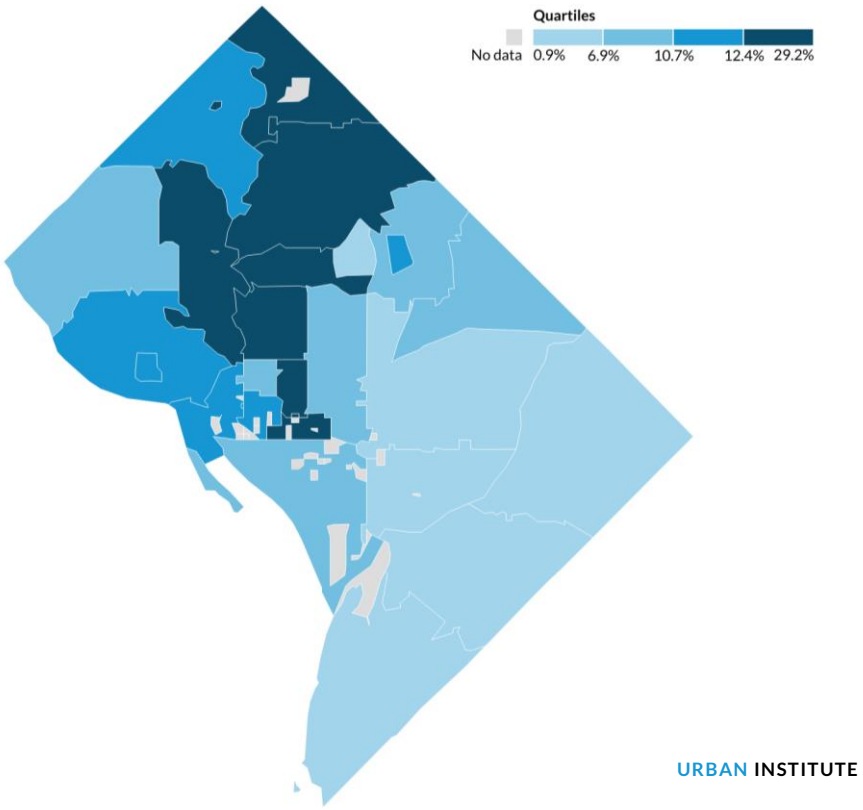
c. Hispanic

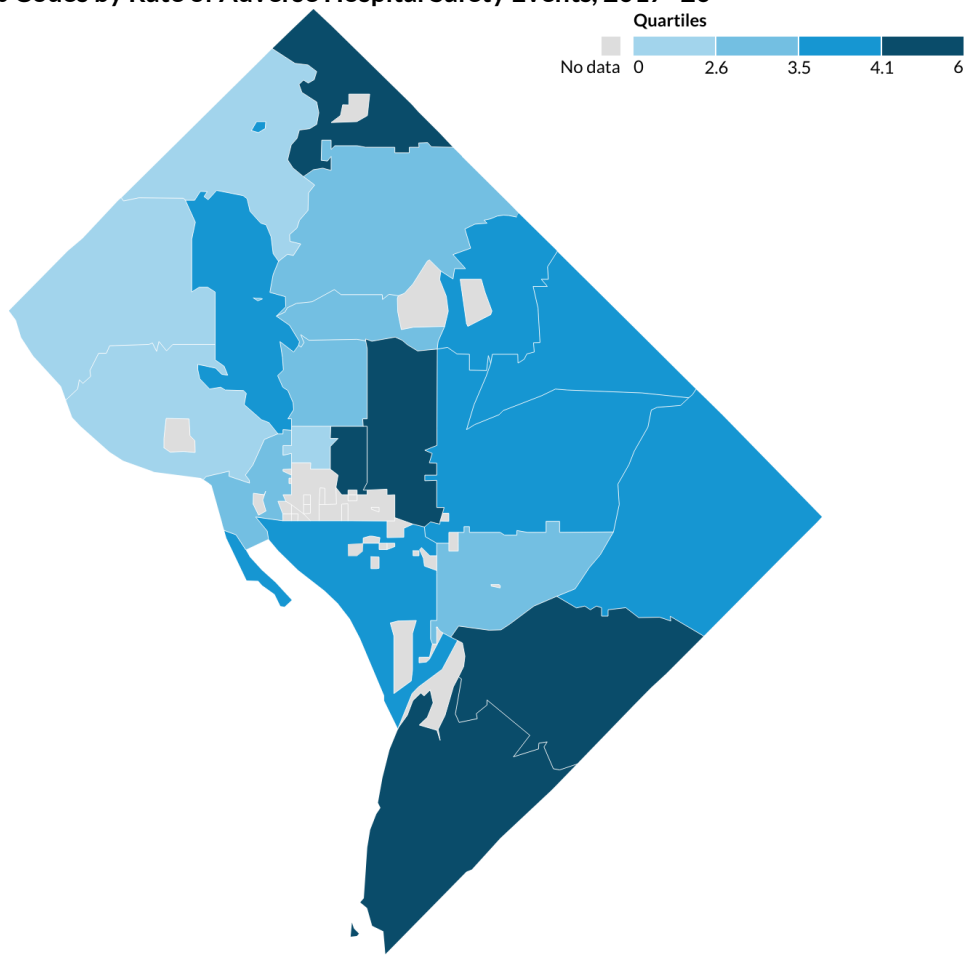


Source: American Community Survey five-year zip code tabulation area estimates, 2017–20.
Notes: Quartiles of racial and ethnic population shares are calculated at the zip code level.

Figure 2 shows that patient safety reflects patterns of racial segregation within DC, with predominantly white zip codes in Northwest DC having lower rates of adverse safety events (i.e., with Quartile 1 having 0–2.6 adverse safety events per 1,000 discharges) and predominantly Black zip codes in Northeast and Southeast DC having higher rates (i.e., with Quartile 4 having 4.1–6.0 adverse safety events per 1,000 discharges). Because geographic variation in adverse safety events mirrors racial and ethnic segregation within DC, our analysis primarily focuses on racial and ethnic disparities in patient safety, particularly differences between Black and white patients.

FIGURE 2

Washington, DC, Zip Codes by Rate of Adverse Hospital Safety Events, 2017–20



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Source: Agency for Healthcare Research and Quality, State Inpatient Databases for DC, 2017–20, https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.
Notes: Rates of adverse safety events are calculated per 1,000 at-risk discharges.

Health and Safety Outcomes of DC Patients and Residents

Table 3 examines the demographic characteristics of adult residents and hospitalized patients across DC by three major racial and ethnic groups: white, Black, and Hispanic adults. These three groups account for 92.1 percent of the adult DC population. Hospitalized adults are not representative of the total adult population within DC. Black hospitalized patients account for the largest share of hospitalized adults at 71.3 percent while representing only 44.1 percent of the adult resident population. Conversely, white hospitalized patients are underrepresented in the patient population at 18.4 percent while making up 36.9 percent of the adult population.

Relative to the total adult population, the hospitalized adult population includes fewer privately insured patients than those enrolled in Medicaid and Medicare. An estimated 71.2 percent of adult

residents are privately insured, while only 33.4 percent of hospitalized adults are privately insured. Medicaid and Medicare patients account for a combined 65.1 percent of hospitalized adults and 25.1 percent of adult residents. Insurer type may also be a compounding driver of racial and ethnic disparities in patient care, as more than half of white patients, relative to one-quarter of Black and Hispanic patients, are privately insured.

TABLE 3

Total and Hospitalized Adult Washington, DC, Residents by Demographic Characteristics, 2017–20

	Total adults	Hospitalized Adults			
		All	White	Black	Hispanic
Patient race/ethnicity (%)					
Non-Hispanic White	36.9	18.4	100.0	0.0	0.0
Non-Hispanic Black	44.1	71.3	0.0	100.0	0.0
Hispanic	11.1	5.9	0.0	0.0	100.0
Insurer (%)					
Private insurance	71.2	33.4	57.4	26.7	25.2
Medicaid	19.0	29.5	5.8	33.3	55.6
Medicare	6.1	35.6	35.1	38.9	16.0
Age (%)					
19–44	47.6	35.5	44.5	29.6	57.4
45–64	20.6	32.0	17.9	37.3	23.3
65–84	10.9	25.9	28.1	26.8	16.0
85+	1.5	6.6	9.6	6.3	3.3
Gender (%)					
Male	47.3	40.4	37.0	42.0	38.1
Female	52.7	59.6	63.0	58.0	61.9
Observations	281,0712	194,992	35,034	135,515	11,175

Sources: Total adult estimates are calculated using American Community Survey one-year estimates, 2017–20. Data on hospitalized adults (ages 19 and older) come from Agency for Healthcare Research and Quality, State Inpatient Databases for DC, 2017–20, https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.

Notes: Black, white, and Hispanic do not account for all races and ethnicities represented within the DC adult and hospitalized adult populations. As a result, race and ethnicity shares do not total 100 percent. Private, Medicaid, and Medicare do not account for all insurer types within the DC adult and hospitalized adult populations; a small percentage not shown here are uninsured or self-pay. Insurer type is hierarchically measured for all total adult estimates. All privately insured adults who have Medicaid or Medicare are coded as privately insured. All Medicaid enrollees with Medicare are coded as Medicaid enrollees.

Unadjusted Differences in Rates of Adverse Safety Events across DC Hospitals

Table 4 presents the unadjusted average rates of adverse safety events by total discharges and patient characteristics. Unadjusted estimates state the total disparity, or rate of adverse safety events, experienced by each demographic group. All rates of adverse safety events are higher for Black patients relative to white and Hispanic patients. The rate of any adverse safety event is higher by 1.36 per 1,000 discharges for Black patients relative to white patients (i.e., 50 percent higher). There is no measurable difference in rates of adverse safety events between Hispanic and white patients.

Rates of any adverse safety events are similar between privately insured and Medicaid patients, but the rate of general adverse safety events for Medicaid patients is statistically different from that of

privately insured patients. The rate of any adverse safety event is 2.26 per 1,000 discharges higher for Medicare patients than for privately insured patients (i.e., 80.4 percent higher). Differences in adverse safety events are significantly higher for Medicare patients than for privately insured patients for the rates of both general adverse safety events and surgical adverse safety events.

Regarding age, rates of adverse safety events are higher for patients 45 and older and statistically different from those of patients 19–44. Female patients have lower and statistically different rates of adverse safety events relative to male patients.

TABLE 4

Rates of Adverse Hospital Safety Events in Washington, DC, by Patient Demographic Characteristics, 2017–20

	Rate of Adverse Safety Events					
	All		General		Surgical	
All discharges	3.64		0.97		2.72	
Race/ethnicity						
Non-Hispanic white	2.71		0.63		2.11	
Non-Hispanic Black	4.07	**	1.09	*	3.05	**
Hispanic	2.33		0.81		1.52	
Insurer						
Private insurance	2.81		0.42		2.44	
Medicaid	2.94		0.91	**	2.08	
Medicare	5.07	**	1.53	**	3.59	**
Age						
19–44	1.49		0.42		1.10	
45–64	4.45	**	1.01	**	3.52	**
65–84	5.54	**	1.52	**	4.06	**
85+	3.81	**	1.55	**	2.33	*
Gender						
Male	4.56		1.19		3.46	
Female	3.02	**	0.82	**	2.23	**

Source: Agency for Health care Research and Quality, State Inpatient Databases for DC, 2017–20, https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.

Notes: Rate of adverse safety events is calculated per 1,000 at-risk discharges. White patients are the reference group for Black and Hispanic patients. Patients who are Asian or Pacific Islander, Native American, other races or ethnicities, or patients with no identified race or ethnicity are included in the sample, but estimates are not shown here. Privately insured patients are identified as the reference group for Medicare and Medicaid enrollees. Uninsured patients, other insurance types, and patients with no reported insurer type are included but not shown here. The reference group for all age groups is 19–44, and male is the reference group for female patients. * or ** denotes whether unadjusted rates of adverse safety events are statistically different from their corresponding reference groups for race, ethnicity, insurer, age, and gender.

* = $p < 0.05$; ** = $p < 0.01$.

Across- and Within-Hospital Differences in Rates of Adverse Safety Events

Table 5 presents the unadjusted (i.e., based on the same estimates in table 4) and adjusted differences in rates of adverse safety events by patient racial and ethnic background and primary payer relative to the reference group. There are two adjusted difference models: one that estimates differences between race and ethnicity or insurance-type groups across DC hospitals and one that estimates within-hospital

differences. Both models control for demographic characteristics, namely race, ethnicity, insurer type, age, and gender. The within-hospital adjusted differences model also controls for hospital fixed effects, allowing us to examine differences in the quality of care each demographic group receives within the same hospital.

Across DC hospitals, Black patients have significantly higher rates of adverse safety events relative to white patients. Even after we adjust for other patient characteristics, the rate of adverse safety events across DC hospitals is higher by 1.01 per 1,000 discharges (i.e., 37.3 percent higher) for Black patients relative to white patients. However, there is no significant difference in rates of adverse safety events between Black and white patients within the same hospital. Rather than there being significant differences in the quality of care received by Black and white patients within the same hospital, Black-white disparities in patient safety are likely driven by unequal access to safer hospitals.

Table 5 indicates that there is no statistically significant difference in the quality of care received by white and Hispanic patients with and without adjusting for patient characteristics. Additionally, the adjusted models have no systematic differences in the quality of care being delivered to patients with different insurer types.

TABLE 5

Unadjusted and Adjusted Differences in Rates of Adverse Hospital Safety Events in Washington, DC, by Patient Demographic Characteristics, 2017–20

	Differences in Rate of Adverse Safety Events				
	Unadjusted		Adjusted		Adjusted, within hospital
Patient race/ethnicity					
Non-Hispanic white	-		-		-
Non-Hispanic Black	1.36	**	1.01	**	0.56
Hispanic	−0.39		0.20		−0.41
Insurer					
Privately insured	-		-		-
Medicaid	0.13		−0.37		−0.76
Medicare	2.26	**	0.65		0.40

Source: Agency for Healthcare Research and Quality, State Inpatient Databases for DC, 2017–20, https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.

Notes: Estimates indicate adverse safety events are per 1,000 at-risk discharges. Adjusted within-hospital differences include hospital-fixed effects. Both unadjusted and adjusted differences control for patients who are Asian/Pacific Islander, Native American, and other races, and patients with no identified race or ethnicity to identify white patients as the reference group. To identify privately insured patients as the reference group for both adjusted and unadjusted differences, we control for uninsured patients, other insurer types, and patients with no reported insurer type. Adjusted differences in rates of adverse safety events control for age and gender.

- = reference group.

* = $p < 0.05$; ** = $p < 0.01$.

Differences in Hospital-Level Patient Safety Indicators

Because Black-white disparities in patient safety are driven by the hospitals that patients have access to, table 6 more closely examines hospital-level differences in the racial and ethnic composition of those served by each hospital. We do so by ranking hospitals in DC by their overall rate of adverse safety events. The hospital with the best safety record recorded about 1.9 adverse safety events per 1,000 discharges, while the hospital with the worst safety record recorded 4.93 adverse safety events per 1,000 discharges.

Findings further support that in DC, racial and ethnic disparities in patient safety are driven by unequal access to safe hospitals, as 37.7 percent of white patients accessed the safest hospital, while only 3.7 percent and 8.4 percent of Black and Hispanic patients, respectively, accessed the safest hospital. Moreover, 66.9 percent of white patients accessed the three hospitals with the best safety records, while only 29.9 percent of Black and 22.1 percent of Hispanic patients accessed the three hospitals with the best safety records. In contrast, 32.5 percent of white patients used the three hospitals with the worst safety records, while 63.4 percent and 73.2 percent of Black and Hispanic patients accessed the three hospitals with the worst safety records, respectively.

TABLE 6

Patient Demographic Characteristics in Washington, DC, by Hospital Safety Rank, 2017–20

Hospital safety rank (best to worst)	Rate of adverse safety events	Discharges	Share of Patients (%)		
			White	Black	Hispanic
1	1.90	21,102	37.7	3.7	8.4
2	2.14	2,798	1.1	1.6	0.7
3	2.73	49,054	28.1	24.6	13.0
4	2.82	10,270	0.7	6.7	4.6
5	3.87	27,101	2.9	16.7	18.1
6	4.61	67,216	14.7	39.4	47.0
7	4.93	17,451	14.9	7.3	8.1

Source: Agency for Healthcare Research and Quality, State Inpatient Databases for DC, 2017–20, https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp.
Notes: Rates of adverse safety events are per 1,000 at-risk discharges. Hospital access is estimated by calculating the share of each racial and ethnic group using each hospital.

Discussion

Our study of racial and ethnic differences in access to safe hospital care in DC highlights that across DC hospitals, the rate of adverse safety events was significantly higher for Black patients relative to white patients. However, no significant differences emerged in rates of adverse safety events within DC hospitals. Black-white disparities in patient safety in DC are therefore driven by unequal access to the safest hospitals as opposed to systematic differences in patient care within hospitals. This was further supported by findings showing that approximately two-thirds of white patients accessed the three hospitals with the best safety records, while approximately two-thirds of Black patients accessed the three hospitals with the worst safety records. Further, when simultaneously examining racial and

income segregation, we found that neighborhoods with increasing shares of high-income white residents had decreasing rates of adverse safety events.

These findings are consistent with previous evidence that racial residential segregation is a fundamental cause of racial health inequities (Link and Phelan 1995; Phelan and Link 2015; Steil and Arcaya 2023; White, Haas, and Williams 2012; Williams 2001).[8] Such segregation is the result of historical and contemporary policies and practices (e.g., redlining, urban renewal, educational segregation) that have concentrated health-promoting resources in white communities and have excluded nonwhite, primarily Black, communities from equitable access. For example, differential access to high-quality hospitals by patient race and ethnicity is a major driver of racial-ethnic disparities in unexpected newborn health complications in New York City (Glazer et al. 2021).

Further, primarily Black neighborhoods are more likely to experience primary care shortages and more limited access to ambulatory facilities, physicians, and surgeons (Gaskin et al. 2012a, 2012b). Between 2019 and 2023, two major hospitals and specialty care service lines closed in majority-Black Wards 5 and 8, restricting access to convenient and timely care (King et al. 2022). Therefore, reducing racial disparities in patient safety within DC requires increased funding and support for low-performing hospitals so that they can emulate the patient care practices of better-resourced, safer hospitals.

Examining patient safety disparities within a single major city represents an advance in the patient safety literature. Whereas other studies have examined disparities in patient safety and hospital access nationally (Gangopadhyaya 2021a, b; Gangopadhyaya et al. 2023; Lin et al. 2023), our study examines disparities within the local DC context. This study holds fixed the social and political amenities and resources available to the DC population to examine how the distribution of these resources has resulted in racial and economic disparities in access to safe hospital care.

Research into unequal access to safe hospital care within a city presents opportunities for local policymakers and stakeholders to assess how to improve equitable hospital care citywide. Understanding how structural determinants of health influence patient outcomes is necessary in developing interventions to reduce health inequities. Although recent efforts to address racial inequities in health care have focused primarily on interpersonal discrimination, such as implicit bias and medical training, interventions must work to better address the determinants of hospital segregation. Within DC, racial residential segregation functions as a structural determinant of health, as it produces racial and ethnic differences in access to safe hospitals, yielding disparate patient safety outcomes. Future research should expand on this work by examining how patient safety inequities occur uniquely within additional cities.

Notes

[1] "Table HStat: Respondent-Assessed Fair or Poor Health Status, by Selected Characteristics: United States, Selected Years 1991–2019," Centers for Disease Control and Prevention, accessed January 7, 2025.

[2] "Percentage of Population without Health Insurance Coverage by State: 2019 and 2021," US Census Bureau, September 15, 2022, https://www.census.gov/library/visualizations/interactive/population-without-health-insurance-coverage-2019-and-2021.html.

[3] "Uninsured DC Residents Can Apply for Free Health Insurance," Department of Health Care Finance, Government of the District of Columbia, accessed January 7, 2025.

[4] In 2019, rates of diabetes were 2.1 percent for white residents and 17.5 percent for Black DC residents. National rates of diabetes were 7 and 11.9 percent for white and Black adults, respectively. Rates of high blood pressure were 18.5 percent for white residents and 41.9 percent for Black residents. Nationally, 29.4 percent of white adults and 39.7 percent of Black adults reported high blood pressure(Government of the District of Columbia 2022). See "Diagnosed Diabetes - Race-Ethnicity, Adults Aged 18+ Years, Age-Adjusted Percentage, National," Center for Disease Control, accessed January 6, 2025, https://gis.cdc.gov/grasp/diabetes/diabetesatlas-surveillance.html.

[5] Average median income by DC ward according to the 2015–19 American Community Survey: Ward 1, $102,882; Ward 2, $111,064; Ward 3, $128,670; Ward 4, $94,810; Ward 5, $71,782; Ward 6, $114,363; Ward 7, $45,318; and Ward 8, $35,245 (Government of the District of Columbia 2022).

[6] Families in poverty by DC ward according to the 2015–19 American Community Survey: Ward 1, 11.9 percent; Ward 2, 3.1 percent; Ward 3, 1.8 percent; ; Ward 4, 6.8 percent; Ward 5, 9.9 percent; Ward 6, 8.0 percent; Ward 7, 23.0 percent; and Ward 8, 29.5 percent; See "2015–2019 ACS Key Demographic Indicators," State Data Center, DC Office of Planning, accessed January 6, 2025.

[7] Number of full-service grocery stores by DC ward in 2020: Ward 1, 10; Ward 2, 11; Ward 3, 16; Ward 4, 11; Ward 5, 9; Ward 6, 14; Ward 7, 2; and Ward 8, 1. Population by DC ward in 2020: Ward 1, 91,498; Ward 2, 92,509; Ward 3, 84,869; Ward 4, 86,660; Ward 5, 90,479; Ward 6, 103,316; Ward 7, 80,951; and Ward 8, 80,552 (DC Hunger Solutions 2021).

[8] Arcaya, Mariana, and Alina Schnake-Mahl, "Health in the Segregated City," NYU Furman Cetner: The Dream Revisited (blog), October 2017, https://furmancenter.org/research/iri/essay/health-in-the-segregated-city.

References

AHRQ (Agency for Healthcare Research and Quality). 2023. *2023 National Healthcare Quality and Disparities Report.* Pub 23(24)-0091-EF. Rockville, MD: Agency for Healthcare Research and Quality, US Department of Health and Human Services.

Arias, Elizabeth, Jiaquan Xu, Betzaida Tejada-Vera, and Brigham Bastian. 2022. "US State Life Tables, 2019." *National Vital Statistics Reports* 70 (18).

Asch, Chris Myers, and George Derek Musgrove. 2017. *Chocolate City.* Chapel Hill: University of North Carolina Press.

Barnato, Amber E., F. Lee Lucas, Douglas Staiger, David E. Wennberg, and Amitabh Chandra. 2005. "Hospital-Level Racial Disparities in Acute Myocardial Infarction Treatment and Outcomes." *Medical Care* 43 (4): 308–19.

Chandra, Amitabh, Pragya Kakani, and Adam Sacarny. 2020. "Hospital Allocation and Racial Disparities in Health Care." Working Paper 28018. Cambridge, MA: National Bureau of Economic Research.

DC Hunger Solutions. 2021. "Still Minding the Grocery Gap in DC: 10th Anniversary Grocery Store Report." Washington, DC: DC Hunger Solutions.

Dimick, Justin, Joel Ruhter, Mary Vaughan Sarrazin, and John D. Birkmeyer. 2013. "Black Patients More Likely than Whites to Undergo Surgery at Low-Quality Hospitals in Segregated Regions." *Health Affairs (Project Hope)* 32 (6): 1046–53.

Ely, Danielle M., and Anne K. Driscoll. 2020. "Infant Mortality in the United States, 2018: Data from the Period Linked Birth/Infant Death File." *National Vital Statistics Reports* 69 (7): 1–18.

Gangopadhyaya, Anuj. 2021a. "Black Patients Are More Likely than White Patients to Be in Hospitals with Worse Patient Safety Conditions." Washington, DC: Urban Institute.

———. 2021b. "Do Black and White Patients Experience Similar Rates of Adverse Safety Events at the Same Hospital?" Washington, DC: Urban Institute.

———. 2024. "Assessing Between- and Within-Hospital Differences in Patient Safety between Medicaid and Privately Insured Hospital Patients." *Journal of Patient Safety* 20 (8): e135–e141.

Gangopadhyaya, Anuj, Avani Pugazhendhi, Matt Austin, Alex Campione, and Missy Danforth. 2023. "Racial, Ethnic, and Payer Disparities in Adverse Safety Events: Are There Differences across Leapfrog Hospital Safety Grades?" Washington, DC: Leapfrog Group.

Gaskin, Darrell J., Gniesha Y. Dinwiddie, Kitty S. Chan, and Rachael McCleary. 2012a. "Residential Segregation and Disparities in Health Care Services Utilization." *Medical Care Research and Review* 69 (2): 158–75.

———. 2012b. "Residential Segregation and the Availability of Primary Care Physicians." *Health Services Research* 47 (6): 2353–76.

Glazer, Kimberly B., Jennifer Zeitlin, Natalia N. Egorova, Teresa Janevic, Amy Balbierz, Paul L. Hebert, and Elizabeth A. Howell. 2021. "Hospital Quality of Care and Racial and Ethnic Disparities in Unexpected Newborn Complications." *Pediatrics* 148 (3): e2020024091.

Government of the District of Columbia. 2022. *District of Columbia Behavioral Risk Factor Surveillance System 2019 Annual Health Report.* Washington, DC: Government of the District of Columbia.

Greene, Solomon, Margery Austin Turner, and Ruth Gourevitch. 2017. "Racial Residential Segregation and Neighborhood Disparities." Washington, DC: Urban Institute.

Hasnain-Wynia, Romana, and David W. Baker. 2006. "Obtaining Data on Patient Race, Ethnicity, and Primary Language in Health Care Organizations: Current Challenges and Proposed Solutions." *Health Services Research* 41 (4p1): 1501–18.

Hasnain-Wynia, Romana, David W. Baker, David Nerenz, Joe Feinglass, Anne C. Beal, Mary Beth Landrum, Raj Behal, and Joel S. Weissman. 2007. "Disparities in Health Care Are Driven by Where Minority Patients Seek Care: Examination of the Hospital Quality Alliance Measures." *Archives of Internal Medicine* 167 (12): 1233–39.

Hollingsworth, John M., Xianshi Yu, Phyllis L. Yan, Hyesun Yoo, Dana A. Telem, Ekow N. Yankah, Ji Zhu, Akbar K. Waljee, and Brahmajee K. Nallamothu. 2021. "Provider Care Team Segregation and Operative Mortality Following Coronary Artery Bypass Grafting." *Circulation: Cardiovascular Quality and Outcomes* 14 (5): e007778.

Kijakazi, Kilolo, Rachel Marie Brooke Atkins, Mark Paul, Darrick Hamilton, and William A. Darity Jr. 2016. "The Color of Wealth in the Nation's Capital." Washington, DC: Urban Institute.

King, Christopher J., Bryan O. Buckley, Riya Maheshwari, and Derek M. Griffith. 2022. "Race, Place, and Structural Racism: A Review of Health and History in Washington, DC." *Health Affairs* 41 (2): 273–80.

King, Katherine E., Jeffrey D. Morenoff, and James S. House. 2011. "Neighborhood Context and Social Disparities in Cumulative Biological Risk Factors." *Psychosomatic Medicine* 73 (7): 572–79.

Kochanek, Kenneth D., Jiaquan Xu, and Elizabeth Arias. 2020. "Mortality in the United States, 2019." NCHS Data Brief 395. Washington, DC: Centers for Disease Control and Prevention.

Lin, Sunny C., Gmerice Hammond, Michael Esposito, Cassandra Majewski, Randi E. Foraker, and Karen E. Joynt Maddox. 2023. "Segregated Patterns of Hospital Care Delivery and Health Outcomes." *JAMA Health Forum* 4 (11): e234172–e234172.

Link, Bruce G., and Jo C. Phelan. 1995. "Social Conditions as Fundamental Causes of Disease." Special issue, *Journal of Health and Social Behavior* 35: 80–94.

Ly, Dan P., Lenny Lopez, Thomas Isaac, and Ashish K. Jha. 2010. "How Do Black-Serving Hospitals Perform on Patient Safety Indicators? Implications for National Public Reporting and Pay-for-Performance." *Medical Care* 48

(12): 1133–37. Mateo, Camila M., and David R. Williams. 2020. "Addressing Bias and Reducing Discrimination: The Professional Responsibility of Health Care Providers." *Academic Medicine* 95 (12S).

Mitchell, Pamela H. 2008. "Chapter 1: Defining Patient Safety and Quality Care." In *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*, edited by Ronda G. Hughes. Rockville, MD: Agency for Healthcare Research and Quality.

Nong, Paige, Minakshi Raj, Melissa Creary, Sharon L. R. Kardia, and Jodyn E. Platt. 2020. "Patient-Reported Experiences of Discrimination in the US Health Care System." *JAMA Network Open* 3 (12): e2029650.

Okoroh, Juliet Siena, Erika Flores Uribe, and Saul Weingart. 2017. "Racial and Ethnic Disparities in Patient Safety." *Journal of Patient Safety* 13 (3): 153–61.

Phelan, Jo C., and Bruce G. Link. 2015. "Is Racism a Fundamental Cause of Inequalities in Health?" *Annual Review of Sociology* 41: 311–30.

Roberts, Max, Eric N. Reither, and Sojung Lim. 2020. "Contributors to the Black-White Life Expectancy Gap in Washington, DC." *Scientific Reports* 10 (1): 13416.

Romano, Patrick S., Hillary J. Mull, Peter E. Rivard, Shibei Zhao, William G. Henderson, Susan Loveland, Dennis Tsilimingras, Cindy L. Christiansen, and Amy K. Rosen. 2009. "Validity of Selected AHRQ Patient Safety Indicators Based on VA National Surgical Quality Improvement Program Data." *Health Services Research* 44 (1): 182–204.

Roux, Ana V. Diez, Sharon Stein Merkin, Donna Arnett, Lloyd Chambless, Mark Massing, F. Javier Nieto, Paul Sorlie, Moyses Szklo, Herman A. Tyroler, and Robert L. Watson. 2001. "Neighborhood of Residence and Incidence of Coronary Heart Disease." *New England Journal of Medicine* 345 (2): 99–106.

Sekkarie, Ahlia, Jing Fang, Donald Hayes, and Fleetwood Loustalot. 2024. "Prevalence of Self-Reported Hypertension and Antihypertensive Medication Use Among Adults—United States, 2017–2021." *CDC Morbidity and Mortality Weekly Report* 73 (9).

Selden, Thomas M. 2020. "Differences between Public and Private Hospital Payment Rates Narrowed, 2012–16." *Health Affairs (Project Hope)* 39 (1): 94–99.

Shen, Jay J., Christopher R. Cochran, Olena Mazurenko, Charles B. Moseley, Guogen Shan, Robin Mukalian, and Scott Neishi. 2016. "Racial and Insurance Status Disparities in Patient Safety Indicators among Hospitalized Patients." *Ethnicity and Disease* 26 (3): 443–52.

Slonim, Anthony D., James P. Marcin, Wendy Turenne, Matt Hall, and Jill G. Joseph. 2007. "Pediatric Patient Safety Events during Hospitalization: Approaches to Accounting for Institution-Level Effects." *Health Services Research* 42 (6p1): 2275–323.

Smedley, Brian D., Adrienne Y. Stith, and Alan R. Nelson, eds. 2003. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academies Press.

Spencer, Christine S., Darrell J. Gaskin, and Eric T. Roberts. 2013. "The Quality of Care Delivered to Patients within the Same Hospital Varies by Insurance Type." *Health Affairs (Project Hope)* 32 (10): 1731–39.

Steil, Justin, and Mariana Arcaya. 2023. "Residential Segregation and Health: History, Harms, and Next Steps." Health Policy Brief. Washington, DC: Health Affairs.

Tolbert, Jennifer, Patrick Drake, and Anthony Damico. 2023. "Key Facts about the Uninsured Population." Menlo Park, CA: Kaiser Family Foundation.

White, Kellee, Jennifer S. Haas, and David R. Williams. 2012. "Elucidating the Role of Place in Health Care Disparities: The Example of Racial/Ethnic Residential Segregation." *Health Services Research* 47 (3p2): 1278–99.

Williams, David R., and Chiquita Collins. 2001. "Racial Residential Segregation: A Fundamental Cause of Racial Disparities in Health." *Public Health Reports* 116 (5): 404–16.

Zingmond, David S., Punam Parikh, Rachel Louie, Daphne Y. Lichtensztajn, Ninez Ponce, Romana Hasnain-Wynia, and Scarlett Lin Gomez. 2015. "Improving Hospital Reporting of Patient Race and Ethnicity: Approaches to Data Auditing." *Health Services Research* 50 (S1): 1372–89.

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Acknowledgments

This brief was funded by The Robert Wood Johnson Foundation. We are grateful to them and to all our funders, who make it possible for Urban to advance its mission.

The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at urban.org/fundingprinciples.

We thank the Urban Institute's Health Equity Community Advisory Board for insights into directions for this research, We also thank Sarah LaCorte and Devlan O'Connor for their editorial assistance, along with Fredric Blavin, Kristen Brown, and Loni Tabb for their helpful feedback.

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