



RESEARCH REPORT

Do Black and White Patients Experience Similar Rates of Adverse Safety Events at the Same Hospital?

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Do Black and White Patients Experience Similar Rates of Adverse Safety Events at the Same Hospital?

Patient safety is “freedom from accidental injury due to medical care or medical errors” (IOM 2000) and represents a fundamental domain of inpatient quality of care. Hospital-acquired illnesses and injuries have direct consequences on patient health and erode the trust patients place in providers and health systems. Our recent Urban Institute analysis found that in the 26 states with available data for 2017, Black adult patients experienced higher rates of hospital-acquired injuries or illnesses than white patients and that some of these differences in patient safety can be attributed to differences in the quality of hospitals that Black patients are admitted to relative to white patients (Gangopadhyaya 2021). A related but unresolved research question is whether Black and white patients experience similar rates of adverse patient safety events when admitted to the same hospital. Investigating within-hospital racial differences in patient safety is critical to understanding what progress, if any, has been made in improving racial equity in health care. Moreover, policies intended to remedy racial inequities in the quality of the hospitals patients are admitted to, discussed in Gangopadhyaya (2021), could be ineffective if racial differences in patient safety risks persist even when patients are admitted to the same hospital.

Examining within-hospital differences in Black and white adult patient safety risks is the central focus of this study. We assess racial disparities in the quality of inpatient care using 11 patient safety indicators that measure rates of adverse patient safety events of hospital-acquired illnesses or injuries. Four of these measures center on general patient safety, and seven center on adverse events surrounding surgical procedures. This study investigates differences in Black and white patient safety using hospital discharge records from 26 states in 2017 and examines whether these differences narrow when comparing Black and white patients within the same hospital. We further assess whether these within-hospital differences in Black and white patient safety indicators persist when comparing patients with similar types of insurance coverage. Finally, we investigate whether inequities in patient safety by race differ in hospitals that serve more Black patients or more private paying patients as a share of all patients.



Key Findings

- For 6 out of 11 patient safety indicators, including 4 out of 7 surgery-related patient safety indicators, Black adult patients experienced significantly worse patient safety relative to white patients in the same age group, of the same gender, and treated in the same hospital. White patients experienced significantly worse quality of care relative to Black patients in the same hospital on 2 patient safety indicators. When admitted to the same hospital, quality of care was similar for Black and white patients on 3 out of 11 patient safety indicators.
- Adjusting for patient insurance coverage type had little effect on the estimated differences in patient safety risks between Black and white adult patients admitted to the same hospital. Similarly, analyses limiting patient populations to Medicare-covered patients only (the most frequent payer for inpatient services) found similar results as the main analysis. Combined, this evidence suggests that for Black and white patients treated in the same hospital, Black-white patient safety disparities persist even when patients have similar types of coverage.
- When separating hospitals into those in which more than 25 percent of patients are Black and all other hospitals, we find that Black adult patients experienced higher within-hospital adverse patient safety events relative to white patients in both groups of hospitals. Of the six patient safety indicators for which Black patients have significantly higher (worse) rates relative to white patients in the same hospital overall, five of these differences remain significant when comparing Black and white patients treated in the same hospitals in which more than 25 percent of patients are Black.

Among the four general patient safety measures, we find mixed evidence that Black adult patients experience higher rates of adverse patient safety events relative to white patients when receiving care at the same hospital. But our evidence shows that Black patients systematically experience higher rates of hospital-acquired illnesses or injuries related to surgical procedures relative to white patients treated in the same hospital. For all seven of these surgery-related measures, rates of adverse patient safety events were higher for Black patients relative to white patients. For four of the seven measures, these differences were clinically large and statistically significant. For example, per 1,000 at-risk discharges (discharges at risk for experiencing a specific adverse event based on diagnostic and procedural codes), Black patients had rates of postoperative sepsis infections that were 1.3 cases higher than those of white patients in the same age group, of the same gender, and treated in the same hospital. For context, that difference is about 27 percent of the overall risk of postoperative sepsis infections for Black patients.

Our previous analysis examining differences in the quality of hospitals accessed by Black and white patients suggested that increasing the racial diversity of patients that high-quality hospitals serve or concentrating resources to improve quality of care at low-performing hospitals would narrow



inequities in overall racial disparities of quality of care. Findings from this study indicate that this recommendation is a necessary but insufficient step in reducing racial disparities in the quality of health care and that racial equity in patient safety requires transforming the way care is delivered within hospitals as well.

Background

In its seminal 2000 report, *To Err is Human*, the Institute of Medicine estimated that the number of deaths per year caused by preventable adverse events or medical errors exceeded that of motor vehicle accidents (IOM 2000). Recognizing the importance of establishing standardized measures of hospital-acquired illnesses or injuries, the Agency for Healthcare Research and Quality (AHRQ) developed patient safety indicators to measure inpatient care quality based on rates of adverse safety events. Importantly, patient safety indicators do not depend on health and health behaviors of patients before a hospital visit and therefore represent objective measures of quality of care.

Previous literature has recognized that Black patients experience higher rates of hospital-acquired illnesses and injuries relative to white patients (AHRQ 2020; Gangopadhyaya 2021; IOM 2003; Metersky et al. 2011; Shen et al. 2016). For example, Gangopadhyaya (2021) found that out of 11 patient safety indicators, Black patients experienced significantly higher rates of adverse safety events on 6 measures (including higher rates on 5 out of 7 patient safety indicators related to surgical procedures) using 2017 inpatient discharge data across 26 states.

From the perspective of hospital systems, Black-white differences in rates of adverse patient safety events arise because of differences in the quality of hospitals Black and white patients are admitted to (i.e., differences *between* hospitals), differences in the quality of care delivered to Black and white patients admitted to the same hospital (i.e., differences *within* hospitals), or a combination of both of these factors. Several studies have found that Black patients use distinct hospitals from white patients and that these hospitals have worse overall performance on quality-of-care measures, including patient safety (Barnato et al. 2005; Dimick et al. 2013; Gangopadhyaya 2021; Gaskin et al. 2011; Ly et al. 2010). Additionally, studies have examined within-hospital differences in inpatient quality of care between Black and white patients (Barnato et al. 2005; Gaskin et al. 2008; Hasnain-Wynia et al. 2007). Findings from this literature are mixed and depend on the measures in question or the setting. Notably, no studies have examined within-hospital differences in patient safety indicators between Black and white patients broadly across many states and hospitals and after implementation of the Affordable Care Act's (ACA's) main provisions in 2014.



Within-hospital differences in the quality of care delivered to patients may stem from several factors. Relative to white patients, Black patients are less likely to have the same racial background as their doctors, and race-discordant physician-patient interactions are associated with lower likelihood of treatment planning (Oliver et al. 2001) and health information exchange between patients and physicians (Gordon et al. 2006; Hagiwara et al. 2013), critical factors for minimizing patient safety risks in hospitals (IOM 2000). Physician implicit or explicit racial biases can contribute to poorer administered health in health care settings, including fewer referrals, greater physician verbal dominance, worse patient reviews, and lower rates of providing opioids for managing postoperative pain (Cooper et al. 2012; Green et al. 2007; Penner et al. 2010; Sabin and Greenwald 2012).¹ Within-hospital provider team segregation by patient race is associated with higher rates of mortality following coronary artery bypass grafting among Black Medicare patients relative to white Medicare patients (Hollingsworth et al. 2021), and such segregation could translate to poorer care quality in other domains. Even seemingly objective approaches to maintaining equitable care among patient populations, such as using algorithmic-based decision making that adjusts for patient race to determine care intensity or guidelines, can maintain or exacerbate racial and ethnic disparities in care quality within institutions or health systems (Ashana et al. 2021; Obermeyer et al. 2019; Vyas, Eisenstein, and Jones 2020). Finally, nonelderly Black patients may be more likely to have Medicaid coverage or be uninsured and less likely to have private insurance coverage relative to white patients. As a result, payment rates for hospital services delivered to white patients may be higher and thereby establish racial differences in financial incentives for hospital care services. Pre-ACA research identified differences in coverage types to be a driver of within-hospital differences in care quality (Spencer, Gaskin, and Roberts 2013).

This analysis investigates the prevalence of within-hospital differences in patient safety quality experienced by Black and white patients in 2017 across 26 states, three years after the major ACA coverage provisions went into effect. We examine whether adjusting for patient insurance coverage type or restricting analyses to Medicare enrollees mitigates within-hospital disparities by race. Moreover, we assess whether within-hospital Black-white differences in patient safety quality are prevalent in hospitals in which more than 25 percent of patients are Black relative to all other hospitals. The prevalence of within-hospital disparities in Black and white quality of care suggests that the above-mentioned factors continue to influence racial inequities in health care and that policy efforts to direct patients to higher-quality institutions may have reduced efficacy absent changes in the way care is delivered *within* those institutions.



Data and Methods

This study uses discharge records from AHRQ's Healthcare Cost and Utilization Project state inpatient databases for 26 states in 2017.² These databases contain a nearly full accounting of discharge records for all hospitals in the state. These databases include patient information such as age, hospital-coded race or ethnicity, the primary expected payer, and patient diagnostic and procedure codes. We acquired data from 26 states (Alaska, Arkansas, Arizona, Colorado, the District of Columbia, Delaware, Florida, Georgia, Kansas, Kentucky, Massachusetts, Maryland, Michigan, Mississippi, North Carolina, New Jersey, New Mexico, Nevada, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia), with complete hospital discharge records for 2,347 hospitals.³

To assess quality of care, this study uses software developed by AHRQ to construct patient safety indicators.⁴ AHRQ's patient safety indicators identify avoidable inpatient adverse safety events. These measures are rates identifying counts of an adverse outcome per at-risk discharge. This study examines 11 AHRQ patient safety indicators.⁵ Four of these measures are referred to as general patient safety indicators because they represent a broader set of illnesses or injuries that apply to a large share of inpatient discharges (pressure ulcer rates, iatrogenic pneumothorax rates, central venous catheter-related bloodstream infection rates, and rates of in-hospital falls with hip fractures). The remaining seven measures are referred to as surgery-related patient safety indicators because they are related to inpatient illnesses or injuries acquired during or shortly after a surgical procedure.

AHRQ software identifies patients who experienced adverse safety events and all patients who were at risk of experiencing the adverse events, depending on the measure in question. For example, when assessing postoperative sepsis infection rates, at-risk patients are those with an elective surgical procedure on their discharge record, but this definition excludes patients with sepsis or related infections reported as the principal diagnosis or diagnosed as present at the time of admission and obstetric discharges.⁶ Using this information, we assess differences between Black and white adult patients in the likelihood of experiencing an adverse safety event, among all at-risk Black and white patients. Black and white patients differ significantly in age and gender, and these factors may make patients vulnerable to experiencing adverse safety events. To account for this, we use a multivariate regression adjusting for patient age group (19–44, 45–64, 65–84, or 85 or older) and gender.

Ultimately, this study sets out to assess whether Black and white patients experience different patient safety risks in the *same* hospital. To investigate this, we adjust the regression model to include indicators for each hospital in the analysis, which constrains comparisons in Black and white patient



safety to be drawn among patients admitted to the same hospital. However, note that Black and white patients often use different hospitals. For example, 80 percent of Black hospitalizations in our analysis are contained in 348 hospitals, but those very hospitals contain just 44 percent of all white hospitalizations. To ensure that there is sufficient balance to evaluate differences in Black and white patient safety risks within a hospital, our analysis excludes hospitals that have fewer than either 30 Black or 30 white at-risk discharges for any patient safety indicator. Appendix table A.1 compares differences in patient safety rates and overall rates of adverse patient safety events when looking at the full sample and the more limited sample with this exclusion. The table shows that this exclusion reduces the number of hospitals used for assessing each patient safety indicator, but there is little difference in the average rates for each of these patient safety indicators.

The study examines three extensions to the main analysis. First, we add indicators for patient insurance coverage type (Medicare, Medicaid, private payer, self-pay or uninsured, or other payer type) to assess whether Black and white patients with similar insurance coverage types continue to experience differences in patient safety. Second, we examine analyses in which discharges are limited to Medicare-covered patients to investigate whether Black-white differences in access to high-quality hospitals are unchanged among those with this similar coverage type.⁷ Third, we assess whether Black-white differences in within-hospital patient safety conditions differ based on the share of overall Black patients admitted into the hospital or by the share of overall patients with private insurance coverage in 2017.⁸ Hospitals treating larger shares of Black patients may be more sensitive to provider or system bias and could be better able to narrow or eliminate Black-white disparities in patient safety experiences. Moreover, given that private payment rates are, on average, greater than rates paid for by public payers, hospitals treating more patients with commercial insurance coverage as a share of all patients are expected to have greater revenues and may have more resources to draw on to address overall quality of care and inequities in care delivery among patients with different racial or ethnic backgrounds.

This analysis has several limitations. First, patient racial backgrounds are collected from hospital classification systems and are coded into broad categories on discharge records. Hospital-designated racial records may not match self-identified patient racial or ethnic backgrounds, so important exceptions or exclusions to Black or white race designations may be unobserved in the data. Second, the analysis is limited to 26 states in 2017, and some of the largest states are not included here (e.g., California, Illinois, New York, and Texas). Moreover, this analysis uses data from three years before the COVID-19 pandemic, so many hospital protocols, including patient safety protocols, may have been



significantly updated since this analysis. Thus, findings in this analysis may not generalize to other states or to more recent periods.

Third, although analyses limited to Black and white patients with Medicare coverage are intended to assess differences in patient safety quality among older patients with similar insurance coverage, important differences in access remain among those with Medicare coverage. For example, there are major differences in payment rates among those with Medicare Advantage and those with traditional Medicare, and these differences could be correlated with patient race. Similarly, there are important and unobserved differences in private coverage plans, such as their payment rates and cost-sharing restrictions, and these differences could also correlate with patient race. Finally, although patient safety indicators represent standard measures of quality of patient safety care in hospitals, these measures are routinely updated and redefined to reflect new findings in clinical data (Romano et al. 2009). Because of this iterative process, patient safety indicators may imperfectly represent hospital patient safety quality in any given year.

Results

Do Black and White Patients Experience Different Patient Safety in the Same Hospital?

Table 1 presents average rates of adverse patient safety events among Black patients, the difference between Black and white adult patients after adjusting for patient age and gender, and the adjusted difference between Black and white adult patients admitted to the same hospital. Positive differences indicate higher (worse) rates of adverse safety events among Black patients relative to white patients. We find that an estimated 1.2 Black patients per 1,000 at-risk discharges suffered a pressure ulcer. Compared with white patients of the same age group and gender, pressure ulcer rates between Black and white patients were nearly the same. Compared with white patients in the same age group, of the same gender, *and* admitted to the same hospital, rates of pressure ulcers among Black patients were about 0.3 cases higher per 1,000, indicating that where the average Black patient experiences 1.2 cases per 1,000 at-risk discharges, similar white patients in the same hospital experience about 0.9 cases of pressure ulcer per 1,000. This difference is large (about 27 percent of the overall rate among at-risk Black patients) and statistically significant. Relative to white patients treated in the same hospital, Black patients were also significantly more at risk for experiencing central venous catheter-related bloodstream infections rates. Black patients were significantly far *less* likely to suffer from



iatrogenic pneumothorax or an in-hospital fall with a hip fracture relative to white patients of a similar age and gender treated in the same hospital. White patients in the same age group, of the same gender, and treated in the same hospital experience in-hospital falls with hip fractures (about 0.07 cases per 1,000) more than twice as often as Black patients (0.03 cases per 1,000, on average).

For Black adults, adverse events surrounding surgery-related patient safety measures occur more frequently than the general patient safety indicators. An estimated 2.8 Black adult patients per 1,000 at-risk discharges suffered from perioperative hemorrhage, and 4.8 Black patients per 1,000 at-risk discharges acquired a postoperative sepsis infection. An estimated 5.6 and 5.1 Black patients per 1,000 at-risk discharges experienced postoperative respiratory failure or pulmonary embolism. Moreover, across all seven surgery-related patient measures, Black patients experienced higher rates of surgery-related adverse events relative to white patients of the same age group and gender, and five of these differences are statistically significant. Relative to white patients, Black patients had significantly higher rates of post- or perioperative hemorrhage, acute kidney injury requiring dialysis, respiratory failure, pulmonary embolism or deep vein thrombosis, and sepsis.⁹



TABLE 1

Overall and Within-Hospital Differences in Adverse Patient Safety Events between Black and White Adult Patients, 2017

	Average rate among Black patients (cases per 1,000 at-risk discharges)	Adjusted Black-white differences (cases per 1,000 at-risk discharges)	Within-hospital adjusted Black-white differences (cases per 1,000 at-risk discharges)
General patient safety indicators			
Pressure ulcer rate	1.19	0.09	0.32**
Iatrogenic pneumothorax rate	0.14	-0.03**	-0.04**
Central venous catheter-related bloodstream infection rate	0.17	0.06**	0.04**
In-hospital fall with hip fracture rate	0.03	-0.04**	-0.04**
Surgery-related patient safety indicators			
Perioperative hemorrhage or hematoma rate	2.75	0.68**	0.55**
Postoperative acute kidney injury requiring dialysis rate	1.05	0.31**	0.16
Postoperative respiratory failure rate	5.62	1.60**	1.00**
Perioperative pulmonary embolism or deep vein thrombosis rate	5.10	2.12**	1.52**
Postoperative sepsis rate	4.82	1.88**	1.31**
Postoperative wound dehiscence rate	0.73	0.15	0.14
Abdominopelvic accidental puncture or laceration rate	1.04	0.09	0.02

Source: 2017 state inpatient database discharges from Alaska, Arkansas, Arizona, Colorado, Delaware, the District of Columbia, Florida, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia. Quality measures calculated using AHRQ SAS Quality Indicator Software, version 2020.

Notes: AHRQ = Agency for Healthcare Research and Quality. Adjusted Black-white differences for patient safety control for patient age group and gender. “At-risk discharges” are discharges identified as being at risk for a specific adverse event based on diagnostic and procedural codes following AHRQ-developed definitions of quality indicators. Models assessing differences within the same hospital further include hospital indicators. A positive adjusted difference indicates worse patient safety rates for Black patients relative to white patients. The sample is limited to adult patients and to hospitals with at least 30 at-risk discharges for Black patients and white patients. Standard errors are clustered at the hospital level.

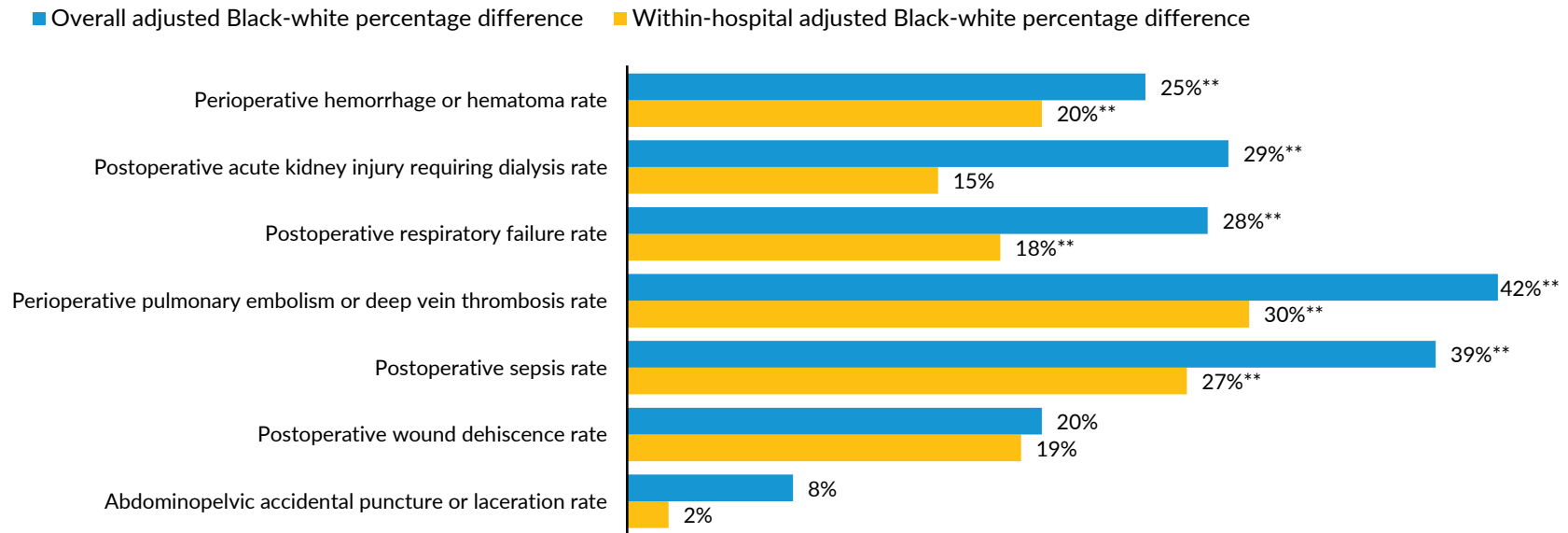
** Differences are statistically significant at the $p < 0.05$ level.



FIGURE 1

Overall and Within-Hospital Adjusted Black-White Percentage Differences in Surgery-Related Patient Safety Indicators, 2017

Percentage difference in adverse event rates between Black and white patients



Source: 2017 state inpatient database discharges from Alaska, Arkansas, Arizona, Colorado, Delaware, the District of Columbia, Florida, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia. Quality measures calculated using AHRQ SAS Quality Indicator Software, version 2020.

Notes: Adjusted Black-white differences for patient safety control for patient age group and gender. Models assessing differences within the same hospital further include hospital indicators. Percentage differences are calculated as the Black-white adjusted difference divided by the average rate experienced by white patients. A positive adjusted difference indicates worse patient safety rates for Black patients relative to white patients. The sample is limited to adult patients and to hospitals with at least 30 at-risk discharges for Black patients and white patients.

** Differences are statistically significant at the $p < 0.05$ level.



Restricting comparisons to Black and white patients admitted to the same hospitals slightly reduces these differences but continues to indicate that Black patients endure higher rates of adverse safety events occurring during or shortly after surgical procedures relative to white patients. Figure 1 presents overall and within-hospital percentage differences in these adverse events. Black patients experience 0.55 more cases of perioperative hemorrhage per 1,000 at-risk discharges relative to white patients of similar age, of the same gender, and in the same hospital, which is about 20 percent higher than the overall rate white patients experienced. Similarly, rates of postoperative respiratory failure, perioperative pulmonary embolism, and postoperative sepsis were 18 percent, 30 percent, and 27 percent higher for Black patients than for white patients admitted to the same hospital and of the same age group and gender. Each of these differences is statistically significant. Overall, Black patients had significantly higher estimated rates of adverse patient safety events on four of the seven surgery-related patient safety indicators relative to white patients admitted to the same hospital.

Do Differences in Insurance Coverage and Type Contribute to Black-White Differences in Patient Safety?

Differences in Black and white patient safety rates among patients served in the same hospital may reflect differences in the intensity of services delivered within hospitals to patients with different insurance coverage. Insurers reimburse for medical services at different payment rates, which may affect hospital incentives for care intensity and management. Spencer, Gaskin, and Roberts (2013) found that inpatient quality varied within hospitals across patients with different coverage types, with privately covered patients having the lowest risk-adjusted inpatient mortality rates relative to all other payers. Moreover, Medicaid coverage, which typically has lower payment rates for inpatient services relative to Medicare or private plans (Selden 2020), accounts for a disproportionate share of coverage for Black patients.¹⁰ Thus, we assess whether the observed Black-white differences in patient safety indicators within the same hospital persist when comparing patients with similar types of insurance coverage.

Table 2 describes the within-hospital adjusted Black-white differences in patient safety indicators (drawn from table 1), these differences after adjusting for payer type, and differences exclusively among patients with Medicare coverage. For the seven surgery-related patient safety indicators, the corresponding percentage differences in Black-white incidence rates are presented in figure 2.

Including adjustments for patient coverage types within hospitals slightly attenuates the main estimates on the differences between Black and white patient safety, but most estimates change little when including these controls. Specifically, only one of the measures for which Black patients had significantly higher patient safety risks (central venous catheter-related bloodstream infections) is no



longer statistically significant at conventional levels ($p < 0.05$). Before adjusting for insurance coverage type, Black patients were estimated to be 27 percent more likely to experience postoperative respiratory failure relative to white patients treated in the same hospital (figure 2). Adjusting for coverage type nearly halves this difference (14 percent), but the estimate remains large and statistically significant. For surgery-related patient safety indicators, we continue to observe greater, statistically significant patient safety risks for Black patients relative to white patients treated in the same hospital with similar health insurance coverage.



TABLE 2

Within-Hospital Differences in Adverse Patient Safety Events between Black and White Patients with Similar Insurance Coverage Types and among Medicare-Covered Patients, 2017

Adjusted Black-white differences within the same hospital (cases per 1,000 at-risk discharges)

	Main estimates (drawn from table 1)	Adjusting for patient coverage type	Among Medicare-covered patients only
General patient safety indicators			
Pressure ulcer rate	0.32**	0.26**	0.43**
Iatrogenic pneumothorax rate	-0.04**	-0.04**	-0.03
Central venous catheter-related bloodstream infection rate	0.04**	0.03	0.09**
In-hospital fall with hip fracture rate	-0.04**	-0.04**	-0.06**
Surgery-related patient safety indicators			
Perioperative hemorrhage or hematoma rate	0.55**	0.51**	0.58**
Postoperative acute kidney injury requiring dialysis rate	0.16	0.11	0.23
Postoperative respiratory failure rate	1.00**	0.77**	1.42**
Perioperative pulmonary embolism or deep vein thrombosis rate	1.52**	1.42**	1.51**
Postoperative sepsis rate	1.31**	1.14**	1.82**
Postoperative wound dehiscence rate	0.14	0.10	0.31
Abdominopelvic accidental puncture or laceration rate	0.02	0.01	0.02

Source: 2017 state inpatient database discharges from Alaska, Arkansas, Arizona, Colorado, Delaware, the District of Columbia, Florida, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia. Quality measures calculated using AHRQ SAS Quality Indicator Software, version 2020.

Notes: AHRQ = Agency for Healthcare Research and Quality. Adjusted Black-white differences for patient safety control for patient age group and gender and include hospital indicators. "At-risk discharges" are discharges identified as being at risk for experiencing a specific adverse event based on diagnostic and procedural codes following AHRQ-developed definitions of quality indicators. Models adjusting for patient coverage type include indicators for the following payer categories: Medicare, Medicaid, private insurance, self-pay or uninsured, or other coverage type. A positive adjusted difference indicates worse patient safety rates for Black patients relative to white patients. The sample is limited to adult patients and to hospitals with at least 30 at-risk discharges for Black patients and white patients. Standard errors are clustered at the hospital level.

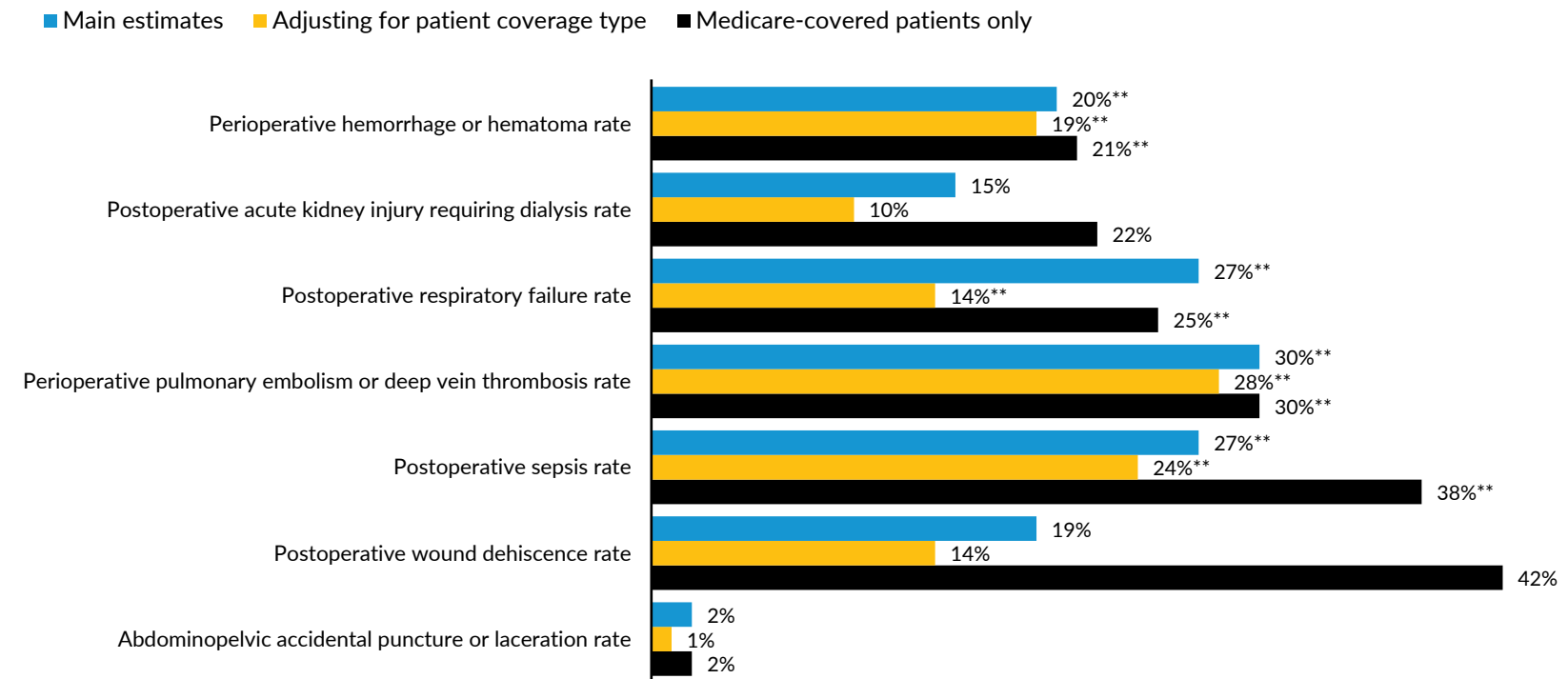
** Differences are statistically significant at the $p < 0.05$ level.



FIGURE 2

Within-Hospital Differences in Surgery-Related Patient Safety Indicators between Black and White Patients with Similar Insurance Coverage Types and among Medicare-Covered Patients, 2017

Percentage difference in adverse event rates between Black and white patients



Source: 2017 state inpatient database discharges from Alaska, Arkansas, Arizona, Colorado, Delaware, the District of Columbia, Florida, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia. Quality measures calculated using Agency for Healthcare Research and Quality SAS Quality Indicator Software, version 2020.

Notes: Adjusted Black-white differences for patient safety control for patient age group and gender and include hospital indicators. Models adjusting for patient coverage type include indicators for the following payer categories: Medicare, Medicaid, private insurance, self-pay or uninsured, or other coverage type. Percentage differences are calculated as the Black-white adjusted difference divided by the average rate experienced by white patients. A positive adjusted difference indicates worse patient safety rates for Black patients relative to white patients. The sample is limited to adult patients and to hospitals with at least 30 at-risk discharges for Black patients and white patients. Standard errors are clustered at the hospital level.

** Differences are statistically significant at the $p < 0.05$ level.



Table 2 also investigates within-hospital differences in patient safety indicators exclusively among Medicare-covered patients, which represents the largest group of hospital patients by payer. Results from this analysis are similar to the main estimates among all patients. In fact, most differences are slightly *larger* in magnitude among Medicare enrollees. Specifically, relative to the main analysis, Black-white differences in within-hospital patient safety are identical in both direction and statistical significance among Medicare-covered patients. The differences in rates of postoperative wound dehiscence more than double when restricting to Black and white Medicare-covered patients, but this estimate remains statistically insignificant, and the seemingly large reported percentage difference in figure 2 is estimated using a very low baseline rate (0.7 cases per 1,000 at-risk discharges among white patients; data not shown).

Table 2 and figure 2 indicate that differences in insurance coverage between Black and white patients are not a major contributing factor driving differences in adverse patient safety events between Black and white patients within the same hospital in 2017 across these 26 states. That patient disparities exist among Black and white patients with similar coverage types indicates that insurers will want to consider holding hospitals accountable for different outcomes and to evaluate whether aspects of their arrangements with health systems contribute to these differences.

Do Black-White Differences in Patient Safety Differ in Hospitals That Care for Larger Shares of Black Patients or in Hospitals with Greater Financial Resources?

Recent and previous evidence indicates that hospitals more frequently used by Black patients have higher overall rates adverse safety events (Gangopadhyaya 2021; Ly et al. 2010), but hospitals serving more Black patients as a share of all patients may be more adept at applying clinical guidelines fairly across patient populations and have greater likelihood of physician-patient race concordance for patients who are racial and ethnic minorities, which may lead to more equitable quality of care for Black patients. Such hospitals may also be less able to effectively segregate provider teams across patient populations by patient race, which may produce more equitable care delivery. We investigate this question in table 3 by estimating within-hospital Black-white differences in adverse patient safety events separately in hospitals in which more than a quarter of all patients are Black and all other hospitals.

Among the four general patient safety indicators, within-hospital differences in Black-white patient safety rates were modestly related to the overall share of Black patients treated at hospitals. Rates of pressure ulcer were significantly higher for Black adult patients relative to white patients both



in hospitals treating larger or fewer shares of Black patients (0.20 and 0.41 more cases per 1,000 at-risk discharges). In hospitals in which Black patients represent more than a quarter of patients, iatrogenic pneumothorax rates were significantly lower for Black patients relative to white patients (0.06 fewer cases per 1,000 at-risk discharges). Black and white patients in the same hospital treating a greater share of Black patients experienced similar rates of central venous catheter-related bloodstream infections, but Black patients experienced significantly higher rates relative to white patients in hospitals that had lower shares of Black patients. Rates of in-hospital falls with hip fractures were lower for Black patients relative to white patients in the same hospital among both groups of hospitals. Finally, we tested whether estimates of within-hospital Black-white differences in patient safety indicators were significantly different across the two groups of hospitals, and among the four general patient safety indicators, we found all estimates were statistically similar to each other. This reinforces that, for these measures, the share of Black patients served by a hospital is largely unrelated to the differences in quality delivered to Black and white patients within a hospital.



TABLE 3

Within-Hospital Differences in Adverse Patient Safety Events Between Black and White Patients, by Hospital Share of Black Patients, 2017

	Hospitals in Which at Least 25% of Patients Are Black		Hospitals in Which Fewer Than 25% of Patients Are Black	
	Number of hospitals	Within-hospital adjusted Black-white difference (cases per 1,000 at-risk discharges)	Number of hospitals	Within-hospital adjusted Black-white difference (cases per 1,000 at-risk discharges)
General patient safety indicators				
Pressure ulcer rate	377	0.20**	953	0.41**
Iatrogenic pneumothorax rate	384	-0.06**	1,044	-0.03
Central venous catheter-related bloodstream infection rate	379	0.03	987	0.06**
In hospital fall with hip fracture rate	376	-0.04**	972	-0.04**
Surgery-related patient safety indicators				
Perioperative hemorrhage or hematoma rate	223	0.79**†	577	0.35**
Postoperative acute kidney injury requiring dialysis rate	190	-0.02†	436	0.34**
Postoperative respiratory failure rate	185	0.99**	417	1.03**
Perioperative pulmonary embolism or deep vein thrombosis rate	226	1.38**	583	1.67**
Postoperative sepsis rate	186	1.57**	427	1.16**
Postoperative wound dehiscence rate	193	0.18	365	0.12
Abdominopelvic accidental puncture or laceration rate	230	-0.14†	536	0.16

Source: 2017 state inpatient database discharges from Alaska, Arkansas, Arizona, Colorado, Delaware, the District of Columbia, Florida, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia. Quality measures calculated using AHRQ SAS Quality Indicator Software, version 2020.

Notes: AHRQ = Agency for Healthcare Research and Quality. "At-risk discharges" are discharges identified as being at risk for experiencing a specific adverse event based on diagnostic and procedural codes following AHRQ-developed definitions of quality indicators. Adjusted Black-white differences for patient safety control for patient age group and gender. Models assessing differences within the same hospital further include hospital indicators. A positive adjusted difference indicates worse patient safety rates for Black patients relative to white patients. The sample is limited to adult patients and to hospitals with at least 30 at-risk discharges for Black patients and white patients. Standard errors are clustered at the hospital level.

** Within-hospital Black-white adjusted differences are statistically significant at the $p < 0.05$ level.

† Differences in within-hospital Black-white adjusted differences in adverse safety event rates between hospitals treating greater and fewer Black patients as a share of all patients are statistically significant at the $p < 0.05$ level.



TABLE 4

Within-Hospital Differences in Adverse Patient Safety Events between Black and White Patients, by Share of Hospital Patients with Private Coverage, 2017

	Low-Resourced Hospitals (Fewer Than 25% of Discharges Have Private Coverage)		High-Resourced Hospitals (at Least 25% of Discharges Have Private Coverage)	
	Number of hospitals	Within-hospital adjusted Black-white difference (cases per 1,000 at-risk discharges)	Number of hospitals	Within-hospital adjusted Black-white difference (cases per 1,000 at-risk discharges)
General patient safety indicators				
Pressure ulcer rate	731	0.29**	599	0.34**
Iatrogenic pneumothorax rate	782	-0.03	646	-0.05**
Central venous catheter-related blood stream infection rate	737	0.04	629	0.04**
In hospital fall with hip fracture rate	737	-0.03**	611	-0.04**
Surgery-related patient safety indicators				
Perioperative hemorrhage or hematoma rate	389	0.40**	411	0.65**
Postoperative acute kidney injury requiring dialysis rate	284	0.18	342	0.15
Postoperative respiratory failure rate	267	1.04	335	1.00**
Perioperative pulmonary embolism or deep vein thrombosis rate	395	1.48**	414	1.55**
Postoperative sepsis rate	278	1.23**	335	1.37**
Postoperative wound dehiscence rate	265	-0.09	293	0.29**
Abdominopelvic accidental puncture or laceration rate	389	0.10	377	-0.02

Source: 2017 state inpatient database discharges from Alaska, Arkansas, Arizona, Colorado, Delaware, the District of Columbia, Florida, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia. Quality measures calculated using AHRQ SAS Quality Indicator Software, version 2020.

Notes: AHRQ = Agency for Healthcare Research and Quality. Adjusted Black-white differences for patient safety control for patient age group and gender. "At-risk discharges" are discharges identified as being at risk for experiencing a specific adverse event based on diagnostic and procedural codes following AHRQ-developed definitions of quality indicators. Models assessing differences within the same hospital further include hospital indicators. A positive adjusted difference indicates worse patient safety rates for Black patients relative to white patients. The sample is limited to adult patients and to hospitals with at least 30 at-risk discharges for Black patients and white patients. Standard errors are clustered at the hospital level.

** Within-hospital Black-white adjusted differences are statistically significant at the $p < 0.05$ level.

† Differences in within-hospital Black-white adjusted differences in adverse safety event rates between hospitals treating greater and fewer Black patients as a share of all patients are statistically significant at the $p < 0.05$ level.



Relative to white patients admitted to the same hospital, perioperative hemorrhage or hematoma rates were significantly higher for Black adult patients both in hospitals serving greater shares of Black patients (0.79 more cases per 1,000 at-risk discharges) and in hospitals serving fewer Black patients as a share of all patients (0.35 more cases per 1,000). In hospitals treating greater shares of Black patients, Black and white patients experience nearly identical rates of postoperative acute kidney injuries. Conversely, among all other hospitals with smaller shares of Black discharges, Black patients experience significantly higher rates of postoperative acute kidney injuries relative to white patients in the same hospital (0.34 more cases per 1,000, or 32 percent of the overall rate for Black patients). This estimated difference in the magnitude of Black and white patient safety across the two groups of hospitals is statistically significant. Relative to white patients in the same hospital, Black patients experienced significantly higher rates of postoperative respiratory failure, perioperative pulmonary embolism, and postoperative sepsis in both groups of hospitals.

We further investigate whether differences in patient safety may be more muted in hospitals that have greater resources to directly address inequities in care delivery. To proxy for hospital resource intensity, we identified hospitals in which fewer than a quarter of all discharges were covered by private insurance (considered to be low-resourced hospitals) and hospitals in which a quarter or more discharges were covered by private insurance (high-resourced hospitals), noting that payment rates for inpatient services are typically higher for private payers relative to other payers. Using the 25 percent private coverage share threshold creates roughly even groups of low- and high-resourced hospitals (table 4).

Across both low- and high-resourced hospitals, we continue to observe Black-white differences in patient safety that are in the same direction as in the main analysis. For the four general patient safety indicators, we observe little difference in the magnitudes of Black-white differences in rates of these measures by hospital resource intensity. Similarly, among the seven surgery-related patient safety indicators, we find that Black patients experience higher rates of adverse events relative to white patients treated in the same hospital, although fewer estimates among low-resourced hospitals are statistically significant. Somewhat surprisingly, rates of postoperative wound dehiscence were higher for Black patients relative to white patients when treated at the same high-resourced hospital (although the difference relative to low-resourced hospitals was not statistically significant). Ultimately, estimates of within-hospital differences in Black-white patient safety indicators were not statistically different in low- versus high-resourced hospitals for any of the 11 patient safety indicators.



Overall, the evidence from this analysis indicates that among surgery-related patient safety indicators, Black patients experienced higher rates of adverse patient safety events relative to white patients both in hospitals where Black patients represent larger and smaller shares of the hospital's patient population. Even at the same high-resourced hospitals that treat more private patients as a share of all patients, Black patients continue to experience higher rates of adverse safety events surrounding surgical procedures relative to white patients. Put similarly, differences in a hospital's ability to deliver equitable care to Black and white patients is not related to the share of Black patients or to the share of privately insured patients the hospital serves.

Discussion

Despite significant progress in addressing racial disparities in insurance coverage and health care access under the ACA (Buchmueller et al. 2016; Wehby and Lyu 2018), sharp inequities in the quality of care Black adults receive relative to white adults at hospitals persisted in 2017 (Gangopadhyaya 2021). Black adult patients endure higher rates of adverse inpatient safety events relative to white adults. This difference is attributable to both differences in the quality of hospitals that Black patients are admitted to relative to white patients (Gangopadhyaya 2021) and, as we show in this new analysis, differences in the quality of care delivered to Black and white patients within the same hospital.

Even when admitted to the same hospital, Black patients experience higher rates of hospital-acquired injuries or illnesses occurring during or shortly after surgical procedures relative to white patients. These Black-white differences remain when comparing Black and white patients with similar insurance coverage types. Moreover, within-hospital patient safety differences do not narrow when Black-white comparisons are limited to adults with Medicare coverage. Thus, these findings suggest that within-hospital Black-white disparities in care quality cannot be fully accounted for by differences in insurance coverage type. From a policy standpoint, further efforts to expand insurance coverage among minorities—while having many positive benefits for patients, including potentially improved patient safety—are unlikely to reduce Black-white disparities in hospital patient safety. Similarly, policies that increase payment rates for Medicaid to align provider financial incentives across patient populations, advocated as a means of improving health care equity by the Institute of Medicine (IOM 2003), could improve safety for patients covered by Medicaid but would not address the Black-white safety differences experienced by patients on the same coverage type observed in this study.

Further progress will likely require a shift from focusing on policies addressing disparities through indirect channels to more direct ones. As the primary payers for hospital services, insurers are in a



position to spearhead such direct reform. Recent efforts by Michigan's Medicaid program to require contracted managed care organizations to implement disparity-reduction initiatives highlights current examples of such reforms under way,¹¹ and continued research is required to evaluate whether such reforms are effective in reducing disparities in patient safety and whether they would be recommended for other state Medicaid agencies. Federal action, such as tying a percentage of the Federal Medical Assistance Percentage to state measures of racial disparities in patient safety (among other domains of quality of care), could encourage state Medicaid programs to introduce policies that provide incentives for more equitable outcomes by race.

Further, our analysis indicates that for most of the patient safety measures examined here, Black Medicare-covered patients experienced adverse safety events at higher rates relative to white Medicare-covered patients who were treated in the same hospital. Although several Medicare programs penalize health systems for delivering low-quality care, no current policies directly address disparities in care quality. Building on earlier policy attempts from the Centers for Medicare and Medicaid Services to address patient safety, the ACA established the Hospital-Acquired Conditions Reduction Program, which penalizes hospitals in the bottom quartile of specified patient safety metrics by withholding a share of overall Medicare reimbursements. This policy may compel low-performing hospitals to improve their patient safety rates, thereby potentially reducing Black-white disparities in patient safety stemming from differences in hospitals they access. But as currently constructed, no penalties are levied on hospitals based on *which* patients in their hospitals receive worse patient safety; therefore, this policy has no direct bearing on differences in care delivered within hospitals across different patients. One feasible policy approach may be to extend penalties under the current program to apply to hospitals with higher rates of adverse events among specific Medicare-covered patient groups, with an emphasis on patients who are racial or ethnic minorities. Following the lead of state Medicaid initiatives to reduce disparities among managed care plans, the Centers for Medicare and Medicaid Services may consider updating Medicare Advantage's Star Rating system for quality-based bonus payments to include direct measures of disparities in patient safety by members' race or ethnicity.

We found little evidence that within-hospital differences in patient safety varied in hospitals treating more Black patients as a share of all patients relative to all other hospitals. Hospitals in which Black patients represent a larger share of the patient population typically have more Black providers, and physician and patient race concordance is associated with many benefits to patient outcomes (Gordon et al. 2006; Hagiwara et al. 2013; Jetty et al. 2021; Oliver et al. 2001). But we did not find that Black-white differences in patient safety were strikingly different in hospitals treating greater or



fewer Black patients as a share of all patients. Black patients endure higher rates of adverse patient safety events relative to white patients irrespective of how many Black patients their hospital treats. We also found no evidence that high-resourced hospitals, as proxied by the share of patients with private insurance coverage, had markedly better outcomes for Black patients relative to white patients.

Addressing within-hospital differences in care quality will also likely require provider-level interventions to confront and address racial biases in the care that is provided. Identifying and acknowledging provider implicit or explicit biases for patients has previously been shown to affect treatment patterns and may help address differential treatment (Cooper et al. 2012; Green et al. 2007; Penner et al. 2010). The Institute of Medicine has recommended strict adherence to clinical guidelines across patient populations as a means of reducing racial disparities in care quality, but no policies have been implemented to help enforce or incentivize such actions. Periodic auditing of physician disease diagnosis, treatment, and care coordination practices would be a way to assess whether care is standardized across patient populations. Actively preventing provider teams delivering similar services from segregating to provide services to distinct patient populations could also reduce inequitable care delivery within hospitals (Hollingsworth et al. 2021). Installing chief equity officers to focus on service and delivery performance at various system levels could highlight pain points and areas that need change in delivery standards.¹² Finally, a long-term solution could involve diversifying the physician pipeline by improving the affordability of medical education based on need, particularly among underrepresented groups. A more diverse talent pool could help identify gaps in the curriculum that fail to appropriately address health inequities and ultimately improve minority patients' access, quality of care, and adherence to treatment recommendations.

Lastly, patients must be informed about avenues through which complaints and grievances for discriminatory care can be reported and acted upon. The Centers for Medicare and Medicaid Services requires hospitals to inform all patients of their rights, including the right to express grievances about the care they receive. Moreover, patient grievances must be resolved by hospitals, and grievances surrounding patient allegations of abuse or neglect must be immediately reviewed (CMS 2020). The involvement of patient advocates and community-based organizations can facilitate this process for patients. Medicare provides a Beneficiary Ombudsman to help inform patients about these processes. Several state Medicaid programs have used Section 1115 demonstration waivers to authorize the use of Medicaid funds to enlist support from patient advocates and community-based organizations and to provide direct legal services for beneficiaries (Alderwick, Hood-Ronick, and Gottlieb 2019). Further, the pursuit of bold, transformative, and multipronged approaches to reforming the civil legal system



beyond how it interacts with hospital systems alone can equip patients with a wider focal lens for assessing and advocating equitable treatment across domains of health. For example, providing resources for legal assistance services to perform complete legal check-ups can help people address interrelated drivers of inequities in their daily lives.¹³ Informing patients of their rights and available means of response to substandard care will help spotlight potentially problematic actors to regulatory agencies, insurers, and peers.



Appendix: Supplemental Table

TABLE A.1

Average Rate of Adverse Patient Safety Events, among Hospitals with at Least 30 At-Risk Discharges and among Hospitals with at Least 30 At-Risk Black Discharges and at Least 30 At-Risk White Discharges

	Hospitals With At Least 30 At-Risk Discharges		Hospitals With At Least 30 At-Risk Black Discharges and 30 At-Risk White Discharges	
	Number of hospitals	Rate of adverse event (cases per 1,000 at-risk discharges)	Number of hospitals	Rate of adverse event (cases per 1,000 at-risk discharges)
General patient safety indicators				
Pressure ulcer rate	2,274	1.26	1,330	1.19
Iatrogenic pneumothorax rate	2,300	0.18	1,428	0.18
Central venous catheter-related blood stream infection rate	2,281	0.13	1,366	0.12
In hospital fall with hip fracture rate	2,293	0.08	1,348	0.07
Surgery-related patient safety indicators				
Perioperative hemorrhage or hematoma rate	1,498	2.15	800	2.25
Postoperative acute kidney injury requiring dialysis rate	1,373	0.92	626	1.02
Postoperative respiratory failure rate	1,333	4.65	602	4.92
Perioperative pulmonary embolism or deep vein thrombosis rate	1,502	3.27	809	3.50
Postoperative sepsis rate	1,329	3.57	613	3.87
Postoperative wound dehiscence rate	1,278	0.72	558	0.68
Abdominopelvic accidental puncture or laceration rate	1,497	0.97	766	1.01

Source: 2017 state inpatient database discharges from Alaska, Arkansas, Arizona, Colorado, Delaware, the District of Columbia, Florida, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and West Virginia. Discharges at risk for patient safety indicators calculated using AHRQ SAS Quality Indicator Software, version 2020.

Notes: AHRQ = Agency for Healthcare Research and Quality Hospital-level estimates are weighted by the number of inpatient discharges. "At-risk discharges" are at risk for experiencing a specific adverse event based on diagnostic and procedural codes following AHRQ-developed definitions of quality indicators.



Notes

- ¹ See Chapman, Kaatz, and Carnes (2013) for a review of physician implicit and explicit biases and effects on quality of care.
- ² “Overview of the State Inpatient Databases,” AHRQ, accessed June 16, 2021, <http://www.hcup-us.ahrq.gov/sidoverview.jsp>.
- ³ This analysis is limited to states that had inpatient databases available for purchase through AHRQ in August 2020 and had requisite data elements for calculating AHRQ patient safety indicators. We exclude Iowa, Minnesota, and Nebraska from the analysis because these state inpatient databases do not separate discharge data by hospital. Discharge data from Maine do not identify patient racial or ethnic background and we therefore exclude them from the analysis. Discharge data from South Carolina do not identify patient age and we therefore exclude them. New York currently has 2017 inpatient data available through AHRQ, but this database was not available when we acquired the data.
- ⁴ “Quality Improvement and Monitoring at Your Fingertips,” AHRQ, accessed June 16, 2021, <https://www.qualityindicators.ahrq.gov/>.
- ⁵ We exclude measures related to mortality rates or obstetric care because these patient safety indicators apply to a significantly smaller subset of inpatient discharges. We also exclude a patient safety indicator assessing rates of retained surgical items or unretrieved device fragments because substantially fewer hospitals had the requisite number of at-risk discharges to construct these rates.
- ⁶ “Patient Safety Indicator 13 (PSI 13) Postoperative Sepsis Rate,” AHRQ, June 2017, https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V60-ICD09/TechSpecs/PSI_13_Postoperative_Sepsis_Rate.pdf.
- ⁷ Healthcare Cost and Utilization Project data provide information on the primary payer for each discharge. Therefore, limiting analyses to patients with Medicare as their listed primary payer may include disabled patients that have both Medicare and Medicaid coverage.
- ⁸ For analysis among hospitals with greater or fewer Black patients as a share of all patients, we separated hospitals by those in which greater or fewer than 25 percent of treated patients were Black. This aligns with the threshold used by Ly and coauthors (2010) to classify “Black-serving” hospitals. Moreover, this threshold maintains an adequate number of hospitals to measure average quality measures. For analysis among hospitals with greater or fewer private-paying patients as a share of all patients, we separated hospitals by those in which greater or fewer than 25 percent of treated patients had private insurance coverage, which was roughly the median value across hospitals in the analysis.
- ⁹ These estimated adjusted differences are qualitatively similar in direction, magnitude, and statistical significance with findings from Gangopadhyaya (2021), which was not limited to hospitals with 30 at-risk discharges for each patient safety indicator for both Black and white patients.
- ¹⁰ We find that 27 percent of Black adult patients had Medicaid coverage in 2017 across these 26 states, and this is more than twice the rate of Medicaid coverage among white adult patients (12 percent).
- ¹¹ This reform is one of several taking place under Michigan’s Health Disparities Reduction Program. In addition, the state will fund community-based organizations to target health conditions among specific racial and ethnic groups. Further, the state will monitor measures of access to care among Medicaid managed care beneficiaries by racial and ethnic groups to evaluate and develop recommendations for addressing disparities. See Loretta Davis-Satterla, “Michigan Tackles Health Care Disparities,” Commonwealth Fund newsletter, November 2018, <https://www.commonwealthfund.org/publications/newsletter-article/michigan-tackles-health-care-disparities>.



¹² Shantanu Agrawal and Adaeze Enekwechi, "It's Time to Address the Role of Implicit Bias within Health Care Delivery," *Health Affairs* blog, January 15, 2020, <https://www.healthaffairs.org/doi/10.1377/hblog20200108.34515/full/>.

¹³ Sandra Ambrozy and Shena Ashley, "Transforming the Civil Justice System Would Advance Equity for All," *Urban Wire* (blog), Urban Institute, June 2, 2021, <https://www.urban.org/urban-wire/transforming-civil-justice-system-would-advance-equity-all>.



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