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DO HOSPITALS PROVIDE LOWER-QUALITY CARE TO MINORITIES THAN TO WHITES?

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Disparities in the quality of hospital care between white and minority patients can be attributed to differences within or across hospitals, or perhaps both. One possibility is that hospitals provide their minority patients with lower-quality care than they provide to their white patients. A second is that white and minority patients are served by different hospitals and that hospitals primarily serving minority patients provide lower-quality care than do hospitals serving predominantly white patients.

This study examined whether hospitals provide lower-quality care to their minority patients than to their white patients. Unlike prior studies that have focused on care for cardiac patients and used general estimating equations to control for hospital fixed effects, we considered a broader range of services and directly compared hospital-specific quality indicators for racial and ethnic groups.

A number of studies have used regression techniques to demonstrate that disparities in the quality of hospital care are attributable more to variation in quality across hospitals than to variation within hospitals.[1] These studies demonstrate that observed disparities in quality of care can be substantially narrowed or eliminated when differences in hospital-level quality are considered—that is, controlling hospital fixed effects. Researchers have shown that disparities in care for cardiac, pneumonia, and knee arthroplasty patients were associated with where minority patients received care and where they lived.[2] Several studies have shown that minority patients are concentrated in a relatively fewer hospitals and that these hospitals tend to be lower performing.[3] Romana Hasnain-Wynia and colleagues studied disparities in the quality of hospital care among patients who received treatment at 123 teaching hospitals reporting to the University HealthSystem Consortium. They found that disparities in clinical processes of care measures for

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acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia were attributable to where minority patients received care.[4] Amber Barnato and colleagues studied disparities in AMI treatment and outcomes using data from the Cooperative Cardiovascular Project. They found that racial disparities in medical treatment narrowed or disappeared when hospital fixed effects were included in their analysis; however, racial disparities in surgical treatment either were unaffected or widened when hospital fixed effects were employed. They also found that after hospital fixed effects were controlled for, AMI mortality was lower for black patients than for white patients.[5] Elizabeth Bradley and colleagues studied disparities in the time to fibrinolytic therapy and percutaneous coronary intervention (PCI) for AMI patients. They found that controlling for hospital fixed effects greatly reduced disparities in time to PCI, by 33 percent for blacks and 75 percent for Hispanics.[6] Research by Katherine Baicker and colleagues suggests that race disparities in hospital care were attributable in part to racial differences in geographic access to hospital care.[7]

There is empirical evidence demonstrating that compared to white patients, minority patients tend to use specialists with poorer clinical outcomes and primary care physicians with less clinical training and with less access to specialists and hospital-based specialty services.[8]

Study Data And Methods

Data

Our analysis was based on state inpatient discharge (SID) data for thirteen states from the Agency for Healthcare Research and Quality's (AHRQ's) Healthcare Cost and Utilization Project (HCUP), the Pennsylvania Department of Health, and the Texas Department of State Health Services. The 2001–03 SID data were from Arizona, Colorado, Florida, Iowa, Maryland, Massachusetts, Michigan, New Jersey, New York, North Carolina, Texas, and Wisconsin; the 2000–02 SID data were from Pennsylvania (2003 data from Pennsylvania in HCUP format were unavailable).

These states were selected because they report patients' race, permit researchers to use their hospital identifiers, and collect all of the data elements required to compute AHRQ's inpatient quality indicators (IQIs) and patient safety indicators (PSIs). Eleven of the thirteen states reported Hispanic origin. North Carolina and

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Iowa did not report Hispanic origin, but they represent less than 3 percent of the Hispanic population covered by the study. More than 44 percent of the U.S. population lives in these thirteen states. They cover large portions of each racial and ethnic subgroup in the study: more than 36 percent of Asians, almost 50 percent of Hispanics, more than 44 percent of whites, and 46 percent of African Americans. Almost four in ten of the nation's acute care general hospitals are located in these states. This includes more than 45 percent of U.S. urban hospitals and 28 percent of rural hospitals. This project was reviewed and approved by the Institutional Review Board of the Johns Hopkins Bloomberg School of Public Health.

Quality Measures

AHRQ, in conjunction with researchers at Stanford University and the University of California, developed measures of hospital quality that can be computed using hospital administrative data. To measure hospital quality, we used IQIs and PSIs. IQIs are mortality rates, utilization rates, and volume indicators associated with the quality of hospital care. For this study, we used hospital mortality rates for certain procedures and conditions. PSIs are hospital rates of complications and adverse events following surgeries, procedures, and childbirth. We computed race/ethnicity-specific IQIs and PSIs for each hospital using software in SAS provided by AHRQ. Specifically, we computed mortality rates for four inpatient procedures (abdominal aortic aneurysm [AAA] repair, coronary artery bypass graft [CABG], craniotomy, and hip replacement), six inpatient conditions (AMI, CHF, acute stroke, gastrointestinal hemorrhage, hip fracture, and pneumonia), and fifteen patient safety indicators (decubitus ulcer, failure to rescue, iatrogenic pneumothorax, selected infection due to medical care, postoperative hip fracture, postoperative hemorrhage or hematoma, postoperative physiologic and metabolic derangements, postoperative respiratory failure, postoperative pulmonary embolism or deep vein thrombosis, postoperative sepsis, postoperative wound dehiscence in abdominopelvic surgical patients, accidental puncture and laceration, birth trauma, and obstetric trauma in vaginal delivery with and without instrument). We included all of the IQI and PSI measures available with the following exceptions. We did not use the utilization rates and volume indicators because they are inappropriate for comparing subgroups within a hospital. We did not use mortality and adverse event rates for those procedures and events that were too infrequent to allow the computation of unadjusted rates

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for the subgroups—for example, pediatric heart surgery and death in low-mortality diagnosis-related groups (DRGs).

Limitations and Strengths of PSIs and IQIs

PSIs are routinely cited in the health services research literature as reasonable, valuable, and inexpensive measures of hospital quality; however, there are some concerns about their validity.[9] An AHRQ review clinical panel identified nine: (1) the diagnosis may be subjective and vary across physicians, (2) the conditions are subject to underreporting or screening, (3) it is unclear whether the condition is preventable, (4) the indicator includes codes that encompass several levels of severity, (5) the denominator is questionable, (6) there is possible case-mix bias, (7) the indicator includes high-risk groups and stratification may be warranted, (8) the condition is rare and may not have adequate statistical power, and (9) use of the indicator may have undesirable effects.

The strength of the empirical evidence regarding PSIs varies. According to AHRQ, the empirical evidence is strong for five indicators, somewhat strong for three indicators, mixed for three indicators, and questionable for one indicator. There is no empirical evidence to support or refute the validity of three indicators.

The empirical literature on the validity of IQIs is stronger. With the exception of gastrointestinal (GI) hemorrhage, the empirical evidence demonstrates construct validity, and all of the measures are currently being used by a national or state quality improvement organization.[10]

Methods

For each hospital, we computed risk-adjusted mortality, complications, and adverse event rates for whites, blacks, Hispanics, and Asians. The risk adjustment consisted of controlling for age, sex, modified DRG, and comorbidities.[11] AHRQ software computes risk-adjusted rates that account for differences in case-mix between the hospital and a nationally representative sample of hospital patients. The software applies the regression coefficients from a national model to each hospital's discharges to compute expected mortality or adverse event rates. The national regression model is based on three years of HCUP data. The risk-adjusted rate equals the observed rate divided by the expected rate multiplied by the rate for the national sample. AHRQ recommends that a hospital have at least thirty discharges in the appropriate denominator to compute valid risk-adjusted rates. Most

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hospitals do not have valid risk-adjusted rates for all twenty-five indicators for each subgroup because every hospital did not provide all of the services covered by the quality indicators or did not serve sufficient numbers of patients in each subgroup. Hence, we only make comparisons where comparisons are possible.

We conducted two analyses. First, we compared subgroup-specific risk-adjusted rates for mortality and adverse events. The risk-adjusted rates are estimates, so we compared the risk-adjusted rates along with their respective confidence intervals across subgroups. We computed the percentage of hospitals where the minority risk-adjusted rates were greater than the white rates and the percentage of hospitals where the lower bound of the minority rates exceeded the upper bound of the white rates. Second, we conducted pairwise comparisons of the risk-adjusted mortality and adverse event rates. Using t-tests, we ascertained whether the mortality and adverse event rates for each minority subgroup were statistically higher, lower, or the same when compared to whites in the same hospitals. All of the analyses were conducted using SAS version 9.1.

Study Results

Overall Rates of Mortality and Adverse Events

A comparison of the overall risk-adjusted rates of mortality and adverse events by race and ethnicity shows that there are disparities in quality of care (Table 35.1). For example, for AAA repair, whites had the lowest risk-adjusted mortality rate (0.0335), and blacks had the highest (0.0381). Compared to the other three subgroups, whites had the lowest risk-adjusted mortality rates for three indicators (AAA repair, CABG, and craniotomy); blacks had the lowest risk-adjusted mortality rates for three indicators (AMI, CHF, and stroke); and Hispanics had the lowest risk-adjusted mortality rates for four indicators (hip replacement, GI hemorrhage, hip fracture, and pneumonia). Conversely, blacks had the highest rates for the four IQI inpatient procedures, and Asians had the highest rates for the six IQI inpatient conditions. For the PSIs, whites had the lowest rates for three indicators; blacks had the lowest rates for three indicators; Hispanics had the lowest rates for eight indicators; and Asians had the lowest rate for only one indicator. Conversely, the breakdown of the highest risk-adjusted adverse event rates by race and ethnicity is whites, zero; blacks, seven; Hispanics, two; and Asians, six.

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Table 35.1. Risk-Adjusted Morality and Adverse Event Rates in Hospitals in Thirteen States, by Race and Ethnicity, 2001–2003

	White	Black	Hispanic	Asian
Inpatient procedures				
AAA repair	**0.0336**	0.0381	0.0353	—[a]
CABG	**0.0246**	0.0285	0.0259	0.0263
Craniotomy	**0.0501**	0.0686	0.0534	0.0503
Hip replacement[b]	2.56	3.38	**1.30**	—[a]
Inpatient conditions				
Acute myocardial infarction	0.0759	**0.0697**	0.0743	0.0783
Congestive heart failure	0.0457	**0.0329**	0.0369	0.0524
Acute stroke	0.1025	**0.0923**	0.0951	0.1168
Gastrointestinal hemorrhage	0.0161	0.0162	**0.0156**	0.0176
Hip fracture	0.0229	0.0224	**0.0189**	0.0347
Pneumonia	0.0587	0.0589	**0.0548**	0.0702
Adverse events				
Decubitus ulcer	**0.0211**	0.0305	0.0234	0.0218
Failure to rescue	0.1195	0.1247	**0.1189**	0.1419
Iatrogenic pneumothorax	5.82	6.62	**4.26**	6.33
Infection due to medical care[b]	0.0020	0.0023	**0.0016**	0.0017
Postoperative hip fracture[b]	3.09	**1.88**	3.44	3.27
Postoperative hemorrhage or hematoma	0.0021	0.0023	**0.0016**	0.0021
Postoperative physio. metabol. derangement[b]	9.96	10.43	**9.68**	9.85
Postoperative respiratory failure	**0.0093**	0.0106	0.0105	0.0103
Postoperative PE or DVT	0.0089	0.0117	0.0084	**0.0078**
Postoperative sepsis	**0.0090**	0.0110	0.0111	0.0101
Postoperative wound dehiscence	0.0022	0.0024	**0.0019**	0.0028
Accidental puncture or laceration	0.0032	0.0032	**0.0027**	0.0032
Birth trauma	0.0059	0.0061	**0.0040**	0.0055
OB trauma, vaginal with instrument	0.2028	**0.1429**	0.1657	0.2847
OB trauma, vaginal without instrument	0.0514	**0.0357**	0.0396	0.0724

NOTE: *Includes 2000 data from PA. Lowest rates are in bold; highest rates are underlined. AAA is abdominal aortic aneurysm. CABG is coronary artery bypass graft. PE is pulmonary embolism. DVT is deep vein thrombosis. OB is obstetric.*

[a]*No hospital had enough cases to compute a valid rate.*

[b]*Per 10,000 discharges.*

SOURCE: *Based on state inpatient discharge data from thirteen states: AZ, CO, FL, IA, MD, MA, MI, NJ, NY, NC, PA, TX, and WI.*

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Comparison of Hospitals

Our findings indicate that in most hospitals, minority patients did not receive lower-quality care than white patients in the same hospital. Only a relatively few hospitals provided their minority patients with lower-quality care than their white patients. For almost all hospitals, their risk-adjusted mortality rates for minority patients were not statistically higher than their risk-adjusted mortality rates for white patients. Only a few hospitals had statistically higher risk-adjusted mortality rates for their minority patients compared to their white patients (Table 35.2). Although not shown, we also found that only a few hospitals had statistically lower risk-adjusted mortality rates for minority patients than for white

Table 35.2. Percentage of Hospitals Where Minority Patients Had Statistically Significant Higher Risk-Adjusted Mortality and Adverse Event Rates Than White Patients in the Same Hospital, 2001–2003

	Black		Hispanic		Asian	
	Percent	No.[a]	Percent	No.[a]	Percent	No.[a]
Inpatient procedures						
AAA repair	0.0	2	0.0	3	—[b]	—[b]
CABG	1.3	158	1.5	137	0.0	15
Craniotomy	0.0	95	0.0	58	0.0	4
Hip replacement	0.0	76	0.0	17	—[b]	—[b]
Inpatient conditions						
Acute myocardial infarction	0.0	350	0.8	248	0.0	28
Congestive heart failure	0.1	723	0.3	395	0.0	35
Acute stroke	0.6	494	0.4	229	5.1	39
Gastrointestinal hemorrhage	0.0	470	0.9	230	0.0	25
Hip fracture	0.0	79	0.0	72	0.0	5
Pneumonia	0.4	701	0.2	438	3.1	64
Adverse events						
Decubitus ulcer	13.8	1,241	1.8	926	4.2	458
Failure to rescue	0.3	739	0.9	446	0.0	73
Iatrogenic pneumothorax	2.9	1,475	1.9	1,236	4.6	779
Infection due to medical care	3.9	1,450	1.2	1,209	3.4	782
Postoperative hip fracture	1.1	1,008	2.4	779	1.7	353

(*Continued*)

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Table 35.2. (*Continued*)

	Black		Hispanic		Asian	
	Percent	No.[a]	Percent	No.[a]	Percent	No.[a]
Postoperative hemorrhage or hematoma	3.5	1,067	2.8	850	6.9	431
Postoperative physio. metabol. derangement	3.0	890	2.3	681	5.2	251
Postoperative respiratory failure	3.6	860	3.9	648	5.9	220
Postoperative PE or DVT	4.7	1,066	1.1	850	1.8	434
Postoperative sepsis	2.1	560	1.9	377	6.5	46
Postoperative wound dehiscence	3.4	786	1.5	585	7.3	136
Accidental puncture or laceration	2.5	1,480	2.7	1,240	4.3	792
Birth trauma	1.4	792	1.2	693	1.9	467
OB trauma, vaginal with instrument	0.9	221	1.6	251	18.3	93
OB trauma, vaginal without instrument	0.1	744	1.0	667	18.2	429

NOTE: *Includes 2000 data from PA. To be included in the comparison of risk-adjusted rates, a hospital had to have at least thirty discharges in the relevant denominator for both whites and minority groups. AAA is abdominal aortic aneurysm. CABG is coronary artery bypass graft. PE is pulmonary embolism. DVT is deep vein thrombosis. OB is obstetric.*

[a]*Number of hospitals with data for both groups in the comparison.*

[b]*No hospital had enough cases to compute a valid rate.*

SOURCE: *Based on state inpatient discharge data from thirteen states: AZ, CO, FL, IA, MD, MA, MI, NJ, NY, NC, PA, TX, and WI.*

patients in the same hospital. We found similar results for risk-adjusted adverse event rates. For African American and Hispanic patients, we found significantly higher rates of adverse events in less than 5 percent of hospitals, with the exception of decubitus ulcer for African Americans. More than 13 percent of hospitals had higher decubitus ulcer rates for their African American patients than for their white patients. For Asian patients, we found that rates of adverse events were statistically higher—ranging from 0 percent to 7.3 percent of hospitals—for fourteen of the

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sixteen PSIs. However, for obstetrical trauma, vaginal birth with and without instruments, Asian patients had higher adverse event rates than white patients had in 18 percent of hospitals.

Pairwise Comparisons

The results of our pairwise comparisons of mortality and adverse event rates indicate that minority patients did not receive lower quality of care and might actually have received higher quality of care than white patients in the same hospital (Table 35.3). Of seventy-three comparisons, minority patients had statistically higher risk-adjusted mortality and adverse event rates compared to white patients six times and lower risk-adjusted rates twenty-one times.

Table 35.3. Pairwise Comparisons: Risk-Adjusted Mortality and Adverse Event Rates of Minority Patients to White Patients in the Same Hospital, 2000–2003

	Black		Hispanic		Asian	
	Abs. Diff.	Stat. Sign.	Abs. Diff.	Stat. Sign.	Abs. Diff.	Stat. Sign.
Inpatient procedures						
AAA repair	NA	ND	NA	ND	NA	—[a]
CABG	NA	ND	NA	ND	NA	ND
Craniotomy	0.0120	Higher	ND	ND	ND	ND
Hip replacement	NA	ND	NA	ND	NA	—[a]
Inpatient conditions						
Acute myocardial infarction	−0.0098	Lower	−0.0048	Lower	NA	ND
Congestive heart failure	−0.0147	Lower	−0.0125	Lower	NA	ND
Acute stroke	−0.0129	Lower	NA	ND	NA	ND
Gastrointestinal hemorrhage	−0.0029	Lower	NA	ND	NA	ND
Hip fracture[b]	NA	ND	ND	ND	NA	ND
Pneumonia	NA	ND	−0.0065	Lower	NA	ND
Adverse events						
Decubitus ulcer	0.0030	Higher	−0.0025	Lower	−0.0069	Lower
Failure to rescue	−0.0052	Lower	−0.0085	Lower	NA	ND

(*Continued*)

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Table 35.3. (*Continued*)

	Black		Hispanic		Asian	
	Abs. Diff.	Stat. Sign.	Abs. Diff.	Stat. Sign.	Abs. Diff.	Stat. Sign.
Iatrogenic pneumothorax	NA	ND	−0.0002	Lower	NA	ND
Infection due to medical care	0.0002	Higher	−0.0005	Lower	ND	ND
Postoperative hip fracture	−0.0001	Lower	NA	ND	NA	ND
Postoperative hemorrhage or hematoma	NA	ND	NA	ND	NA	ND
Postoperative physio. metabol. derangement	NA	ND	NA	ND	NA	ND
Postoperative respiratory failure	NA	ND	NA	ND	NA	ND
Postoperative PE or DVT	0.0010	Higher	−0.0014	Lower	−0.0030	Lower
Postoperative sepsis	NA	ND	NA	ND	NA	ND
Postoperative wound dehiscence	NA	ND	NA	ND	NA	ND
Accidental puncture or laceration	NA	ND	NA	ND	NA	ND
Birth trauma	−0.0009	Lower	−0.0008	Lower	ND	ND
OB trauma, vaginal with instrument	−0.0546	Lower	−0.0103	Lower	0.0740	Higher
OB trauma, vaginal without instrument	−0.0136	Lower	−0.0060	Lower	0.0220	Higher

NOTE: *Includes 2000 data from PA. To be included in the comparison of risk-adjusted rates, a hospital had to have at least thirty discharges in the relevant denominator for both whites and minority groups. ND denotes no statistically significant difference. NA denotes not applicable because change was not statistically different. AAA is abdominal aortic aneurysm. CABG is coronary artery bypass graft. PE is pulmonary embolism. DVT is deep vein thrombosis. OB is obstetric.*

[a]*No hospital had enough cases to compute a valid rate.*

[b]*Cases per 10,000 discharges.*

SOURCE: *Based on state inpatient discharge data from thirteen states: AZ, CO, FL, IA, MD, MA, MI, NJ, NY, NC, PA, TX, and WI.*

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Discussion

There is an extensive literature on racial and ethnic disparities in hospital care.[12] Although we did find racial disparities in the overall mortality and adverse event rates, we did not find major differences in the quality of care across racial categories within hospitals. These findings seem to counter most of the hospital disparities literature. However, most of the prior research demonstrates racial and ethnic disparities in cardiovascular care and the receipt of surgical, major therapeutic, and major diagnostic procedures rather than in health outcomes.[13] The AHRQ quality indicators reflect the experience of patients who have received care. They do not tell us whether hospitals are offering differential access to major surgical and diagnostic procedures on the basis of race and ethnicity.

A potential explanation of this unanticipated result is that documented disparities in procedure use and processes of care within the same hospital probably do not result in disparities in hospital mortality or adverse events. Perhaps we are looking in the wrong place to observe the negative health consequences attributable to within-hospital disparities in procedure use and processes of care. To observe these negative health effects, we may have to follow patients out of the hospitals and look at other health outcomes measures—for example, rates of death within seven, thirty, and ninety days or readmission due to complications.[14]

Our findings of lower-quality care for white patients compared to minority patients are also consistent with a few studies that have focused on disparities in hospital mortality and patient safety.[15] Rosanna Coffey and colleagues found that disparities in PSIs varied by type of indicator and that more than half of the indicators showed minority rates of adverse events lower than non-Hispanic white rates.[16] Barnato and colleagues found that AMI mortality rates were lower for minority patients than for whites.[17] A possible explanation is that physicians may have a lower threshold for admitting minority patients to hospitals, and our risk adjustment does not adequately control for differences in the propensity to be admitted to the hospital. Another explanation is that because minority patients have limited access to hospital care, they may on average be better candidates for the care than white patients are. This finding may be an indication of overuse by whites as opposed to underuse by minorities.[18] Health care disparities researchers sometimes routinely assumed that whites always received clinically appropriate care. However, whites may be more likely to receive inappropriate procedures because they have better access to hospital care and are less likely to be under- or uninsured.

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Limitations

This study has several limitations. First, although our data represent large proportions of discharges from each subgroup, the absence of a West Coast state with a large Asian population is a weakness. The findings might not reflect the experience of Asian patients in states where Asians are a sizable minority. Second, the AHRQ indicators do not reflect what is happening in hospital outpatient settings. Third, three years of SID data were combined to compute the hospital quality measures. This assumes that quality remained relatively stable over the three-year period. Fourth, we did not risk-adjust for socioeconomic status (SES) and health insurance status, an important consideration in a multivariate analysis framework. Disparities in quality attributable to SES and health insurance coverage can be attributed to race and ethnicity when these confounders are omitted from the analysis. However, it is unlikely that these confounders are masking disparities in quality within hospitals and leading us to erroneously conclude that there are no disparities when in fact there are disparities.

Conclusions

Our findings suggest that when minority patients receive hospital care, they receive the same standard of care that white patients receive. Within-hospital disparities in quality of care are isolated to a relatively small number of hospitals and appear to be for certain specific conditions. Hence, when it comes to addressing within-hospital disparities in health outcomes, interventions should be targeted toward those hospitals that are lower-performing as opposed to hospitals nationwide. Also, targeted interventions could be designed to address disparities in outcomes for specific conditions.

More attention needs to be devoted to eliminating disparities in quality across hospitals rather than within hospitals. All patients in these hospitals are at higher risk for mortality, complications, and adverse events, not just their minority patients. Policymakers should focus their efforts on improving care at low-performing hospitals.

Notes

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