Racial Disparities in the Quality of Care for Enrollees in Medicare Managed Care

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THE TECHNOLOGY OF MEDICAL care has improved dramatically in the past century, yet for some populations in the United States, care has fallen short of important goals.\textsuperscript{1,2} In particular, blacks have been less likely to receive many types of medical services and procedures.\textsuperscript{3,4} Blacks bear a disproportionate share of suffering related to a variety of chronic diseases. To the extent that they fail to receive quality care, they may be at risk for complications that could otherwise have been ameliorated or prevented altogether.

Enrollment in managed care has grown in the past decade, yet few studies have examined whether there are racial disparities in the quality of care within health plans.\textsuperscript{9-12} Some features of managed care insurance, such as mandatory enrollment with a primary care physician, targeted outreach to populations with special needs, case-management programs for patients with chronic conditions, and enhanced quality monitoring, may lessen racial disparities by differentially improving the quality of care for blacks.\textsuperscript{9,16}

Until recently, limited nationally representative data were available to assess health care quality.\textsuperscript{2} Most studies of racial disparities in care have examined differences in use that may or may not accurately represent the quality of care. However, the Balanced Budget Act of 1997 requires all health plans that enroll Medicare beneficiaries to report quality-of-care data annually using a Medicare-specific version of the Health Plan Employer Data and Information Set (HEDIS).\textsuperscript{17} Derived from measures explicitly designed to assess the quality of care, these data offer the first opportunity to examine racial disparities in the quality of care provided to Medicare enrollees in health plans nationwide.

METHODS
Sample and Data
On an annual basis since 1997, all health plans that participate in the Medicare+Choice program have been required to report HEDIS data to the Center for Medicare and Medicaid Services (CMS, formerly known as the Health Care Financing Administration) in a format that includes a confi-
dential identifier for each beneficiary. In 1998, the Medicare HEDIS data set summarizing performance in calendar year 1997 included 4 measures of the quality of care (described by the National Committee for Quality Assurance as clinical effectiveness measures). To populate this data set, each health plan submitted a file that identified the enrolled beneficiaries selected for each HEDIS measure denominator as well as a variable indicating whether the individual received the measured service. Our analysis made use of all 4 clinical effectiveness measures.

National Committee for Quality Assurance specifications define precise clinical criteria for using health plan administrative files to identify a continuously enrolled population (having no break in enrollment >45 days) and to select a random sample of those enrollees eligible for each measure. The specifications also define a protocol for using administrative data and/or medical record review to identify, among each eligible population, the clinical events that constitute good clinical performance. For example, to calculate the measure of eye examinations for patients with diabetes, the specifications identify patients with diabetes using preselected outpatient and inpatient claims codes (Uniform Billing form 92, International Classification of Diseases, Ninth Revision, and Current Procedural Terminology codes) or pharmacy data (dispensing of insulin or oral hypoglycemics). Among this eligible population of patients with diabetes, the performance standard is met if a patient has at least 1 claim that matches a specified list of Current Procedural Terminology codes for a visit to an ophthalmologist or optometrist or if the patient has evidence on medical record review that a dilated retinal examination was performed.18 The “performance rate” is the proportion of eligible patients who met the standard.

At the time health plans prepared their data for reporting to CMS, all of them underwent onsite audits, which included review of data systems, interviews with health plan personnel, and centralized review of medical records. Because the audit was concurrent, deficiencies in the data were corrected before submission of the results to the National Committee for Quality Assurance and the CMS. For the clinical effectiveness measures, between 90.3% and 96.6% of the health plans that reported data were in compliance with the HEDIS technical specifications.18

We obtained the 1998 HEDIS file from CMS, which included usable data from 294 health plans for 415,040 beneficiaries who had been included in at least 1 of the 4 HEDIS clinical effectiveness measures: breast cancer screening, β-blocker use after myocardial infarction (MI), eye examinations for patients with diabetes, and follow-up after hospitalization for mental illness. These measures are summarized in Table 1.

The CMS provided a second file containing demographic data for approximately 4.7 million beneficiaries enrolled in managed care health plans at some point during 1997. This file included a unique identifier (the health insurance claim number and beneficiary identity code [HICBIC]), which was transformed to protect the identities of individual beneficiaries from the researchers, the beneficiary’s date of birth, sex, race, region, state, ZIP code, an eligibility indicator (age, disability, or end-stage renal disease), and indicators of whether the beneficiary had obtained Medicare part B insurance or Medicaid coverage. It also contained an identifier (the group health plan number) for the health plan in which the beneficiary was enrolled and the number of months of Medicare enrollment in the health plan.

We used the transformed HICBIC number to match the HEDIS file to the file containing demographic information, achieving a match for 363,199 (88%) enrollees included in the HEDIS file. Using the demographic information, we removed 57,625 (16%) enrollees who were ineligible for our analysis, including those who were younger than 65 years or had died during the reporting year. For the breast cancer measure, we excluded 1,325 men. After exclusions, the study sample consisted of 305,574 individuals. For

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descriptive and comparative purposes, we used the demographic file of all managed care enrollees who were aged 65 years or older and were alive at the end of 1997 (approximately 4 million enrollees).

**Sociodemographic Characteristics**

We classified enrollees according to the following sociodemographic categories for analysis: (1) age (3 categories), (2) sex, (3) race, (4) Medicaid recipient (sometimes referred to as “dual-eligible”), (5) residence in a low-income area (as described below), (6) residence in an area where a low, medium, or high proportion of the population had attended college, and (7) rural residence. Income, education, and rural residence for each enrollee were based on ZIP code. We used data from the 1990 census to classify all ZIP codes based on these variables. A ZIP code was classified as low income if 25% or more of its residents aged 65 years or older received public assistance. Educational attainment was defined in tertiles after ranking all ZIP codes on the proportion of residents aged 65 years or older who had attended college. For rural ZIP codes, we used the standard census definition. Beneficiaries were classified as Medicaid recipients if they were enrolled in state coverage for at least 1 month during the calendar year.

**Health Plan Characteristics**

We obtained data on health plan characteristics (including total enrollment, Medicare enrollment, whether the health plan enrolled Medicaid beneficiaries, tax status, model type, age of health plan, and region) from the InterStudy Competitive Edge database, which contains information on health maintenance organizations operating in the United States. This file was matched to the Medicare health plan file by name, city, and state. Matches were verified by comparing the county service areas provided by CMS for each Medicare plan with the counties listed in the InterStudy database. Where discrepant information was noted or a match was not obtained, we contacted health plans directly to resolve these discrepancies. Only 25% of the health plans were unmatched to the InterStudy database. Using the CMS demographic file, we classified each health plan into 1 of 3 tertiles (low, medium, or high) based on its proportion of black enrollment.

**Analysis**

For all managed care enrollees and for each HEDIS measure’s eligible population, we tabulated the number of enrollees and calculated the percentages with each sociodemographic characteristic. We calculated performance on each HEDIS measure as the percentage of eligible enrollees who received the specified service, calculating percentages for the entire eligible population, for blacks and whites, and for each sociodemographic group. For each HEDIS measure, multivariate logistic regression models were used to calculate the adjusted probability of receiving the HEDIS-specified service among eligible blacks and whites. Initial models were controlled for age and sex (except for breast cancer screening). Medicaid status, income, educational attainment, and rural residence. Next, to address the possibility of confounding of race with the effect of differential enrollment of blacks in low-quality health plans, we fit a set of models that included a dummy variable for each health plan, controlling all other predictors at their mean values. We also examined the association between racial disparities and health plan characteristics by adding interaction terms to this model. To assess statistical significance of comparisons, we used \( \chi^2 \) tests or analysis of variance. In all analyses, variances were adjusted using either SUDAAN or STATA to account for clustering of enrollees within health plans.

**RESULTS**

During 1997, of the approximately 4 million Medicare beneficiaries aged 65 years or older and enrolled in managed care, 305 574 (7.7%) were included in health plans’ reports to the CMS on 1 or more of the 4 HEDIS clinical effectiveness measures. The total number of enrollees assessed for each HEDIS measure ranged from 161 179 for the measure of eye examinations for patients with diabetes to 3590 for the measure of follow-up after hospitalization for mental illness (Table 2). The sociodemographic characteristics of the enrollees included in each HEDIS measure reflect the differing eligibility criteria for each measure and the clinical epidemiology of the diseases assessed. For example, the breast cancer screening measure is restricted to women between the ages of 65 and 69 years. The relatively higher proportion of blacks included in the eye examinations for patients with diabetes measure reflects the higher prevalence of diabetes for that group.

National Medicare HEDIS performance rates for the 4 measures were 70.3% for breast cancer screening; 49.6% for eye examinations for patients with diabetes; 73.2% for \( \beta \)-blocker use after MI; and 52.5% for follow-up after hospitalization for mental illness (Table 3). Blacks were significantly less likely than whites to receive each of the HEDIS measured services. The unadjusted differences between whites and blacks ranged from 6.8 percentage points (95% confidence interval, 1.2%-12.4%) for the eye examinations for patients with diabetes measure to 20.8 percentage points (95% confidence interval, 14.1%-27.3%) for the follow-up after hospitalization for mental illness measure.

Other important socioeconomic factors were associated with differences in clinical quality of care (Table 4). In general, beneficiaries with Medicaid insurance, low income, or lower educational attainment were less likely to receive each of the 4 clinical services. Medicaid-insured beneficiaries and those with lower educational attainment had substantially lower rates of receiving all 4 clinical services. Differences related to income were statistically significant only for the breast cancer screening measure. Differences in the clinical quality of care based on age, sex, or rural vs urban residence were
small and not statistically significant (data not shown).

After adjustment for individual socioeconomic factors (Table 5), racial disparities for breast cancer screening, \(\beta\)-blocker use after MI, and follow-up after hospitalization for mental illness were somewhat smaller, but still statistically significant. When we added adjustment for health plan effects using dummy variables for individual health plans, the racial disparities were smaller, but they remained statistically significant for the eye examinations for patients with diabetes, \(\beta\)-blocker use after MI, and follow-up after hospitalization for mental illness measures. The racial disparity in breast cancer screening was not statistically significant. Health plans in the lowest tertile of black enrollment had breast cancer screening rates of 76% for whites and 74% for blacks while health plans in the highest tertile of black enrollment had breast cancer screening rates of 60% for whites and 58% for blacks (data not shown).

Of the health plan characteristics we examined, 4 were associated with differences in the magnitude of racial disparity for 2 of the clinical quality measures. For the breast cancer screening measure, we noted smaller racial disparities in not-for-profit health plans (P=.02), group or staff model health plans (P=.02), and health plans located in the New England and North Central regions (P=.03). For the follow-up after hospitalization for mental illness measure, racial disparities were smaller in health plans with larger total Medicare enrollment (P=.03) and health plans in the New England and Pacific regions (P<.001). For the eye examinations for patients with diabetes and \(\beta\)-blocker use after MI measures, there were no statistically significant interactions of race and plan characteristics. Interactions of race with other health plan characteristics were not significant (total health plan en-

Table 2. Characteristics of Medicare Beneficiaries Enrolled in Managed Care and Sampled for Health Plan Employer Data and Information Set (HEDIS) Clinical Effectiveness Measures in 1998*

<table>
<thead>
<tr>
<th>HEDIS Measure</th>
<th>All</th>
<th>Breast Cancer Screening</th>
<th>Eye Examinations for Patients With Diabetes</th>
<th>(\beta)-Blocker Use After Myocardial Infarction</th>
<th>Follow-up After Hospitalization for Mental Illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of managed care enrollees†</td>
<td>3977235</td>
<td>139437</td>
<td>161179</td>
<td>11183</td>
<td>3590</td>
</tr>
<tr>
<td>No. of health plans</td>
<td>294</td>
<td>241</td>
<td>263</td>
<td>234</td>
<td>205</td>
</tr>
<tr>
<td>Age, y</td>
<td>65-69</td>
<td>33</td>
<td>99</td>
<td>35</td>
<td>29</td>
</tr>
<tr>
<td>70-80</td>
<td>51</td>
<td>1</td>
<td>53</td>
<td>53</td>
<td>62</td>
</tr>
<tr>
<td>&gt;80</td>
<td>16</td>
<td>0</td>
<td>12</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Women</td>
<td>58</td>
<td>100</td>
<td>52</td>
<td>44</td>
<td>64</td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>86</td>
<td>85</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>Black</td>
<td>8</td>
<td>7</td>
<td>11</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Medicaid</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Low income‡</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Education§</td>
<td>Low</td>
<td>12</td>
<td>9</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Medium</td>
<td>27</td>
<td>23</td>
<td>26</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>High</td>
<td>62</td>
<td>68</td>
<td>62</td>
<td>62</td>
<td>63</td>
</tr>
<tr>
<td>Rural</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

*Values are expressed as percentages unless otherwise indicated.
†Excluded persons younger than 65 years and persons who died before the end of the year.
‡Resident of ZIP code with 25% or more of the population (among those older than 65 years) receiving public assistance.
§Resident of ZIP code classified by the proportion of residents older than 65 years with some college education (see "Sociodemographic Characteristics").

Table 3. Racial Disparity in Clinical Quality*

<table>
<thead>
<tr>
<th>HEDIS Measure</th>
<th>All</th>
<th>White</th>
<th>Black</th>
<th>Racial Disparity (95% CI)†</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer screening</td>
<td>70.3</td>
<td>70.9</td>
<td>62.9</td>
<td>8.0 (4.5-11.4)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Eye examinations for patients with diabetes</td>
<td>49.6</td>
<td>50.4</td>
<td>43.6</td>
<td>6.8 (1.2-12.4)</td>
<td>.02</td>
</tr>
<tr>
<td>(\beta)-Blocker use after myocardial infarction</td>
<td>73.2</td>
<td>73.8</td>
<td>64.1</td>
<td>9.7 (4.2-14.9)</td>
<td>&lt;.002</td>
</tr>
<tr>
<td>Follow-up after hospitalization for mental illness</td>
<td>52.5</td>
<td>54.0</td>
<td>33.2</td>
<td>20.8 (14.1-27.3)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Cf indicates confidence interval.
†Value adjusted for clustering by health plan.
Follow-up after hospitalization

However, disparities in care may be explained by socio-economic factors. In a study of heart disease, racial disparities in the use of β-blocker medication after heart attack were explained by socio-economic factors. In contrast, a substantial part of disparities in breast cancer screening may be explained by socio-economic factors while less than one tenth of the racial disparity in follow-up after hospitalization for mental illness is explained by these factors.

Our descriptive analysis of the interaction of race with health plan characteristics suggests that a subset of health plans (for-profit, decentralized model types, and health plans in some regions of the United States) may need to make special efforts to improve rates of breast cancer screening. For the other 3 clinical services we studied, the similarity of disparities across all categories of health plans suggests that all health plans should attend to racial disparities in care.

These results have important clinical implications. HEDIS measures incorporate widely accepted standards of care. Racial disparities for these clinical services could be associated with adverse outcomes that have previously been noted among minority patients. For example, lower rates of breast cancer screening among black women may contribute to later stage breast cancer diagnosis and a higher mortality rate.23-25 Low rates of eye examinations for blacks with diabetes may contribute to their high rate of established retinal disease at the time of first eye examination.20,27 Racial disparity in use of β-blocker medication after MI is consistent with prior research indicating that blacks are less likely to receive other therapies for coronary artery disease.28

Our analysis demonstrates that the Medicare program’s HEDIS data collection offers an unprecedented opportunity to assess racial and socio-economic disparities in quality of care. Reports to health plans about identified disparities could be a powerful lever for change if health plans are able to use this information to target interventions that improve clinical quality for minority enrollees.20

Efforts to increase the level of service delivery to minority populations can succeed. In a study of influenza vaccination of Medicare beneficiaries, blacks enrolled in health plans were more likely to receive influenza vaccination than those with fee-for-service insurance.11 Ensuring that a primary

**Table 5. Racial Disparity Adjusted for Individual Socioeconomic Factors and Health Plan Effects**

<table>
<thead>
<tr>
<th>Racial Disparity Adjusted for Socioeconomic Factors</th>
<th>Unadjusted</th>
<th>Individual Socioeconomic Factors</th>
<th>Health Plan Effects†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer screening</td>
<td>7.9 (4.5 to 11.4)</td>
<td>3.6 (0.6 to 6.8)</td>
<td>1.7 (0.4 to 3.8)</td>
</tr>
<tr>
<td>Eye examinations for patients with diabetes</td>
<td>6.8 (1.2 to 12.4)</td>
<td>4.3 (1.0 to 9.5)</td>
<td>2.5 (0.8 to 4.2)</td>
</tr>
<tr>
<td>β-Blocker use after myocardial infarction</td>
<td>9.6 (4.2 to 14.9)</td>
<td>7.7 (2.6 to 13.2)</td>
<td>4.3 (0.3 to 8.8)</td>
</tr>
<tr>
<td>Follow-up after hospitalization for mental illness</td>
<td>20.7 (14.1 to 27.3)</td>
<td>18.9 (11.7 to 25.6)</td>
<td>15.7 (7.9 to 23.1)</td>
</tr>
</tbody>
</table>

*Includes age, sex, Medicaid insurance, income, education, and rural vs urban residence.
†Includes a dummy variable for each health plan.

COMMENT

Our analysis demonstrates that the clinical quality of care for Medicare beneficiaries was significantly lower for blacks than for whites on 4 widely used HEDIS measures. These racial disparities were consistent across the 4 measures, were substantial, and were not completely explained by potentially important confounders, such as socio-economic characteristics or differential enrollment of blacks in health plans with poor performance.

The results summarized in Table 5 offer 3 clues about the nature and potential causes of racial disparities in quality of care. First, the magnitude of racial disparity varies among quality measures. The disparity was smallest for breast cancer screening and largest for the mental health quality measure. In the case of breast cancer screening, it could be that health plans and clinicians have effectively reduced the extent of racial disparity because of accumulated evidence over the past decade highlighting racial disparity in screening, stage at diagnosis, and mortality from breast cancer.23-25 In contrast, we know of no prior literature suggesting that blacks are less likely to receive follow-up after hospitalization for mental illness. The magnitude of this previously unrecognized disparity is formidable.

Second, our results suggest that individual socioeconomic characteristics (the most important being attained education, income, and Medicaid insurance status) explain differing proportions of the observed racial disparity across quality measures. Comparing the adjusted and unadjusted disparities, more than half of the racial disparity in breast cancer screening may be explained by socio-economic factors while less than one tenth of the racial disparity in follow-up after hospitalization for mental illness is explained by these factors.

Third, part (but not all) of the racial disparity in clinical quality is explained by disproportionate enrollment of blacks in health plans with poorer performance. After accounting for individual characteristics, approximately half of the remaining racial disparity on measures of breast cancer screening, eye examinations for patients with diabetes, and β-blocker use after MI appears to occur between plans rather than within plans. For breast cancer screening, the racial disparity is no longer statistically significant after controlling for individual and health plan effects. In contrast, a substantial part of the racial disparity in the other 3 measures is not explained by differences in quality of health plans, but rather by different quality for blacks and whites within health plans.

Our descriptive analysis of the interaction of race with health plan characteristics suggests that a subset of health plans (for-profit, decentralized model types, and health plans in some regions of the United States) may need to
care physician is involved in care may be a key first step. Blacks in managed care were more likely to report a usual source of care than blacks with other forms of insurance.\textsuperscript{19,20} A study of patients of family practitioners found no disparity in preventive service use as long as patients had access to primary care.\textsuperscript{31} On the other hand, having a usual source of care may not suffice to overcome financial barriers such as co-payments, or nonfinancial barriers, such as the location of facilities in areas with limited transportation, inadequate interpreter services, or a lack of cultural sensitivity on the part of clinicians or staff.\textsuperscript{12,36}

Our study has several strengths. To our knowledge, this is the first study to use HEDIS measures to assess racial disparities. This is the first study to examine racial disparity in the quality of mental health care. Few studies have examined racial disparity in the quality of care provided within Medicare managed care and only a handful have been based on a nationally representative sample of enrollees.\textsuperscript{8,10,12,37} The data reported to CMS were audited making it unlikely that our results are biased due to data collection.\textsuperscript{18} The HEDIS specifications require minimum enrollment time frames and we excluded enrollees who died, so our results are not biased due to differential rates of disenrollment or death. We were able to control for potential confounding between race, a wide range of other socioeconomic factors, and health plan effects. By including health plans in our multivariable models, we controlled for both measurable and implicit plan characteristics.

Our study has limitations. It was not designed to determine the specific features of managed care that are associated with racial disparity. We lacked detailed information about patients’ comorbidities, knowledge, beliefs, and attitudes toward health care. However, these characteristics are probably related to income, education, and Medicaid insurance, and the latter factors do mediate part of the racial disparity in clinical quality. We cannot exclude the possibility that inadequacies in the clinical and administrative records for the populations that we studied may have biased our results. However, controlling for health plan effects should at least partially address this potential bias. We could not determine whether enrollees might have received these clinical services (for example, a mammogram or eye examination for a patient with diabetes) immediately before or after the study period. Media reports have noted that some health plans are withdrawing from Medicare, but the current enrollment in Medicare managed care plans is 5.5 million beneficiaries, which is higher than enrollment at the time our data were collected.\textsuperscript{38}

We found significant racial disparities in the quality of care among Medicare beneficiaries enrolled in managed care. Our analysis demonstrates the importance of CMS’s efforts to collect HEDIS data and their potential as a resource for tracking racial disparities in the quality of care. This program of monitoring should be expanded and extended to the other types of insurance offered by government. Our results should also motivate future research to address the reasons for these disparities within and among health plans. Identifying plans that succeed at narrowing disparities in the quality of care could inform programs to reduce or potentially eliminate such disparities.

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REFERENCES


All our knowledge begins with the senses, proceeds then to the understanding, and ends with reason. There is nothing higher than reason.

—Immanuel Kant (1724-1804)