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Despite Improved Quality Of Care In The Veterans Affairs Health System, Racial Disparity Persists For Important Clinical Outcomes

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ABSTRACT Both government and private health care systems have engaged in efforts to improve quality, but the effect of these initiatives on racial and ethnic disparities has not been well studied. In the decade following an organizational transformation, the Veterans Affairs (VA) health care system achieved substantial improvements in quality of care with minimal racial disparities for most process-of-care measures, such as rates of cholesterol screenings. However, in our study we observed a striking disconnect between high levels of performance on widely used process measures and modest levels of improvement in clinical outcomes, such as control of blood pressure, blood glucose, and cholesterol levels. We also observed a gap in clinical outcomes of as much as nine percentage points between African American veterans and white veterans. Almost all of the disparity in outcomes in the VA was explained by within-facility disparity, which suggests that VA medical centers need to measure and address racial gaps in care for their patient populations. Moreover, because cardiovascular disease and diabetes are major contributors to racial disparities in life expectancy, the findings of this study and others underscore the urgency of focused efforts to improve intermediate outcomes among African Americans in the VA and other settings.

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Improving quality and reducing racial and ethnic health care disparities are two important and related challenges confronting health care systems in the United States.^{1,2} The Institute of Medicine and others have endorsed collecting quality-of-care data both in the aggregate and separately for vulnerable populations that may be at risk for suboptimal care.³⁻⁵ By examining clinical performance stratified by race, ethnicity, and other sociodemographic characteristics, health care organizations can determine whether disparities in the quality of care exist among their patient populations and can implement interventions to eliminate any disparities they find.

The Veterans Affairs (VA) health care system, the nation's largest integrated delivery system, is

an important venue in which to gauge progress toward improving the quality and equity of health care. The VA serves more than five million veterans of military service annually. Most people enrolled in the VA are eligible to receive care if they have a disability that arose during military service or if they have a low income. Veterans in racial and ethnic minority groups are more likely than others to be dependent on the VA for health care, and more than 20 percent of VA users are members of racial and ethnic minorities.⁶ The VA health system includes comprehensive covered services and limited patient cost sharing, thereby reducing some financial barriers that lead to racial and socioeconomic disparities in health care.

In response to concerns that the VA provided

substandard and variable care, the system implemented an organizational transformation in 1995–99 to improve the quality of care.⁷ In this transformation, the VA decentralized its administrative structure; allocated funds to regional service networks on the basis of the number of veterans served instead of historical costs; designed an extensive set of clinical quality measures; held managers and clinicians accountable for clinical performance; implemented universal primary care; and adopted a systemwide electronic health record and related health information technologies.

This transformation and subsequent quality improvement initiatives have greatly improved the VA's quality of care.^{8–11} However, the effect of these efforts on racial disparities in the quality of care is not known.

In this article we report on trends in the quality of care and racial disparities in relation to ten clinical performance measures that assessed cancer screening, cardiovascular care, and diabetes care from 2000 to 2009. We also examined whether racial disparities were driven primarily by a concentration of black veterans in lower-performing VA facilities, or a differential quality for white and black veterans receiving care in the same VA facility.

Study Data And Methods

SOURCES OF DATA AND STUDY POPULATION We acquired data on quality of care in the VA for the period 2000–09 from the External Peer Review Program. This program collects data annually

from a random sample of veterans enrolled for at least two years in the VA health care system.

We restricted our analysis to quality indicators that were reported continuously for at least five years and that were designated as having comparable specifications to measures reported in the Healthcare Effectiveness Data and Information Set, a set of performance measures widely used by health plans and developed by the National Committee for Quality Assurance (Exhibit 1). Six quality indicators measured processes of care, and four measured clinical outcomes.

Process-of-care measures assess whether the care provided adheres to processes that have been proved by scientific evidence or agreed upon by broad consensus to improve health. An example of a process indicator is whether an adult age fifty or older has received screening for colorectal cancer. Such screening in this age group has been demonstrated to reduce mortality from colorectal cancer and has been recommended by expert clinical guidelines.

In contrast, outcome measures assess clinical characteristics of patients that are associated with health. An example of an outcome measure is whether a patient with coronary heart disease had a low-density lipoprotein (LDL, or “bad”) cholesterol level below 100 mg/dL—a level that is associated with reduced risk of subsequent heart attacks, strokes, and death.

The VA measured quality indicators in a sample of enrollees who had at least one outpatient primary care visit in the 13–24 months prior to the performance assessment. Trained abstractors

EXHIBIT 1

Description Of Quality-Of-Care Measures In The Veterans Affairs (VA) Health Care System

Measure	Description	Years
DIABETES		
Eye exam	Retinal exam by an eye care professional in the past year	2000–09
Testing of HbA1c level	Testing of HbA1c within past year	2000–09
Control of HbA1c level ^a	Level of HbA1c below 9.5% (2000–02) or 9.0% (2003–07)	2000–09
Testing of LDL cholesterol level	Testing of LDL cholesterol within past year	2000–09
Control of LDL cholesterol level ^a	Level of LDL cholesterol below 100 mg/dL	2005–09
CARDIOVASCULAR DISEASE		
Testing of LDL cholesterol level	Testing of LDL cholesterol among people with coronary artery disease	2005–09
Control of LDL cholesterol level ^a	Level of LDL cholesterol below 100 mg/dL among people with coronary artery disease	2005–09
HYPERTENSION		
Control of blood pressure ^a	Blood pressure below 140/90 mmHg among people with hypertension	2003–09
CANCER SCREENING		
Breast cancer screening	Mammography within the past two years for women	2000–09
Colorectal cancer screening	Fecal occult blood testing within the past year, flexible sigmoidoscopy within the past five years, or colonoscopy in the past ten years	2003–07

SOURCE VA External Peer Review Program data. **NOTES** Indicators measure process of care unless otherwise noted. HbA1c is a measure of glucose control. LDL is low-density lipoprotein. ^aOutcome indicator.

tors reviewed the electronic health record for the sampled patients to determine whether they had received the indicated process or achieved the desired outcome.

To acquire information on demographic characteristics, we linked quality data to VA enrollment records, data on VA health system use, and the Medicare enrollment file. The latter provided data on race for people with missing race data in VA records. Our initial study sample included 1,221,232 VA enrollees who were eligible to be included in the sample for one or more of the performance indicators during the study period.

To ascertain race, we used the most frequent self-reported race value in the VA use data (available for 74 percent of the sample). For people who did not report their race, we used the most frequent observer-reported race value in the VA data (16 percent of the sample). For people without self-reported or observer-reported data, we used race data from the Medicare enrollment file (8 percent of the sample). The proportion of subjects without VA self-reported, VA observer-reported, or Medicare enrollment race data was 2 percent.

The agreement between self-reported and observer-reported race data in the VA and Medicare records is excellent for people identified as white or black; therefore, observer and self-reported data can be pooled for these two groups without creating bias in assessments of multi-year trends.^{12,13} However, observer-reported data are less accurate for people of other races and ethnicities. Because approximately 98 percent of the sample was clearly identified as either white or black, we restricted the sample to these VA enrollees. We further excluded people who died in the measurement year and veterans younger than age fifty for the two cancer screening measures.

Thus, our final sample included 1,126,254 veterans (955,047 white; 171,207 black) who were sampled for one or more performance indicators between 2000 and 2009.

VARIABLES The outcome variables were each of the quality measures described in Exhibit 1. Each VA quality measure was dichotomous (yes or no). Therefore, each measure determines whether the VA enrollee received the care process (for example, colorectal cancer screening) or whether the clinical outcome (for example, LDL cholesterol level) was below the specified threshold.

Our primary independent variables were race, year, and a race-by-year interaction term. Important covariates were age, sex, census region, and two area-level socioeconomic indicators: the proportion of people age sixty-five and older residing in the enrollee's ZIP code whose income

was less than the federal poverty level; and the proportion of people age sixty-five and older residing in the enrollee's ZIP code who attended college.

We included these ZIP code-level variables in the analysis to determine whether racial disparities were mediated by difference in area-level socioeconomic status. We used census data for people older than age sixty-five to match the mean age of our study cohort. For both ZIP code-level income and education, we assigned enrollees to three groups, representing the highest quartile, the middle two quartiles, and the lowest quartile.

ANALYSES We used the Student's t-test and chi-square test to compare demographic characteristics and the geographic distribution of the entire sample according to race and performance measure category. To identify racial disparities in performance measures, for the initial and final years for which a particular measure was collected, we calculated the disparity for each measure as the difference in unadjusted national performance scores between whites and blacks. To examine whether any disparity persisted across the study period, we calculated the difference between the unadjusted final year and the unadjusted initial year disparity, and we used the Student's t-test to assess the statistical significance and 95 percent confidence interval of the change in disparity.

To test whether sociodemographic or institutional factors contributed to racial disparities, we constructed separate generalized linear models predicting performance on each outcome quality indicator. Each model adjusted for clustering of observations within each VA medical center using generalized estimating equations, with an identity link function to generate output on the risk-difference scale. Therefore, our regression results estimate the adjusted absolute racial difference in performance rates between white and black veterans.

We used a fixed-effects model with clustering, rather than a random-effects model, because our data included all VA medical centers rather than a sample of centers.

Model 1 included variables for age, sex, year of observation, and race. Model 2 further included terms for census regions and indicator variables for the VA facility at which the enrollee received care, to provide an estimate of the average within-facility racial disparity.¹⁴ In Model 3 we added terms for area-level income and education to assess whether racial disparities were mediated by these socioeconomic factors.

For each VA medical center with more than twenty eligible black veterans during the final three years of the study (2007–09), we assessed

the absolute racial disparity (the performance rate for white veterans minus the performance rate for black veterans) for the four intermediate outcome measures: control of blood pressure for hypertension, control of cholesterol (two measures) for diabetes and heart disease, and control of glycosylated hemoglobin level for diabetes. This analysis provides an assessment of the average magnitude and national variation of racial disparities observed in each VA medical center.

The study protocol was approved by the Providence VA Medical Center Institutional Review Board. All analyses were performed using the statistical analysis software SAS, version 9.2.

LIMITATIONS Our study was limited by its focus on ten measures of quality; many other important measures of quality were not included in the study. We did not assess other potential mediators of disparities in intermediate outcomes, such as prescribing medications and discussing lifestyle modifications.

The measure of area-level socioeconomic status can underestimate socioeconomic effects compared with individual-level measures.¹⁵ We did not account for differential use of non-VA services. However, the quality measures would account for such non-VA care if it were documented by VA providers in the clinical record. A glucose or cholesterol level was obtained from almost all VA enrollees in the study, and blood pressure was recorded during most ambulatory visits. Therefore, it is unlikely that capturing

recorded intermediate outcomes in non-VA sites would have changed our findings.

We did not examine the impact of coexisting, or comorbid, medical conditions. Finally, our analyses were restricted to white and black racial comparisons, and they might not necessarily generalize to other racial and ethnic groups.

Study Results

For each measure category, compared to white enrollees, black enrollees were younger, had lower area-level income and education, and were more likely to be living in the southern census region (Exhibit 2). Unadjusted performance trends are shown in Exhibit 3. With the exception of mammography, absolute performance rates improved for white and black enrollees over time on each quality indicator. The largest improvement occurred for the measure assessing eye examination among people with diabetes, which increased by twenty-two and twenty-three percentage points for white and black enrollees, respectively.

For all but one of the six indicators assessing care processes, racial disparities were two percentage points or less in the initial and final year of measurement (Exhibit 3). The exception was colorectal cancer screening (the racial disparity was six percentage points in 2003 and four percentage points in 2009). In contrast, disparities were greater than four percentage points for all

EXHIBIT 2

Demographic Characteristics Of Veterans Affairs (VA) Study Population And Sample Size Of Quality Measure Categories, By Race, 2000–09

Characteristic	Race	
	White	Black
Total sample size	955,047	171,207
Mean age (years)	67	62
Female	13%	17%
Below poverty ^a	10%	15%
At least some college ^b	31%	29%
Census region		
Northeast	19%	14%
Midwest	26	19
South	33	55
West	21	12
Measure category (number) ^c		
Diabetes	521,377	100,465
Cardiovascular disease	89,853	11,099
Hypertension	164,034	30,221
Breast cancer screening	60,215	13,767
Colon cancer screening	201,142	30,998

SOURCE VA External Peer Review Program data. ^aMean proportion of people living in a subject's ZIP code who are age sixty-five or older and have income below the federal poverty level. ^bMean proportion of people living in the subject's ZIP code who are age sixty-five or older and attended college. ^cIndividuals may be eligible for more than one measure category.

EXHIBIT 3

Performance On Quality Measures Of The Veterans Affairs (VA) Health System, By Race, In Initial And Final Years

Specific measure (initial year-final year)	Initial rates (%)			Final rates (%)			Change in disparity, percentage points (95% CI)
	White	Black	Disparity	White	Black	Disparity	
DIABETES							
Eye exams (2000-09)	66	66	0	88	89	-1	-1 (-3, 1)
HbA1c test (2000-09)	94	95	-1	98	98	0	1 (0, 2)
HbA1c control (2000-09) ^a	84	76	8	86	80	6	-2** (-4, 0)
LDL test (2000-09)	90	89	1	97	96	1	0 (-1, 1)
LDL control (2005-09) ^a	61	52	9	71	63	8	-1 (-4, 2)
CARDIOVASCULAR DISEASE							
LDL test (2005-09)	93	91	2	96	94	2	0 (-2, 3)
LDL control (2005-09) ^a	61	51	10	68	59	9	-1 (-7, 4)
HYPERTENSION							
Blood pressure control (2003-09) ^a	70	63	7	79	74	5	-2** (-6, 0)
CANCER SCREENING							
Mammogram (2000-09)	87	86	1	87	88	-1	-2 (-6, 1)
Colonoscopy (2003-09)	70	64	6	82	78	4	-2** (-4, 0)

SOURCE Authors' analysis of VA External Peer Review Program data. **NOTES** Text and numbers reflect process indicators unless otherwise indicated. CI is confidence interval. HbA1c is a measure of glucose control. LDL is low-density lipoprotein. ^aOutcome indicator. **p < 0.05

four intermediate outcome indicators in every year of measurement.

Of the five quality indicators with an absolute racial disparity of five percentage points or more in the initial year, we observed statistically significant reductions in racial disparity for three: blood glucose control, blood pressure control, and colorectal cancer screening. However, the reductions in disparity were modest; none of these disparities was reduced by more than two percentage points. Racial trends in performance on the four clinical outcome measures are shown in the Appendix.¹⁶

Results of sequential generalized linear regression models predicting performance on each of the four intermediate outcome measures are shown in Exhibit 4. The addition of a VA medical

center-level indicator variable had little effect on adjusted disparities. This indicates that the average racial disparity within VA medical centers was similar in magnitude to the disparity at the national level. Further adjustments for area-level socioeconomic status had minimal impact on absolute racial disparities.

Among all VA medical centers with at least twenty black veterans who were sampled for an outcome measure, we observed a median absolute disparity of ten percentage points for the cholesterol control in coronary artery disease measure (interquartile range: 3-15), eight percentage points for the cholesterol control in diabetes measure (interquartile range: 4-13), six percentage points for the blood pressure control measure (interquartile range: 3-9), and five per-

EXHIBIT 4

Adjusted Racial Disparities In Clinical Outcomes Measures, Veterans Affairs (VA) Health Care System, 2000-09

Specific measure	Model 1: age, sex, year (95% CI)	Model 2: Model 1 + VA medical center and census region (95% CI)	Model 3: Model 2 + area-level income and education (95% CI)
DIABETES CARE			
HbA1c control	5.8 (5.4, 6.3)	5.3 (4.8, 5.8)	5.1 (4.6, 5.6)
LDL control	6.8 (6.0, 7.6)	7.4 (6.5, 8.3)	7.2 (6.4, 8.1)
CARDIOVASCULAR CARE			
LDL control	8.3 (7.2, 9.5)	8.8 (7.6, 10.0)	8.5 (7.3, 9.8)
HYPERTENSION			
Blood pressure control	5.8 (5.3, 6.4)	6.5 (5.9, 7.1)	6.3 (5.7, 7.9)

SOURCE Authors' analysis of VA External Peer Review Program data. **NOTES** Percentage points. Racial disparity is white rate minus black rate. All standard errors are adjusted for clustering within VA medical centers. CI is confidence interval. HbA1c is a measure of glucose control. LDL is low-density lipoprotein.

centage points for the glucose control measure (interquartile range: 2–9).

Discussion

In this analysis of the quality of care and racial disparities in the decade following the VA health care system's organizational transformation, we found that the quality of care improved for both white and black VA enrollees from 2000 to 2009. The VA had negligible racial disparities—two percentage points or less—for all but one process-of-care measure during each year of the study. In contrast, racial disparities were substantial and persistent for intermediate outcome measures assessing control of blood pressure, glucose, and cholesterol.

Although racial disparity in control of blood pressure for people with hypertension and glucose for people with diabetes declined during the study period, the magnitude of disparity in 2009 remained considerable. Racial disparities in intermediate outcomes were largely produced by different outcomes for white and black enrollees receiving care in the same VA medical center, rather than overrepresentation or clustering of black enrollees in lower-performing facilities.

Our study contributes to an expanding evidence base about disparities in the quality of care in the VA health care system in particular, and the relationship between quality improvement and achieving racial equity in care more broadly. Prior studies found statistically significant disparities in the use of recommended laboratory testing and preventive services among veterans with diabetes.^{17,18}

It is possible that our contrasting findings result from the use of more recent quality data or the inclusion of a national sample. The rates of glucose testing, cholesterol testing, and retinal eye examinations reported in these earlier analyses were much lower than the performance rates we observed. Consistent with our study, other analyses of colorectal cancer screening among veterans found variations by race.¹⁹ We observed a modest reduction in this disparity over time.

Our findings are consistent with prior studies of racial disparities in blood pressure control.^{20,21} Studies of cholesterol control and glucose control in the VA have been mixed. For example, LeChauncy Woodard and colleagues found equivalent control of cholesterol for black and white veterans in five VA medical centers.²² In a study of patients with diabetes, Michele Heisler and colleagues found that compared with white veterans, black veterans had similar rates of glucose control but worse rates of cholesterol control.¹⁷

Our results also mirror results in the general

The quality of care improved for both white and black VA enrollees from 2000 to 2009.

population and other insured populations. For example, J. Michael McWilliams and colleagues found that control of glucose, blood pressure, and cholesterol improved from 1999 to 2006, but racial disparities in these outcomes remained largely unchanged.²³

Similarly, Medicare managed care plans improved performance in glucose and cholesterol control following initiation of mandatory public reporting of quality data, but racial disparities persisted.²⁴ Of note, in the Medicare managed care program, racial disparities were approximately 1.3–2 times greater than those observed in the VA using the Healthcare Effectiveness Data and Information Set intermediate outcome indicators with comparable specifications to the VA External Peer Review Program measures.

NEED FOR BETTER PROCESS-OF-CARE MEASURES It is possible that the quality improvement strategies adopted by the VA have effectively narrowed racial disparities for simple process measures. Interventions that improve the consistency of care or standardize treatment protocols may reduce unwanted variations based on race and ethnicity for recommended laboratory testing, specialist referrals, and other preventive services.

However, achieving racial equity for more-complex measures of chronic disease management has proved more challenging and resistant to broadly targeted quality improvement initiatives.²⁵ Controlling blood pressure, glucose, and cholesterol requires the initiation and intensification of pharmacologic therapy; promotion of medication adherence; encouragement of behavioral changes; and consideration of social determinants of health outcomes, such as social support, health literacy, and education. These activities are largely not assessed or considered by widely used performance indicators, often because they require abstracting more-detailed information from clinical records, linking to electronic prescription data, or surveying patients directly.

We observed a striking disconnect between

high levels of performance on widely used process measures and continuing disparity and modest levels of improvement in important health outcomes. This finding suggests that continued assessment of annual glucose testing and cholesterol testing alone—indicators that have been reported by most US managed care plans for more than a decade—is unlikely to yield notable gains in improving control of these outcomes.

The level of performance in the VA and other managed care plans is already well above 90 percent, which suggests that there is little room for improvement.²⁶ Furthermore, assessing a laboratory value and achieving optimal control of glucose and cholesterol are separated by a large and complex number of intervening steps.

Other process indicators that are more closely linked to achieving desired outcomes may be better candidates for ongoing monitoring. For example, measuring the initiation and intensification of blood pressure and diabetes therapy predicts control of these outcomes, can be done by reviewing medical records, and is directly under the control of providers.^{27,28}

WITHIN-FACILITY VERSUS BETWEEN-FACILITY DISPARITIES To address racial disparities in the quality of care, it is critical to understand the relative contributions of within-facility disparities (differential results for black and white patients treated in the same facility) and between-facility disparities (concentration of black patients among facilities that perform poorly for all patients, irrespective of race).^{29,30} These two sources of disparity demand different types of interventions.

We found that almost all of the disparity in intermediate outcomes in the VA was explained by within-facility disparities—a finding that runs

counter to prior studies of quality and outcomes of care in private-sector hospitals and nursing homes.^{31–33} These results have important implications for the VA. They support the proposition that most VA medical centers will need to measure and address racial gaps in care for their patient populations. They also suggest that measuring disparities at the facility level could be a useful tool to inform local and national efforts to improve the equity of care. Given the difference between this study and other analyses, the relative contribution of the providers to disparities may vary according to the population, health system, and outcome measures that are assessed.

Conclusion

In the decade following the VA's organizational transformation, the quality of care improved, and racial disparities were minimal for most process-of-care measures. However, these improvements in clinical performance were not accompanied by meaningful reductions in racial disparity for important clinical outcomes such as blood pressure, glucose, and cholesterol control.

As affirmed by the Institute of Medicine, linking clinical performance measures to race and ethnicity data can yield important insights for health care organizations seeking to improve the quality and equity of their care. Because cardiovascular disease and diabetes are major contributors to racial disparities in life expectancy, the findings of this study and others underscore the urgency of focused efforts to improve intermediate outcomes among black Americans in the VA and other health care settings. ■

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Amal Trivedi and coauthors examine disparities in clinical outcomes between black and white veterans receiving care through the Veterans Affairs (VA) health care system. The authors note that after an organizational transformation of the VA in the mid-1990s led to major improvements in overall clinical performance, a critical question remained unanswered: whether successful systemic quality improvement could simultaneously close racial gaps in care.

The authors were surprised to learn that although the VA achieved important performance improvements in process measures for both white and black veterans, racial gaps in clinical outcomes persisted. The results indicate the need for more-targeted quality improvement efforts, they say.

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