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Brief Report

Race and Preventive Services Delivery Among Black Patients and White Patients Seen in Primary Care

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BACKGROUND. Numerous studies have documented racial disparities in delivery of health care treatment services, but there is little information to determine whether similar disparities exist in the delivery of preventive services.

OBJECTIVE. To determine if disparities exist in preventive service delivery to non-Hispanic white patients and black patients in primary care.

RESEARCH DESIGN. Multimethod study using direct observation of patient encounters, medical record review, and patient exit questionnaire.

SUBJECTS. Four thousand three hundred thirteen outpatients presenting to 138 family physicians.

MEASURES. Delivery of 15 screening, 24 health-habit counseling and 11 immunization services recommended by the US Preventive Services Task Force.

A disturbing pattern is apparent in health care. Studies across the United States have repeatedly found that racial minorities are less likely than white patients to receive a variety of health services. Even when controlling for disease severity, insurance, socioeconomic status, and physical ac-

RESULTS. Using multilevel linear regression analysis, no significant racial differences were found in rates of delivery of screening services or immunizations. However, black patients were more likely to receive preventive health-habit counseling (mean percent of patients up-to-date on all recommended counseling services, adjusted for covariates: 11.6% for black patients, 9.5% for whites, $P = 0.003$).

CONCLUSIONS. Black patients able to access primary care receive preventive services at rates equal to or greater than white patients. This suggests that efforts to increase delivery of preventive care in black patients need to focus on access to primary care.

Key words: Race; preventive health services; health services research; black patients. (*Med Care* 2001;11:1260-1267)

cess, studies have demonstrated that black patients and Hispanics are less likely to receive coronary artery bypass and angioplasty than non-Hispanic whites.¹⁻⁸ Other studies have shown black patients less likely than whites to receive a wide range of procedural services.⁹⁻¹² The extent

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of racial disparities found in treatment services raises questions about whether delivery of preventive services shows similar patterns. These services may be particularly important for minority groups that suffer disproportionately from preventable health problems.¹³

Data relating patient race and preventive service delivery are more limited than those regarding treatment services. However, some data suggest a similar pattern of racial disparity in mammography, influenza immunization, flexible sigmoidoscopy/stool guaiac, and well-child care.¹⁴⁻¹⁹ Other studies suggest that at least with regard to breast and cervical cancer screening, racial disparities may be improving.²⁰⁻²² Given the limitations of existing information, additional data are needed to assess whether racial disparities exist in preventive services delivery.

Previous research on racial disparities in health care has primarily relied on analysis of secondary data, such as the Medicare files. Unfortunately, most preventive services are provided in primary care settings where secondary data sources are generally less useful for evaluating health services delivery and may not include information on non-reimbursed services, such as health habit counseling.²³

We report a study using an alternative, multimethod approach to compare rates of delivery of preventive care to black patients and whites (ie, non-Hispanic whites) in primary care.

Materials and Methods

Design

This study was part of the Direct Observation of Primary Care study, a cross-sectional, multimethod study, described in detail elsewhere.²³⁻²⁴ Briefly, physicians in the study were volunteers among the 531 members of the Ohio Academy of Family Physicians in northeast Ohio who agreed to participate in a study of the content of primary care practice. Research nurses collected data on 4,454 consecutive office visits (adults and children) to 138 family physicians in 84 practices between October 1994 and August 1995, using direct observation of the patient visit, patient exit questionnaires, and medical record review. Using a checklist, the research nurse recorded delivery of preventive services observed during each physician-patient encounter. Physicians and patients were blinded to research questions regarding race or preventive service delivery. Multiple strategies were

used to reduce the possibility of a Hawthorne effect, as detailed elsewhere.²³⁻²⁴

Main Independent Variable

Patient race was self-classified on an exit questionnaire. In addition, the research nurse independently classified patient race. A kappa statistic was calculated to assess the level of agreement between these methods of classification.

Outcome Measures

Preventive services for which each patient was eligible during observed encounters were determined based on age- and sex-specific recommendations of the US Preventive Services Task Force.²⁵ Fifteen screening services, 24 health habit counseling activities, and 11 immunization services were examined (Appendix A, Table 1).²⁶ For each of these three categories of service, percentages of recommended services that were "delivered" during the encounter were calculated.^{26,27} For each category of service, a percentage was also calculated based on the number of recommended services for which the patient was "up-to-date". Patients were described as "up-to-date" on a preventive service only if the medical record showed receipt of the service during the recommended time interval or if the service was delivered during the observed encounter. Thus, six outcomes (the percentages for "delivered" and "up-to-date" for each of the three categories of preventive service) were calculated.

Potential Confounding Variables

Potential confounding variables examined included: patient age (<18, 18-39, 40-54, 55-64, >64), gender, education level, insurance type (none, Medicaid, Medicare, private or other), reason for visit (well care vs. illness visit), number of chronic illnesses listed on the patient's problem list, and number of visits in the past year; median per capita income of the patient's residence census tract; new or established patient; and physician age and gender. Because few physicians were black, physician race was not included.

Data Analysis

Differences in patient and visit characteristics by patient race on each of the potential confounding variables were evaluated using Chi-square, *t* tests, and Mann-Whitney tests, as appropriate. Unadjusted patient race group differences in the "delivered" and "up-to-date" percentages were tested by *t* tests. (Differences were also tested using the non-parametric Mann-Whitney test; the resulting *P* values were similar to those produced with the *t* test. Results reported are those from the *t* tests.) Those variables associated with both race and one of the six preventive care outcomes were included in subsequent multivariable regression analyses.

Multilevel Modeling

Because of the nested nature of the data (patients nested within physicians), multilevel linear regression using HLM 5²⁸ was used to test for differences in preventive service delivery by race while controlling for the likelihood that preventive service delivery rates of patients seeing the same physician are correlated and not independent observations.²⁹⁻³⁰ One regression model was specified for each of the six preventive service delivery outcomes. Patient race, the confounding variables, and physician age and sex were entered as a block; no stepwise procedures were used.

A random coefficient model (with both intercepts and slopes allowed to vary) was used; the equation is presented below.²⁹ With the percentage of preventive service delivered in each category as outcomes in separate models, patient race as the main independent variable, and confounders as covariates, the patient level models can be specified as (Equation 1):

$$Y_{ij} = B_{0j} + B_{1j}RACE_{ij} + B_{2j}GENDER_{ij} + \dots + B_{kj}ADDITIONAL\ Covariates_{ij} + e_{ij} \quad (1)$$

where $j=1, \dots, J$ physicians, $i=1, \dots, N_j$ patients and $k=1, \dots, K$ covariates. The B s are regression coefficients that characterize the structural influence of covariates on the outcome at the patient level. The physician level model expressed below shows that each of the intercepts (Equation 2) and regression coefficients (Equation 3-5) are treated as an outcome at the physician level.

$$B_{0j} = G_{00} + G_{01}PHYSICIAN\ AGE_j + G_{02}PHYSICIAN\ GENDER_j + U_{0j} \quad (2)$$

$$B_{1j} = G_{10} + U_{1j} \quad (3)$$

$$B_{2j} = G_{20} + U_{2j} \quad (4)$$

$$B_{kj} = G_{k0} + U_{kj} \quad (5)$$

The j stands for the physician, and $k=0, \dots, K$ is the k th regression weight defined in the patient level model with $k=0$ being the intercept. The G s are regression coefficients that capture the effects of physician level variables on the within-physician structural relationships, and U s represent random error.

Results

Practice and Patient Characteristics

Demographic and practice characteristics of the 138 physicians in the study were representative of family physicians nationally, in mean age, percentage in rural practice, and mean patient volumes compared with members of the American Academy of Family Physicians.²³ The sample reflects recent demographic trends by over-representing female and residency-trained physicians.³¹

Of 4,994 patients presenting for care during observation days, 4,454 (89%) agreed to have their visits observed. Twelve participating physicians provided basic descriptive data on their patients who declined to participate. These patients were slightly older, but other characteristics, including race, were similar to those of enrolled patients.²³ Characteristics of enrolled patients were found to be similar to patient characteristics reported in the National Ambulatory Medical Care Survey.²³

Seventy five percent of patients returned the exit questionnaire giving their race. For these patients, the kappa statistic assessing level of agreement about patient race between patient self-report and nurses' observation was 0.90. Because of the risk for response bias in restricting the analyses to patients who returned the exit questionnaire, the analyses reported are based on the nurses' classification of patient race. However, major analyses were repeated with the subgroup of patients for which there was agreement on patient race between the two classification methods, and the results were unchanged. Further analysis was limited to 4,313 patients classified as black or white for whom age was recorded.

Relationship of Race to Outcome Measures

The associations of patient race with confounding variables are reported in Table 1. The black

TABLE 1. Patient and Visit Characteristics by Patient Race

Patient and Visit Characteristics	Patient Race		P
	Black (n = 485)	White (n = 3828)	
Age (Percentage in each age group):			
<18 years	17.7%	21.4%	0.001
18-39	34.0%	24.1%	
40-54	22.3%	21.2%	
55-64	10.9%	11.1%	
>64	15.1%	22.1%	
Gender (% female)	69.5%	60.4%	0.001
Type of visit (% well care)	14%	11.6%	0.23
Education*			
Less than high school graduate	26.4%	14.6%	0.001
High school graduate	27.3%	35.0%	
Some college	28.7%	22.2%	
College degree	13.4%	19.1%	
Graduate school	4.2%	9.1%	
New patients	12.4%	8.1%	0.001
Number of visits in the past year (Mean [SD])	4.37 (2.79)	4.29 (2.64)	0.58
Number of chronic illnesses listed on problem list (Mean [SD])	.22 (.42)	.24 (.42)	0.60
Insurance Type			
None	11.5%	6.8%	0.001
Medicaid	16.4%	5.2%	
Medicare	18.1%	23.7%	
Private/other	54.0%	64.3%	
Median family income of patients' residence census tract (Mean [SD])	\$24,857 (13,950)	\$38,573 (12,970)	0.001

*Education was reported for patients 18 years of age and older.

patients (n = 485, 11.2% of the total sample) were more likely to be younger, female, and a new patient to the practice, and less likely to have a high school degree and Medicare or private health insurance. There was no statistically significant difference in the proportion of well-care visits, the number of chronic illnesses, or the number of visits in the past year.

The unadjusted mean percentages of the three categories of preventive service delivery are presented in Table 2. Overall, the data show that black patients did not receive fewer preventive services. In fact, these unadjusted percentages show that black patients were slightly, but significantly, more likely to receive health-habit counseling services on the observed encounters and to be "up-to-date" on indicated screening and counseling services.

Controlling for physician and patient confounding variables in the multivariable, multi-level analyses, there was no significant difference, by race, in the rates of delivery of recommended services during the

observed encounter (Table 3). Black patients still were more likely to be "up-to-date" ($P = 0.003$) on health-habit counseling.

Discussion

Contrary to expectations, this study found no evidence of lower levels of preventive care for black patients compared with white patients seen in primary care practices. In examining a range of preventive services using methods that overcome the under-reporting bias seen with other data collection methods, there were no racial differences demonstrated in services delivered during observed patient visits. Similarly, there were no differences in whether patients were up-to-date on screening and immunization services. In fact, the only difference identified showed that black patients were more likely to be up-to-date on health-habit counseling.

TABLE 2. Unadjusted Mean Percents of Recommended Preventive Services Delivered to Blacks and Whites

Preventive Service Categories	Patient Race		P
	Black (n = 485) Mean Percentage (SD)	White (n = 3,828) Mean Percentage (SD)	
Delivered during observed visit			
Screening	16.7 (29.0)	14.7 (26.7)	0.16
Health habit counseling	5.0 (8.4)	3.4 (6.1)	0.001
Immunizations	2.8 (12.8)	3.4 (14.6)	0.41
Up to date on recommended services			
Screening	59.4 (22.1)	54.3 (23.5)	0.001
Health habit counseling	13.8 (12.2)	8.5 (9.7)	0.001
Immunizations	22.3 (32.3)	22.7 (34.0)	0.83

These findings are in contrast to a number of studies documenting racial differences in a wide range of treatment services.^{9,11,12,32} Findings of differences by race have been so consistent in a variety of treatment services, across the country and across health care systems, that any possibility they are isolated or statistical anomalies has been ruled out.

A number of possible explanations for the lower rates of service delivery to minorities have been studied. Among the factors considered, but not supported by the data in studies of treatment services are lack of physical or financial access, insurance status, income, pre-existing morbidity, and over-utilization by whites.^{1,3-5,7,33} Possible ex-

planations for which there is some supporting data include: 1) racial discrimination; 2) a lack of trust by the patient leading to reluctance to agree to treatments; or 3) that the differences reflect patient preferences.^{1,3,34-37}

Differences in Observations Regarding Treatment and Preventive Services

What could explain the differences between this study examining preventive services and those of treatment services? The context in which care is delivered may play a role. Patients in this study had

TABLE 3. Mean Percentage of Recommended Preventive Services Delivered for Blacks and Whites Adjusted for Patient and Physician Covariates and Clustering Effect*

Preventive Service Category	Black (n = 485) Mean Percentage	White (n = 3828) Mean Percentage	P
Delivered			
Screening	15.1	15.2	0.97
Health habit counseling	4.3	3.6	0.09
Immunizations	3.1	3.4	0.74
Up-to-date			
Screening	57.5	55.9	0.24
Health habit counseling	11.6	9.5	0.003
Immunizations	24.2	23.2	0.57

*Multilevel analyses adjusted for the following confounders associated with both race and an outcome: patient sex, age, new or established patient, insurance type, median family income, and physician age and sex. Patient education was a confounding variable only for up-to-date screening. Because of the substantial amount of missing data on this variable collected by patient questionnaire, the model for this outcome was run both including and excluding patient education. The mean percentages reported in the table are those without patient education. With patient education included in the model, the percentages were Black = 57.3 and White = 55.9, with P = 0.26. The full models are available from the authors upon request.

been with the practice at which they were being seen a mean of 5.4 years (data not shown). Continuity of care may lead to greater trust by the patient, and therefore greater acceptance of services. In addition, patients could see preventive services as less risky than treatment services, and they may therefore be more likely to consent to these services. Indeed, some preventive services, such as smoking cessation counseling, do not even require patient consent to be delivered.

Another possible reason for the difference in findings between treatment and preventive services is that this study was patient-based, not population-based. If black patients experience greater difficulties in access to care than white patients, a population-based study might demonstrate a differential in preventive services. The current study gives evidence that once access is achieved, however, there is no decrement in preventive services.

Limitations

If a predominant factor in treatment differentials is geographic variation, the regional nature of this study might explain the lack of preventive care differences. It is also possible that physicians participating in this study are a select group whose preventive care practices are not representative of the population of primary care physicians. These concerns seem unlikely, however, because both the physician and patient samples have characteristics suggesting they are representative of national samples.^{23,24} In addition, although some studies have shown a geographic variation, racial differentials in treatment services have been widespread across the country (including Ohio).

The study data do not reveal whether a racial differential exists in receipt of preventive services by study subjects in other health care settings. Nevertheless, this possibility does not materially influence the study findings that in primary care settings there is essentially no racial disparity in preventive care.

It is possible that black patients in this study may have had greater relative need for preventive services and therefore, received a lower "risk-adjusted" rate of service. Data from this study do not permit conclusions regarding this hypothesis. Conversely, because many preventive service recommendations are population-based, rather than risk-group based, this should not greatly affect the findings. An exception is health-habit counseling, which is more often risk-group based. This is the

one outcome that did show a difference, with black patients receiving more such counseling. Additional study is needed, though, to learn whether black patients receive equal levels of "risk-adjusted" preventive care services, and whether other ethnic and minority groups receive comparable levels of preventive care services.

Conclusion

The present study provides evidence that for black patients able to access primary care, rates of preventive-services delivery are equal to or greater than those of white patients. Combined with evidence that in the population as a whole, black patients are less likely to receive preventive services,¹³ this suggests that access to primary care remains key to reducing racial differences in preventive care.

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APPENDIX A. TABLE 1. US Preventive Services Task Force Recommended Services Included in Each of the Three Preventive Service Categories

Screening Services	Age (in years) and gender (if applicable) criteria for service delivery	Time interval preceding date of visit for performance to be up-to-date*
Blood pressure	>3	Within 1 year
Breast exam	50–69, females	Within 1 year
Eye exam for amblyopia	3–5	Within 1 year
Hearing test	>65	Within 1 year
Height	All	Within 1 year
Weight	All	Within 1 year
Hemoglobin/hematocrit	<3	Once
Mammogram	50–69, females	Within 2 years
Pap smear for cervical cancer	18–65, females	Within 3 years
Cholesterol	35–65, males 45–65, females	Within 5 years
Urinalysis	>65	Within 1 year
Vision screening	3–6, >65	Within 1 year
Home fecal occult blood test	>50	Within 1 year
Sigmoidoscopy	>50	Within 5 years
Blood lead level	<4	Once
Immunizations		
Diphtheria Pertussis Tetanus	<6	Per Advisory Committee on Immunization Practices guidelines
Hemophilus influenza group B	<5	Per Advisory Committee on Immunization Practices guidelines
Influenza	>65 (Oct–Mar)	Within 1 year
Measles mumps rubella	2–5	Once
2nd Measles	≥6 and born after 1957	Once
Polio	<6	Per Advisory Committee on Immunization Practices guidelines
Pneumococcal	>65	Once
Tetanus	>14	10 years
Hepatitis B series	13–40	Once
Estrogen discussion [†]	>45, females	Within 1 year
Estrogen prescription [†]	>45, females	Within 1 year
Counseling services		
Contraception	13–49	Within 1 year
Dental health	All	Within 1 year
Diet		
Caloric balance	>2	Within 1 year
Nutrient intake	<12	Within 1 year
Cholesterol/fat intake	>2	Within 1 year
Calcium intake	>13, females	Within 1 year
Exercise	>2	Within 1 year
Accident prevention	All	Within 1 year
Seat belts	>4	Within 1 year
Car seats	<4	Within 1 year
Violent injury prevention	All	Within 1 year
Bicycle helmets	2–17	Within 1 year
Poisoning prevention	<13	Within 1 year
HIV testing/counseling	>13	Within 1 year
HIV prevention	>13	Within 1 year
Other STD prevention	>13	Within 1 year
Condom use	>13	Within 1 year
Tobacco exposure	All	Within 1 year
Tobacco counseling for smokers	>13	Within 1 year
Tobacco history	>13	Within 1 year
Alcohol history	>13	Within 1 year
Drugs	>13	Within 1 year
Sun exposure	All	Within 1 year
Breast feeding	<1	Within 1 year

*When time intervals were not specified by the US Preventive Services Task Force or other expert panels, one year was typically chosen.

[†]This chemoprevention item was grouped with immunizations as it represents an active intervention.