

Is Patient HMO Insurance or Physician HMO Participation Related to Racial Disparities in Primary Care?

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Objective: To examine the relationship between racial disparities in common primary care procedures and patient HMO membership and physician level of HMO participation.

Design: Cross-sectional analysis.

Methods: Data were obtained from a nationally representative sample of primary care office visits documented in the National Ambulatory Medical Care Survey for 1985, 1989-1992, and 1997-2000. Patient HMO membership was assessed based on reports by primary care physicians (defined as family physicians/general practitioners, internists, or obstetrician-gynecologists). Physician HMO participation was assessed based on the proportion of the physician's patients who were in an HMO. Patient characteristics (age, sex, race, insurance, diagnoses) and office procedures or interventions were determined by examining the physician report. Patients were adults aged 19 years or older.

Results: In adjusted analyses, African Americans, compared with whites, had lower odds of receiving a Pap test (adjusted odds ratio [AOR] = 0.76; 95% confidence interval [CI] = 0.65, .90), a rectal exam (AOR = 0.67; 95% CI = 0.54, 0.84), smoking cessation advice (AOR = 0.72; 95% CI = 0.58, 0.91), and mental health advice (AOR = 0.46; 95% CI = 0.29, 0.72), but had higher odds of receiving advice on diet and weight, and a follow-up appointment. Notably, there were no significant interactions between either patient HMO membership or physician level of HMO participation, patient race, and receipt of primary care services.

Conclusion: Neither patient HMO membership nor physician level of HMO participation is substantially associated with racial disparities in primary care.

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accounting for the managed care arrangements affecting those patients. Significantly, none of the studies examined whether the level of HMO participation by individual physicians affects healthcare disparities.

To some extent, HMOs may affect physicians' practice patterns. Any HMO-induced changes in practice style may generalize to patients not in HMOs.^{11,12} The impact on physician practice style may depend on the proportion of patients seen who are enrolled in HMOs.

In this study, we used national data for primary care office visits to determine whether patient HMO membership or physician level of HMO participation affected visit-level racial disparities. (Most reductions in disparities should be observed at the visit level.) These data primarily reflect procedures recommended or conducted by the physician at the time of the visit. Consequently, racial variation in these procedures (not explained by differences in patient case mix) primarily reflect differences in physician decision making, as opposed to patient adherence. Given the growth and evolution of HMOs over the last 20 years,¹³ we examined whether relationships between the level of physician HMO participation and racial disparities in care changed over time.

METHODS

Sample

The data for this study were derived from the National Ambulatory Medical Care Surveys (NAMCSs) for 1985-2001. The survey was not conducted from 1986 to 1988, and different versions were used in 1993 and 1994. For this survey, a nationally representative

The impact of HMOs on racial and ethnic disparities in healthcare remains uncertain. On one hand, HMOs focus on the quality of healthcare for a defined population and thus might be expected to reduce disparities in healthcare. On the other hand, HMO cost-containment strategies and administrative barriers to care might disproportionately affect racial and ethnic minorities. Empirical data are mixed; some studies show attenuation of disparities in some areas,¹⁻⁵ while others show worse or no effects.⁶⁻¹⁰ However, these studies all have examined effects of HMO participation at the individual patient level, with limited

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sample of office-based physicians complete a short survey on approximately 20 patient encounters. Immediately after the encounter, the physicians complete a patient record for every encounter, regardless of billing source, which includes age, race, insurance status, up to 3 diagnoses assigned, medications prescribed, whether or not the patient had been seen before for the presenting problem or other problems, services provided, advice given, disposition, and visit duration. Not all questions are asked each year. Information also is collected on specialty, whether the physician's practice is located in a standard metropolitan statistical area (ie, whether the practice is urban or rural), and geographic region. Complete details about the surveys are available at: <http://www.cdc.gov/nchs/about/major/ahcd/ahcd1.htm>.

The subset of encounters selected for this analysis were visits by African American or white patients 19 years of age and older to primary care physicians (internists, family physicians/general practitioners, and obstetrician-gynecologists). Visits that were the result of a referral were excluded (given our focus on primary care). Elements were selected for analysis based on a review of the current literature on racial disparities and those activities documented frequently enough in the surveys to generate stable estimates. These included advice giving (exercise, diet, chole-

sterol, smoking cessation, breast health, and mental health), prevention procedures (Pap test, mammogram in women over age 40 years, breast examination, pelvic examination, rectal examination, blood pressure check, vision examination, cholesterol test, and prostate-specific antigen testing in men over age 50 years), visit duration, and follow-up plans (specific follow-up and referral to another physician).

Independent Variables

The primary independent variables were patient HMO membership and physician level of HMO participation. Patient HMO membership was defined based on check-off by the physician that the patient was in an HMO. In 1985, an HMO was defined in NAMCS as "charges included under a health maintenance organization plan or other pre-payment plan. Include IPAs, PPOs, etc." By 1992, HMOs were defined in NAMCS as "health maintenance organizations (HMOs), independent practice organizations (IPAs), and all other prepaid health care plans." By 1997, the definition was "HMO is defined as a health care delivery system that offers comprehensive health services provided by an established panel or network of providers to a voluntarily enrolled population for a prepaid fixed fee and whose members are required to utilize services within the panel of contracted providers."

Physician level of HMO participation was defined based on the proportion of patients seen by the physician during the sampling period who were in an HMO. There were 2 categories: <50%, and ≥50%. We also examined this variable as a continuous measure.

Covariates

The following measures were used: age (years), sex, race (African American or white), insurance (private, Medicaid, Medicare), rurality (living in a metropolitan statistical area or not), region of the country (Northeast, Midwest, South, or West), year of visit, case mix (based on the number of medications prescribed and the ambulatory care groups [ACGs] described below), physician specialty (family physician/general practitioner, internist, or obstetrician-gynecologist), and percent-age of Medicaid patients seen.

Case-Mix Adjustment

Case-mix adjustment was based on the ACG system¹⁴ using the ambulatory diagnostic groups (ADGs) of the ACG system. The ADGs comprise 32 diagnostic and preventive clusters to which each *International Classification of*

Table 1. Characteristics of the Primary Care Patients by Race*

Characteristic	African American	White
No. (%)	6301 (10.7)	56 047 (89.3)
Mean age, y [†]	47.6	49.4
Female [†]	70.9	68.1
HMO	24.7	23.2
Medicaid [‡]	20.2	5.5
Medicare [‡]	20.0	22.6
MSA [‡]	78.9	72.2
Region [‡]		
Northeast	17.7	20.1
Midwest	21.4	26.8
South	51.1	31.6
West	9.8	21.5
Case mix (mean numbers)		
Medications prescribed [‡]	1.59	1.44
ADGs coded	1.78	1.70
Seen previously [‡]	88.6	90.0

*Except where indicated, numbers are percentages, which are adjusted for sampling strategy. ADG indicates ambulatory diagnosis group; MSA, metropolitan statistical area.

[†]Rates differed significantly ($P < .01$).

[‡]Rates differed significantly ($P < .05$).

Table 2. Characteristics of Delivered Primary Care by Race

Procedure	No.	Years	Unadjusted Percentage		Adjusted Race Effects	
			African American	White	Odds Ratio	95% Confidence Interval
Pap smear	43 246	All	10.2*	14.3	0.81	0.70, 0.94*
Mammogram	20 310	1989-2000	6.3	8.2	0.97	0.74, 1.27
Prostate-specific antigen testing	3905	1997-2000	7.6	8.1	0.86	0.56, 1.32
Cholesterol testing	52 098	1989-2000	6.3	7.2	0.84	0.68, 1.02
Blood pressure taken	62 224	All	75.2	71.3	1.16	0.98, 1.37
Rectal exam	49 045	1985-1990, 1997-2000	4.5*	7.4	0.67	0.54, 0.83*
Breast exam	33 704	1985-1990, 1997-2000	13.4	16.2	0.65	0.80, 1.15
Pelvic exam	33 727	1985-1990, 1997-2000	18.9	21.8	1.00	0.85, 1.19
Vision screening	61 486	All	1.8	1.4	1.22	0.88, 1.70
Mental health advice	22 455	1995-2000	1.2*	2.4	0.46	0.29, 0.73*
Breast self-exam advice	27 367	1989, 1990, 1997-2000	4.6	6.2	0.87	0.67, 1.15
Cholesterol advice	29 621	1989-1992	6.6	5.7	1.18	0.87, 1.60
Exercise advice	35 590	1991-2000	14.2	12.9	1.15	0.94, 1.40
Diet advice	62 224	All	21.8*	16.1	1.33	1.15, 1.54*
Injury prevention advice	22 414	1997-2000	1.5	1.9	0.86	0.53, 1.39
Smoking advice	52 122	1989-2000	3.2*	4.2	0.72	0.58, 0.91*
Return appointment	50 628	1985-1992, 1999-2000	69.9*	61.5	1.51	1.31, 1.75*
Referred to another physician	49 236	1985-1992, 1999-2000	4.7	4.8	0.94	0.75, 1.18
Mean visit duration, min	60 624	All	17.0	16.8	-0.32	-1.02, 0.37

*Effects (difference between crude rates, or odds ratio) were significant at $P < .05$.

Diseases diagnostic and preventive code can be uniquely assigned. Each patient is assigned a series of dummy (0,1) values for each ADG, depending on the up to 3 diagnoses assigned by the physician for the visit. Use of the ADGs for case-mix adjustment has previously been found to be valid in this dataset.¹⁵

Statistical Analyses

The National Ambulatory Medical Care Surveys use a complex survey design, involving the clustering of visits within each physician's practice and the use of weights designed to yield population estimates of encounters. The data were analyzed with STATA (version 8.2, StataCorp, College Station, Tex) to adjust for the sampling design and weights. The weights on the public-use data adjust each physician-patient encounter according to its sampling probability and the probability of physician nonresponse to yield unbiased national estimates of annual total visits.

The relationship between patient race (African American vs white) and each visit characteristic was examined using logistic regression models, except for visit duration, which was examined using linear regression. We adjusted for potential confounding by physician specialty, whether or not the patient was seen before, patient sociodemographics (age, sex, insurance status, rurality, region, year of visit), and case mix (based on the number of medications prescribed and the ADGs coded).

The key term of interest was the interaction between race and patient membership in an HMO or physician level of HMO participation. This term was included in all analyses. The proportion of HMO patients seen by the physician was examined both as a continuous variable and a dichotomized one (<50%, and ≥50%). To reduce the risk of confounding by practice setting, we also included a term for the proportion of patients seen with Medicaid insurance. We examined 2 sets of strati-

Table 3. Racial Disparities in Care by Level of Physician HMO Participation

Procedure	Level of Physician HMO Participation	Odds Ratio	95% Confidence Interval
Pap smear	Low	0.81*	0.60, 0.96
	High	0.94	0.66, 1.33
Mammogram	Low	0.99	0.72, 1.36
	High	0.83	0.49, 1.40
Prostate-specific antigen testing	Low	0.77	0.45, 1.31
	High	1.55	0.72, 3.32
Cholesterol testing	Low	0.80	0.62, 1.01
	High	1.02	0.75, 1.40
Blood pressure taken	Low	1.24*	1.05, 1.48
	High	0.86	0.61, 1.22
Rectal exam	Low	0.68*	0.53, 0.88
	High	0.77	0.50, 1.18
Breast exam	Low	1.00	0.82, 1.23
	High	0.86	0.58, 1.28
Pelvic exam	Low	1.02	0.85, 1.21
	High	1.12	0.72, 1.72
Vision screening	Low	1.30	0.95, 1.78
	High	0.66	0.31, 1.41
Mental health advice	Low	0.33*	0.19, 0.57
	High	0.84	0.35, 2.18
Breast self-exam advice	Low	0.76	0.55, 1.03
	High	1.32	0.75, 2.31
Cholesterol advice	Low	1.19	0.85, 1.68
	High	0.60	0.22, 1.60
Exercise advice	Low	1.18	0.93, 1.49
	High	1.09	0.76, 1.59
Diet advice	Low	1.34	1.13, 1.59
	High	1.12	0.85, 1.49
Injury prevention advice	Low	0.78	0.46, 1.32
	High	1.34	0.45, 3.76
Smoking advice	Low	0.73*	0.56, 0.94
	High	0.70	0.44, 1.14
Return appointment	Low	1.50*	1.28, 1.76
	High	1.60*	1.51, 2.24
Referred to another physician	Low	0.82	0.63, 1.07
	High	1.13	0.72, 1.78
Mean visit duration, min	Low	-.41	-1.24, 0.42
	High	0.37	-0.71, 1.44

*Odds ratio was significant at $P < .05$.

fied subsamples of the data: first, we repeated the analyses stratified by patient HMO status, and we again repeated the analyses stratified by physician level of HMO participation. Finally, to explore temporal trends, we conducted analyses including interaction terms

action with time, Medicaid insurance, or percentage of Medicaid patients in the physician's practice. The stratified results by patient HMO status are shown in **Table 3** and by physician HMO participation in **Table 4**. It can be seen that there is little evidence that any trends in

between race and year, and between race, proportion of HMO patients, and year.

RESULTS

The sample included 62 348 visits, 10.7% by African Americans, to 2112 primary care providers (**Table 1**). Patients with HMO insurance accounted for 23% of the visits; physicians with practices consisting of >50% HMO patients saw 16.4% of all patients. Compared with white patients, African Americans were younger; more likely to reside in metropolitan statistical areas, to be female, have Medicaid coverage, and reside in the South; and were prescribed more medications. African Americans were less likely, however, to have Medicare or to have been seen previously.

Compared with whites, African Americans were less likely to have Pap smear screening, mammography ordered, rectal or breast exams, mental health advice, breast self-exam advice, and tobacco counseling (**Table 2**). African Americans, however, were more likely to receive blood pressure testing and diet/weight counseling, and be given a scheduled follow-up appointment (**Table 2**). In adjusted analyses, African Americans had lower odds of receiving a Pap test, a rectal exam, mental health advice, and smoking cessation advice, but had higher odds of receiving diet/weight counseling and a follow-up appointment.

We found no significant interactions between race and either patient HMO membership or physician level of HMO participation.

There also was no significant interaction with time, Medicaid insurance, or percentage of Medicaid patients in the physician's practice. The stratified results by patient HMO status are shown in **Table 3** and by physician HMO participation in **Table 4**. It can be seen that there is little evidence that any trends in

patient HMO membership or physician level of HMO participation are associated with systematic effects on racial disparities.

DISCUSSION

Previous findings have been mixed regarding the impact of HMOs on racial and ethnic disparities in healthcare.^{1-3,6-9} However, to our knowledge, this is the first analysis of disparities at the visit level that examined the relationship between physician level of HMO participation and disparities in primary care procedures. Prior studies examined the effect of patient HMO membership, but no previous studies examined the impact of greater physician HMO participation.

Given the limitations of NAMCS, our findings may underestimate racial disparities in primary care and thus our ability to detect significant interactions between race and physician level of HMO participation. Furthermore, despite aggregation of the NAMCS data across years, our power to detect modest interactions was limited. We cannot exclude the possibility of small effects.

We also cannot exclude the possibility that HMO membership either hinders or promotes access to primary care. We conducted visit-level analyses, not patient- or population-level analyses, so we could only assess disparities that occurred during the visit.

Self-reported data by physicians may lead to underestimation of racial disparity in their care. A comparison of NAMCS data with direct observation of office visits showed high specificity (range of 90% to 99%) for office procedures and counseling, but moderate to low sensitivity (range of 0.12 to 0.84).¹⁶ The reliability of physician coding of patient HMO status in NAMCS has not been formally assessed. However, these data should be readily available from patient insurance information typically included on patient encounter forms. Any measurement error would likely bias results towards the null.

Other limitations include the use of a short data-collection form; under-representation of African Americans due to restriction of the sample to office visits as opposed to clinic visits; unmeasured confounders, particularly physician characteristics; absence of data for selected years; slight changes in the definition of relevant variables, including HMOs; and the potential for inadequate comorbidity adjustment.

In summary, our findings suggest that neither patient HMO membership nor physician level of HMO participation significantly affect disparities in receipt of pri-

Table 4. Racial Disparities in Care by Patient HMO Membership

Procedure	Patient Enrolled in HMO	Odds Ratio	95% Confidence Interval
Pap smear	No	0.82*	0.69, 0.99
	Yes	0.83	0.65, 1.07
Mammogram	No	0.95	0.67, 1.33
	Yes	1.02	0.68, 1.55
Prostate-specific antigen testing	No	0.86	0.50, 1.49
	Yes	1.07	0.50, 2.30
Cholesterol screening	No	0.79	0.61, 1.02
	Yes	0.98	0.76, 1.27
Blood pressure taken	No	1.22*	1.03, 1.46
	Yes	1.01	0.79, 1.28
Rectal exam	No	0.67*	0.52, 0.87
	Yes	0.77	0.55, 1.08
Breast exam	No	1.05	0.85, 1.30
	Yes	0.80	0.60, 1.06
Pelvic exam	No	0.98	0.82, 1.18
	Yes	1.18	0.87, 1.61
Vision screening	No	1.23	0.87, 1.73
	Yes	1.22	0.69, 2.18
Mental health advice	No	0.37*	0.20, 0.68
	Yes	0.65	0.30, 1.40
Breast self-exam advice	No	0.88	0.64, 1.21
	Yes	0.82	0.54, 1.26
Cholesterol advice	No	1.24	0.84, 1.82
	Yes	0.91	0.58, 1.41
Exercise advice	No	1.22	0.96, 1.54
	Yes	1.05	0.79, 1.38
Diet advice	No	1.29*	1.09, 1.54
	Yes	1.36*	1.09, 1.71
Injury prevention advice	No	0.69	0.40, 1.20
	Yes	1.24	0.55, 2.78
Smoking advice	No	0.71*	0.53, 0.94
	Yes	0.76	0.53, 1.09
Return appointment	No	1.51*	1.28, 1.77
	Yes	1.47*	1.15, 1.89
Referred to another physician	No	0.84	0.64, 1.10
	Yes	0.99	0.68, 1.45
Mean visit duration, min	No	-45	-1.25, 0.35
	Yes	0.32	-0.56, 1.21

*Odds ratio was significant at $P < .05$

POLICY

mary care visits. Changes in HMO membership alone are unlikely to affect disparities in receipt of primary care for better or worse. Other, more focused interventions will likely be required to address disparities.

REFERENCES

1. Clancy CM, Franks P. Utilization of specialty and primary care: the impact of HMO insurance and patient-related factors. *J Fam Pract.* 1997;45:500-508.
2. Crawford K, Fisher WH, McDermeit M. Racial/ethnic disparities in admissions to public and private psychiatric inpatient settings: the effect of managed care. *Admin Policy Mental Health.* 1998;26:101-109.
3. Haas JS, Phillips KA, Sonneborn D, McCulloch CE, Liang SY. Effect of managed care insurance on the use of preventive care for specific ethnic groups in the United States. *Med Care.* 2002;40:743-751.
4. Bindman AB, Chattopadhyay A, Osmond DH, Huen W, Bacchetti P. The impact of Medicaid managed care on hospitalizations for ambulatory care sensitive conditions. *Health Serv Res.* 2005;40:19-38.
5. DeLaet DE, Shea S, Carrasquillo O. Receipt of preventive services among privately insured minorities in managed care versus fee-for-service insurance plans. *J Gen Intern Med.* 2002;17:451-457.
6. Davis K, Collins KS, Schoen C, Morris C. Choice matters: enrollees' views of their health plans. *Health Aff.* 1995;14(2):99-112.
7. Schneider EC, Cleary PD, Zaslavsky AM, Epstein AM. Racial disparity in influenza vaccination: does managed care narrow the gap between African Americans and whites? *JAMA.* 2001;286:1455-1460.
8. O'Connell L, Brown SL. Do nonprofit HMOs eliminate racial disparities in cardiac care? *J Health Care Finance.* 2003;30:84-94.
9. Stevens GD, Shi L. Effect of managed care on children's relationships with their primary care physicians: differences by race. *Arch Pediatr Adolesc Med.* 2002;156:369-377.
10. Stepanikova I, Cook KS. Insurance policies and perceived quality of primary care among privately insured patients: do features of managed care widen the racial, ethnic, and language-based gaps? *Med Care.* 2004;42:966-974.
11. Glied S, Zivin JG. How do doctors behave when some (but not all) of their patients are in managed care? *J Health Econ.* 2002;21:337-353.
12. Hadley J, Mitchell JM, Sulmasy DP, Bloche MG. Perceived financial incentives, HMO market penetration, and physicians' practice styles and satisfaction. *Health Serv Res.* 1999;34(1 pt 2):307-321.
13. Dudley RA, Luft HS. Managed care in transition. *N Engl J Med.* 2001;344:1087-1092.
14. Weiner JP, Starfield BH, Steinwachs DM, Mumford LM. Development and application of a population-oriented measure of ambulatory care case-mix. *Med Care.* 1991;29:452-472.
15. Blumenthal D, Causino N, Chang YC, et al. The duration of ambulatory visits to physicians. *J Fam Pract.* 1999;48:264-271.
16. Gilchrist VJ, Stange KC, Flocke SA, McCord G, Bourguet CC. A comparison of the National Ambulatory Medical Care Survey (NAMCS) measurement approach with direct observation of outpatient visits. *Med Care.* 2004;42:276-280.