Referrals of Adult Patients from Primary Care: Demographic Disparities and Their Relationship to HMO Insurance

Peter Franks, MD, and Carolyn M. Clancy, MD
Rochester, New York, and Rockville, Maryland

BACKGROUND. Increasing enrollment in managed care organizations and dissatisfaction with policies to restrict direct access to specialists have intensified interest in referrals from primary care physicians to specialists. We examined the associations of demographic factors and insurance with referrals of adult patients by primary care physicians.

METHODS. Office visits of adult patients to primary care physicians (general practitioners, family physicians, and internists) reported in the National Ambulatory Care Survey for the years 1985 through 1992 were used to examine referrals by primary care physicians. Regression analyses were adjusted for *patient factors* (age, sex, race, insurance, case mix, diagnostic category, new problem or not, new patient or not, and visit length), *physician factors* (age, sex, specialty, and degree of specialization), and *practice factors* (proportion of HMO patients, rural location, region, and study year).

RESULTS. Overall, 4.5% of patients were referred compared with 7.5% of patients with HMO insurance. After adjustment, an increased likelihood of referral was associated with being a male patient, having fewer medications prescribed, not being seen before for the presenting problem, a longer visit, less physician specialization, seeing a female physician, seeing an internist, and seeing a physician with a greater proportion of patients with HMO insurance. Among patients with HMO insurance, no gender disparity in referral rate was observed, and patients who also had Medicaid or Medicare insurance were more likely to be referred.

CONCLUSIONS. Male patients are more likely to be referred. HMO insurance may reduce this gender disparity and increase the access of patients with Medicaid and Medicare to specialty care.

KEY WORDS. Primary health care; insurance, health; managed care programs; referral and consultation; Medicare; Medicaid. *(J Fam Pract 1997; 45:47-53)*

Market-driven de facto reforms of the health care system and recommendations for the future distribution of physicians by discipline[1] suggest an expanding role for primary care physicians as gatekeepers controlling access to specialists through referrals. Referrals to specialists are the main avenues through which primary care physicians bring the sophisticated technical capacity of the US health care system to bear on the health problems of their patients. Excessive or inappropri-

ate referrals may result in unnecessary costs and exposure to invasive and risky procedures.[2] Delayed referrals or needed referrals that do not occur may result in adverse outcomes[3] or require interventions that are ultimately more expensive. Pressures exist in managed care organizations for primary care physicians to reduce their referral rates; but no information is available about the possible effects of these pressures, although recent media articles indicate increasing public concern.[4] Moreover, there is relatively little information about referrals in the United States other than studies involving only a few physicians or practices.[5,6]

The purpose of this paper is to provide a descriptive study of physician, practice, and patient factors affecting referrals of adult patients. Because of the changes in the delivery of health care services, we also examined the possible modifying effects of managed care on the referral process. We used data from the National Ambulatory Medical Care Survey (NAMCS).[7] The NAMCS, conducted by the National Center for Health Statistics, is the only nationally

representative source of data on physicians' encounters with ambulatory care patients.

A key factor driving much of the current interest in outcomes research is the evidence pointing to medical practice variations.[8-11] Studies documenting significant disparities in the use of major diagnostic and therapeutic interventions associated with sex, race, and insurance status[12-15] indicate that practice variations include inequitable utilization of specialty care, ie, both under- and overutilization of selected services. Differential access to specialty care through referrals and self-referrals could account for some of the sociodemographic variations in procedure rates; however, there has been little research examining this possibility.[16] We therefore focused our analysis on the possible role of sociodemographic factors (sex, race, and insurance) that might determine differential referrals by primary care physicians.

METHODS

SAMPLE

The data were derived from the National Ambulatory Medical Care Survey (NAMCS) for 1985, and for years 1989 through 1992 (there were no surveys from 1986 to 1988). All nonfederal physicians in office-based practice, including physicians with offices within hospitals and those who are employed full-time by HMOs, are eligible for inclusion in the NAMCS.

The NAMCS has a multi-stage probability sample design involving, at the first stage, primary sampling units (each one a county or a group of adjacent counties). The second stage consists of a probability sample of office-based physicians selected from the master files maintained by the American Medical Association and American Osteopathic Association. Within each primary sampling unit, eligible physicians are stratified by specialty group and randomly selected within each stratum. The final selection stage is the selection of a systematic random sample of about 20 patient visits to sample physicians. The basic sampling unit for the NAMCS is thus the physician-patient encounter.

After the encounter, the physician completes a patient record that includes physician-identified sociodemographic information; up to three diagnoses; up to five medications prescribed; whether or not the patient has been seen before for the present-

ing problem or other problems; whether the patient was referred for the visit by another physician; visit length; and whether or not the patient was referred to another physician. For this study, the National Center for Health Statistics also provided us with additional physician information, including age and sex.

The subset of encounters selected were visits by patients 25 years of age and older to primary care physicians (internists, family physicians, and general practitioners). Visits with primary sex-specific diagnoses (pregnancy and diagnoses involving sex organs) were excluded to simplify examination of the effect of sex on utilization. Visits by patients whose race was neither black nor white were excluded because their number was too small to allow reliable analysis.

ANALYSES

Logistic regression analyses were conducted to investigate the likelihood of being referred by a primary care physician following a visit. The dependent variable was whether or not the patient was referred to another physician at the end of the encounter. Analyses were also stratified according to the physician report of whether or not the patient had HMO insurance. Independent variables included patient, physician, and practice factors.

Patient factors were: age; sex; race (black or white); insurance status, ie, any one or more of the following: self-pay (including co-payments), HMO (any plans involving patient prepayment), private insurance (including all payments made either directly to the physician or reimbursed to the patient by nongovernmental insurance companies), Medicaid, and Medicare; number of medications prescribed and number of chronic disease diagnoses made (from the following categories: malignancies, diabetes mellitus, and cardiovascular, cerebrovascular, or chronic pulmonary disease), both number of medications and number of diagnoses serving as a measure of illness burden; principal diagnostic category (infectious disease, cancer, endocrine, psychiatric, neurologic, cardiovascular, respiratory, gastroenterologic, urologic, dermatologic, musculoskeletal, symptom, injury, or other); new or old problem; new or old patient; and visit length.

Physician factors included: age; sex; physician specialty, and the physician's Herfindahl Index.[17] In this analysis, the Herfindahl Index is used to mea-

sure the extent to which the physician's diagnoses are concentrated in one or more diagnostic categories. The index is the sum of the squared shares of the diagnostic categories used by the physician. A score of 1 means only one diagnostic category is used (extreme specialist), whereas if all categories are used equally, the score approaches 0 (extreme generalist). For this analysis the index was based on all the diagnoses used by the physician during the sampling period; the diagnoses were grouped into the 17 main diagnostic categories of the *International Classification of Diseases, 9th Revision.* The index has been shown to discriminate among different clinical specialties[18] and also the degree of specialization within a specialty.[17]

Practice factors included: proportion of patients in physician's practice with HMO insurance; rural location (standard metropolitan statistical area or not); geographic region (Northeast, West, South, and Midwest); and visit year.

Because of the complex survey design of the NAMCS, involving the clustering of visits within individual physicians' practices, the analyses were conducted with the statistical package SUDAAN.[19] SUDAAN uses Taylor series linearization to produce appropriate standard errors in surveys involving cluster sampling. Each physician was treated as the primary unit of analysis, stratified within physician specialty group, with visits to the physician clustered within the physician unit. Observations were weighted, based on the weights provided on the public-use tapes. The weights on the public-use tapes 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.

RESULTS

Study Sample. The sample included 49,738 visits by adult patients to general practitioners, family physicians, and internists (Table 1). Overall, 4.5% of visits to primary care physicians resulted in referrals. Patients of female primary care physicians were younger than patients seeing male primary care physicians (mean age 51.6 vs 55.3 years). Patients visiting internists as compared with those visiting family physicians or general practitioners were older (mean 58.4 vs 52.5 years), had more chronic disease diagnoses (mean 0.71 vs 0.44), and had more med-

ications prescribed (mean 1.61 vs 1.33). The mean (standard error) Herfindahl Index for general practitioners and family physicians was 0.16 (0.00), and 0.18 (0.00) for internists.

Insurance. Among patients with HMO insurance, 7.5% were referred, and no time trends in the referral rate were observed between 1985 and 1992. Patients with HMO insurance compared with those without HMO insurance were younger (mean age 47.9 vs 55.8 years), had fewer medications prescribed (1.3 vs 1.45), had fewer chronic disease diagnoses (0.45 vs 0.56), and had younger physicians (mean 47.8 vs 53.1 years).

Referral Rates. The relationship between each study characteristic and referral rate is shown in Table 1. A higher rate of referral was noted among male patients, those who were not self-pay, those who had HMO insurance, who had fewer medications prescribed, who were given fewer chronic disease diagnoses, who were presenting with new problems, and who had female physicians or internists. The referral rate was highest (Table 2) for patients whose principal diagnostic category was cancer (10.3%) and lowest for those with respiratory problems (2%). Referrals occurred least frequently for patients in the infectious disease category (0.8 referrals/1000 visits) and most frequently for patients whose diagnosis was at the symptom level (7.3/1000 visits).

Multiple Logistic Regression. After multivariate adjustment (Table 3), it was found that male patients and those with HMO insurance were more likely to be referred, while patients for whom more medications were prescribed and those seen previously for the presenting problem were less likely to be referred. Visits that resulted in referrals were longer than those that did not. Female physicians, internists, and those whose practices were more general than specialized, ie, had a lower Herfindahl Index, were more likely to refer than physicians who were male or who specialized to a greater degree. Physicians with a greater proportion of HMO-insured patients were more likely to refer, and a similar trend was observed in an analysis (n=43,631) limited to their patients without HMO insurance (adjusted odds ratio [AOR] = 1.39, 95% confidence interval [CI], 0.91 to 2.15).

To minimize spurious results due to comparing utilization at different stages of an episode of care, we conducted several subanalyses to identify

TABLE 1

Relationship Between Patient Referral Status and Other Characteristics, All Visits (N=49,738)

Characteristic	N (Visits)	Not Referred (% or means)	Referred (% or means)
Total	49,738	95.5	4.5
Patient factors			
Age group			
<45	16,454	95.5	4.5
45-64	15,144	95.3	4.7
≥65	16,697	95.6	4.4
Male	19,703	94.6	5.4
Female	30,035	96.1	3.9
White	45,385	95.4	4.6
Black	4,353	96.0	4.0
Self-pay	18,411	96.3	3.7
Private insurance	11,697	95.5	4.5
HMO	6,107	92.5	7.5
Medicaid	3,534	95.8	4.2
Medicare	14,134	95.7	4.3
Medications, mean (SE)	0.45 (.01)	1.05 (.03)	
Chronic diseases, mean (SE)	0.55 (.00)	0.42 (.02)	
Previously seen	43,739	95.7	4.3
Old problem	30,904	96.0	3.9
Physician factors			
Male physician	46,295	95.6	4.4
Female physician	3,443	94.0	6.0
Physician age, y, mean (SE)		54.7 (.09)	54.4 (.46)
General practitioner	19,846	96.2	3.8
Family physician	15,007	94.4	4.6
Internist	14,885	92.6	7.4
Herfindahl Index	0.17 (.00)	0.16 (.00)	
Practice factors			
Proportion HMO (SE)	0.14 (.00)	0.21 (.01)	
Rural location	14,544	95.6	4.4
Urban location	35,194	95.4	4.6
Northeast region	9,781	95.8	4.2
South region	16,124	95.8	4.2
West region	8,694	94.8	5.2
Midwest region	15,139	95.3	4.7
1985	6,672	95.2	4.8
1989	9,284	96.5	3.5
1990	10,979	95.4	4.6
1991	7,519	94.8	5.2
1992	5,284	95.6	4.4

NOTE: N represents sample size; percentages and means are adjusted using sampling weights to produce national estimates. Percents are based on total visits in row. Mean denotes mean value of characteristic. SE denotes standard error.

whether observed overall differences in referral rates were attributable to specific points in the process of care. First, we examined only patients presenting for the first time with a particular problem (n=18,834). The analysis produced similar results; in particular, male patients were more likely to be referred than female patients (AOR = 1.42; 95% CI, 1.20 to 1.68). A second analysis restricted to the patients of female physicians (n=3443 patients) suggested that male patients were more likely to be referred than female patients (AOR = 1.35; 95% CI, 0.90 to 2.01). A third analysis restricted to patients with cardiovascular problems (n=8856) also revealed that male patients were more likely to be referred than female patients (AOR = 1.49; 95% CI, 1.11 to 2.00).

A logistic regression analysis limited to patients with HMO insurance (n=6107) revealed results different from those of the overall analysis. In particular, no significant gender disparity in the likelihood of patient referral was noted (AOR for male patients = 1.09; 95% CI, 0.86 to 1.37). Patients who also had Medicaid insurance were more likely to be referred than those with no other insurance (AOR = 4.01; 95% CI, 1.23 to 13.09), as were patients who also had Medicare insurance (AOR = 1.96; 95% CI, 1.19 to 3.22). The wide confidence intervals of these results reflect the relatively small numbers of patients referred in the HMO analysis (n=462).

DISCUSSION

The results present an overview of referrals of adult patients by primary care physicians in the United States during the period 1985 through 1992. Male patients were more likely than female patients to have been referred. This gender disparity was not observed among patients with HMO insurance. Furthermore, patients with HMO insurance who also had Medicaid or Medicare insurance were more likely to be referred. The results of the HMO subanalysis should be viewed as tentative, given the small sample size of the analysis.

Higher Referral Rate of Male Patients. The higher referral rate of male patients is noteworthy. The findings are unlikely to reflect simply the lower rate of use of primary care by male patients, with a similar referral rate per illness episode but increased

risk of referral for a given encounter; the higher referral rate in male patients was also observed in the analysis limited to patients presenting for the first time for the problem. Because the higher referral rate for male patients was observed for both male and female primary care physicians, the results are unlikely to represent simple gender bias of male physicians toward female patients. In analyses not shown, it was found that, while there was an overall higher referral rate for male patients, the higher rate was not consistently observed across all diagnostic categories. Thus, it is plausible that the higher referral rate in men reflects the greater physician-perceived need for referral for specific conditions. These results may also partly explain why the use of invasive technology is greater in male patients.[11] The absence of gender bias in referrals among HMO patients was unexpected, but may reflect greater demand by female patients with HMO insurance, greater sensitivity of their physicians to gender issues, greater compliance with practice guidelines, or the effects of feedback to physicians from HMOs on referral rates.

Higher Referral Rate of HMO Patients. The higher referral rate of HMO patients by primary care physicians may be related to the lower rate of self-referral to specialist care by HMO patients and to the prior approval requirements within HMOs.[20] For fee-for-service patients, physicians may not make a specific referral but may recommend that the patient see a specialist if a clinical situation does not improve. Thus, for non-HMO patients, there may be some ambiguity regarding whether a patient was physician- or self-referred. Patients in HMOs may be more assertive in requesting referrals than their fee-for-service counterparts. The results also show that physicians with a greater proportion of HMO patients tend to refer more, and that incentives to discourage discretionary referrals had little impact before 1993. This is not surprising since the majority of HMO patients in the late 1980s and early 1990s were enrolled in staff or group models with few disincentives to specialty referral.

Primary care physicians may adjust their practice style with respect to HMO patients over time through greater compliance with practice guidelines, an evolving relationship with consultants, or referring more patients to reduce their workload. It is noteworthy that there were no time trends in visit

TABLE 2			
Referral Rates in Primary Care, by Diagnostic Category			
Principal Diagnostic Category	N (Visits)	Referrals/ 100 Visits in Diagnostic Category	Referrals/ 1000 Total Visits
Total	49,738	4.5	5.1
Infection	1,476	2.6	0.8
Cancer	1,208	10.3	2.6
Endocrine	3,794	2.9	2.3
Psychiatric	1,626	4.8	1.6
Neurologic	2,163	6.8	3.0
Cardiovascular	8,856	3.2	5.9
Respiratory	7,704	2.0	3.3
Gastroenterologic	2,673	7.8	3.3
Urologic	1,077	5.9	4.4
Dermatologic	1,903	6.7	1.2
Musculoskeletal	5,759	7.1	2.6
Symptom	2,652	7.6	7.3
Injury	4,376	3.6	4.2
Other	4,470	3.3	3.0

duration for HMO or non-HMO patients (results not shown), suggesting that similar efforts to provide time were made by physicians throughout the study period; furthermore, visits leading to a referral were longer. Primary care physicians and patients may have viewed HMO insurance as reducing financial barriers to specialty care.

Barriers to Specialty Care Access. In general, black[21,22] and uninsured[23,24] patients utilize health care relatively less frequently and later during illness episodes than white and insured patients. The absence of race or insurance disparities in the primary care physicians' referral rate for these patients may represent relative underreferral for black and uninsured patients. The results of the HMO subanalysis suggesting that the rate of referral is higher for HMO Medicaid patients may be understood in this context.

Most studies suggest that Medicare patients joining HMOs are less sick than non-HMO Medicare patients,[25] so their increased referral rate appears puzzling. Medicare patients in metropolitan areas, however, may have relatively reduced access to specialists because of financial barriers,[26] and having HMO Medicare insurance may facilitate access to specialty care compared with non-HMO Medicare patients. Also, as we note below, severity of illness may not be the only determinant of referral likelihood.

Patient Morbidity Measures. No satisfactory measures of illness burden exist for use in the ambu-

TABLE 3

Multiple Logistic Regression of Factors Associated with Referral by Primary Care Physicians (N=49,738)

Risk Factor	Adjusted Odds Ratio (95% CI)	P Value
Patient factors		
Age (/10 years)	1.03 (0.99-1.07)	.18
Male sex	1.38 (1.23-1.55)	.00
Black	0.90 (0.74-1.09)	.28
Insurance		
Self-pay	0.98 (0.84-1.14)	.77
Private	1.09 (0.93-1.27)	.28
HMO	1.58 (1.27-1.98)	.00
Medicaid	1.23 (0.97-1.56)	.09
Medicare	1.10 (0.92-1.31)	.31
Number medications	0.81 (0.76-0.85)	.00
Number chronic diagnoses	0.90 (0.79-1.02)	.10
Previously seen	0.89 (0.75-1.06)	.19
Old problem	0.87 (0.76-0.99)	.04
Visit length	1.01 (1.00-1.01)	.01
Physician factors		
Herfindahl Index	0.33 (0.16-0.70)	.00
Female	1.34 (1.12-1.60)	.00
Age (/10 years)	1.00 (1.00-1.01)	.86
Family physician	1.12 (0.96-1.31)	.14
Internist	1.23 (1.06-1.44)	.01
Practice factors		
Proportion HMO patients	1.42 (1.08-1.86)	.01
Rural location	1.12 (0.99-1.27)	.07
Northeast	0.97 (0.82-1.14)	.67
South	0.95 (0.83-1.09)	.49
West	0.99 (0.85-1.15)	.90
Year	1.00 (0.98-1.02)	.93

NOTE: Risk factors indicate the value of the characteristic with associated adjusted odds ratio of referral. Except where noted, the odds ratio shows the adjusted odds of referral with the risk factor present compared with the risk factor absent; for age and physician age, the odds ratios reflect 10-year increments in age; for visit length, the odds ratio reflects the impact of an increase in visit length of 10 minutes above the mean visit length for the physician; for the Herfindahl Index, the odds ratio reflects the impact of a change in the index from 0 to 1; for physician specialty, the reference category is general practice; for regions, the reference region is the Midwest. Also adjusted for diagnostic category.

finding that internists have patients who have more chronic diseases and who are given more medication prescriptions. The lower rate of referral for patients with more chronic disease diagnoses and more medications prescribed appears counterintuitive. It is possible that these patients are sicker and have been referred at some point earlier in the course of the disease. A recent study comparing outcomes for stroke patients referred to neurology with those referred to the general medical service found that neurology patients were less sick.[27] An earlier study found that subspecialists were more likely to retain patients with less morbidity and refer back to generalists patients with higher morbidity.[28] These studies suggest that increased morbidity is not the sole determinant of patients' being referred for specialist care, and emphasize the current lack of knowledge to define when patients are most likely to benefit from specialty care.

Referrals for Specific Problems. These results also suggest that referrals for specific problems are relatively rare events in specific encounters; for most diagnostic categories, referrals occurred between 0.8 and 5.9 per 1000 encounters (Table 2). The diagnostic category most likely to result in a referral was for diagnoses occurring at a symptom level (7.3 referrals per 1000 encounters, Table 2), perhaps reflecting a greater likelihood of referral with clinical uncertainty. Although referrals by primary care physicians for specific problems are rare events, Salem-Schatz et al[29] found a rate of about 0.8 referrals per patient per year in the Harvard Community Health Plan. These rates have significant implications for attempts to evaluate the quality of referrals and for research into the referral process.

The NAMCS Survey. Inferences derived from the data presented here must be tempered by the nature of the NAMCS, a cross-sectional survey of isolated physician-patient encounters. The survey provides no information about the episode of care for a particular problem, the appropriateness of care, or outcomes. Biases may be introduced, since patients presenting for the first time to a particular physician may have been seen before by another physician; also, the data set does not allow identification of the

latory setting, and the measures used in our study have questionable validity. Patients may well have significant morbidity, not addressed in the encounter. Significant chronic disease medications may not be prescribed during the encounter, whereas medications for acute problems are likely to be overrepresented. It is unlikely, however, that these deficiencies introduce significant bias in the assessment of encounters resulting in referrals. Some convergent validity of the measures is suggested by the

kind of physician that the patient is being referred to, who may be another primary care physician. All the data are provided by physician self-report, without quality control or verification. In particular, patient insurance status is not verified, but represents the physician's perception of patient insurance; the perceived insurance status, however, may be the relevant measure of the effect of patient insurance on the physician's decisions.[30] The NAMCS data do not allow direct inferences about the relationship between physician propensity for referral and availability of specialists nor between patient demand for referral and different modes of physician reimbursement or type of HMO.

CONCLUSIONS

During a period when a majority of HMOs use primary care physicians as gatekeepers,[20] these results offer some assurance that patients enrolled in HMOs may be at decreased risk of lower access to specialists based solely on sex or insurance status compared with non-HMO patients. As competition between health plans increases pressures to reduce utilization of specialists,[31] as managed care plans evolve with physicians assuming a greater share of financial risk for patient care, and as an increased number of Medicaid patients are required to join HMOs, vigilance will be needed to ensure that socioeconomic disparities do not increase. Research that clarifies appropriate and cost-effective utilization of specialists through referral and collaborative care will help ensure optimal delivery of care in an evolving health care system. These results provide an important baseline for monitoring and interpreting patterns of care occurring during a time of rapid changes in health care delivery.

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