

Special Article

THE MEDICARE-HMO REVOLVING DOOR — THE HEALTHY GO IN
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AND NANCY A. PERSILY, M.P.H.**ABSTRACT**

Background Enrollment in Medicare health maintenance organizations (HMOs) is encouraged because of the expectation that HMOs can help slow the growth of Medicare costs. However, Medicare HMOs, which are paid 95 percent of average yearly fee-for-service Medicare expenditures, are increasingly believed to benefit from the selective enrollment of healthier Medicare recipients. Furthermore, whether sicker patients are more likely to disenroll from Medicare HMOs, thus raising average fee-for-service costs, is not clear.

Methods We used Medicare enrollment and inpatient billing records for southern Florida from 1990 through 1993 to examine differences in the use of inpatient medical services by 375,406 beneficiaries in the Medicare fee-for-service system, 48,380 HMO enrollees before enrollment, and 23,870 HMO enrollees after disenrollment. We also determined whether these differences were related to demographic characteristics and whether the pattern of use after disenrollment persisted over time.

Results The rate of use of inpatient services in the HMO-enrollment group during the year before enrollment was 66 percent of the rate in the fee-for-service group, whereas the rate in the HMO-disenrollment group after disenrollment was 180 percent of that in the fee-for-service group. Beneficiaries who disenrolled from HMOs re-enrolled at about the time that their level of use dropped to that in the fee-for-service group.

Conclusions These data show marked selection biases with respect to HMO enrollment and disenrollment. These biases undermine the effectiveness of the Medicare managed-care system and highlight the need for longitudinal and population-based studies. (N Engl J Med 1997;337:169-75.)

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HEALTH maintenance organizations (HMOs) serving Medicare beneficiaries have been credited with reducing the length of stay and the number of bed-days associated with the traditional fee-for-service system,¹ and the assumption has been that HMOs could help slow the growth in the costs of health care for the elderly. Over the past few years, this assump-

tion has been questioned. A number of studies suggest that there is a bias in the enrollment of Medicare beneficiaries in HMOs, potentially offsetting any savings derived from the fact that HMOs are paid only 95 percent of average yearly fee-for-service Medicare expenditures. However, the focus on selective enrollment addresses only the first part of the overall problem of Medicare-HMO enrollment and disenrollment. Without considering the continuous cycling of Medicare beneficiaries into and out of HMOs, we are left with an incomplete picture of the effect of HMOs on the Medicare system.

As of January 1997, more than 4.9 million Medicare beneficiaries were enrolled in 336 Medicare HMOs nationwide,² with southern Florida (Dade, Broward, Palm Beach, and Monroe counties) having a substantially higher rate of Medicare-HMO enrollment than the national average. This region has more Medicare beneficiaries than each of 35 states, one of the nation's highest per capita health care costs, and the nation's second highest Medicare capitated rate,³ making it an ideal setting for an examination of HMO enrollment and disenrollment and fee-for-service care.

Medicare beneficiaries who enroll in HMOs appear to be healthier before their enrollment than those who remain in the fee-for-service system,⁴ with fewer hospitalizations and fewer days spent in the hospital,^{1,5} lower per capita reimbursements,^{6,7} higher levels of performance with respect to activities of daily living and instrumental activities of daily living,⁵ and a higher level of perceived health.⁸ It is less clear how long these differences persist after Medicare beneficiaries enroll in HMOs.⁹ Initial differences in mortality between HMO enrollees and nonenrollees even out within three to five years after enrollment. Furthermore, persons already enrolled in HMOs are reported to be similar to fee-for-serv-

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ice beneficiaries in terms of selected measures of health and functional status.^{10,11}

Medicare beneficiaries can change their HMO-enrollment status on a month-by-month basis. Thus, the elderly can shop among managed-care organizations for the benefit package that best suits their changing needs and can enter and exit the fee-for-service system in order to use services not provided by managed-care organizations. As compared with beneficiaries who remain enrolled in Medicare HMOs, those who disenroll are less satisfied with their access to care, its cost, and their choice of physicians.¹²⁻¹⁴ There do not appear to be differences in health status between beneficiaries who remain in their HMOs and those who disenroll but remain in the HMO system (i.e., switch HMOs). In contrast, beneficiaries who return to the fee-for-service system appear to be less healthy^{13,15} and report using more out-of-plan services before disenrollment than those who switch from one HMO to another.¹⁴ In a recent report to Congress, the Physician Practice Review Commission noted that Medicare expenditures for HMO enrollees were lower during the six months before their enrollment in HMOs (about 37 to 44 percent lower) and higher during the six months after their disenrollment (about 60 percent higher) than Medicare expenditures for beneficiaries in the fee-for-service system.¹⁵ However, the commission did not address differences attributable to age, sex, race or ethnic group, or income level, nor did it determine whether the differences in use were maintained over an extended period after disenrollment.

In summary, although prior studies have established that use of services by Medicare beneficiaries in the fee-for-service system differs according to demographic characteristics (e.g., age, sex, race or ethnic group, and income),¹⁶ the research to date has not addressed the question of whether these demographic differences extend to patterns of use by Medicare beneficiaries before enrollment in HMOs or after disenrollment. Furthermore, the substantial number of Medicare beneficiaries who disenroll from HMOs and subsequently re-enroll have not been studied, nor has it been determined whether the initial increases in use of services after disenrollment persist.

We studied the use of inpatient medical services by Medicare beneficiaries in the fee-for-service system and by HMO enrollees before their enrollment in HMOs and after their disenrollment. We examined the relation between differences in use and demographic characteristics, as well as the extent to which the pattern of use after disenrollment persists over time.

METHODS

Medicare Data

The Medicare administrative (claims) data used for these analyses were obtained from the Medicare Provider Analysis and Re-

view (MEDPAR) files for the four counties in southern Florida, covering the four-year period from 1990 through 1993. Persons who were eligible for Medicare because of age (≥ 65 years) and resided in the four-county region for the entire study period were included in the analysis. Persons who became eligible for Medicare, died, or moved out of the region during the study period were excluded.

Information on age (as of 1990), sex, race, and monthly HMO-enrollment status was obtained from the Medicare enrollment files. Race was classified as black or nonblack (white, other, or unknown) on the basis of a preliminary analysis of enrollment patterns.

Income Data

Since data on income are not available from the Medicare files, the income level for each Medicare beneficiary was determined on the basis of the average disposable income in that person's ZIP Code area for households with persons 65 years old or older, according to the 1990 Census. The Medicare beneficiaries were then assigned to one of two income levels: an average disposable income less than or equal to \$15,000 per year or an average disposable income higher than \$15,000 per year. Although income levels defined according to ZIP Code are only approximate, they have been shown to be related to use of medical care by Medicare beneficiaries in the fee-for-service system¹⁶ and thus represent potentially important information.

Beneficiary Groups

Three mutually exclusive beneficiary groups were defined for the purpose of these analyses. The fee-for-service group included 375,406 Medicare beneficiaries who were enrolled in the fee-for-service system throughout the study period. The HMO-enrollment group included 48,380 Medicare beneficiaries who were enrolled in the fee-for-service system at the beginning of the study period but switched to HMOs during the 1991, 1992, or 1993 calendar year. For this group, information on use of inpatient services was collected for the one-year period before their enrollment in HMOs. The HMO-disenrollment group included 23,870 Medicare beneficiaries who disenrolled from Medicare HMOs at some point between 1990 and the end of the third quarter of 1993. Persons who were not enrolled in fee-for-service plans for at least three months after their disenrollment from HMOs were excluded from the study. For the HMO-disenrollment group, data on use of inpatient services were obtained for up to one year after disenrollment or until re-enrollment, in the case of beneficiaries who remained in the fee-for-service system for less than a year. Eighty-three percent of the HMO-disenrollment group stayed in the fee-for-service system for at least six months after disenrollment, 71 percent for at least nine months, and 59 percent for a year or more.

To further investigate changes in use of inpatient services, we identified a subgroup of 7495 Medicare beneficiaries for whom we had both pre-enrollment and postdisenrollment data (the enrollment-disenrollment group) and calculated the change in the rate of admissions for these beneficiaries as compared with the rate for the fee-for-service beneficiaries.

A total of 74,215 Medicare beneficiaries who were continuously enrolled in HMOs throughout the four-year study period were excluded from these analyses, since data on their use of inpatient services were largely unavailable from Medicare claims files.

Statistical Analysis

To examine use of inpatient services, rates of hospital admissions for the three groups of Medicare beneficiaries were calculated according to age (65 to 69 years, 70 to 74 years, 75 to 79 years, 80 to 84 years, or ≥ 85 years), race (black or nonblack), sex, and income level ($\leq \$15,000$ or $> \$15,000$). For each group, rates were calculated separately for each cell of the resulting multifactorial ($5 \times 2 \times 2 \times 2$) matrix. Poisson regression¹⁷ was used to estimate the effect of membership in either the HMO-enrollment group or the HMO-disenrollment group on use of inpatient serv-

ices, as compared with membership in the fee-for-service group, with adjustment for demographic characteristics.

One-year and three-month estimates of use of inpatient services for the fee-for-service group were standardized by the direct standardization method¹⁸ to reflect the age, race, sex, and income distributions in the HMO-enrollment group and the HMO-disenrollment group, respectively.

RESULTS

Demographic Characteristics

The fee-for-service group had larger proportions of women and nonblacks than either the HMO-enrollment group or the HMO-disenrollment group (Table 1). In addition, members of the fee-for-service group and the HMO-disenrollment group tended to be slightly older than the members of the HMO-enrollment group. There were no dramatic differences in income levels among the groups.

Use of Inpatient Services before HMO Enrollment

The Poisson regression model showed that use of inpatient services was primarily a function of HMO-enrollment status, age, sex, and household-income level. A substantial difference in use between the HMO-enrollment group and the fee-for-service group persisted after adjustment for the demographic factors (Table 2). Before their enrollment in HMOs, the HMO enrollees had a rate of hospital ad-

missions that was two thirds the rate in the fee-for-service group (137 admissions vs. 208 admissions per 1000 beneficiaries, $P \leq 0.001$). Fewer HMO enrollees had at least one admission (10 percent, vs. 14 percent of the fee-for-service group). Furthermore, the HMO enrollees had fewer inpatient days than the fee-for-service group (1005 days vs. 1810 days per 1000 beneficiaries) and lower payments to hospitals by Medicare for inpatient services (approximately \$693,000 vs. \$1,260,000 per 1000 beneficiaries).

In general, admissions were more frequent among older beneficiaries than among younger beneficiaries, among men than among women, and among persons in the lower-income group than among those in the higher-income group ($P \leq 0.001$ for all three comparisons). Blacks were slightly more likely than nonblacks to have admissions ($P \leq 0.001$).

Interestingly, there was a statistically significant interaction between HMO-enrollment status and age ($P \leq 0.001$), with smaller differences between HMO and fee-for-service beneficiaries in the older age groups than in the younger age groups (Table 2). There was also a significant interaction between race and HMO-enrollment status ($P \leq 0.001$), with smaller differences between HMO and fee-for-service beneficiaries among blacks than among nonblacks.

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF THE STUDY GROUPS.*

CHARACTERISTIC	FEE-FOR-SERVICE (N = 375,406)	HMO†		
		ENROLLMENT (N = 48,380)	DISENROLLMENT (N = 23,870)	ENROLLMENT-DISENROLLMENT (N = 7495)
percentage of beneficiaries				
Income‡				
≤\$15,000	10.5	9.7	12.6	14.0
>\$15,000	89.5	90.3	87.4	86.0
Age§				
65–69 yr	32.9	47.3	35.1	39.6
70–74 yr	25.8	23.2	24.6	22.4
75–79 yr	21.2	17.0	20.3	19.8
80–84 yr	12.9	8.8	12.9	12.4
≥85 yr	7.2	3.8	7.2	5.8
Sex§				
Male	37.3	43.6	41.0	40.7
Female	62.7	56.4	59.0	59.3
Race§				
Nonblack	97.2	91.0	88.9	88.9
Black	2.8	9.0	11.1	11.1

*Percentages may not sum to 100, because of rounding.

†The enrollment group included Medicare beneficiaries who switched from the fee-for-service system to HMOs during the study period, the disenrollment group included beneficiaries who switched from HMOs to the fee-for-service system during the study period, and the enrollment–disenrollment group included beneficiaries who switched from the fee-for-service system to HMOs and then returned to the fee-for-service system during the study period.

‡Data were obtained from the 1990 Census.

§Data were obtained from the Medicare enrollment files.

TABLE 2. ADMISSION RATES FOR HMO ENROLLEES DURING THE 12 MONTHS BEFORE ENROLLMENT AND STANDARDIZED RATES FOR FEE-FOR-SERVICE ENROLLEES.

CHARACTERISTIC*	HMO-ENROLLMENT GROUP	FEE-FOR-SERVICE GROUP	RATIO
	no. of admissions per 1000 beneficiaries		
Income†			
≤\$15,000	165	238	0.69
>\$15,000	134	205	0.65
Age‡			
65–69 yr	102	167	0.61
70–74 yr	139	208	0.67
75–79 yr	164	255	0.64
80–84 yr	214	292	0.73
≥85 yr	261	307	0.85
Sex§			
Male	144	225	0.64
Female	132	194	0.68
Race¶			
Nonblack	135	208	0.65
Black	162	209	0.78
Overall	137	208	0.66

*The results for each characteristic are adjusted for the other characteristics listed in the table.

†For the comparison between income levels across beneficiary groups, chi-square with 1 df = 179.4, P ≤ 0.001. The interaction between income and HMO enrollment was not significant.

‡For the comparisons among age groups across beneficiary groups, chi-square with 4 df = 5038.2, P ≤ 0.001. For the interaction between age and HMO enrollment, chi-square with 4 df = 39.4, P ≤ 0.001.

§For the comparison between men and women across beneficiary groups, chi-square with 1 df = 599.3, P ≤ 0.001. The interaction between sex and HMO enrollment was not significant.

¶For the comparison between nonblack and black members across beneficiary groups, chi-square with 1 df = 18.8, P ≤ 0.001. For the interaction between race and HMO enrollment, chi-square with 1 df = 20.2, P ≤ 0.001.

||For the overall comparison between beneficiary groups, with the analysis adjusted for demographic characteristics, chi-square with 1 df = 1142.5, P ≤ 0.001.

Use of Inpatient Services after Disenrollment

The picture changed dramatically when the beneficiaries who withdrew from HMOs were compared with those who remained in the fee-for-service system. In an analysis adjusted for demographic factors, the members of the HMO-disenrollment group had a substantially higher rate of admissions than the fee-for-service beneficiaries (101 vs. 56 admissions per 1000 beneficiaries, P ≤ 0.001) (Table 3). Twice as many beneficiaries in the HMO-disenrollment group had at least one inpatient stay (8 percent, vs. 4 percent in the fee-for-service group), and they had twice as many inpatient days (968 vs. 457 days per 1000 beneficiaries) and twice the inpatient hospital payments (approximately \$644,000 vs. \$322,000 per 1000 beneficiaries).

TABLE 3. ADMISSION RATES FOR HMO DISENROLLEES DURING THE FIRST THREE MONTHS AFTER DISENROLLMENT AND STANDARDIZED RATES FOR FEE-FOR-SERVICE ENROLLEES.

CHARACTERISTIC*	HMO-DISENROLLMENT GROUP	FEE-FOR-SERVICE GROUP	RATIO
	no. of admissions per 1000 beneficiaries		
Income†			
≤\$15,000	106	64	1.66
>\$15,000	100	55	1.82
Age‡			
65–69 yr	81	43	1.88
70–74 yr	101	53	1.91
75–79 yr	115	65	1.77
80–84 yr	127	74	1.72
≥85 yr	115	78	1.47
Sex§			
Male	116	60	1.93
Female	90	53	1.70
Race¶			
Nonblack	100	56	1.79
Black	105	57	1.84
Overall	101	56	1.80

*The results for each characteristic are adjusted for the other characteristics listed in the table.

†For the comparison between income levels across beneficiary groups, chi-square with 1 df = 48.8, P ≤ 0.001. The interaction between income and HMO enrollment was not significant.

‡For the comparisons among age groups across beneficiary groups, chi-square with 4 df = 1155.8, P ≤ 0.001. For the interaction between age and HMO enrollment, chi-square with 4 df = 15.4, P ≤ 0.01.

§For the comparison between men and women across beneficiary groups, chi-square with 1 df = 191.0, P ≤ 0.001. For the interaction between sex and HMO enrollment, chi-square with 1 df = 8.0, P ≤ 0.01.

¶None of the differences were significant.

||For the overall comparison between beneficiary groups, with the analysis adjusted for demographic characteristics, chi-square with 1 df = 634.1, P ≤ 0.001.

Like pre-enrollment admission rates, postdisenrollment admission rates were related to age, sex, and income level (P ≤ 0.001 for all three comparisons), with older beneficiaries, men, and beneficiaries from lower-income areas having higher admission rates. There were no observed differences according to racial classification. There were also interactions between HMO-disenrollment status and age (P ≤ 0.01), with the differences between admission rates for the HMO-disenrollment group and the fee-for-service group declining as age increased, and between HMO-disenrollment status and sex (P ≤ 0.01), with a greater difference in admission rates between male members of the two beneficiary groups than between female members.

Thus, the use of inpatient services by beneficiaries

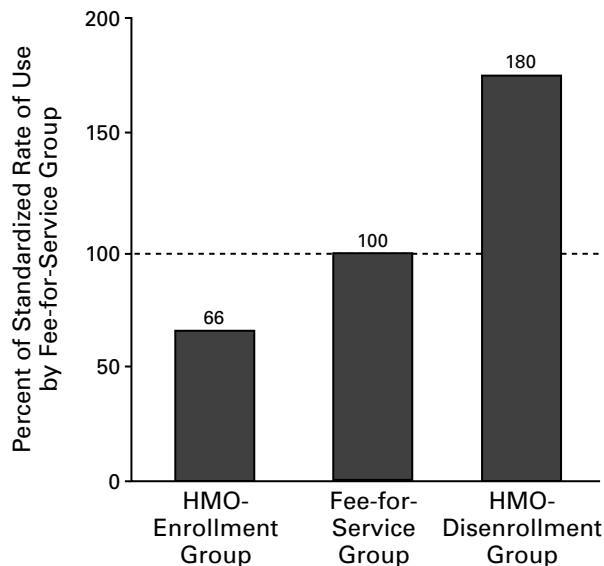


Figure 1. Use of Inpatient Services by Medicare Beneficiaries Who Switched from the Fee-for-Service System to HMOs (HMO-Enrollment Group), Those Who Remained in the Fee-for-Service System (Fee-for-Service Group), and Those Who Switched from HMOs to the Fee-for-Service System (HMO-Disenrollment Group).

Rates of use are shown as percentages of the standardized rate of use by the fee-for-service group (100 percent).

before their enrollment in HMOs or after their disenrollment differed from the use of inpatient services by beneficiaries in fee-for-service plans (Fig. 1). In addition, the use of inpatient services before enrollment in HMOs differed markedly from the use of services after disenrollment.

Figure 2 shows the rates of use of inpatient services in four subgroups of beneficiaries who disenrolled from HMOs: those who stayed in the fee-for-service system for at least three months before re-enrolling in a Medicare HMO, those who stayed in the fee-for-service system for at least six months, those who stayed in the fee-for-service system for at least nine months, and those who stayed in the fee-for-service system for one year or more. The rate of use for each complete 91-day quarter after disenrollment is shown as a percentage of the standardized rate for the fee-for-service group.

Use of inpatient services declined over successive quarters after disenrollment among the beneficiaries who remained in the fee-for-service system for six months or more after their index disenrollment (i.e., at least two quarters) (Fig. 2). Thus, there was a concentrated period of use of inpatient services immediately after disenrollment from HMOs, with re-enrollment occurring at about the same time that the admission rate approximated the standardized rate for the Medicare beneficiaries who remained in the fee-for-service system.

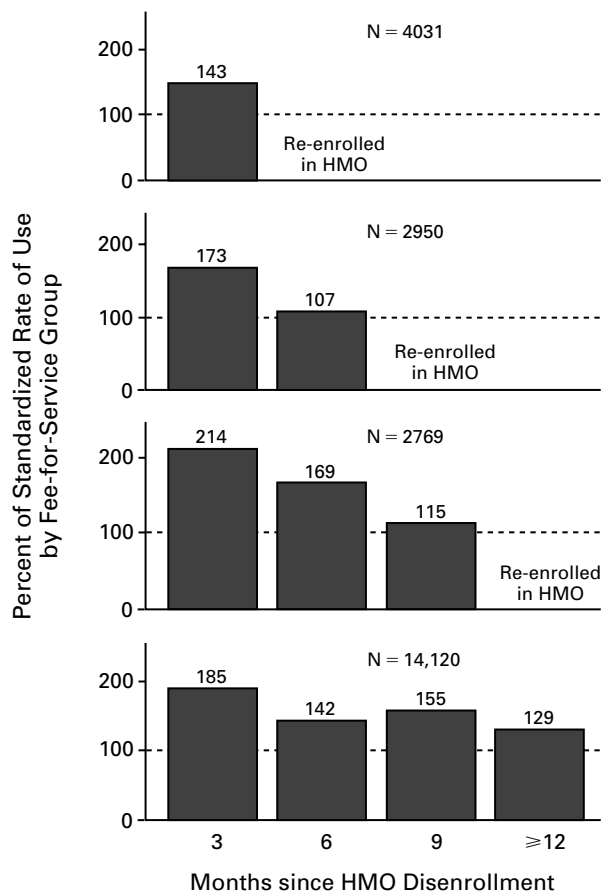


Figure 2. Use of Inpatient Services by Medicare Beneficiaries Who Switched from HMOs to the Fee-for-Service System, According to the Length of Time since Disenrollment.

Rates of use are shown as percentages of the standardized rate of use by beneficiaries continuously in the fee-for-service system (100 percent).

Changes in Use of Inpatient Services

Other than being slightly poorer and younger, the members of the enrollment–disenrollment group were similar to the overall HMO-disenrollment group (Table 1). Their median stay in a Medicare HMO was four months. These beneficiaries had admission rates that were similar to those in the fee-for-service group during the 12 months before their enrollment in Medicare HMOs (95 percent of the rate in the fee-for-service group), a rate considerably higher than that in the overall HMO-enrollment group (66 percent of the rate in the fee-for-service group). Nevertheless, this subgroup had a substantial increase in admissions during the first three months after their disenrollment (147 percent of the rate in the fee-for-service group).

Reasons for Admission

An examination of the diagnosis-related groups (DRGs) documented on the Medicare inpatient bill-

TABLE 4. REASONS FOR ADMISSION IN THE HMO-DISENROLLMENT AND FEE-FOR-SERVICE GROUPS.*

DRG CATEGORY	HMO-DISENROLLMENT GROUP	FEE-FOR-SERVICE GROUP
	% of admissions	
Cardiac procedures	9.2 (1)	8.2 (1)
Mental disorders	8.8 (2)	3.9 (7)
Rehabilitation	5.1 (3)	4.4 (6)
Major joint and limb disorders	5.1 (4)	3.0 (8)
Nonmalignant prostate disorders	5.0 (5)	2.6 (12)
Heart failure and shock	4.1 (6)	5.8 (2)
Stroke	3.7 (7)	4.6 (4)
Angina	3.7 (8)	4.6 (5)
Respiratory infections	3.4 (9)	5.4 (3)
Malignant conditions	2.8 (10)	2.7 (10)

*Numbers in parentheses indicate rankings, which were performed before rounding. DRG denotes diagnosis-related group.

ing records showed that the reasons for admission were similar in the HMO-disenrollment group and the fee-for-service group (Table 4). Nine of the top 10 DRGs in the HMO-disenrollment group were among the top 10 DRGs in the fee-for-service group. Only two DRG categories — mental disorders and nonmalignant prostate disorders — were substantially more frequent in the HMO-disenrollment group.

DISCUSSION

Our data reveal an important mix of selection biases. Medicare beneficiaries who use fewer services than average are more likely to enroll in HMOs, and beneficiaries who disenroll from HMOs subsequently use more services than average. These findings are consistent in subgroups of beneficiaries classified on the basis of age, race, and income level. The most striking finding is that among the beneficiaries who move from HMOs to the fee-for-service system and then back to HMOs, re-enrollment in HMOs occurs after their admission rates drop. Furthermore, among the beneficiaries who are disenrolled from HMOs for less than a year, there seems to be a relation between the admission rate during the first three months after disenrollment and the length of time before re-enrollment.

Current efforts to reform Medicare are focused on cost rather than access, in part because studies of the influence of Medicare HMOs on access to care have had mixed findings.^{5,19} The substantial increase in use of inpatient services by beneficiaries after their disenrollment from HMOs suggests that they move into the fee-for-service system in order to obtain needed services, returning to Medicare HMOs after they have obtained these services. In contrast, those who remain out of the HMO system for a year or more

may be more likely to need long-term care or to have other reasons for disenrollment. The high levels of use of inpatient services in our HMO-disenrollment group dovetail with the previously reported high levels of out-of-plan use by Medicare-HMO enrollees before their disenrollment and return to the fee-for-service system, reported in a previous study.¹⁴ Alternatively, the pattern of care seeking we have identified may be influenced by the providers. In particular, the independent-practice-association (IPA) model, which dominates the southern Florida HMO market, lends itself to this pattern of use, since most physicians who participate in IPAs work with a variety of payment mechanisms. Thus, patients do not necessarily have to switch providers in order to move from an IPA to the fee-for-service system.

The disproportionately high enrollment in HMOs by Medicare beneficiaries with low use of inpatient services and the disproportionately high use by beneficiaries who disenroll from HMOs make it difficult for the Medicare system to realize the anticipated cost savings from the HMO program. The capitated rate paid to Medicare HMOs is currently 95 percent of Medicare's average annual per capita cost for fee-for-service care. Thus, Medicare saves money only if the use of services by beneficiaries enrolling in HMOs is 95 percent or more of the average rate of use in the prior year. Our studies indicate that, at least with inpatient care, this savings is not being realized. Furthermore, the selective enrollment of low-use beneficiaries and disenrollment of high-use beneficiaries means that annual increases in the capitated rate paid to Medicare HMOs may be biased upward, reflecting the changing composition of Medicare beneficiaries in the fee-for-service system. Compounding the problem, the proportionately greater differences in use by younger as compared with older Medicare beneficiaries in the HMO and fee-for service groups (Tables 2 and 3) suggest that Medicare's capitation strategy is most out of balance for the youngest Medicare beneficiaries, who use the least inpatient care and make up the largest proportion of the beneficiary pool.

The Medicare system seems to be moving inexorably toward an increased reliance on managed-care providers. However, substantial changes are needed if Medicare is truly going to curtail costs without compromising its dramatic success in improving health care for older Americans. Competitive bidding on HMO plans, incorporation of data on prior health status in the calculation of capitated payments, and a required enrollment period of more than one month have all been suggested.¹¹ Combined with managed-care models (e.g., point-of-service plans) that give greater flexibility to beneficiaries, who in exchange assume a larger share of the financial risk, these strategies have the potential to apportion both the responsibilities and the benefits of managed care equitably among the beneficiaries, providers, and payers.

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REFERENCES

1. Brown RS, Hill JW. Costs and use of services. I. The effects of Medicare risk HMOs on Medicare costs and service utilization. In: Luft HS, ed. HMOs and the elderly. Ann Arbor, Mich.: Health Administration Press, 1994:13-54.
2. Managed care in Medicare and Medicaid: fact sheet. Washington, D.C.: Health Care Financing Administration, 1997.
3. Welch WP, Miller ME, Welch G, Fisher ES, Wennberg JE. Geographic variation in expenditures for physicians' services in the United States. *N Engl J Med* 1993;328:621-7.
4. Medicare: issues raised by Florida health maintenance organization demonstrations. Washington, D.C.: Government Accounting Office, 1986. (Publication no. GAO/HRD-86-97.)
5. Retchin SM, Clement DG, Rossiter LF, Brown B, Brown R, Nelson L. How the elderly fare in HMOs: outcomes from the Medicare competition demonstrations. *Health Serv Res* 1992;27:651-69.
6. Eggers PW, Prihoda R. Pre-enrollment reimbursement patterns of Medicare beneficiaries enrolled in "at-risk" HMOs. *Health Care Financ Rev* 1982;4(1):55-73.
7. Hill J, Brown R. Biased selection in the TEFRA HMO/CMP program. Princeton, N.J.: Mathematica Policy Research, 1990.
8. Brown R, Langwell K, Berman K, et al. Enrollment and disenrollment in Medicare competition demonstration plans: a descriptive analysis. Princeton, N.J.: Mathematica Policy Research, 1986.
9. Riley G, Rabey E, Kasper J. Biased selection and regression toward the mean in three Medicare HMO demonstrations: a survival analysis of enrollees and disenrollees. *Med Care* 1989;27:337-51.
10. Clement DG, Retchin SM, Brown RS, Stegall MH. Access and outcomes of elderly patients enrolled in managed care. *JAMA* 1994;271:1487-92. [Erratum, *JAMA* 1994;272:276.]
11. Dowd B, Christianson J, Feldman R, Wisner C, Klein J. Issues regarding health plan payments under Medicare and recommendations for reform. *Milbank Q* 1992;70:423-53.
12. Mechanic D, Weiss N, Cleary PD. The growth of HMOs: issues of enrollment and disenrollment. *Med Care* 1983;21:338-47.
13. Harrington C, Newcomer RJ, Preston S. A comparison of S/HMO disenrollees and continuing members. *Inquiry* 1993;30:429-40.
14. Porell FW, Cocotas C, Perales PJ, Tompkins CP, Glaven M. Factors associated with disenrollment from Medicare HMOs: findings from a survey of disenrollees. Washington, D.C.: Health Care Financing Administration, 1992.
15. Risk selection and risk adjustment in Medicare. In: 1996 Annual report to Congress. Washington, D.C.: Physician Payment Review Commission, 1996:255-79.
16. Gornick ME, Eggers PW, Reilly TW, et al. Effects of race and income on mortality and use of services among Medicare beneficiaries. *N Engl J Med* 1996;335:791-9.
17. Koch GG, Atkinson SS, Stokes MF. Poisson regression. In: Kotz S, Johnson NL, Read CB, eds. *Encyclopedia of statistical sciences*. New York: John Wiley, 1986:7.
18. Fleiss JL. *Statistical methods for rates and proportions*. 2nd ed. New York: John Wiley, 1981.
19. Safran DG, Tarlov AR, Rogers WH. Primary care performance in fee-for-service and prepaid health care systems: results from the Medical Outcomes Study. *JAMA* 1994;271:1579-86.