Drug Prescription Rates Before and After Enrollment of a Medicaid Population in an HMO

As health care costs continue to mount and as more of these costs are borne by the public sector, there are increasing pressures to contain costs and to assure that dollars are well spent in terms of quality and equity. Prepayment through enrollment in health maintenance organizations (HMOs) has been found to reduce costs most notably through reduced hospitalization (*1–5*). The effect on quality of care is less certain. With respect to equity, however, there is evidence that enrollment of low-income families in HMOs will raise their levels of use of physician visits and hospital days at least to those of other enrollees (*6,7*).

Because prescription drugs are neither the major component nor an increasing proportion of health care costs, they have not received as much attention as have other components. However, national rates of medicine use are steadily increasing (*8*) with the consequences of increasing not only costs but the risks of drug interactions and adverse reactions.

Because medicines are prescribed at more than 50 percent of the visits of ambulatory patients, according to the National Ambulatory Medical Care Survey (*9*), the effects of HMO enrollment on number of visits to physicians may also be reflected in the use of prescribed medicines. Moreover, HMO physicians may prescribe differently than others. For example, certain therapeutic categories of drugs such as antibiotics (*10*) and tranquilizers (*11,12*) that are considered to be prescribed excessively for the population may be used more conservatively by HMO physicians. Thus HMO enrollment may decrease rates of prescribed medicine use and the associated costs by increasing the quality of prescribing.

In 1971, the District of Columbia enrolled 1,000 Medicaid beneficiaries in a prepaid group practice, Group Health Association, Inc. (GHA) of Washington, D.C. GHA, one of the oldest prepaid plans in the United States, is cooperatively owned by its 80,000 subscriber population. The terms of the contract for this project provided for a broad range of health services that were evaluated over a 3-year period (1971–74), pre- and post-enrollment. In this project, medicine use for the enrollees was evaluated and compared with that for the entire universe of the 160,000 Medicaid beneficiaries in the District of Columbia. Specifically investigated were (*a*) rates of drug prescriptions and physician visits, (*b*) prescriptions by specific drugs and by therapeutic category, (*c*) per capita costs of prescription drugs, and (*d*) quality of drug prescribing.

Methods

In early 1971, approximately 4,000 letters were sent to heads of Medicaid households living in the service area of a GHA outpatient clinic. The letter announced this program of the D.C. Medicaid Agency and invited recipients to enroll. In addition to the continued availability of the full range of title XIX benefits, two special benefits—waiver of eligibility redetermination for the 3 years of the project and free dental care—were offered as inducements to volunteer for the project.

The D.C. Medicaid population consists of those on public assistance (PA) and those who are medically indigent and classified as nonpublic assistance (NPA). Enrollment in GHA required exchange of the Medicaid card, which beneficiaries used to purchase medical services from any health care provider participating in Medicaid, for the GHA card, which entitled participants to obtain services only from the four clinics run by GHA. Those who volunteered for the project were permitted to revert to regular Medicaid status if they so desired at any time during the

study. The voluntary termination rate was less than 3 percent for the entire 22-month study period. These terminations, and the involuntary terminations caused by death, change of residence, or incarceration reduced the GHA study group from 1,000 to 934 persons.

Data on newborns' use of health services were incomplete because of the administrative lag in issuing Medicaid cards, and Medicaid data on use of health services by persons over 65 years were unavailable. Therefore, children under 1 year old and persons over 65 years old were excluded, reducing the Medicaid control group to 142,268 and the study group to 834. The study group consisted of 781 persons in the Aid to Families with Dependent Children Program (AFDC) of whom 257 were NPA, and 53 persons in the Aid to the Permanently and Totally Disabled Program (APTD) of whom 4 were NPA.

The project was designed to compare the study group's use of health services before and after enrollment in GHA and with the use of health services by a control group, the D.C. Medicaid population for the ages corresponding to the study group. In such an experiment, randomization into study and control groups would guard against selection bias. However, in this instance the GHA study group volunteered from a randomly selected population.

A comparison of the GHA and the control populations by age, sex, public aid program category, and eligibility for public assistance revealed that the 834-person study group had an age-sex distribution similar to the control group, consisting mostly of women and children with virtually no men between 22 and 64 years. In both groups, 61 percent were females. There was no significant difference by program category but, by eligibility, the study group had fewer medically indigent enrollees (31 percent were NPA) as compared to 41 percent in the control group. Since per capita expenditure of an NPA recipient was more than twice that of a PA recipient in 1972, the study group, consisting of fewer medically indigent persons, was expected to have somewhat lower rates of health services use than the Medicaid control population.

Changes in rates of use of health services by a Medicaid population enrolled in a prepaid health plan must be assessed over time. When any group changes health care providers, new conditions may be diagnosed which lead to transient increases in the use of services.

Accordingly, the study group's use of health services and medicines was observed at 6 intervals at 12, 18, and 22 months, 3 before and 3 after enrollment in GHA on July 1, 1971; data were annualized for each

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period. The Medicaid control group was observed during fiscal year 1972. Use data were not calculated for the control group for fiscal year 1971 because the District of Columbia Master Eligibility File maintains reliable data only for the most recent 2 years. Therefore, it was not possible to calculate the annualized population at risk. However, use data per recipient (not per annualized person at risk) for the control group showed an increase in their rates of use of physician visits and prescription drugs from fiscal years 1970 to 1972.

Data on use of health services were obtained in the following ways. For the Medicaid control group and the pre-GHA Medicaid study group, all claims were transferred to magnetic tape on a daily basis in the sequence they were received. A computer checked them for eligibility and computed the amount to be paid. Physicians' claims identified the patient, the provider physician by specialty or institution, the service performed, and the date of the service. Pharmacy claims identified the patient, the pharmacy, and the name and quantity of the drug. Because the claims file was maintained by date of payment rather than date of service, some services rendered in fiscal year 1971 were counted in fiscal year 1972 and so on. The D.C. Master Eligibility File determined the denominator (annualized population at risk) for the rates of use for the control group for fiscal year 1972.

For the study group, each service rendered was reported on a punched card which provided the information for the three periods after enrollment. Cost data were obtained from GHA annual membership reports and from data provided the D.C. Government prior to renewal of each year's contract.

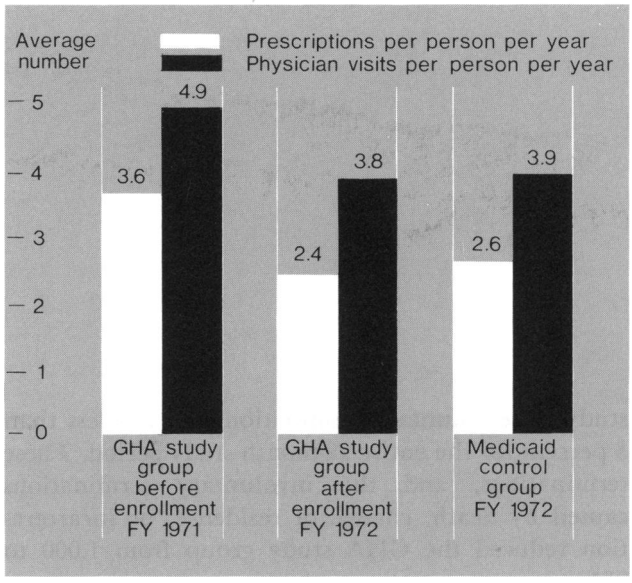
The D.C. Medicaid formulary listed 2,772 drug items. These were collapsed to 1,541 drug names by combining those with the same brand name but of different strength or form. Removal of nonlegend (over-the-counter) drugs from the formulary left 1,197 brand or generic name prescription drugs that were entered into the study. These were categorized into 90 therapeutic categories as derived from "AMA Drug Evaluation" (*13*).

Results

Comparisons of the study and control groups are reported in five areas: (*a*) rates of use of prescription drugs by age and eligibility status, (*b*) physician visit rates, (*c*) costs of drugs, (*d*) rates of use of prescription drugs by therapeutic category and by specific drug, and (*e*) prescribing quality.

As shown in the chart, both the average number of prescribed drugs and physician visits were reduced

Average number of prescriptions obtained and physician visits by AFDC recipients aged 1–64 years 12 months before and after enrollment in GHA and by Medicaid control group



for the AFDC recipients in the GHA study group in the 12 months after, as compared to the 12 months before, enrollment. Further, the study group's rates of use of these services were less after enrollment as compared to the rates of the Medicaid control group. Because it was known that the rate of use of services per user and costs increased in the control group from fiscal years 1970 to 1972, one can infer from the chart that those who volunteered for the study group were higher than average users of services since their fiscal year 1971 prestudy use rates were much higher than the fiscal year 1972 use rates of the controls.

Table 1 shows that, 22 months after enrollment in GHA, the average annualized prescription use rate was 18 percent less (2.4 prescriptions per enrollee per year) than before enrollment (2.9 prescriptions per enrollee per year). The *t*-value differences between before and after periods were -5.88 at 12 months, -6.33 at 18 months, and -3.09 at 24 months. (Values less than -1.96 are required for significance at the .05 level.) Rates were less at 12 months after than before enrollment among all age groups except for the 7 persons aged 55–64 years, and the difference persisted over the 22 months of observation. The most marked reductions were in the two age groups 20–34 years; their rates were nearly halved. Note that while the average rate of use for the 781 AFDC recipients increased from 2.9 at 22 months to 3.6 at 12 months before enrollment, they were stabilized after enrollment (2.4 at 12 and also at 22 months). By 12 months

Table 1. Annualized rates of prescription use per enrollee for the study group at 12, 18, and 22 months before and after enrollment and FY 1972 rates for the Medicaid control group, by age group

Age group (years)	Number of persons	Study group before enrollment			Study group after enrollment			Control group	
		22 months	18 months	12 months	12 months	18 months	22 months	FY 1972	Number of population [1] at risk
1–4	123	1.7	2.0	2.2	1.6	1.2	1.1	2.2	23,716
5–9	157	1.1	1.0	1.1	0.8	0.7	0.8	0.9	27,987
10–14	160	0.9	1.0	1.0	0.9	0.9	1.0	0.7	24,471
15–19	135	1.8	2.1	2.3	2.2	2.2	2.2	2.0	20.411
20–24	46	5.8	7.3	7.8	3.7	3.7	4.1	5.7	11,110
25–34	65	7.9	9.6	9.9	4.8	4.4	4.7	6.0	11,741
35–44	57	7.6	8.8	9.0	6.2	5.9	6.1	5.7	6,802
45–54	31	8.9	10.8	11.3	8.1	7.4	9.1	7.6	3,335
55–64	7	4.4	5.1	0.9	6.6	5.5	7.0	9.0	1,240
Subtotal 1–64 years	781	2.9	3.4	3.6	2.4	2.2	2.4	2.6	130,813
Disabled	53	10.1	12.3	12.7	12.6	11.2	12.5	7.0	11,455

[1] Number of person years.

after enrollment, rates of use of GHA enrollees were 9 percent less than the Medicaid controls—2.4 prescriptions per GHA enrollee compared to 2.6 in the control group.

For the 53 disabled persons (APTD), the pattern of use was similar, with increasing rates in the observed pre-enrollment periods and relatively stable post-enrollment rates. However, the *t*-values of differences in the rates of use in the comparable pre- and post-enrollment time periods were not significant at the .05 level. In all periods, disabled persons in the study group had higher rates of prescription use than disabled persons in the control group.

Comparing the average number of prescriptions dispensed to the study group and to the controls in fiscal year 1972 by eligibility category (NPA and PA) reveals that, as expected, the medically indigent had higher rates of use in both groups (and also among both males and females) than those on public assistance. The average NPA rate of use was lower for the study group (3.9) than for the controls (4.9), particularly for females (4.7 and 6.2 respectively). The average use rates for PAs were identical (2.8) and varied little by sex between the study and control groups.

Because prescriptions derive from physician visits, lower rates for ambulatory physician visits in the study group after enrollment than in the control group may account for the difference in the rates of prescribed medicines. Table 2 shows the average annualized rates of physician visits for the study group 22 months before and after entering into GHA and for the controls for fiscal year 1972. All encounters of ambulatory patients with GHA physicians were counted as physician visits. For persons aged 1–64 years, annual rates for physician encounters were steadily and significantly reduced ($P<.05$ using a two-tail *t*-test) at 12, 18, and 22 months after enrollment in GHA. Rates were reduced 15 percent (4.2 to 3.5 visits) between the 22-month period before enrollment compared to the 22 months afterward. Five of the nine age groups showed a decrease; the most marked decreases were in age groups 20–44 years. Visit rates for the disabled showed little change over the study period.

A comparison of the study group and the control population for the same period, fiscal year 1972, shows that the Medicaid control group had somewhat higher (3.9) rates of encounters than did the study group (3.8) at 12 months after enrollment (table 2). However, there are some notable disparities by age and disabled groups. In the control population, visit rates were higher for persons 20–34 years and lower for persons 35–64 years and for the disabled than in the study group.

Prescription use rates (table 1) dropped 18 percent compared to the 15 percent drop in physician visit rates (table 2) for the 22 months before and after joining GHA. A Pearson product-moment correlation (r^2) between prescribed medicine use rates and physician visit rates using the 12-month study periods, by age groups, was 0.92. This is a high and significant

Table 2. Annualized rates of physician encounters [1] per enrollee for the study group at 12, 18, and 22 months before and after enrollment and FY 1972 rates for the Medicaid control group, by age group

Age group (years)	Number of persons	Study group before enrollment			Study group after enrollment			Control group	
		22 months	18 months	12 months	12 months	18 months	22 months	FY 1972	Number of population [2] at risk
1–4	123	2.4	2.7	2.7	3.3	2.8	2.8	3.0	23,716
5–9	157	1.7	1.8	1.6	1.8	1.7	1.6	1.9	27,987
10–14	160	2.2	2.4	2.4	1.8	1.9	1.8	1.7	24,471
15–19	135	2.8	3.4	3.6	3.8	3.6	3.5	3.7	20,411
20–24	46	9.3	11.2	12.0	4.6	4.3	4.5	8.1	11,110
25–34	65	10.2	12.2	12.0	6.4	5.9	5.7	8.3	11,741
35–44	57	10.1	10.7	11.1	8.5	8.6	8.6	7.2	6,802
45–54	31	8.1	10.1	10.3	10.5	10.1	9.6	7.6	3,335
55–64	7	6.0	6.4	6.7	7.7	7.5	7.2	6.5	1,240
Subtotal 1–64 years	781	4.2	5.0	4.9	3.8	3.6	3.5	3.9	130,813
Disabled	53	10.2	11.8	11.3	11.1	10.3	10.1	6.3	11,455

[1] Includes ambulatory patient encounters for mental and physical conditions at home, office, outpatient department, and emergency room.

[2] Number of person years.

correlation, a perfect correlation being ±1. Thus, the decrease in physician visit rates appears to account for most of the decrease in prescribed medicine use for the enrollees over the study period. The most marked decreases in both prescribed medicine use and physician visit rates were in the same age groups, 20–34 years, which were 95 percent female.

Furthermore, the average number of prescriptions per physician visit decreased from 0.74 at 12 months before enrollment to 0.63 at 12 months after enrollment. The Medicaid controls averaged 0.68 prescriptions per visit during fiscal year 1972.

The decrease in prescription rates was reflected in considerable cost savings for drugs. Total cost for benefits per annualized person at risk per year for comparable benefits in the GHA study group in fiscal year 1972 was $282, of which 5.5 percent was attributable to drugs as compared to $373, of which 7.0 percent was attributable to drugs in the Medicaid control group. The 18 percent difference in the average number of prescriptions per person meant a 41 percent drug cost saving for those enrolled in GHA as compared to the control group. Drug costs per person in fiscal year 1972 for the GHA study group were $15.51, compared to $26.11 for the controls. Part of this difference may be accounted for by a greater propensity for GHA physicians to prescribe nonlegend drugs which are usually cheaper than legend drugs. Of all drugs prescribed, 20.2 percent were nonlegend medications in the GHA study group compared to 17.2 percent in the Medicaid controls.

Factors in addition to the prescribing rates may have had an effect in lowering costs. These include differences in the tendency to prescribe cheaper brand-name drugs, differences in the average quantity of drugs per prescription, differences in prescribing patterns, and differences in the proportion of drugs that were generically prescribed. (In general a drug prescribed generically is cheaper than a drug prescribed by brand name.) No information was available on the quantities of drugs prescribed per prescription, but comparisons were made by therapeutic category, individual drugs, and the proportion of generic drugs prescribed.

In table 3 the GHA study group and the D.C. Medicaid controls are compared by therapeutic category of prescription drugs. The data are combined for all ages and both sexes and for public assistance (PA) and nonpublic assistance (NPA). The top 30 categories accounted for more than 90 percent of medicines for both the study and the control groups. Eight of the top 10 categories in table 3 are the same, but expectorants and antidiabetic agents were prescribed more frequently for the GHA study group and adrenal-corticosteroids and broncho-dilators were prescribed more frequently for the control population. The top three categories are identical: diuretics, mild analgesics, and antianxiety agents. The top 10 categories account for more than half of drugs pre-

scribed for both the GHA and the control populations.

While the rank ordering of drugs for patients by frequency of categories was very similar for the two groups, the rates were different. Rates of drugs dispensed per 1,000 persons by therapeutic category were consistently higher for the controls; for example, the rate of diuretics was 287 among the control population and 257 among the GHA study group per 1,000 persons. Differences persist for the less commonly prescribed drugs among the 10 categories; for example, penicillins were dispensed at the rate of 232 per 1,000 persons for the controls and 152 per 1,000 persons for the study group.

In comparing specific drugs, one would expect much more variation since there are 1,197 specific drugs as compared to 90 categories. GHA physicians may favor a narrower spectrum of brand or generic named drugs in contrast to the more numerous and dispersed physicians giving care to the Medicaid controls. Of the top 10 specific drugs, 6 were the same in both groups. As predicted, a narrower prescribing spectrum was found for GHA physicians, but the difference was not great; 125 drugs accounted for more than 90 percent of drugs prescribed compared to 147 drugs for the control population.

To compare national rates with the rates of use of categories of prescribed drugs for both the study and control groups, some drug categories were collapsed to be consistent with available national data. Rates of use of antibiotics and hormones were lower in the GHA study group while the controls' rates were almost identical with national rates. The study and control groups used cardiovascular (including antihypertensive) and diuretic medicines at similar rates. These rates were higher than national use rates but were consistent with the greater rates of hypertension among the population of the District of Columbia compared with national rates for this condition. Rates for ataraxics, analgesics, and antispasmodics were similar among the three groups. Sedative-hypnotics and vitamins were prescribed at similar rates for study and control groups, but both were lower than national rates.

Despite considerable differences in the age, sex, and race distribution of the D.C. Medicaid population and the U.S. population, the comparison of prescribing suggests that the GHA and control group prescribers differed little from each other and from national prescribers.

It is difficult to assess prescribing quality in the absence of diagnostic information. The reduction in prescribing rates after enrollment in GHA indicates that prepaid group health plans may reduce drug use among their members. Since it is generally felt that prescribing rates are high and costs and risks of medicine use are considerable, lowered rates of use can be considered desirable. Two more direct indicators of quality of prescribing are the proportion of generic drugs prescribed, reflecting cost consciousness, and the proportion of "irrational" drugs prescribed among the study and control groups.

Table 3. Cumulative percentage and number of prescription drugs per 1,000 persons per year dispensed to study and control groups in FY 1972, by therapeutic category

Rank	Study group			D.C. Medicaid control group		
	Therapeutic category [1]	Cumulative percent	Number per 1,000 persons per year	Therapeutic category [2]	Cumulative percent	Number per 1,000 persons per year
1	Diuretics	8.3	257	Diuretics	8.3	287
2	Mild analgesics	15.9	236	Mild analgesics	15.6	251
3	Antianxiety agents	23.5	235	Antianxiety agents	22.8	249
4	Antihypertensives	28.7	162	Penicillins	29.5	232
5	Estrogens, progesterones, and oral contraceptives	33.8	159	Antihistamines	35.7	215
6	Expectorants and inhalants	38.8	153	Estrogens, progesterones, and oral contraceptives	41.5	199
7	Penicillins	43.7	152	Antihypertensives	45.8	148
8	Antihistamines	48.0	132	Tetracyclines	49.8	138
9	Tetracyclines	51.8	118	Adrenal corticosteroids	53.6	129
10	Antidiabetics	55.6	117	Broncho-dilators	57.2	122

[1] 30 categories account for 90 percent of study group's prescriptions.
[2] 31 categories account for 90 percent of control group's prescriptions.

Note: 8 of 10 categories are the same for the study and the contol groups.

With few exceptions, there is little evidence that brand name drugs are more efficacious than their generic equivalents, although generically prescribed drugs are usually less expensive. If the rates that generic drugs were prescribed are used as a measure of cost consciousness, the study and control groups differed little. Ten percent of the study group's prescriptions were generic compared with 8 percent of the control group's when the 50 most frequently prescribed drugs for each group were examined.

According to "AMA Drug Evaluations" (*13*) certain drugs are "irrational" in that they are inappropriate mixtures or they are not recommended for the purposes for which they are prescribed. Of the 50 most frequently prescribed drugs, 11 (22 percent) fell into this category for the GHA study group as compared to 9 (18 percent) for the control population.

Thus, although there was a decrease in rates and costs in the GHA study as compared to the control group, there is no indication that the study group received better quality of prescribing by the yardsticks of generic and irrational drug prescribing rates.

A decrease in rates of use, with resultant savings from enrolling a Medicaid population in a prepaid group plan, is not in itself justification for doing so if patients are not satisfied with the services. Therefore, the reasons persons terminated from the plan during the study period were investigated. The annual termination rate was 7 percent, but only 2.5 percent (62 persons in 22 families) dropped out because of dissatisfaction with convenience, accessibility, or some aspect of the delivery of services. The few voluntary terminations for dissatisfaction indicated a general acceptance and satisfaction with GHA services (*14*).

Discussion

Results in this study indicate that enrollment of a Medicaid population in a prepaid health plan may decrease rates of use of prescribed drugs and costs without an apparent diminution in quality and with high enrollee satisfaction. Rates of medicine use dropped significantly and stabilized for the enrolled study group compared with their former use and with the nonenrolled Medicaid controls. However, the GHA study group was expected to have lower rates of use of services because of the smaller proportion of medically indigent persons (NPAs) as compared to the Medicaid controls. The decrease in rates of medicine use by the study group was limited to the NPAs and was greatest for women aged 20–34.

The decrease in the average number of prescriptions per visit, associated with the decrease in the average number of physician visits, was greatest among women 20–34 years. A drop in the number of pregnancies may have been responsible. Hospital admissions of obstetric patients decreased from 47 during the 12 pre-enrollment months to 27 for the 12 post-enrollment months.

Although the overall volume of prescriptions decreased for the study group, the pattern of therapeutic categories of prescribed drugs differed little from that of the controls. There was more variation, however, in the individual drugs prescribed. The study group received a somewhat narrower spectrum of drugs, as would be expected from a group of physicians sharing a similar work environment, and an in-house pharmacy. The pattern of prescribing for both study and control groups by drug categories was also quite similar to national patterns despite considerable differences in age-sex distributions of the populations. Thus, decreases in costs for the study group after enrollment are largely attributable to volume, rather than drug category, and to an apparently greater cost consciousness by GHA prescribers.

The similarity in prescribing patterns but the difference in volume is borne out by the similar proportions of drugs generically and irrationally prescribed. Without diagnostic information, prescribing quality cannot be precisely assessed. However, more generic prescribing of drugs and less of irrational mixtures would indicate better prescribing quality. GHA physicians did not significantly differ from the control group's prescribers in these measures of quality. However, in the absence of evidence for an increase in prescribing quality, it remains desirable to decrease rates of use and costs.

Results suggest that strategies that reduce ambulatory physician visit rates are likely to reduce medicine use as well. These strategies are likely to be more successful in prepaid group practice HMOs than in medical foundations; prepaid prescription plans alone may increase prescribed medicine use (*15*). Prepaid group practice HMOs, more than other forms of practice, have incentives to keep their enrolled populations both well and satisfied while controlling costs. This study supports the hypothesis that enrolling a Medicaid group in such a plan reduces prescribing costs. Not only are savings observed from the decrease in costs of prescribed medicine but there are uncounted savings in decreasing risks of drug interactions and adverse drug reactions. Although this study does not show better prescribing quality through en-

rollment in a prepaid group plan, the lower rate of prescribing per patient per visit was beneficial if outcomes were not compromised. There are no direct measurements of outcome, but inferences derived from measures of disenrollment suggest that satisfaction with services was favorable.

Experiments such as the institution of drug utilization review and the implementation of drug therapy protocols are currently underway in several prepaid group plans. These efforts are more readily undertaken in prepaid group practices than among other health care providers because common data systems provide an opportunity to review and assess the quality and costs of care. If widely instituted, such programs may increase prescribing quality and decrease costs. Meanwhile, this study suggests that the decrease in medicine use rates and in other services with no decrease in patient satisfaction may justify enrolling welfare groups in prepaid group plans.

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SYNOPSIS

RABIN, DAVID L. (Georgetown University School of Medicine), BUSH, PATRICIA J., and FULLER, NORMAN A.: *Drug prescription rates before and after enrollment of a Medicaid population in an HMO. Public Health Reports, Vol. 93, January–February 1978, pp. 16–23.*

In 1971, 1,000 beneficiaries of Medicaid in the District of Columbia were voluntarily enrolled in a prepaid group practice. Use of health services and drug prescriptions was evaluated before and for 22 months following enrollment. With respect to medicine use, the evaluation reviewed (*a*) prescription and physician visit rates, (*b*) prescriptions by specific drug and therapeutic category, (*c*) costs of prescription drugs per capita, and (*d*) prescribing quality as compared with that for the 160,000 D.C. Medicaid beneficiaries who were the control group.

The enrollees' rates of medicine use and drug costs decreased after enrollment in comparison to their former use and to the nonenrolled Medicaid controls. The decrease was greatest among the medically indigent (persons not on public assistance) and among women aged 20–34 years. A decrease in the average number of prescriptions per visit occurred as well as a decrease in the average number of physician visits. The decrease in annual prescription rates is associated with a decrease in annual physician visit rates. The study group received a somewhat narrower spectrum of drugs than the controls, but therapeutic categories of the drugs varied little between groups and from national patterns of prescribing. There were only small differences between the groups in the proportions of drugs prescribed generically and irrationally (inappropriate mixtures or not recommended for the purpose for which they were prescribed). Decreases in costs are thus largely attributable to volume.

Results suggest that strategies to reduce ambulatory patients' visits to physicians are likely to reduce medicine use. Enrolling a Medicaid group in a prepaid group practice appears to be beneficial in terms of reducing prescribing and other service rates with no apparent diminution in prescribing quality or patient satisfaction with care.