

The Impact of Pharmaceutical Capitation to Primary Medical Groups on the Health Care Expenditures of Medicare HMO Enrollees

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OBJECTIVE: To evaluate the impact of a pharmaceutical capitation payment policy on total health care and pharmaceutical costs in a Medicare health maintenance organization (HMO) enrollee population.

DESIGN: A retrospective analysis of health care encounters and pharmacy claims data during the 12-month period of Jan. 1, 1994–Dec. 31, 1994.

SETTING: Three multispecialty physician medical groups contracted with a health maintenance organization in the Pacific region.

PATIENTS: 22,848 HMO Medicare enrollees 65 years of age or older.

OUTCOME MEASURES: Pharmacy expenditures and total health care costs.

RESULTS: Medicare HMO enrollees with two pharmaceutical capitation physician medical groups (PMGs) had 10% higher mean total health care costs and 20% higher pharmaceutical costs, and a greater percentage of these patients had pharmaceutical expenditures compared to patients in the nonpharmaceutical capitation PMG. The pharmaceutical capitation patients were also 70% more likely to incur higher total health care expenditures and 69% more likely to incur

higher pharmaceutical expenditures. When controlling for age, gender, and severity of illness, pharmaceutical capitation patients had 14% higher total health costs than noncapitated patients (an additional \$376 per patient per year) and 29% higher pharmaceutical costs (\$110 per patient per year).

CONCLUSIONS: This study's findings parallel those of other studies that show that curtailing access to medications via cost-control mechanisms can adversely affect other health costs and increase total health care utilization. Pharmaceutical expenditures remain the only costs that are not yet totally capitated. Managed care organizations considering pharmaceutical capitation must recognize that such programs may result in increased overall costs. Individual capitation of health care components may not be the best approach to controlling costs and assuring quality of care.

KEYWORDS: Pharmaceutical capitation, Health care expenditures, HMO, Medicare

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During the last two decades, state Medicaid programs, health care organizations, and pharmacy benefit managers have administered policies that restrict coverage, increase cost-sharing, and implement capitation reimbursement for pharmaceuticals.¹ These policies have been implemented to reduce pharmacy costs and patient over-utilization, despite the fact that drug expenditures as a percentage of total health care costs decreased from 25% to 9% between 1950 and 1992, and several clinical and pharmacoeconomic studies have demonstrated the cost-effectiveness of drug therapy in treatment of acute and chronic illnesses.^{2,3} Furthermore, previous studies have shown that policies diminishing access to appropriate medications may ultimately result in unintended detrimental effects, such as increased utilization of costly institutional and physician care or decreased patient quality of care and life.^{1,4} This evidence raises concerns that pharmaceutical cost-containment programs may be frequently implemented without empirical evidence of their efficacy and relationship to total health care costs.⁵

A capitation payment is defined as a fixed sum of money paid annually to a health care provider to ensure care of an enrollee.⁶ Capitation programs for medical care, pharmaceuticals, and hospital care have grown throughout the U.S. due to employer mandates to control the growth in health care costs.⁶ Theoretically, capitation has three distinct advantages over a fee-for-service payment plan: 1) it provides increased incentives to use preventive care; 2) it offers a stimulus for health

care systems to become more coordinated; and 3) it has the capacity to decrease bias toward institutional care.^{7,8} Capitation also may promote continuity and consistency of care by assigning responsibility for care to a designated primary care provider.⁶ A potential problem with capitation is its tendency to encourage under-usage in order to decrease the economic exposure of the provider.⁶

The purpose of this study is to evaluate the impact of a pharmaceutical capitation payment policy on total health care and pharmaceutical costs in a Medicare health maintenance organization (HMO) enrollee population. The HMO implemented a pharmaceutical capitation program with two primary medical groups serving its Medicare enrollees. This study was conducted on Medicare enrollees receiving health care coverage during 1994 from an insurance company (the plan) through an HMO risk model. The plan received payment from the Health Care Financing Administration (HCFA) equal to 95% of HCFAs estimate of the average amount that HCFA spends in the fee-for-service sector for Medicare patients residing in that county.⁹ The plan then capitated multispecialty physician medical groups (PMGs) and hospitals for the provision of medical services to the enrollees. If the cost of ambulatory or institutional medical care exceeded the capitated amount, then the PMG or hospital was responsible for the surplus costs.

To encourage Medicare-eligible patients to enroll with the HMO, the plan offered them prescription drug coverage. However, the program included a benefit cap under which the enrollee was responsible for pharmaceutical payments in excess of \$750. Thus, unlike the ambulatory and inpatient portions of care, enrollees assumed the financial risk for medication costs if they exceeded the benefit amount.

An internal pharmacy benefit management (PBM) department oversaw the administration of the program. The main objectives of the department were formulary management, claims processing, and contracting with pharmacies. The majority of PMGs chose the plan's pharmacies for their Medicare enrollees. Patients enrolled with these PMGs had access to a multitude of privately owned and chain pharmacies that had contracted with the PBM. PMGs also engaged in contractual pharmaceutical capitation agreements with the plan for the pharmacy benefits of the Medicare HMO enrollees. In this case, the PMG received a capitated payment for the pharmaceuticals and was responsible for expenditures that exceeded the capitation rate but were below the patient benefit cap. The enrollee was still responsible for charges exceeding the patient level benefit cap of \$750.

Very little, if any, research literature exists on the impact of pharmaceutical capitation on medical groups. A few articles address capitation payments to pharmacies, but these assess generic product use and ingredient costs rather than total health care costs and outcomes.^{10,11} Yesalis et al.¹⁰ examined changes in the rates of generic substitution when the traditional fee-for-service reimbursement system was replaced with a capitation payment for pharmaceuticals in Iowa's Medicaid

program. They found increased generic substitution and decreased ingredient cost in the capitated counties.¹⁰ An expanded capitation program, however, did not demonstrate differences in substitution or drug cost savings per generic substitution.¹¹

METHODS

Study Population

The study population included Medicare beneficiaries 65 years or older enrolled in the plan's Medicare HMO risk program who received care at the three PMGs contracted by the plan. Study data were collected for a 12-month period (January 1, 1994–December 31, 1994) and included only those continuously enrolled with the PMGs throughout.

The two capitation primary medical groups, PMG-A and PMG-B, (the capitation PMGs) received a pharmaceutical capitation payment from the plan for Medicare HMO enrollees. To manage drug costs, these two PMGs restricted their enrollees to three pharmacies. Because prescriptions for these patients were processed similarly, data from the two capitation PMGs were combined. A third medical group, PMG-C, did not receive pharmaceutical capitation payments for the plan's Medicare HMO members. Patients in PMG-C received ambulatory and mail-order pharmacy benefits through a network of pharmacies contracted by the internal PBM. All three medical groups were subject to a nonrestrictive drug formulary established by the plan; however, the capitated PMGs were more focused on applying formulary restrictions to control drug costs. Other reimbursement arrangements for the three medical groups were identical—that is, all three medical groups were capitated for outpatient medical services and for hospital expenditures.

Study Design

This study is a retrospective analysis. The hypotheses are that drug capitation payments to PMGs would not influence total health care costs and would reduce pharmaceutical costs. A payors' perspective (the plan's perspective) was taken for measurement of all costs for this investigation. The patients at PMG-A and PMG-B constitute the experimental groups because they were capitated for pharmaceuticals. Patients from PMG-C form the comparison group because their PMG was not capitated for pharmaceuticals and patients were free to use a network of pharmacies.

Definition of Costs

Total health care costs were defined as the sum of ambulatory, inpatient, and pharmacy expenditures per enrollee. Proxies were utilized for the measurement of ambulatory and inpatient expenditures because the medical groups in this capitated ambulatory environment did not report costs to the plan and costs reported in the hospital claims data were

Table 1. Enrollee Demographics, Health Care Utilization and Chronic Disease Scores

	Control	Capitated
	N=6166	N=9825
Age years (Mean±Standard Deviation [SD])	74±6	76±7
Gender (% Females)	55	58**
Health Care Utilization		
<i>Ambulatory Services</i>		
Percentage of enrollees	87.4	81.1**
No. of encounters/enrollee (Mean±SD)	8±8	9±11
<i>Pharmacy services</i>		
Percentage of enrollees	80.9	84.2**
No. of RXs/enrollee (Mean±SD)	13±14	11±11**
<i>Inpatient services</i>		
Percentage of enrollees	12.1	13.7
No. of admissions (Mean±SD) (of enrollees who utilized inpatient services)	1.6±1.0	1.7±1.0*
Length of stay in days (Mean±SD) (of enrollees who utilized inpatient services)	3.85±4.04	4.65±5.21**
Health Care Costs		
<i>Total health care costs</i>		
Percentage of enrollees	91.3	94.4
Total health care costs (Mean±SD)	\$2400±7584	\$2863±8347
<i>Pharmacy Costs</i>		
Percentage of enrollees	79.8	84.2
Pharmacy costs (Mean±SD)	\$347±290	\$382±292
Chronic disease score (Mean±SD)	2.20±2.32	2.03±2.18**

**p value<0.001; *p value<0.05

unreliable. For purposes of this study, ambulatory medical expenditure per enrollee (including lab and x-rays) was equal to the average cost of an outpatient physician visit multiplied by the number of outpatient encounters experienced by an enrollee during the study period. The average cost for an outpatient office visit was obtained from the Health Insurance Association of America's *Source Book of Health Insurance Data, 1994*.² The cost used for a physician office visit was \$73 (average fee for an office visit with a new patient for a general or family practice physician in the Pacific region). Aggregate hospitalization costs were computed by multiplying the length of stay for each inpatient visit by the average cost per day of hospitalization for an HMO Medicare patient, which was estimated at \$1,230.¹² The pharmacy costs were estimated by totaling the amount paid by the plan for each prescription dispensed to an HMO Medicare enrollee. All costs were converted to 1996 dollars using the Consumer Price Index from the Bureau of Labor Statistics.

Chronic Diseases and Score

The American Hospital Formulary System (AHFS) prescription descriptors were used to identify the presence of various chronic diseases. The prevalence of six chronic diseases—pulmonary disorder, cardiovascular disorder, diabetes mellitus, glaucoma, hyperlipidemic disorder, and gastrointestinal disorder—was compared between the experimental and control groups. A chronic disease score was calculated from the automated drug data base using methods proposed by Von Korff et al. and Clark and colleagues.^{13,14} The chronic disease scores were utilized to control for severity of illness between the experimental and control group patients.

Data Analyses

Univariate analyses (i.e., chi-square and student t-test) were conducted to investigate potential differences between the patients in the experimental and the control groups with regard to patient demographics (age and gender), health care utilization (number of ambulatory encounters), severity of illness (both chronic disease scores and specific disease states identified through the AHFS categories), and physician prescribing style (for oral sulfonylureas and calcium channel blockers). Parametric tests and multivariate analyses were conducted using normally distributed data sets. The distribution of total health care costs and pharmacy expenditures was normalized through a natural log transformation.

A two-part model was used because 10% of the population did not use health care benefits and 20% did not use pharmacy benefits.¹⁵ The first equation of the two-part model was a logistic regression for which the dependent variable consisted of a dichotomous parameter (1=patient procured total health care or pharmacy costs during the study period). The second equation is a linear model for which the dependent variable consisted of the natural log of total health care costs or the natural log of pharmacy expenditures for those patients who had health care costs during the study interval. The two equations were then combined to determine the influence of each variable in the equation over the entire enrolled population.

The independent variables for both models include age, gender, chronic disease score, and a dummy variable to identify the medical groups (capitation PMGs or not). In all significance tests (univariate and multiple regression models), the alpha level is 0.05. The variance inflation factor (VIF) and Pearson's r statistic were used to test for multicollinearity. All statistical tests were estimated using the SPSS statistical software program.¹⁶

RESULTS

The three PMGs had a total enrollment of 22,848 Medicare HMO members (>65 years of age); 70% (15,991) of the members were continuously enrolled. PMG-C had 6,166 enrollees (39%); 9,825 patients (61%) were enrolled in the pharmaceutical capitation PMGs.

Table 2. Logistic Regressions: Probability of Incurring Health Expenditures

Independent Variables	Probability of Incurring Total Health Care Expenditures		Probability of Incurring Pharmacy Expenditures	
	Alpha Coefficient (Standard Error)	Odds Ratio (Confidence Interval)	Alpha Coefficient (Standard Error)	Odds Ratio (Confidence Interval)
Age (in years)	0.0108* (0.0052)	1.01 (1.01–1.23)	-0.017** (0.0039)	0.98 (0.78–0.91)
Gender (1=Female)	0.1541* (0.0674)	1.17 (1.02–1.33)	0.049 (0.0518)	1.05 (0.95–1.16)
Chronic disease score	4.55** (0.4874)	94.7 (36–245)	4.25** (0.2128)	70.2 (46–106)
Pharmacy capitation (1=yes)	0.5282** (0.0681)	1.70 (1.48–1.94)	0.524** (0.0533)	1.69 (1.52–1.87)

**p value<0.001; *p value<0.05

As noted in Table 1, a greater percentage of the capitation PMG enrollees had health care or pharmacy expenditures during the study period and these patients had higher mean total health care expenditures. Two disease categories (oral sulfonylureas for diabetes and the use of calcium channel blockers for cardiovascular disease) were further compared to investigate potential differences in physician prescribing styles by medical group. A statistically significant difference existed in the proportion of patients with diabetes (6.5% for the pharmaceutical capitation PMGs and 7.5% for the comparison group, $p<0.05$), but no differences were found in prescribing of first generation oral sulfonylureas in Type 2 diabetes mellitus patients. Although there were no differences in the proportion of the patient populations using calcium channel blockers, pharmaceutical capitation patients were less likely to receive verapamil (21% vs. 31%, $p<0.001$) and more likely to receive diltiazem (41% vs. 34%, $p<0.05$). Of the six chronic diseases that were compared, only the prevalence of diabetes differed between the two groups (6.5% for pharmaceutical capitation PMGs and 7.5% for the comparison group, $p<0.05$).

Regression Analysis

The strongest factor in whether an enrollee had any health care expenditures during the study interval was chronic disease score (see Table 2). The pharmaceutical capitation variable also was associated with an increased chance of incurring total health care and pharmaceutical expenditures. Enrollees receiving care at pharmaceutical capitation PMGs had a 70% greater chance of incurring health expenditures or a 69% greater chance of incurring pharmaceutical expenditures than the patients receiving care at PMG-C.

The ordinary least square estimates illustrate that patients in PMGs who receive pharmacy capitation have a 10% elevation in total health care costs and a 20% elevation in pharmaceutical costs (see Table 3). The impact of the

pharmaceutical capitation variables in the entire population using combined logit/linear equations is calculated at 14% for total health care costs and 29% for total pharmaceutical costs (see Table 4). This results in a \$376 average per enrollee increase in total costs (with mean total health care costs of \$2,685 per person) and a \$110 average per enrollee increase in the pharmaceutical costs (mean pharmaceutical costs of \$379 per person) over the entire enrolled population.

DISCUSSION

This study investigated the consequences of pharmaceutical capitation to PMGs in a Medicare HMO environment. Our findings, controlling for age, gender, and severity of illness, document an elevation in total health care costs of 14% per enrollee (\$376) and increased pharmaceutical expenditures of 29% (\$110 per enrollee) in PMGs that received a pharmaceutical capitation payment. Elevated pharmaceutical expenditures in the capitated group may have resulted from physician focus on prescribing based on pharmacy cost rather than optimal pharmacotherapy. This approach would perhaps result in

Table 3. Ordinary Least Square Regression: Total Health Care and Pharmacy Expenditures

Independent Variables	Total Health Care Beta Coefficient (SE)	Pharmacy Beta Coefficient (SE)
Age (in years)	0.0174** (0.001531)	-0.0068** (0.001694)
Gender (1=Female)	-0.0260 (0.20011)	0.1168* (0.021858)
Chronic disease score	0.2461** (0.004432)	0.3460** (0.004894)
Pharmacy capitation (1=pharmacy capitation PMG)	0.1004** (0.20740)	0.1987** (0.022766)
F-Value	824 (signif F=0.0000)	1254 (signif F=0.0000)
Adjusted R ²	0.181	0.275

**p value<0.001; *p value<0.05

Table 4. Combined Logistic and OLS Models

Independent Variables	Model A—Total Health Care Expenditures	Model B—Pharmacy Expenditures
	Calculated Coefficient (Variance)	Calculated Coefficient (Variance)
Age (in years)	0.0181** (0.0000025)	-0.0098** (0.0000033)
Gender (1=Female)	-0.0154 (0.0004215)	0.1253** (0.00056)
Chronic disease score	0.5557** (0.001119)	1.089** (0.00141)
Pharmacy capitation (1=pharmacy capitation PMG)	0.1364** (0.000452)	0.29022** (0.000605)

***p* value<0.001

more drug switching or lower drug use initially but overall achieve poorer outcomes, resulting in more visits and higher total health care costs.

To validate the database, the authors compared some study variables to nationally available Medicare data. The demographic, health care utilization, and chronic disease data from this study population are very similar to the general Medicare HMO population. For example, in 1992, Hill et al.¹⁷ reported that 89% of Medicare HMO enrollees visited a physician at least once a year, similar to the percentage of patients in both the comparison (87%) and the pharmaceutical capitation PMGs (81%) who had an outpatient medical encounter during the study period. Furthermore, Moeller and Mathiowetz¹⁵ found that 82% of elderly Medicare beneficiaries in 1987 received at least one prescription per year, a finding corresponding to that found in this investigation (81% of comparison and 84% of the pharmaceutical capitation PMG enrollees used their pharmacy benefit package during the study period). Finally, the results suggest that the study and the national populations may have had similar disease conditions; for example, 5.6% of the comparison group and 5.9% of the capitation population suffered from glaucoma, compared to 6% of all individuals over the age of 65.¹⁹

Despite the similarities, in some respects the study population is quite different from average Medicare patients. The average length of hospital stay for both groups (3.85 days for the comparison group and 4.65 days for the pharmaceutical capitation population) was significantly lower than the state averages for Medicare patients (6.4 days per discharge in 1993).¹² The lower average length of stay may be a byproduct of healthier Medicare patients enrolled with HMOs compared to the fee-for-service sector or better utilization management of hospital bed days in HMOs.²⁰ The reduction in hospital length of stay may possibly reflect a combination of these two factors.

The percentage of elderly patients with chronic diseases such as diabetes mellitus or cardiovascular disease in the study patient population also is dissimilar to the national standards. According to the American Diabetes Association, the prevalence of diabetes among persons 65 years or older is approximately

12%,²¹ while the estimated percentages of patients with diabetes mellitus Type 1 and 2 in the comparison group was 7.5% and in the pharmaceutical capitation group was 6.5%. This disparity may reflect the fact that estimation of diabetes prevalence for this study was based upon patients treated with pharmacotherapy; it did not include patients who may have been treated through other methods such as diet and exercise.

Furthermore, in 1995, the American Heart Association stated that approximately 25% of Americans have one or more forms of cardiovascular disease.²²

In contrast, 36% of comparison group patients and 34% of pharmaceutical capitation enrollees had cardiovascular disease during the study interval. However, the larger prevalence calculated from this study population may be due to the inclusion of heart failure and arrhythmia as cardiovascular disorders, categories not included in the American Heart Association estimates.²²

Limitations

Several weaknesses associated with this study limit the generalizability of the findings. Retrospective study design limits the ability to determine whether the pharmaceutical capitation program or variability in the study population or physician groups was the cause of changes in costs and utilization. The authors controlled for some population variability such as age, gender, and severity of illness using multivariate methods; the patients lived in similar geographic locations; and the physician groups practiced in geographic proximity and appeared to be similar. However, costs and utilization may have been affected by physician practice patterns or patient variability undetected by our analyses. The study did not include data on race and socioeconomic status of the study populations, factors that also may have caused a differential impact on health resource use.

The use of claims (encounter) data for determination of the use of health care services may be problematic. First, claims data may be unreliable in a capitated environment because PMGs receiving a capitation payment from the plan often do not report service detail. Although we estimated the cost of office visits and hospital use from these data, some patients may have received more or less intensive services during a visit, resulting in an inaccurate cost estimate. A more uniform measure for inpatient resource utilization, such as Diagnosis-Related Groups, could have improved confidence in the cost estimates. The use of procedural terminology (CPT-4) categories could have resulted in improved accuracy for ambulatory utilization. However, inaccurate estimation of costs would likely have affected both control and experimental groups equally, as all groups were capitated for medical services.

There is no reason to suspect that claims data from any of the three medical groups was more or less reliable. Second, capitated medical groups may under-report encounter data to the plan, which would result in underestimation of total costs. Our analysis of the availability of encounter data did not seem to support lack of data as a problem with any of the three groups in the study. Third, pharmacy claims data for prescription medications that cost less than the copayment were not reported, so pharmaceutical costs may have been underestimated. Finally, data on miscellaneous health care expenditures such as long-term or home health care were not available.

CONCLUSIONS

Despite these weaknesses, the current study provides the first empirical investigation of the consequences of a pharmaceutical capitation policy in a Medicare HMO enrollee population. Furthermore, the findings parallel the results from other studies in which policies that curtail access to medications via cost-control mechanisms were found to potentially adversely affect other segments of health care or total health care utilization.^{4,23,24} Decision makers who devise such policies must recognize that reductions in one segment of health care may induce cost increases in other domains.²⁵ Most managed care plans are now seeking capitated contracts for medical services with independent practice associations/networks of physicians. Physician groups are at risk for increased office visits and in some cases increased hospital and ER/urgent care utilization. Contracts that capitate medical groups for pharmaceuticals may place these groups at risk for higher costs overall.

Pharmaceutical expenditures in the ambulatory setting are of major concern to managed care payors. With the trend toward capitation of medical and hospital services, pharmaceutical costs remain the only expenditure not completely capitated and place both insurer and physician at risk for a reduced bottom line. Although pharmaceutical management is often subcontracted to PBM companies, payors and employers remain concerned that ingredient costs must be reduced. Managed care organizations implementing policies such as pharmaceutical capitation must determine how these processes affect medical groups, hospitals, total health care utilization, and overall patient outcomes. Finally, if managed care organizations consider capitation as the mechanism to control expenditures, then capitation of individual components of health care may not be the best policy.

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