

# Quality and Cost Evaluation of a Medical Financial Assistance Program

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## Abstract

**Background:** Kaiser Permanente Colorado has been responding to the financial challenges of its members by providing a medical financial assistance (MFA) program since 1992. However, there have been no evaluations of the effect of this program on members' use of health services or their health outcomes.

**Methods:** A prospective cohort study of 308 MFA program members who were enrolled between May 16, 2008, and May 16, 2009, examined changes in their use of health services, costs, and self-reported physical and mental health after enrollment in the MFA program. Use of services was analyzed with multiple regression, and costs of services with generalized linear models.

**Results:** MFA increased members' access to health services. There were no changes in physical or mental health status. For each health care visit before the MFA award, patients used the health care system 0.23 visits less. The MFA amount was not associated with an increase or decrease in use. There was no significant difference in total overall cost. Hospital costs were lower, but costs for clinic visits, pharmacy services, phone calls, and radiology services were significantly higher, resulting in service cost neutrality, possibly because financial barriers before MFA award led to accumulated demand for services.

**Conclusions:** Use of services decreased after MFA was received. There was no significant change in total service cost. MFA improved members' ability to pay for medical services and increased their satisfaction with health services.

## Introduction

The cost of health care in the US has increased disproportionately to spending on goods and other services. In 1970, total health care spending averaged about \$356 per person (\$1147 per person when adjusted for inflation). In 2010, health care spending averaged \$6697 per person. Much of this expense has been shifted to the patient. For those living below the poverty level, the increase in out-of-pocket expenses is especially burdensome. Health care costs consumed 26% of their income in 1996 and 33% in 2003.<sup>1</sup> Employment is no guarantee of health care coverage. In 2004, almost half (46%) of the uninsured worked full-time, and 46% worked part-time or for only a few months of the year.<sup>2</sup>

As costs and affordability challenges increase, more individuals are self-restricting treatment for their health conditions. Cost-related underuse, substitution, and discontinuation of medication have resulted in higher rates of Emergency Department (ED) visits, increases in nonelective medical and psychiatric

hospitalizations, and decreased overall health status.<sup>3,4</sup> Those with chronic conditions such as diabetes or hypertension are particularly sensitive to treatment disruption, poor medication adherence, and adverse health outcomes.

Since 1992, Kaiser Permanente Colorado (KPCO) has been responding to the financial challenges of its members by providing a medical financial assistance (MFA) program. As part of KPCO's larger community benefit investment portfolio, this program provides free or deeply discounted access to the appropriate level of health care for patients with limited financial resources. The right level of health care for these patients often includes greater use of planned, coordinated outpatient services, instead of preventable, fragmented, and often more costly emergency services.

There have been no evaluations of the effectiveness of this program, formerly called KP Helps, on members' use of health services or their health outcomes. Changes to the structure of the program and its name, now MFA, were implemented in April 2008. These changes included elimination of a cap on assistance. Whereas the previous annual cap totaled \$500, KPCO members who qualified for financial assistance from April 2008 to April 2009 received annual coverage of all copayments and deductibles for all medically necessary health-related services (excluding optical services, over-the-counter medications, and nonformulary prescriptions). KPCO members were eligible for MFA if their income was at or below 300% of the federal poverty level (\$10,400 in 2008, and \$10,830 in 2009).<sup>5</sup>

The lack of data available for capturing the effectiveness of the previous program, in conjunction with the program changes, provided an ideal opportunity to prospectively evaluate the impact of the program on members' use of health care services, medication adherence, and physical and mental health status. Our specific question regarding MFA was whether the increase in assistance would remove financial barriers to preventive and primary care services and prescription medications, and in turn, decrease use of emergency and other hospital services that might otherwise result from delays in obtaining care. Such a shift from higher to lower intensity care might also result in lower overall costs of care, since emergency and hospital services are more costly than primary care services. An additional question was whether increased access to primary care services and prescriptions might reduce the risk of delays in necessary care and subsequent adverse outcomes, thereby improving members' functional status in different domains (eg, physical, emotional, and work-related functions).

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We hypothesized that increased financial assistance to KP Helps participants would

- reduce hospital admissions and ED visits
- reduce overall cost of care
- improve self-reported physical and mental health status
- reduce work time lost because of illness
- increase medication use
- counteract the self-reported impact of financial limitations on use of health care services.

## Methods

We contacted 393 MFA program recipients by mail, and 308 recipients consented to participate in this prospective cohort study between May 16, 2008, and May 16, 2009.

The study was approved by KPCO's institutional review board. Two weeks after each member's MFA enrollment, the study team mailed them a recruitment letter; a physical and mental health status survey; an opt-out postcard; and a self-addressed, stamped envelope. A second survey was mailed 12 months later to each member who had returned a baseline survey.

The primary outcomes for this study were changes in use of health services, including prescriptions, related costs, and self-reported physical and mental health status 12 months after enrollment in the MFA program.

## Physical and Mental Health Status Survey

The survey assessed self-reported physical and mental health status, time missed at work, medication adherence, and impact of financial limitations on use of health care services. The survey consisted of 8 demographic questions and 13 items dealing with physical and mental health status. It included 10 questions about behaviors to save money on health care services or medication. Likert scale responses ranged from "very easy" to "very difficult," "never" to "always," "excellent" to "poor," or "yes" to "no," depending on the question. The survey was mailed to MFA participants at baseline and 12 months after program enrollment.

## Use of Health Care Services

Most health care use and demographic data were obtained from our Virtual Data Warehouse. Use measures comprised several categories: inpatient, ED, primary care (family practice, internal medicine, or primary care), durable medical equipment, mental health, oncology, and the remaining specialty departments. Other measures used as covariates included sex, age, race, Quan score (a measure of comorbidity burden), total prior use, socioeconomic status (SES), MFA for prescriptions, MFA for weight management, MFA for optical services, type of Health Plan coverage, and total amount of MFA awarded.

## Costs

Cost data were obtained from KPCO's Decision Support System, which distributes total costs for all internal KPCO services from each cost center that then populate the General Ledger. These costs in the General Ledger are then allocated among the different cost centers by all encounter procedure codes and their frequencies for each cost center. Costs are based on the fourth edition of Current Procedural Terminology intensity-weighted

procedure codes (for a more detailed description, see Ritzwoller et al).<sup>6</sup> The Decision Support System provides pre-MFA and post-MFA costs for 12 cost centers for all MFA participants (including ambulatory surgery, ambulance, durable medical equipment, emergency room, home health, hospital inpatient services, hospital outpatient services, clinic visits, laboratory, pharmacy, phone calls to clinical staff, and radiology). Total cost was the sum of costs of individual services.

## Socioeconomic Status

Low SES was defined as enrollment in the KPCO MFA program and residence in a neighborhood in which at least 20% of residents were below the federal poverty level or in an area where less than 25% graduated from high school. The designated value of the SES variable was "Yes" when these criteria were met, based on census data in the Virtual Data Warehouse.

## Data Analyses

Descriptive statistics included age, sex, race, diagnosis (including behavioral health), Health Plan coverage, comorbidity burden as measured by Quan score,<sup>7</sup> and Medicare membership. Differences between responses on pre-MFA and post-MFA surveys were tested using the Wilcoxon signed rank test or McNemar test.

Linear regression was used, with baseline use as a covariate for the 12 months before MFA award, and change in use as the outcome. To adjust for the numerous covariates, two submodels were used: one included demographics and socioeconomic status; and the other included type and amount of MFA award, type of medical coverage, and comorbidities. Initial covariates included sex, age, race, Quan score for comorbidities, total prior use, SES, MFA for prescriptions, MFA for weight management, type of Health Plan coverage, and amount of MFA awarded. The final submodels were then combined, and the final models were created after further backward selection.

Cost data were analyzed using a two-part model to account for zero-inflated data (a lot of zero costs and a long tail representing few but very high costs). The first part of the model addressed members who had costs associated with each cost center in question. Repeated measures SAS Genmod procedures were used to measure differences in pre-MFA and post-MFA costs. A gamma distribution with a log link was used to normalize the skewed data. The second part then addressed whether there were differences in the number of members whose cost for each cost center was zero. Multivariate logistic regression was used for those members with no costs. Unadjusted models for each cost center were run, as well as models with demographic and benefit covariates.

## Results Surveys

Three hundred and ninety-three surveys were mailed to MFA recipients, and 308 recipients consented to study participation (78.3%). One hundred and seventy of the 308 members returned the baseline survey (43.3%). At 12 months, 170 surveys were mailed, of which 107 (40%) were returned. One hundred and seven enrollees completed both surveys. There were few differences between survey responders who returned both surveys and those who completed only the baseline survey. Compared

with those who completed both surveys, those who returned only the baseline survey were significantly younger and the proportion who were married was higher, but the proportion who were widowed or divorced was lower. Significantly more nonresponders were working (results not shown).

Table 1 summarizes demographic, health, and Health Plan data from the baseline surveys. Sixty-four percent were women, and the average age was 61 years. A substantial proportion (28%) had low SES. Additionally, patients had an average Quan score of 4 (range, 0–14), which indicates a relatively high burden of disease.<sup>7</sup>

Table 1. Descriptive measures for 308 participants		Table 1. Descriptive measures for 308 participants	
Variable	Value	Variable	Value
<b>Sex, n (%)</b>		<b>Marital status, n (%)</b>	
Female	198 (64.3)	Married	55 (17.9)
Male	110 (35.7)	Widowed	23 (7.5)
<b>Mean age in years (SD)</b>		Divorced	37 (12)
	61 (14.74)	Separated	6 (1.9)
<b>Hispanic, n (%)</b>		Never married	9 (2.9)
No	249 (80.8)	Other	4 (1.3)
Yes	59 (19.2)	Missing/no response	174 (56.5)
<b>Race, n (%)</b>		<b>Mean MFA benefit in \$ (SD)</b>	
White	200 (64.9)		2223.63 (468)
Black	24 (7.8)	<b>MFA for optical, n (%)</b>	
Mixed	4 (1.3)	No	230 (74.7)
Other	34 (11)	Yes	78 (25.3)
Missing/no response	46 (14.9)	<b>MFA for outpatient services, n (%)</b>	
<b>Low socioeconomic status, n (%)</b>		No	11 (3.6)
No	219 (71.1)	Yes	297 (96.4)
Yes	85 (27.6)	<b>MFA for prescriptions, n (%)</b>	
Missing/unknown	4 (1.3)	No	48 (15.6)
<b>Education, n (%)</b>		Yes	260 (84.4)
8th grade or less	9 (2.9)	<b>MFA for weight management, n (%)</b>	
Some high school	13 (4.2)	No	303 (98.4)
High school diploma, GED	44 (14.3)	Yes	5 (1.6)
Some college, 2-year degree	46 (14.9)	<b>KPCO product, n (%)</b>	
4-year college degree	16 (5.2)	DCO	27 (8.8)
More than 4-year college degree	6 (1.9)	HDHP	2 (0.6)
Missing/no response	174 (56.5)	HMO	279 (90.6)
<b>Income in \$, n (%)</b>		<b>Medicare, n (%)</b>	
10,000 or less	14 (4.5)	No	125 (40.6)
10,001 - 15,000	36 (11.7)	Yes	183 (59.4)
15,001 - 20,000	26 (8.4)	<b>Medicaid, n (%)</b>	
20,001 - 25,000	27 (8.8)	No	308 (100)
25,001 - 30,000	11 (3.6)	Yes	0 (0)
30,001 - 35,000	6 (1.9)	<b>Five most frequent chronic conditions making up the Quan score, n (%)</b>	
35,001 - 40,000	5 (1.6)	Diabetes, complicated and uncomplicated	184 (59.7)
40,001 - higher	5 (1.6)	Hypertension	188 (61.6)
Missing/no response	178 (57.8)	Chronic pulmonary disease	112 (36.7)
<b>Homeowner, n (%)</b>		Depression	102 (33.4)
Rent	60 (19.5)	Fluid and electrolyte imbalance	71 (23.3)
Own	62 (20.1)	<b>Quan score (SD)</b>	
Other	11 (3.6)		4 (3.13)
Missing/no response	175 (56.8)		
<b>Number in household, n (%)</b>			
1	54 (17.5)		
2	51 (16.6)		
3	11 (3.6)		
4 or more	13 (4.2)		
Missing/no response	179 (58.1)		

DCO = deductible coinsurance plan; GED = general equivalency diploma; HDHP = high deductible health plan; HMO = health maintenance organization plan; KPCO = Kaiser Permanente Colorado; MFA = medical financial assistance; SD = standard deviation.

<b>Table 2. Baseline and follow-up survey responses for those completing both surveys (n = 107)</b>				
<b>Question</b>	<b>Response</b>	<b>Baseline, %</b>	<b>Follow-up, %</b>	<b>p</b>
Ease/difficulty of paying for prescriptions in past 12 months? (n = 101)	Very easy/somewhat easy	13.9	55.4	<0.001 <sup>a</sup>
	Neither easy nor difficult	22.8	7.9	
	Somewhat difficult/very difficult	63.4	36.6	
Ease/difficulty of paying for other health care in past 12 months? (n = 103)	Very easy/somewhat easy	6.8	51.5	<0.001 <sup>a</sup>
	Neither easy nor difficult	7.8	7.8	
	Somewhat difficult/very difficult	85.4	40.8	
What were the changes made to save money in past 12 months? (n varied for each item)	Did not see physician	61.2	33.7	<0.001 <sup>b</sup>
	Did not get other health care services	67.7	37.4	<0.001 <sup>b</sup>
	Used less medication than prescribed	45.8	27.1	0.003 <sup>b</sup>
	Stopped a medication	20.8	17.7	0.54 <sup>b</sup>
	Did not fill prescription for new medication	29.5	11.6	0.001 <sup>b</sup>
	Switched to a different medication	22.9	12.5	0.04 <sup>b</sup>
	Bought medications outside US	4.2	5.2	0.65 <sup>b</sup>
	Took someone else's medication	8.3	6.2	0.40 <sup>b</sup>
	Got free medication samples	10.9	8.7	0.56 <sup>b</sup>
	Used mail order	54.2	44.8	0.07 <sup>b</sup>
For those employed in past 4 weeks, hours of work missed because of illness in past 4 weeks (mean, SD)		22.8 (37.7)	24.4 (46.2)	0.38 <sup>a</sup>
How often did you decide not to do enjoyable activities? (n = 102)	Never	13.7	30.4	0.002 <sup>a</sup>
	Sometimes	31.4	39.2	
	Usually	38.2	14.7	
	Always	16.7	15.7	
How often did you decide not to get other medical care? (n = 100)	Never	37.0	52.0	0.005 <sup>a</sup>
	Sometimes	37.0	35.0	
	Usually	14.0	5.0	
	Always	12.0	8.0	
How often did you borrow money or get help paying for health care? (n = 101)	Never	29.7	41.6	0.17 <sup>a</sup>
	Sometimes	38.6	33.7	
	Usually	20.8	10.9	
	Always	10.9	13.9	
How often did you have difficulty paying rent or other bills? (n = 105)	Never	19.1	42.9	<0.001 <sup>a</sup>
	Sometimes	46.7	37.1	
	Usually	12.4	9.5	
	Always	21.9	10.5	
Were you unemployed during the past 12 months? (n = 107)	Yes	68.2	67.3	0.86 <sup>b</sup>
	No	31.8	32.7	
Were you unemployed during the past 4 weeks? (n = 107)	Yes	72.9	75.7	0.57 <sup>b</sup>
	No	27.1	24.3	
During past 4 weeks, how much did health problems affect productivity at work? (n = 40)	No effect	10.0	20.0	0.48 <sup>a</sup>
	Some effect	17.5	15.0	
	Moderate effect	27.5	20.0	
	Significant effect	45.0	45.0	
Rate your physical health (n = 103)	Excellent/very good/good	35.0	39.8	0.31 <sup>a</sup>
	Fair/poor	65.0	60.2	
Rate your mental health (n = 102)	Excellent/very good/good	72.5	73.5	0.82 <sup>a</sup>
	Fair/poor	27.5	26.5	
Average number of workdays missed because of illness in past 12 months (n = 13)		16.5	8.8	0.08 <sup>a</sup>
Average number of work hours missed because of illness in past 4 weeks (n = 10)		23.7	26.2	0.38 <sup>a</sup>

<sup>a</sup> Wilcoxon signed rank test was used for items with paired ordinal responses.

<sup>b</sup> McNemar test was used for items with paired nominal responses.

SD = standard deviation.

Table 2 summarizes responses to each survey item. There was a significant decrease in the percentage of members reporting health-related financial difficulties. Members also reported they were more likely to see a doctor, access other health services, and use medication as prescribed. Members reported greater ability to pay their rent on the follow-up survey. In contrast, there were no differences in self-reported physical or mental health or work days or work hours missed (although the number of respondents for this latter question was only 10, indicating that many respondents were unemployed or retired).

### Use of Health Care Services

Three hundred and eight MFA enrollees agreed to examination of their use of health care services. Univariate comparisons

between pre-MFA and post-MFA demographic variables and other covariates showed that the median number of health care visits for members reporting low SES increased, as it did for members reporting higher SES following MFA ( $p = 0.0004$ , data not shown). The final regression model (Table 3) for total change in use included the following variables: total prior use, SES, MFA for prescriptions, MFA for weight management, Health Plan type, and MFA award amount. Patients who received prescription MFA had 4.23 fewer total visits after enrollment. Patients significantly increased their use after MFA enrollment, after adjustment for all covariates ( $p < 0.0001$ ). For example, a patient who only had one encounter the year preceding MFA, received \$2500 or more in MFA benefits, had low SES, and had the High Deductible Health

Plan had approximately 16 more visits the year after MFA enrollment.

The final regression model for pharmacy use (Table 4) included total prior prescription counts; Quan score; SES status; and whether the MFA award was for prescriptions, outpatient services, or weight management. After adjustment for all covariates, the number of prescription fills was significantly higher for the year after MFA enrollment, compared with the preceding year ( $p = 0.0139$ ). For example, a patient who had 6 prescription fills the year before MFA, had MFA for prescriptions, had low SES, and had a Quan score  $\leq 2$ , had on average approximately 17 more prescription fills the year after MFA. After adjusting for the other covariates, patients who received an MFA award specifically for prescriptions were dis-

**Table 3. Covariate parameter estimates for health care use**

Variable	Parameter estimate	Standard error	t	Pr >  t  <sup>a</sup>	95% Confidence limits
Intercept	10.38046	2.61460	3.97		5.23504, 15.52588
Total prior use	-0.22759	0.04547	-5.01	<0.0001	-0.31708, -0.13811
MFA $\leq$ \$2000 (ref)					
MFA \$2000-\$2500	2.79867	1.66474	1.68	0.0938	-0.47747, 6.07481
MFA $\geq$ \$2500	5.63883	3.46577	1.63	0.1048	-1.18166, 12.45931
MFA prescription	-4.22503	2.15580	-1.96	0.0509	-8.46756, 0.01750
MFA weight management	13.54436	6.16621	2.20	0.0288	1.40952, 25.67919
DCO	-5.80122	2.76759	-2.10	0.0369	-11.24771, -0.35472
HDHP Plan	0.82411	9.68684	0.09	0.9323	-18.23917, 19.88740
High SES (ref)					
Low SES	0.63426	1.75559	0.36	0.7181	-2.82066, 4.08918
Unknown SES	28.43189	6.93136	4.10	<0.0001	14.79126, 42.07251

<sup>a</sup> Multivariate regression.

DCO = deductible coinsurance plan; HDHP = high deductible health plan; MFA = medical financial assistance; SES = socioeconomic status.

**Table 4. Covariate parameter estimates for pharmacy use**

Variable	Parameter estimate	Standard error	t	Pr >  t  <sup>a</sup>	95% Confidence limits
Intercept	26.82667	8.34576	3.21	0.0015	10.40257, 43.25076
Prior pharmacy use	-0.11364	0.04593	-2.47	0.0139	-0.20404, -0.02324
MFA prescription	12.24700	3.52409	3.48	0.0006	5.31175, 19.18225
MFA outpatient	-8.88379	6.79965	-1.31	0.1924	-22.26520, 4.49762
MFA weight management	-13.93630	10.02370	-1.39	0.1655	-33.66250, 5.78990
High SES (ref)					
Low SES	-2.47941	2.84860	-0.87	0.3848	-8.08534, 3.12652
Unknown SES	22.15071	11.12630	1.99	0.0474	0.25464, 44.04679
Quan score $\geq$ 6 (ref)					
Quan score $\leq$ 2	-13.02273	3.61941	-3.60	0.0004	-20.14557, -5.89989
Quan score 3-5	-8.62401	3.28729	-2.62	0.0092	-15.09325, -2.15477

<sup>a</sup> Multivariate regression.

MFA = medical financial assistance; SES = socioeconomic status.

**Prescription use also increased for those with the greatest number of comorbidities ...**

pensed an average of 12.25 more fills after the MFA award than before ( $p = 0.0006$ , 95% confidence interval [CI] 5.31 to 19.18).

Patients with a Quan score  $< 2$  were dispensed an average of 13.02 fewer fills after the MFA award than those with a Quan score  $\geq 6$  ( $p = 0.0004$ , 95% CI, -20.15 to -5.9). Additionally, patients with a Quan score between 3 and 5 were dispensed 8.62 fewer fills after the MFA award than those with a Quan score  $\geq 6$  ( $p = 0.0092$ , 95% CI, -15.09 to -2.15). After MFA enrollment, patients with an unknown SES were dispensed 22.15 more fills than those with high SES ( $p = 0.045$ , 95% CI, 0.25 to 44.05). Those with low SES did have different levels of prescription use than those who did not have a low SES ( $p = 0.38$ , 95% CI, -8.09 to 3.13).

**Costs**

Univariate comparison of costs before and after MFA enrollment showed that only Quan score was influenced by comorbidity. A higher score, reflecting greater comorbidity, was associated with higher costs during both the pre-MFA period and the post-MFA period ( $p \leq 0.001$ , results not shown).

Table 5 shows the average costs for the pre-MFA and post-MFA periods for each of the 12 types of services, as well as for

average total cost. Overall, there was no significant difference in total cost before and after MFA enrollment, and there were no demographic or Health Plan covariates that influenced the cost analyses for any service. There were significant cost differences for some services. Hospital costs were \$13,299 less during the postenrollment period. Costs for clinic visits, pharmacy services, phone calls, and radiology services were significantly higher after MFA program enrollment. This suggests appreciable shifts in cost between types of services. There were no significant differences in the unadjusted or covariate models for the presence of costs before and following MFA program enrollment for the second part of the 2-part cost model.

**Discussion**

Findings from these analyses, adjusted for demographics, Health Plan, and other covariates, demonstrated that MFA enrollees did change their overall use of services after receiving an MFA award. A number of covariates significantly influenced the rates of use, including the type of MFA award (eg, pharmacy versus weight management), SES, type of KPCO Health Plan, prior use, and the amount awarded.

Adjusted prescription use was higher for the postenrollment period when MFA award for prescriptions was included in the model. This is not surprising, because

the additional funds provided specifically for prescriptions would increase demand for prescriptions that perhaps had not been filled before the MFA. Prescription use also increased for those with the greatest number of comorbidities (Quan score  $> 6$ ). The tendency for greater prescription use by those with increased comorbidities is well known and suggests an appropriate use of the MFA award.<sup>8,9</sup>

There were no significant differences in total cost before or following enrollment in the MFA program. There was a significant decrease in hospital costs following enrollment in the program, but it was offset by increases in costs of primary care, pharmacy, and radiology (including mammograms) services, which may suggest an increase in some preventive services. Although the savings in hospitalization costs were considerable, they were outweighed by the combined increases for other services. This pattern of cost shifting from higher to lower intensity services is encouraging in that it reflects the goal of the MFA program to increase access to primary care, pharmacy, and preventive services, and in turn reduce the need for inpatient and emergency services.

These results demonstrate a commonly reported pattern that occurs when members have not been using health services because of limited access or financial resources. Other investigators have

**Table 5. Twelve-month unadjusted average costs in US dollars before and after enrollment in medical financial assistance program**

Cost Center	Before			After			Cost Difference <sup>a</sup>	p $\leq$ <sup>b</sup>
	Mean $\pm$ SD	Median	n	Mean $\pm$ SD	Median	n		
Total Cost <sup>c</sup>	24,209 $\pm$ 27,287	13,572	230	26,527 $\pm$ 28,391	17,336	231	-2318	0.17
Ambulatory surgery	3587 $\pm$ 4832	1928	67	4652 $\pm$ 6565	2813	79	-1065	0.25
Ambulance	1293 $\pm$ 1471	804	62	980 $\pm$ 1395	615	56	313	0.23
DME	1023 $\pm$ 1880	343	95	881 $\pm$ 1251	360	104	142	0.48
Emergency room	3430 $\pm$ 5150	360	104	2673 $\pm$ 2979	1426	100	757	0.14
Home health	2209 $\pm$ 2781	1206	38	2710 $\pm$ 3922	1204	43	-501	0.28
Hospital, inpatient	16,532 $\pm$ 17,692	10,836	77	3233 $\pm$ 4548	1826	84	13,299	<0.0001
Hospital, outpatient	4203 $\pm$ 10,876	515	102	6155 $\pm$ 14,873	716	124	-1952	0.11
Clinic	9182 $\pm$ 12,234	5782	228	12,583 $\pm$ 18,472	7602	230	-3401	<0.0001
Laboratory	576 $\pm$ 606	379	216	617 $\pm$ 805	381	224	-41	0.34
Pharmacy	2648 $\pm$ 4455	1337	225	3476 $\pm$ 5193	1892	230	-828	0.003
Phone calls	85 $\pm$ 136	39	45	217 $\pm$ 380	97	135	-132	0.003
Radiology	1184 $\pm$ 1449	651	182	1724 $\pm$ 3347	757	194	-240	0.03

<sup>a</sup> Positive cost difference equals cost savings for postenrollment period.

<sup>b</sup>  $p$  values were determined using repeated measures, Genmod models with a gamma distribution and log link. Zero costs were not included.

<sup>c</sup> Cost differences for all cost centers will not equal the total cost difference because these are average costs based on different numbers of members. DME = durable medical equipment; SD = standard deviation.

found an increased demand for health care services following enrollment in a health plan compared to those already enrolled in the plan. Martin et al<sup>10</sup> found an increased demand for outpatient and emergency visits but also found increases in the number of hospitalizations (unlike this study) and hospital stays after members had been uninsured for one year.

Franks et al<sup>11</sup> found that members new to an insurance plan were more likely to visit a physician and had higher testing expenditures but fewer hospitalizations (as in this study) and a greater risk of not receiving a mammogram after enrolling in an insurance plan. Differences in populations, types of Health Plan, and other factors may account for some of these differences with our results. There are a number of reasons certain costs and use might increase once patients gain access. These include lack of medical care before receiving the MFA award and KPCO's emphasis on preventive care, which may have led to an initial increase in use of preventive services.

Although our results demonstrate no differences in overall use or cost, there were significant findings regarding attitudes toward costs and access to health care. Most participants found it easier to pay for health care services and prescriptions after enrollment in the MFA program.

The percentage of participants who usually or always avoided getting medical care or paying rent or other bills, or who had to change how they managed money significantly decreased after MFA enrollment (Table 2). There was a nonsignificant increase in the percentage of participants who reported excellent, very good, or good physical health. This may indicate that 12 months is an insufficient length of time for participants with multiple chronic conditions to experience self-perceived improvements in physical and mental health. The percentage of those who reported fair or poor physical or mental health decreased after MFA, perhaps because of difficulty in coordinating care to significantly change the physical and/or mental health of participants whose disease burden is already severe. Finally, the number of work days missed because of illness decreased by an average of approximately 5 days over the preceding 12 months, but this finding was based on only 13 employed respon-

dents and was not statistically significant. Replication of this finding in a larger cohort of employed MFA recipients would be of interest to employers, particularly those unable to afford more comprehensive health care coverage (or any coverage) for their employees.

### Limitations

Measuring comorbidity burden was somewhat problematic because all comorbidity burden measures depend on some kind of health service use. Typically, this population uses health services less than other KPCO members; hence, any measure of burden must take this into account. The proposed explanation that increased costs for clinic visits, pharmacy services, phone calls, and radiology services are caused by significant previously unmet needs, although supported by other studies, needs to be tested further in a managed care environment. One important question that was not examined because of time constraints is, at what point is this pent-up demand for primary and specialty care and radiology and pharmacy services sufficiently relieved to prevent more expensive ED services and hospitalizations? Finally, when dealing with a population with multiple health and psychosocial needs, 12 months may not be sufficient to observe significant changes in physical or mental health. Analysis over a longer follow-up period would be instructive. Differences between the number of individuals enrolled in the MFA program (N = 308) and the number that completed the baseline (n = 170) and follow-up (n = 107) surveys may have resulted in bias, particularly when comparing use and costs based on survey responses.

### Conclusions

An evaluation of an MFA program within a managed care organization demonstrated significant reductions in ED and inpatient hospital costs. However, increased use and costs of primary care, durable medical equipment, and pharmacy services offset these cost reductions. Although the program was cost neutral, the shift toward primary care services and away from inpatient services reflects the goal of the MFA program to increase access to preventive services that may have the potential to reduce use of more intensive

services. Moreover, participants reported improved ability to pay for medical services that decreased potentially harmful strategies (eg, not seeing a clinician, and avoiding necessary medication) related to limited access to health care. ♦

### Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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