Knowledge of Cost Sharing and Decisions to Seek Care

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Objectives: To assess knowledge and understanding of cost-sharing responsibilities and whether that knowledge and understanding influence actual and perceived use of healthcare services.

Study Design: A 3000-person random sample was drawn from a state employee database in Massachusetts.

Methods: Survey responses and claims analyses were used to assess knowledge of cost sharing and healthcare utilization over a 3-year study period. Trend models and logistic regression were used.

Results: Nearly two-thirds of respondents (62%) accurately recalled the percentage of premium that they paid; 67% recalled the correct copayment for a doctor's visit. Younger, less educated, and lower-income employees recalled their copayment more accurately than older, more educated, higher-income colleagues. Half of the respondents accurately reported the copayment amount for an emergency department visit. Greater knowledge of overall healthcare costs was positively associated with higher utilization of office visits (P <.01). Knowledge of specific office visit and emergency department copayments had no significant relationship with utilization. Self-reported delays and reductions in utilization were much more pronounced than the actual claims data indicated.

Conclusions: Employees were reasonably well informed about their cost-sharing responsibilities. Knowledge of costs was associated with higher office visit utilization during the study period. Respondents who were more knowledgeable about their specific copayments for office visits and emergency department visits also were more likely to behave in what appeared to be a more cost-efficient manner, with more office visits and fewer emergency department visits.

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Persistent rising healthcare premiums have induced employers to consider cost sharing as a tool for controlling unnecessary, costly utilization of healthcare services. Paying for some of the costs of their care may make consumers more aware of the high cost of healthcare services, thus encouraging more efficient and appropriate use of services. For example, establishing a higher level of cost sharing for emergency department (ED) visits and a lower level of cost sharing for office visits may motivate patients with minor healthcare needs to seek care in a doctor's office instead of the more costly ED. However, this tool assumes people have accurate knowledge and understand their cost-sharing responsibilities. Misunderstanding about the amount of cost sharing could modify the actual effect of this incentive. It is important to learn more about employee understanding of cost-sharing responsibilities and how this influences behavior in a healthcare environment where changes to cost-sharing features are routinely used.

There is relatively little information about patient knowledge of cost sharing and its influence on utilization of healthcare services. Existing studies provide evidence that patients are aware of basic information such as whether they have any health insurance, but suggest that patients have limited knowledge about specific details regarding their coverage.[1-5] We found only a few studies by a single research team that considered specific knowledge of cost-sharing responsibilities by patients and whether that knowledge influenced utilization.[6,7] In these studies, the authors found that about three-fourths of patients were aware of their copayments for physician visits and pharmaceuticals, but only one-third knew what their copayment was for an ED visit. Moreover, the perceived ED copayment amount was strongly associated with avoidance of or delays in self-reported emergency care. Thus, the authors concluded that this lack of understanding could have an important impact on utilization. However, the authors assessed only self-reported utilization and did not address the inaccuracies associated with self-reported behavior relative to claims-based utilization. In addition, the authors addressed only whether patients altered their decisions to seek ED care because of the financial incentive and did not consider the impact on utilization of other healthcare services such as physician office visits.

Another recent study examined the effect of a high-

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deductible health insurance plan on ED utilization and found a 25% reduction in low-severity repeat ED visits but no significant decline in first visits to the ED.[8] This finding provides some indication that as people become aware of their degree of cost sharing they may be less willing to return to the ED for conditions that can be treated in a less costly fashion.

Take-Away Points

Survey responses and claims analyses were used to assess knowledge of cost sharing and healthcare utilization among state employees in Massachusetts.

- About two-thirds of respondents accurately recalled the percentage of premium that they paid and the correct copayment for a doctor's visit.
- Knowledge of costs was associated with higher office visit utilization during the study period.
- Self-reported delays and reductions in utilization were much more pronounced than the actual claims data indicated.

No literature could be found that assessed knowledge of cost sharing in an environment of increasing costs. In the past, economists have found that consumers do respond to increases in cost sharing by decreasing care. But the most cited research study, the RAND Health Insurance Experiment, was a randomized trial whereby consumers were educated about their cost-sharing responsibilities. An observational study is necessary to examine whether people understand their cost-sharing responsibilities and whether those that do, respond differently to these incentives.

Our study focused on a time period when copayments were significantly increased. Analysis using both claims and self-reported survey data was conducted to better understand the differences between these 2 data approaches.

METHODS

Study Sample

The source population included 73,476 persons who were employed by the state of Massachusetts for 3 years or more, under age 65 years at the start of the study period, and continuously enrolled in a health plan. A random sample of 3000 subjects was selected to participate in a mail survey administered by the Center for Survey Research at the University of Massachusetts/Boston Campus in June and July 2005. Nearly half of the 3000 employees selected (1487) responded to the survey.

Claims data were drawn for the surveyed employees and their dependents who had not changed health plans during the 3-year study period (July 2002-June 2005); 165 respondents (11.1%) were deleted from the sample because they had changed health plans during the study period. A final sample of 3220, including 1322 survey respondents and their dependents or family members, was used for this analysis.

Data

The survey included questions on sociodemographic variables such as income, level of education, and age. Respondents were asked questions to determine their knowledge and understanding of their cost-sharing responsibilities for various healthcare services. They also were asked to respond to questions regarding changes they made in utilization in response to recent increases in cost sharing.

A comprehensive database of all medical claims for each employee and his or her dependents was used for this study. Claims for outpatient physician and ED visits were the focus of the study reported here.

Analysis

This analysis merged responses from the survey respondents with claims data for the same members (and their dependents) and was used to evaluate how understanding of cost sharing interacts with changes in cost sharing with respect to both self-reported and actual utilization. A control group was not available, as all plans for this state employee population increased cost sharing for these visits at the same time. For the models assessing changes in actual utilization, a trend model of monthly periodicity was used to assess these effects as follows:

$$UTIL_i = \alpha + \beta copay + \delta_p + \lambda_t + \tau + \varepsilon_i$$

UTIL is a measure of monthly utilization for person i; α is a constant term; copay is the copayment for the particular type of service; τ represents the independent variables of age, income, education, and health status; and δ_p and λ_t are the plan and month fixed effects, respectively. In this model the effect of copayment change is identified by β, which measures the change in utilization relative to the actual change in copayment.

The models were estimated using generalized estimating equation methods with an exchangeable correlation using a Gaussian family and an identity-link function. Analysis of respondent self-reported delays or reductions in utilization was modeled by using logistic regression. The models also were run adjusting for seasonality, but no evidence of seasonality was found in these data.

An index for knowledge of cost sharing was developed using responses from 4 survey questions (see the **eAppendix**, available at **www.ajmc.com**). Each question was scored 0 or 1 for an incorrect or correct response, respectively. Because

of small frequencies for some of the cells, the index was developed as follows: if all responses were incorrect, the respondent scored a 0 on the knowledge index; respondents earned a score of 1 if they answered 1 or 2 questions correctly and a score of 2 for answering 3 or 4 questions correctly. Respondents who chose to skip a question or responded by selecting the "don't know" category scored a 0 for that question.

Health status was controlled in 2 ways for this analysis. First, the Charlson Comorbidity Index was used to categorize sample members into 3 groupings: 0, 1, and 2 or more.[9] The potential range of values for this index is 0 to 37. For purposes of this study, the index was constructed using all inpatient and outpatient claims data for all 3 study years. Members also were classified as either having or not having a chronic disease for these analyses. Combing through all 3 years of inpatient and outpatient claims, we determined whether members had any claim indicating 1 or more of the following 7 chronic disease diagnoses: hypertension, hypercholesterolemia, asthma, diabetes, arthritis, affective disorders, or gastritis.

The age of sample members for the base year, 2002, was used. Age was available from the eligibility record and was centered around zero by subtracting the average age of 32.8 years from each member's age. This technique often is used to make regression coefficients easier to interpret.[10,11]

Respondents reported their income on the survey in $15,000 increments, which were then compressed into the following groupings: <$45,000, $45,000 to $75,000, $75,001to $105,000, and >$105,000. When income was missing from the survey, it was imputed using average income from the 2002 Census data for the sample member's zip code. Income was missing from 4% of the survey respondents.

Education level was reported on the survey instrument and categorized as follows: less than a college education, college education, and more than a college education. When education was missing for the respondent, it was imputed from the spouse's education (also collected on the survey instrument) when available.

RESULTS

Table 1 compares members from the source population with the study population on available demographic characteristics. The survey respondents (and their dependents)

Table 1. Characteristics of Respondents Compared With All Employees

Characteristic	All Employees	Respondents	*P*
No. of individuals	115,006	3220	
Age category, %			
0-18 y	35.1	32.3	
19-34 y	14.1	11.0	
35-64 y	50.6	56.5	
65+ y	0.2	0.2	
Mean age, y (SD)	30.6 (18.1)	32.8 (17.9)	<.0001
Mean income, $ (SD)	48,511 (15,717)	49,876 (15,115)	<.0001
Charlson Comorbidity Index category, %			
0	72.6	70.6	
1	15.6	16.3	
2+	11.8	13.1	
Mean Charlson Comorbidity Index category (SD)	0.57 (1.28)	0.62 (1.30)	<.05
Education, %			
Less than college	NA	14.0	
College	NA	46.7	
More than college	NA	39.3	
Knowledge index			
0	NA	9.2	
1	NA	74.2	
2	NA	16.6	

NA indicates not available.

Table 2. Mean Utilization 2002-2004

Type of Service	Mean per Person per Month (SD)	Mean per Family per Month (SD)
Emergency department visit	0.017 (0.14)	0.041 (0.23)
Office visit	0.429 (1.06)	1.06 (1.81)

were slightly older than the population from which they were drawn. The survey sample was otherwise remarkably similar to the overall population.

The survey captured additional descriptive data on the sample that were not available for the overall state employee population, which also are presented in Table 1. The sample was well educated, with most respondents reporting having had some college education (86%). Only 14% reported a high school education or less and 39.3% reported having completed some graduate work.

The majority of members were categorized as having some understanding of their cost-sharing responsibilities (74.2%) by having answered 1 or 2 of the 4 cost-sharing questions accurately. Almost half of the members (46.8%) were classified as having at least 1 chronic disease from the analysis of claims. Table 2 displays the average utilization per person and per family per month for the services assessed over the study period. This population had a greater-than-average ED visit rate, with about 20% visiting the ED in the year prior to the survey compared with the Northeast average of 13.1%.[12]

Table 3 presents the results of the basic trend models conducted. The coefficient for copayment was not significant for either of the services examined. That is, higher copayments did not result in any significant declines in actual utilization for these respondents.

Increasing income was associated with fewer ED visits. People with worse health status were more likely to use both outpatient office visits and the ED.

To answer questions about whether knowledge of costs played a significant role regarding decisions to seek care, several different analyses were conducted. First, the knowledge index was used to measure whether understanding of costs influenced utilization. Second, an analysis was conducted to assess the effect on utilization of specific knowledge of office visit and ED copayments. For this analysis, both actual utilization changes and self-reported reductions and delays in office visit utilization were assessed. Finally, analyses were conducted to determine whether people with greater knowledge of cost sharing were more or less responsive to increases in cost sharing.

The first analysis showed that greater knowledge of costs was positively associated with higher utilization of office visits (Table 3). No significant relationship was found between knowledge of specific copayment and either actual office visit (P = .06) or ED utilization (P = .74). Table 4 reports results regarding self-reported utilization. Employees were more likely to report a skipped or delayed office visit with higher actual copayment amounts. Knowledge of copayment amounts also was related to self-reported delays and reductions in care. For this analysis, knowledge of copayment amounts was categorized as (1) underestimation of the copayment amount, (2) correct identification of the copayment amount, and (3) overestimation of the copayment amount, as was done by Hsu and colleagues.[6] Both accurate estimation and overestimation of the office visit copayment were associated with significantly higher self-reports of delayed and skipped office visits (Table 4).

When assessing whether people with greater knowledge of overall cost sharing were more or less likely to respond to increases, we found that people with no knowledge of costs were more likely to have reduced their office visit utilization when cost sharing was increased (Table 5).

DISCUSSION

Employers increase cost sharing to attempt to constrain both their share of expenditures and overall healthcare cost growth through increased consumer cost-consciousness. However, there is relatively little information about patient knowledge of cost sharing and its influence on utilization of healthcare services. If people are not knowledgeable about their cost-sharing responsibility, how can they be expected to respond by adjusting their utilization via reducing it or directing it toward less costly options?

Two studies by a single research team found perceived copayment to be strongly associated with avoidance of or delays in self-reported emergency care.[6,7] The authors, however, only assessed self-reported avoidance or delays in utilization and did not assess actual changes in utilization of these services.

Our study did not provide any evidence that use of increased copayments affected actual utilization. There were no significant decreases in utilization of the examined services when copayments were increased. Conflicting results were found, however, when assessing *self-reported* reductions or delays in office visit utilization. Respondents were more likely to report a skipped or delayed office visit with higher actual

Table 3. Results From Trend Models

Independent Variable	Office Visits	Emergency Department Visits
Copayment	–0.0021	0.0005
Age	–0.0007	–0.0002[a]
Education		
Less than college	Referent	Referent
College	–0.0356	–0.0005
More than college	0.0233	–0.0018
Income, $		
<45,000	Referent	Referent
45,000-75,000	0.0101	–0.0073[a]
75,001-105,000	–0.0066	–0.0066[b]
>105,000	0.0108	–0.0081[a]
Knowledge index		
None	Referent	Referent
Some	0.0812[b]	0.0027
A lot	0.0923[b]	0.0006
Charlson Comorbidity Index category		
0	Referent	Referent
1	0.1328[a]	0.0080[a]
2	0.4527[a]	0.0118[a]
Chronic disease	0.1577[a]	0.0065[a]

[a] $P < 0.001$.
[b] $P < 0.01$.

copayment amounts. There are at least 2 possible explanations for these conflicting findings: (1) the self-reports of behavior regarding healthcare utilization were not accurate or (2) respondents did reduce visits (through delays and avoidance), but the underlying trends in utilization confounded the estimations.

Previous studies indicated that patients tended to underestimate office visit utilization compared with what was recorded in claims data, while they slightly overestimated ED visits.[13-15] For this study, respondents were not asked to recall the number of actual visits but whether they reduced or delayed appointments because of cost. No studies could be found that assessed whether self-reports of this behavior were accurate, but it is possible that people with higher cost-sharing amounts were more likely to recall delays and avoidance of visits because of cost than people with lower levels of cost sharing.

It also is possible that we were not able to discern between underlying trends in utilization and the responses due to increases in copayments. However, comparisons with statewide trends were made to assess this question further, using available data from the State's Division of Health Care Finance and Policy. Statewide a slight *decrease* in hospital outpatient utilization was observed between 2003 and 2004, but this data set only included hospital outpatient data, so the results were not directly comparable to the office visit utilization assessed here.[16]

When assessing employee knowledge of cost-sharing responsibilities, we found that nearly two-thirds (62%) of respondents accurately recalled the percentage of premium that they paid, and 67% correctly recalled the copayment for a doctor's visit. Interestingly, employees were more likely to overstate their share of the premium (21.7%) than understate it (8.5%) and were more likely to understate their office visit copayment (25.4%) than overstate it (7.1%). Approximately half of the respondents were aware of the copayment amount for an ED visit (54.9%), which is somewhat higher than the 33% reported by Hsu and colleagues.[6] Of those who incorrectly reported the ED copayment amount, many (32.9%) overstated the amount by $25 or more.

A significant positive relationship was found between the knowledge index and actual utilization. That is, knowledge of costs was associated with more frequent utilization of office visits. A similar relationship was found for ED visits, although it was not significant. This could be evidence of endogeneity in the models; that is, people who used more services were more likely to know their copayments. However, respondents who were more knowledgeable about their specific copayments for office and ED visits also were more likely to behave in what appeared to be a cost-conscious manner by utilizing more office visits and using the ED less frequently, although these results only approached statistical significance ($P = .09$).

It could be that people who are very knowledgeable about healthcare costs also are more engaged in their overall healthcare and thus use more care, as indicated by higher office visit utilization. Moreover, people who use more outpatient care are likely to have a regular and trusted source for that care and thus do not seek ED care as often.

Table 4. Knowledge of Costs and Self-Reported Changes in Utilization[a]

Independent Variable	Odds Ratio (95% Confidence Interval)		
	Delay Office Visit	Skip Office Visit	Delay or Skip Office Visit
Actual copayment	1.13[b] (1.07, 1.19)	1.06 (0.99, 1.13)	1.13[b] (1.07, 1.20)
Knowledge of office copayment			
Underestimate	Referent	Referent	Referent
Accurate	1.81[b] (1.12, 2.92)	2.52[b] (1.21, 5.22)	1.87[b] (1.16, 3.02)
Overestimate	2.36[b] (1.38, 4.03)	3.26[b] (1.49, 7.12)	2.47[b] (1.45, 4.21)

[a]Models included adjustment for age, income, education, chronic disease, and Charlson Comorbidity Index category.
[b]$P < .05$.

However, these results also could be used to postulate a class of sophisticated consumers who understand that they are paying a significant amount of money in premium contributions each month and that the relative cost of the copayment is negligible. The results assessing the relationship between the degree of cost knowledge and the responses to increases in cost sharing also would support this conclusion. That analysis found that when copayments were increased, people with no knowledge of costs significantly reduced their office visit utilization, whereas those with some or a lot of knowledge did not significantly reduce their office visit utilization. Thus, it seems possible that employees more knowledgeable about overall costs were able to process complex information and make what could be construed as rational decisions. Alternatively, it could be that people were unable to process the complex cost-sharing changes used here and decided to remain with their prior utilization patterns, evidence of the status quo bias discussed by Samuelson and Zeckhauser.[17]

Hsu and colleagues found that knowledge of copayment amount was strongly associated with self-reported behavior change.[6] They found that people who believed their copayment to be higher were more likely to report a *reduction* in their ED utilization. We found similar effects for outpatient office visits. That is, self-reported reductions and delays in office visits were much more frequent than the actual claims data indicated. In fact, both accurate estimation and overestimation of the office visit copayment were associated with significantly higher self-reported reductions and delays in office visits.

Several limitations of this analysis are worth mentioning. One concern is endogeneity. That is, it is difficult to discern whether persons who use more services become more knowledgeable about their costs, or whether persons who are knowledgeable about their costs use more services. Although an instrumental variable approach could be useful in this regard, there were no obvious available variables to test. Furthermore, our study showed that knowledge of specific copayment was not related to utilization, which suggests that endogeneity may not be a serious problem.

Adverse selection or retention also could be a problem. Consumers who are more likely to use services also are more likely to select and remain in plans that require them to pay less out of pocket, all else being equal. As a result, comparing insured consumers who have different levels of cost sharing is likely to produce biased estimates. Because this study relied on people continuously enrolled in health plans over a 3-year period, this bias was reduced somewhat; however, it remains a concern. These analyses were adjusted for health status by controlling for people who have a chronic disease or not and by using the Charlson Comorbidity Index. However, it is likely that health status differences still existed across plan types in this sample, as the measurement of chronic disease was not particularly refined and it was difficult to completely control for this factor.

The population studied here may not be representative of the employed population of the United States. People who

Table 5. Knowledge of Costs and Responses to Increases[a]

Type of Service	Level of Knowledge About Costs[b]		
	No Knowledge	Some Knowledge	A Lot of Knowledge
Office visits	–0.03 (0.03)[c]	0.0004 (0.89)	–0.01 (0.27)
Emergency department visits	0.0001 (0.99)	0.001 (0.90)	0.001 (0.96)

[a]Trend models were adjusted for actual copayment, age, education, income, Charlson Comorbidity Index category, and chronic disease.
[b]Units are presented as mean per member per month (SD).
[c]$P < .05$.

choose government jobs may differ from the general population in ways that make our results not broadly applicable. For example, state employees may value healthcare benefits more than others and thus may respond less to increases in copayments than people who value healthcare services less. There is some evidence that these employees are very engaged in healthcare matters, as evidenced by their higher-than-average utilization and knowledge of costs. Therefore, care should be taken in generalizing these results to other populations.

It is possible that the analyses did not have the power to detect some significant effects. The sample size for the survey was dictated by funding constraints; however, calculations of power indicate that the sample size was not large enough to detect some of the subpopulation effects studied here.

Finally, approximately 11% of this sample changed plans during the 3-year study period. We compared respondents who changed plans with respondents who remained with the same plan on several important variables. Respondents who stayed with the same plan (those included in this analysis) were more knowledgeable about costs and healthier.

This study is important for a number of reasons. It is the first study of its kind to directly assess knowledge and perceptions of cost-sharing levels with self-reported and *actual* behavior changes. Clearly, further work exploring how patients understand their complex cost-sharing responsibilities and how they respond to changes is necessary as employers increasingly use these tools to change behavior. This study did not address the types of visits people said they skipped or delayed, or the outcomes of self-reported missed and delayed visits.

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