

# Patient Strategies to Cope with High Prescription Medication Costs: Who is Cutting Back on Necessities, Increasing Debt, or Underusing Medications?

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Many chronically ill adults in the United States face high prescription medication costs, yet little is known about the strategies patients adopt to cope with these costs. Through a national survey of 4,055 adults taking prescription medications for one of five chronic diseases, we compared whether respondents cut back on necessities such as food or heat to pay for medications, increased debt, or underused medications because of cost. We also examined the sociodemographic and clinical correlates and differential use by different sub-groups of these three strategies. Overall, 31% of respondents reported pursuing at least one of the strategies over the prior 12 months. Twenty-two percent had cut back on necessities, 16% had increased their debt burden, and 18% had underused prescription drugs. Among patients who underused their medication, 67% also had cut necessities or increased debt. Although we found significant differences in the way patients with varying socio-demographic characteristics responded to medication cost pressures, use of all these strategies was especially common among patients who were low-income, in poor health, and taking multiple medications.

**KEY WORDS:** prescription medication costs; chronic disease; access to care; medication adherence; cost of care.

## INTRODUCTION

Because many Americans have limited or no prescription drug insurance coverage, a growing number of adults with chronic illnesses face financial burdens from out-of-pocket medication costs (Adams *et al.*, 2001; Hwang *et al.*, 2001; Safran *et al.*, 2002). Research has documented high rates of medication underuse because of cost, especially among patients with low incomes and multiple chronic conditions (Steinman *et al.*, 2001; Strickland and Hanson, 1996; Piette *et al.*, 2004a). Other studies have found

adverse health outcomes associated with cost-related medication underuse (Piette *et al.*, 2004a; Soumerai *et al.*, 1987; Tamblyn *et al.*, 2001; Soumerai *et al.*, 1991; Soumerai *et al.*, 1994; Federman *et al.*, 2001; Kennedy and Erb, 2002).

Underuse of medications, however, constitutes just one possible strategy patients might adopt to cope with the burden imposed by high medication costs. Other strategies also may adversely affect patients' health and well-being. Yet, with the exception of one recent study that found that 21% of Medicare recipients without prescription drug coverage had cut back on essentials such as food or clothing to pay for medications, (Safran *et al.*, 2002) few other studies have examined the range of strategies patients may use to cope with medication cost pressures. Moreover, we know little about how patient characteristics may differ among those who choose one strategy versus another. Finally, we do not know whether patients facing cost pressure tend to pursue

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multiple strategies simultaneously or make choices among them.

To address these gaps in knowledge, we conducted a national study of more than 4,000 older American adults with chronic illnesses to explore: (1) the frequency with which patients respond to medication costs by either cutting back on necessities such as food or heat to pay for medication, increasing debt, or restricting medication use; and (2) the socio-demographic and clinical characteristics of patients associated with responding to medication costs by using each of these different coping strategies.

In prior analyses with this study population, we found high rates of cost-related under-use of disease-specific medications among patients with a variety of chronic conditions (Piette *et al.*, 2004c). In other analyses, we examined the frequency with which respondents with diabetes ( $N = 875$  or 22% of the overall sample) pursued various strategies responding to medication costs (Piette *et al.*, 2004b). Eleven percent of diabetes patients had underused their diabetes medications in the prior year due to cost pressures, 28% reported forgoing food, heat or other essentials in order to pay medication costs, and 14% had increased debt to pay for medications. The current study extends those findings by examining strategies to address the burden of medication costs within the overall sample of 4,055 adults taking prescription medications for 16 separate chronic health problems. In addition, in this study we examine the sociodemographic and clinical correlates and differential use by different sub-groups of these three strategies.

## METHODS

Data were collected through a survey of a nation-wide panel of U.S. adults. Panel members were recruited using random digit dialing and a sampling frame consisting of the entire U.S. population with an assigned telephone number. Non-residential and disconnected numbers were excluded, and individuals with a valid postal address were approached via mailings and telephone calls. Potential panel members were offered WebTV and free Internet access in exchange for completing several short web-based surveys each month. At the time of this study (November–December 2002), the KN panel's acceptance rate was approximately 48%, and the panel included over 40,000 members.

Analyses by other researchers have compared the panel's characteristics to the U.S. Cen-

sus Bureau's current population survey, the National Health Interview Survey, and an independent random-digit dialing sample. On most sociodemographic parameters, key health behaviors (e.g., smoking), and the prevalence of chronic illnesses, the sample has consistently been found to be within a few percentage points of other national estimates (Krosnick and Chang, 2001; Wagner, 2002; Baker *et al.*, 2003a). Neither panel refusal rates nor drop-out rates have been found to result in significant distortions in the distribution of race or gender. Compared to Census data, the panel has more married individuals (64% vs. 60%), fewer individuals with at least some college education (29% vs. 32%), and fewer households with incomes >\$75,000 (18% vs. 25%). Data based on surveys of panel members have been used as the basis for prior population-based health studies published in peer-reviewed medical and public health journals (Lentine *et al.*, 2000; Harris, 2002; Skitka *et al.*, 2002; Schlenger *et al.*, 2002; Baker *et al.*, 2003b).

Human Subjects Committees at the authors' institutions approved the current study. Using sociodemographic and health status information on panel members, we identified all 5,644 individuals aged 50 and over who reported taking prescription medication for diabetes, depression, heart problems, hypertension, or high cholesterol. After three e-mail requests, 4,264 people completed the on-line informed consent and the questionnaire. One hundred eighty-five survey respondents were excluded because they reported no longer taking medication for any of the five index conditions. Thus, the CASRO response rate for the survey was 76%, i.e.:  $(4,264 - 185) / [(4,264 - 185) + (1,380 \times 4,079 / 4264)]$  (Council of American Survey Research Organizations 1998; Council of American Survey Research Organizations, 1982). We excluded 24 additional respondents because they were missing data on income, leaving a final sample of 4,055.

Compared to non-respondents, respondents were more likely to be white (88% vs. 81%,  $p < .001$ ), older (mean age 65 vs. 63 years,  $p < .001$ ) and to have some college education (66% vs. 60%,  $p < .001$ ). Respondents and non-respondents were similar with regard to gender, home ownership, marital status, and income. In all analyses, we used post-stratification weights to correct the distribution of respondents to match the distribution of the U.S. population on age, sex, race/ethnicity, education, region, and metropolitan residence to account for over-sampling and non-response. The Current Population

Survey for October 2002 provided data on the distribution of the U.S. population. (Bureau of Labor Statistics and the Bureau of the Census, 2003) The number of observations reported in the tables reflect that weighted sample size of 4,050.

### Outcome Measures

We considered patients to be cutting back on necessities if they responded affirmatively to the question, "During the last 12 months, have you spent less on food, heat or other basic needs so that you would have enough money for your medicines?" Patients were asked two questions about increasing their debt burden to pay out-of-pocket costs for prescription medications. The first was, "In the past 12 months, did you ever have to borrow money from a friend or relative outside of your household to pay for your prescription medications?" The second was, "Over the past 12 months did you have to increase the amount of credit card debt you carried month-to-month because of the cost of your prescription medications?" We considered patients responding affirmatively to either of these two questions as increasing debt. Finally, for each type of prescription medication respondents reported using, they were asked whether in the prior 12 months they had taken less medications than prescribed by their doctor because of the cost. We considered patients to be under-using medication if they reported cutting back on any medication use in the prior year due to cost.

### Independent Variables

Sociodemographic characteristics of interest in the current study included respondents' ethnicity (white vs. non-white), age, gender, education level (high school degree or less vs. some college or more), and annual household income (<\$20,000, \$20,000–\$39,999, \$40,000–\$59,000, or \$60,000+). Clinical characteristics included self-reported health status (excellent or very good, good, fair or poor), number of current prescription medications (0–2; 3–6; and 7 or more); and out-of-pocket medication costs per month (<\$50; \$51–100; and >\$100). Patients' total number of chronic health conditions was highly collinear with their total number of medications, and having prescription medication coverage was highly collinear with out-of-pocket medication costs. Thus, we did not include indicators of the number of illnesses or prescription coverage in our multivariate models.

### Analyses

In initial analyses, we used bivariate tabulations to identify differences in the prevalence of each coping strategy across socioeconomic and clinical subgroups. Among patients who reported using one or more strategy, we then explored the relative frequencies with which patients with different sociodemographic and clinical characteristics reported cutting necessities or increasing debt, restricting medication use, or simultaneously pursuing all of these strategies. In a second set of analyses, we fit multivariate logistic regression models to assess the independent effect of each of the respondent sociodemographic and clinical characteristics on cutting necessities, increasing debt, and restricting medication use because of prescription medication costs.

Regression diagnostic procedures yielded no evidence of substantive multi-collinearity, heteroscedasticity, or influential outliers in any of the models. We performed all analyses using STATA 7 (StataCorp, College Station, Texas).

## RESULTS

### Characteristics of the Study Population

The population represented by survey respondents was socio-demographically diverse. Fifty five percent were women, 20% were non-white, 55% had a high school education or less, and 51% were at least 65 years of age. Respondents represented a wide range of annual household income levels, including 23% with incomes less than \$20,000 per year and 23% with incomes of \$60,000 per year or higher. Thirty one percent reported that their health was "very good" or "excellent," while 28% reported that their health was either "fair" or "poor." Twenty five percent of respondents reported taking seven or more prescription medications. Most respondents reported multiple chronic health problems, including hypertension (73% of the overall sample), diabetes (27%), a history of myocardial infarction, angina, or heart failure (33%), and depression (28%).

### Frequency of Pursuing Different Strategies

Overall, 31% of all patients reported pursuing at least one of the three strategies to cope with their out-of-pocket medication costs. Twenty two percent reported cutting back on necessities such as food

**Table I.** Proportion of Respondents Who Either Cut-Back on Necessities, Increased Debt, or Restricted Medication Use Due to Cost Within Sociodemographic and Clinical Subgroups\*

( <i>n</i> = 4,050)	1+ Coping strategy (%)
Gender	
Male	24
Female	36
Age	
50–54	38
55–64	35
65+	26
Race	
White	29
Non-white	39
Education	
Some college or more	28
High school or less	33
Annual household income	
<\$20,000	47
\$20,000–\$39,999	34
\$40,000–\$59,999	22
\$60,000+	18
Self-reported health status	
Very good or excellent	17
Good	30
Fair or poor	44
Number of current medications	
0–2	22
3–6	30
7 or More	43
Number of Co-Morbidities	
1–3	21
4–6	31
7 or More	46
Monthly out of pocket medication costs	
<\$50	18
\$51–100	36
\$>101	54

\*Percentages are based on numbers adjusted by sample weights. Statistical differences among groups are all significant at a level of  $p < 0.01$ .

or heat to pay medication costs, 16% reported increasing their debt burden, and 18% reported cost-related medication underuse. The majority of patients who reported cost-related adherence problems (67%) also reported cutting-back on necessities or increased their debt burden to pay for their prescription drugs. Moreover, 15% of the total sample did not report cost-related medication underuse, but reported either cutting back on necessities or increasing debt.

Table I shows the percentage of respondents who reported pursuing one or more of the three strategies to cope with prescription medication costs over the prior 12 months. Overall, the proportion of patients reporting one or more strategy to cope with

medication cost pressures was high regardless of their sociodemographic or clinical characteristics. Thirty six percent of all women, compared with 24% of men, reported pursuing at least one of the three strategies ( $p < 0.001$ ). Forty-four percent of respondents who described their health status as being “fair” or “poor,” and 46% of those with seven or more chronic health problems reported pursuing one or more of the three strategies. Thirty nine percent of non-white respondents, 47% of respondents with annual household incomes less than \$20,000, and 54% of respondents with monthly out of pocket medication costs greater than \$100 pursued at least one of the strategies.

Although higher percentages of respondents with low incomes and high prescription medication costs reported pursuing one or more of the strategies, problems were not limited only to the poorest patients or those with the highest medication costs. For example, among respondents with monthly out of pocket medication costs of \$100 or more, 2.5% of those with annual incomes of at least \$60,000 a year reported using at least one of the strategies and a similar proportion of respondents in this income bracket reported using one of the strategies despite monthly costs of <\$100. Conversely, most respondents with both low incomes and high costs did not report pursuing any of the strategies (e.g., 96% of respondents with annual household incomes less than \$20,000 a year who had monthly medication costs of \$101 or greater did not report adopting any of the strategies). Most patients with low incomes and high out-of-pocket costs did not report using one or more of the coping strategies, suggesting that some other co-factors may moderate the impact of income and medication costs on patients’ medication adherence or other areas of their life.

Among patients reporting one or more strategy to cope with medication cost-pressures, we examined the sociodemographic correlates of choosing various approaches (Table II). As Table II shows, the most common patient response to cost pressures was to cut necessities or increase debt, without restricting medication use. In contrast, relatively few patients chose to cut medication use due to cost without pursuing one of these other strategies. For example, 48% of respondents aged 65 or older cut necessities or increased debt (but did not cut back on medication use), compared with 20% who restricted medication use only, and 32% who pursued all three strategies. Compared to their younger counterparts, older individuals were more likely to respond to cost pressures

**Table II.** Respondents Reporting Problems Due to Medication Costs: Characteristics of Those Who Report Only Cutting Necessities or Increasing Debt, Only Restricting Medications, and Both Strategies

<i>n</i> = 1,092	[ <i>n</i> ]	Only cut necessities or increased debt %	Only restricted medication use %	Both cut necessities or increased debt and restricted medication use %	<i>p</i> -level*
<b>Gender</b>					
Male	448	47	21	32	0.002
Female	644	37	19	44	
<b>Age</b>					
50–54	242	28	15	56	<0.001
55–64	420	38	20	42	
65+	430	48	20	32	
<b>Race</b>					
White	920	42	20	38	>0.10
Non-white	172	38	17	45	
<b>Education</b>					
Some college or more	684	40	22	38	>0.10
High school or less	408	42	18	41	
<b>Annual income</b>					
<\$20,000	317	37	15	48	<0.001
\$20,000–\$39,999	364	45	18	37	
\$40,000–\$59,999	207	35	26	39	
\$60,000+	197	45	28	26	
<b>Self-reported health status</b>					
Very good or excellent	195	42	22	36	<0.001
Good	433	42	22	36	
Fair or poor	463	39	14	47	
<b>Number of current medications</b>					
0–2	129	44	27	28	0.01
3–6	581	39	21	40	
7 or more	368	43	10	47	
<b>Number of co-morbidities</b>					
1–3	256	50	22	28	<0.001
4–6	487	40	21	39	
7 or more	349	34	16	50	
<b>Out of pocket medication costs</b>					
<50	261	42	26	31	0.006
51–100	295	46	18	36	
>101	513	38	13	49	

\*Statistical differences between groups in pursuing each strategy were determined by multinomial logistic regression. Percentages are based on numbers adjusted by sample weights.

by either cutting necessities or increasing debt, without restricting their medication use. Patient characteristics that likely would increase their vulnerability to prescription medication cost burdens, such as higher out of pocket costs, more co-morbidities, worse self-reported health status, and lower incomes were associated with higher frequencies of respondents pursuing all three strategies.

**Correlates of Pursuing Each of the Strategies**

In multivariate logistic regression models (Table III), women were significantly more likely

than men to cut back on necessities to pay for prescription medications or restrict their medication use. However, women were no more likely than men to increase debt in response to medication costs, after controlling for covariates. Non-white respondents were more than twice as likely as white respondents to report cutting necessities (AOR: 2.01, 95% CI:1.41–2.86), though they did not have significantly higher odds of restricting medication use (AOR: 1.25 95% CI:0.87–1.80), after adjustment for potential confounders. Respondents who were 65 or older had significantly lower odds than younger respondents of pursuing each of the three strategies (*p* < 0.001 in all three models).

**Table III.** Patient Characteristics Associated with Cutting Necessities, Increasing Debt, and Restricting Medication Use Because of Prescription Medication Costs\*

N = 4050	Cut necessities			Increased debt			Restricted medication use		
	AOR**	95% CI	p-value	AOR**	95% CI	p-value	AOR**	95% CI	p-value
Gender									
Female	Ref			Ref			Ref		
Male	0.63	0.48–0.82	<0.001	0.78	0.57–1.07	0.12	0.57	0.44–0.74	<0.001
Age									
50–54	Ref			Ref			Ref		
55–64	0.68	0.48–0.97	0.036	0.72	0.48–1.09	0.12	0.74	0.53–1.05	0.09
65+	0.33	0.23–0.48	<0.001	0.31	0.20–0.47	<0.001	0.29	0.20–0.42	<0.001
Race									
White	Ref			Ref			Ref		
Non-white	2.01	1.41–2.86	<0.001	1.92	1.30–2.82	0.001	1.25	0.87–1.80	0.22
Education									
High school or less	Ref			Ref			Ref		
Some college or more	0.91	0.70–1.19	0.49	1.22	0.92–1.65	0.17	1.12	0.87–1.44	0.85
Annual income									
<\$20,000	Ref			Ref			Ref		
\$20,000–\$39,999	0.45	0.32–0.63	<0.001	0.48	0.33–0.70	<0.001	0.48	0.35–0.68	<0.001
\$40,000–\$59,999	0.21	0.14–0.31	<0.001	0.37	0.24–0.57	<0.001	0.33	0.22–0.49	<0.001
\$60,000+	0.14	0.09–0.22	<0.001	0.20	0.13–0.30	<0.001	0.20	0.14–0.29	<0.001
Number of current medications									
0–2	Ref			Ref			Ref		
3–6	0.96	0.61–1.53	0.88	0.89	0.54–1.46	0.64	1.07	0.72–1.61	0.73
7 or more	1.30	0.23–0.48	0.29	1.51	0.89–2.55	0.13	1.01	0.65–1.58	0.95
Monthly out of pocket medication costs									
<\$50	Ref			Ref			Ref		
\$51–100	4.32	2.9–6.4	<0.001	2.92	1.94–4.41	<0.001	2.62	1.85–3.71	<0.001
>\$101	8.36	5.7–12.2	<0.001	5.62	3.83–8.25	<0.001	5.57	4.02–7.73	<0.001

\*N's are adjusted using sampling weights.

\*\*AOR: adjusted odds ratio. Each logistic model controlled for all the variables listed in the table.

Having an annual household income of less than \$20,000 and monthly out of pocket medication costs of more than \$100 were each independently associated with significantly greater odds of pursuing each of the three strategies (Table III). Respondents with monthly out of pocket medication costs greater than \$100 had eight times the odds of those with monthly costs less than \$50 of cutting necessities, and approximately six times the odds of increasing debt to pay for medications and of restricting medication use.

## DISCUSSION

In this study of a large national sample of adults with a variety of chronic conditions, we found high rates of medication underuse because of cost, similar to those observed in prior studies (Steinman *et al.*, 2001; Safran *et al.*, 2002; Piette *et al.*, 2004a). However, we found that cost-related medication restriction under-estimates the negative impact of medication costs in two ways. First, we

found that medication cost pressures affect many patients who do not report cost-related adherence problems. Specifically, 15% of patients who did not report cost-related medication restriction did report either cutting back on necessities in response to medication costs or increasing their debt burden to pay for their prescription drugs. Moreover, 67% of patients who reported cost-related adherence problems also reported one or more of these other problems, and as such, were affected by medication costs to a greater degree than reflected only in their medication underuse. These data suggest that focusing exclusively on cost-related medication restriction underestimates the extent of burdens many adults with chronic conditions face from out-of-pocket medication costs, and the range of coping strategies respondents pursue to cover these costs.

Not surprisingly, patients at highest risk for cost-related medication restriction (i.e., patients with poor health, low incomes, or taking many prescription drugs) were the most likely to cut necessities or increase debt to cover medication costs. Nevertheless,

the prevalence of these problems among vulnerable patients was disturbingly high. Among individuals reporting some strategy for coping with medication cost pressures, nearly half of all patients with incomes <\$20,000/year, fair or poor health, taking seven or more medications, or out-of-pocket costs greater than \$100 per month reported multiple negative responses.

Two other important conclusions can be drawn from the distribution of responses to medication cost pressures across sociodemographic groups. First, although large numbers of patients with low incomes or high medication cost burdens reported some type of economic response to these pressures, the majority of patients in even the lowest income group did not report pursuing one or more of these burdens. Further research should determine the extent to which the current study failed to identify financial problems experienced by these patients, whether their reporting may have been inaccurate, or whether some patients draw on other resources not identified here to meet the financial demands of their illness. Second, a substantial proportion of patients with relatively high incomes and/or low monthly out-of-pocket medication costs did in fact report making financial adjustments in response to medication cost pressures. This suggests that policy responses that only target the poorest patients or reduce out-of-pocket costs to moderate levels will not eliminate the problems associated with medication cost pressures.

Our findings reinforce the importance of physicians and other health care providers talking with all patients about possible burdens they face from medication cost pressures and how they are choosing to address these burdens. Such discussions are necessary to help patients better weigh the costs and benefits of treatment compared with competing demands. Physicians can significantly increase patients' medication-related knowledge and adherence (DiMatteo, 1995; Bultman and Svarstad, 2000). Such discussions are also critically important to enable providers to switch treatment to less-expensive alternatives and provide patients with information about governmental or other assistance programs for which they may be eligible.

These data suggest potentially important differences in the way patients with varying sociodemographic characteristics respond to medication cost pressures. For example, prior epidemiologic studies have found consistently that older individuals are less likely than their younger counterparts to cut back on medication use due to cost pressures

(Steinman *et al.*, 2001; Safran *et al.*, 2002). However, we found that, among patients reporting some coping response, older individuals were substantially more likely than their younger counterparts to respond to medication costs by either increasing their debt burden or cutting back on necessities. Clearly, restrictions on food, heat, or other daily needs pose significant risks for older patients with chronic illnesses; these patients may thus be at greater risk than previously shown.

Unlike prior studies, (Steinman *et al.*, 2001) we did not find a strong association between minority race and medication restriction, after adjusting for other risk factors. However, we did find that, after adjusting for covariates, minority race was strongly associated with cutting necessities and increasing debt. We also found that, after adjusting for other possible risk factors, women remained significantly more likely than men to take less medications and cut other necessities in response to medication cost pressures. Ethnographic and other qualitative studies are needed to elucidate the decision processes underpinning these significant differences in how patients with varying demographic characteristics respond to medication costs.

Whereas most prior research has focused exclusively on the Medicare-eligible population 65 years or older, (Steinman *et al.*, 2001; Safran *et al.*, 2002) we found that respondents younger than 65 were significantly more likely than older respondents to report pursuing each of the three strategies. This finding suggests that large numbers of adults with chronic conditions younger than 65 will remain at risk for adverse outcomes from medication cost pressures, even if Medicare reforms are enacted. Furthermore, current legislation providing a Medicare prescription benefit will require many Medicare beneficiaries with chronic conditions to continue to incur out-of-pocket medication costs greater than \$100 a month. In this study, we found that out-of-pocket expenditures at that level were associated with significantly higher odds of pursuing each of the strategies we studied. In 1999, non-institutionalized Medicare beneficiaries paid out-of-pocket for nearly half of their prescription drug costs, or an average of \$410 per beneficiary (Adams *et al.*, 2001). Out-of-pocket prescription medication expenditures for adults with multiple chronic diseases are more than twice that amount (Hwang *et al.*, 2001). Thus, monthly expenditures of \$100 are relatively low compared to the amount many elderly adults with chronic conditions pay—and will continue to pay—out-of-pocket for

medications each month, even if current reform proposals are implemented.

Several methodological limitations should be considered in interpreting this study. First, this study was based exclusively on patient survey data and thus subject to recall and other forms of self-report bias. In addition, we cannot rule out the possibility of differential reporting by one group compared with another. The few studies that have examined the effect of factors such as race, income, and education on the accuracy of self-reports have produced mixed results (Rost and Roter, 1987; McKenna *et al.*, 1992; Evans and Crawford, 1999; Coughlin, 1990). Second, we only asked respondents about these three particular strategies to cope with the burden of prescription medication costs. We did not collect data on other strategies respondents might have adopted because of cost concerns, such as refusing a new prescription (Federman *et al.*, 2001). Thus, our study does not reflect the full range of strategies patients may pursue in the face of out-of-pocket medication costs. Third, although this was a large, national sample of adults with chronic conditions, and sampling weights were used to correct for non-response and sampling procedures, uncorrected differences between the target population and respondents may bias our results.

In conclusion, many middle-aged and older Americans with chronic conditions are responding to high out-of-pocket medication costs by cutting-back on necessities, increasing their debt burden, under-using prescribed medications, or a combination of these strategies. Individual clinicians and health systems need to develop proactive strategies to identify and assist patients to develop appropriate strategies to secure the medications they need. The scope of the problem, however, calls for broader reforms to reduce the burdens many adults with chronic conditions face from high prescription medication costs.

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## REFERENCES

- Adams, A. S., Soumerai, S. B., and Ross-Degnan, D. (2001). The case for a medicare drug coverage benefit: A critical review of the empirical evidence. *Annu. Rev. Public Health* 22: 49–61.
- Baker, L. C., Bundorf, M. K., Singer, S., and Wagner, T. H. (2003a). Validity of the Survey of Health and Internet and Knowledge Network's Panel and Sample, Accessed June 18, Available at: <http://www.herc.research.med.va.gov/SHI%20appendix.pdf>
- Baker, L., Wagner, T. H., Singer, S., and Bundorf, M. K. (2003b). Use of the Internet and e-mail for health care information: Results from a national survey. *JAMA* 289: 2400–2406.
- Bultman, D. C., and Svarstad, B. L. (2000). Effects of physician communication style on client medication beliefs and adherence with antidepressant treatment. *Patient Educ. Couns.* 40: 173–185.
- Bureau of Labor Statistics and the Bureau of the Census. CPS (Current Population Survey) Basic Monthly Survey. 2003.
- Coughlin, S. S. (1990). Recall bias in epidemiologic studies. *J. Clin. Epidemiol.* 43: 87–91.
- Council of American Survey Research Organizations. (1982). *CASRO Task Force on Completion Rates*, New York.
- Council of American Survey Research Organizations. (1998). *Guidelines for Survey Research Quality*, New York.
- DiMatteo, M. R. (1995). Patient adherence to pharmacotherapy: The importance of effective communication. *Formulary* 30: 596–598, 601–602, 605.
- Evans, C., and Crawford, B. (1999). Patient self-reports in pharmaco-economic studies. Their use and impact on study validity. *Pharmacoeconomics* 15: 241–256.
- Federman, A. D., Adams, A. S., Ross-Degnan, D., Soumerai, S. B., and Ayanian, J. Z. (2001). Supplemental insurance and use of effective cardiovascular drugs among elderly medicare beneficiaries with coronary heart disease. *JAMA* 286: 1732–1739.
- Harris, K. M. (2002). Can high quality overcome consumer resistance to restricted provider access? Evidence from a health plan choice experiment. *Health Serv. Res.* 37: 551–571.
- Hwang, W., Weller, W., Ireys, H., and Anderson, G. (2001). Out-of-pocket medical spending for care of chronic conditions. *Health Aff.* 20: 267–278.
- Kennedy, J., and Erb, C. (2002). Prescription noncompliance due to cost among adults with disabilities in the United States. *Am. J. Pub. Health* 92: 1120–24.
- Krosnick, J. A., and Chang, L. A. (2001). comparison of random digit dialing telephone survey methodology with internet survey methodology as implemented by Knowledge Networks and Harris Interactive, Ohio State University.
- Lentine, D. A., Hersey, J. C., Iannacchione, V. G., Laird, G. H., McClamroch, K., and Thalji, L. (2000). *HIV-Related Knowledge and Stigma—United States*, Morbidity and Mortality Weekly Report 49: 1062–1064.
- McKenna, M. T., Speers, M., Mallin, K., and Warnecke, R. (1992). Agreement between patient self-reports and medical records for Pap smear histories. *Am. J. Prev. Med.* 8: 287–291.
- Piette, J. D., Wagner, T. H., Potter, M., and Schillinger, D. (2004a). Health insurance status, medication self-restriction due to cost and outcomes among diabetes patients in three systems of care. *Med. Care* 42: 102–109.
- Piette, J. D., Heisler, M., and Wagner, T. H. (2004b). Problems paying out-of-pocket medication costs among older adults with diabetes. *Diab. Care* 27: 384–391.
- Piette, J. D., and Heisler, M., (2004c). Wagner Cost-related medication underuse among chronically ill adults: What treatments do people forego? How often? Who is at risk? *Am. J. Pub. Health* 94: 1782–1787.
- Rost, K., and Roter, D., (1987). Predictors of recall of medication regimens and recommendations for lifestyle change in elderly patients. *Gerontologist* 27: 510–515.
- Safran, D. G., Neuman, P., Schoen, C., *et al.*, (2002). Prescription drug coverage and seniors: how well are states closing the gap? *Health Aff. (Millwood)* (Suppl. Web Exclusives): W253–W268.
- Schlenger, W. E., Caddell, J. M., Ebert, L., Jordan, B. K., Rourke, K. M., Wilson, D., *et al.*, (2002). Psychological reactions to terrorist attacks: findings from the National Study of Americans' Reactions to September 11. *JAMA* 288: 581–588.

- Skitka, L. J., Mullen, E., Griffin, T., Hutchinson, S., and Chamberlin, B. (2002). Dispositions, scripts, or motivated correction? Understanding ideological differences in explanations for social problems. *J. Pers. Soc. Psychol.* 83: 470–87.
- Soumerai, S. B., Avorn, J., Ross-Degnan, D., and Gortmaker, S. (1987). Payment restrictions for prescription drugs under Medicaid. Effects on therapy, cost, and equity. *N. Engl. J. Med.* 317: 550–556.
- Soumerai, S. B., McLaughlin, T. J., Ross-Degnan, D., Casteris, C. S., and Bollini, P. (1994). Effects of a limit on Medicaid drug-reimbursement benefits on the use of psychotropic agents and acute mental health services by patients with schizophrenia. *N. Engl. J. Med.* 331: 650–655.
- Soumerai, S. B., Ross-Degnan, D., Avorn, J., McLaughlin, T., and Choodnovskiy, I. (1991). Effects of Medicaid drug-payment limits on admission to hospitals and nursing homes. *N. Engl. J. Med.* 325: 1072–1077.
- Steinman, M. A., Sands, L. P., and Covinsky, K. E. (2001). Self-restriction of medications due to cost in seniors without prescription coverage. *J. Gen. Intern. Med.* 16: 793–799.
- Strickland, W. J., and Hanson, C. M. (1996). Coping with the cost of prescription drugs. *J. Health Care Poor Underserved* 7: 50–62.
- Tamblyn, R., Laprise, R., and Hanley, J. A., Abrahamowicz, M., Scott, S., Mayo, N., *et al.*, (2001). Adverse events associated with prescription drug cost-sharing among poor and elderly persons. *JAMA* 285: 421–429.
- Wagner, T. H. (2002). Using the internet to conduct surveys with veterans: Knowledge Network's sample and sampling validity. Accessed on September 12, 2003. Available at: [http://www.herc.research.med.va.gov/wagner\\_CHI.htm](http://www.herc.research.med.va.gov/wagner_CHI.htm).