

## Effect of a Medication Copayment Increase in Veterans With Schizophrenia

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In 1999, Congress passed the Veterans Millennium Health Care Act (Public Law 106-117), or the “Millennium Bill.”<sup>1</sup> Effective in fiscal year 2002 (FY02), this bill raised outpatient prescription copayments from \$2 to \$7. The goal was ostensibly budgetary, to contain rising pharmacy costs while addressing concerns that patients were increasingly choosing to receive healthcare through the Department of Veterans Affairs (VA) specifically for its generous pharmacy benefits. With nearly 60% of veterans who transferred care citing inexpensive medications as their primary reason,<sup>2</sup> this trend led to observations that the “VA was becoming a drug store.” A rapidly aging veteran population serves to escalate challenges faced by the system and its patients.

This predicament is certainly not unique to the VA. Outpatient pharmacy utilization remains the largest slice of many healthcare budgets, and the fastest growing cost sector. For privately insured patients, national prescription drug expenditures were \$78.9 billion in 1998, up from \$2.7 billion in 1960. With annual growth rates doubling to nearly 15% during that period, medications will represent 16% of total US healthcare expenditures by 2008.<sup>3</sup> Among Medicaid recipients, a population often compared with veterans, prescription payments rose 15.3% annually from \$4.4 billion in 1990 to almost \$12 billion in 1997.<sup>4</sup>

Antipsychotic medications have traditionally spurred rapid pharmacy cost increases. These expenditures rose by a factor of 7 during the 1990s and were up nearly 20% to \$14.7 billion in 2001.<sup>5,6</sup> This exponential growth is attributable to the introduction of newer atypical antipsychotics, along with improved coverage and access to psychiatric treatment.<sup>7</sup> Although the predominant driver of escalating medication costs is generally utilization, the exception is psychotropic drugs: two thirds of rising expenditures is instead due to medication prices.<sup>6</sup>

VA outpatient pharmacy expenditures totaled \$2.85 billion in FY01, increasing 19% annually since FY98 while inpatient and outpatient charges rose by merely 1.5%. Drug costs constitute a significant fraction of the VA budget, increasing from approximately 6% in the early 1990s to 14% this past year.<sup>8</sup> Outpatient psychiatric medications cost \$373.3 million in FY02, with those for depression (selective serotonin reuptake inhibitors) and schizophrenia (atypical antipsychotics) the dominant components (91%) and largest driver of recent increases.

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**Objective:** To assess the effect of the 2002 Veterans Millennium Health Care Act, which raised pharmacy copayments from \$2 to \$7 for lower-priority patients, on medication refill decisions and health services utilization among vulnerable veterans with schizophrenia.

**Study Design:** Quasi-experimental.

**Methods:** This study used secondary data contained in the National Psychosis Registry from June 1, 2000, through September 30, 2003, for all veterans diagnosed with schizophrenia and receiving healthcare through the Department of Veterans Affairs (VA). Longitudinal, mixed models were used to observe changes in prescriptions, health services utilization, and pharmacy costs in veterans subject to copayments (N = 40 654) and a control group of exempt individuals (N = 39 983). Analyses controlled for demographics, substance abuse, non-VA utilization, and medical comorbidities. The Health Belief Model supported analytical criteria for factors directly related to medication adherence issues.

**Results:** Total prescriptions and overall pharmacy costs leveled among veterans with copayments after the medication cost increase. However, psychiatric drug refills dropped substantially, nearly 25%. Although outpatient visits were unaffected, psychiatric admissions and total inpatient days increased slightly, particularly 10 to 20 months after the policy change. Factoring in additional copayment revenue, the VA realized a \$14.7-million annual net revenue gain from this subpopulation alone.

**Conclusion:** These results suggest the new policy successfully reduced utilization and costs, with perhaps minimal clinical consequences to date. However, higher inpatient utilization resulting from cost-related nonadherence is troubling within an already high-risk and poorly adherent population, especially considering the reduction in psychiatric drug refills.

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Antipsychotics alone are the third most expensive drug class, with 1.5 million prescriptions totaling \$158 million—7% of the total pharmacy budget.

Healthcare organizations have implemented a variety of strategies targeting pharmacy cost increases, including tighter formularies, promotion of generic medications, and an array of copayment plans. The latter frequently prove quite effective in controlling pharmacy and health services utilization. RAND experiment findings revealed that patients receiving free care averaged 4.6 annual physician visits and \$340 in expenditures, compared with 3.3 visits and \$224 for patients responsible for 50%.<sup>9</sup> Cost-sharing among chronically ill patients in the Medical Outcomes Study also reduced physician visits, although utilization reductions occurred among patients with serious as well as minor symptoms.<sup>10</sup> Other studies revealed similar reductions in mental health and urgent care visits even for “serious emergencies.”<sup>11,12</sup>

Pharmacy copayments have become increasingly creative, including prescription caps, coinsurance percentages, and tiered systems. In one recent study, a \$5 increase resulted in a 42% reduction of drug costs, but also a 20% decrease in pharmacy utilization and nearly double out-of-pocket patient costs.<sup>13</sup> When Gibson and colleagues analyzed the longitudinal effects of a \$5 copayment increase on employee prescriptions, they also found a sharp decrease in fills.<sup>14</sup> Interestingly, other researchers have reported that medical and psychiatric drug utilization changes minimally in response to large copayment increases.<sup>15</sup>

Among Medicaid recipients in Massachusetts, Soumerai and colleagues observed that a monthly prescription cap resulted in immediate 15% to 49% utilization decreases across a range of psychiatric drugs (antipsychotics, antidepressants, hypnotics).<sup>16</sup> This decrease coincided with increased mental health visits, plus a sharp rise in emergency department (ED) visits and partial hospitalizations. Equally significant, the average \$1530 total treatment cost increase exceeded pharmacy savings by a factor of 17. When the cap was replaced by a flat \$1 copayment, equivalent pharmacy savings were achieved with significantly fewer adverse events.<sup>16</sup>

Copayment amount is closely associated with utilization. Smaller charges (<\$10) had minimal influence on hypoglycemic fills among diabetic patients, but larger copayments reduced prescriptions by 20%.<sup>17</sup> For HMO patients, a \$1 to \$3 increase led to a 3.9% drop in total prescriptions; another raise to \$5 resulted in an additional 6.8% decrease 1 year later.<sup>18</sup> A general review estimated that a \$3 to \$10 copayment increase typically signifies a utilization change of around 20%, with higher copayments resulting in 50% declines within a few months.<sup>19</sup>

Within the general population, medication cost issues are not trivial. One Harris poll reported that 20% of patients list-

ed “medication too costly” as the primary reason for not filling prescriptions.<sup>20</sup> Among patients with a chronic illness (including diabetes and depression), 18% claimed to have had episodes of cost-related medication restriction.<sup>21</sup> Certain subpopulations are particularly vulnerable to higher copayments. Elderly patients or those with chronic conditions are more sensitive to medication costs than younger adults,<sup>22,23</sup> as are ethnic minorities, for whom restrictions are further compounded by advancing age.<sup>24,25</sup> One third of elderly patients who restricted medication use reported moderate to serious health ramifications.<sup>26</sup> These included higher rates of angina and nonfatal heart attacks or strokes, and a reduction in overall health status. Cardiac patients reducing use of antihypertension drugs were 4 to 6 times more likely to suffer serious coronary events.<sup>27</sup> Conversely, in patients with diabetes, a 10% improvement in adherence translated into significantly lower glycosylated hemoglobin levels.<sup>28</sup>

Medication adherence has long been a problem among patients with serious mental illness. In previous work prior to the copayment increase, we found that 40% of VA patients with schizophrenia were poorly adherent with antipsychotic medications, with a linear relationship between adherence and psychiatric admission risk.<sup>29,30</sup> Other studies reported similar findings, noting higher hospitalization rates, longer lengths of stay, multiple relapses, additional ED visits, higher treatment costs, and reduced quality of life.<sup>31-33</sup> Lindstrom and Binglefors concluded that noncompliance in patients with schizophrenia is the most significant contributor to ineffective drug therapy.<sup>34</sup>

The Health Belief Model frequently is used as context for addressing issues of medication adherence.<sup>35</sup> It recognizes that patients must balance perceptions of potential treatment benefits with perceptions of potential barriers (eg, costs) when expressing decisions to pursue healthcare services. The chain that links drug costs to nonadherence to negative outcomes is far from hypothetical. Adherence blends a complex mélange of patient characteristics and health beliefs, along with provider and system factors. These include demographics, social support, functional status, the therapeutic relationship, and substance abuse.<sup>36-39</sup> A substantial segment of veterans with schizophrenia were already nonadherent before the 2002 policy change. Adding a rising cost further complicates a frustratingly multidimensional phenomenon.

According to the National Psychosis Registry,<sup>40</sup> the VA treated 94 395 patients with schizophrenia in FY03, with costs totaling \$1.64 billion. Many of these patients had multiple medical or substance abuse comorbidities. Although still relatively modest compared with copayments in other healthcare systems, the \$7 copayment triples medication costs for these

veterans, whose annual income averages \$10 500. In this study, we examine potential ramifications of higher copayments, measured by medication prescriptions and health utilization patterns, along with pharmacy costs from the VA perspective.

## METHODS

### Data Source and Study Population

The National Psychosis Registry was developed to monitor care provided to veterans with serious mental illness. It provides information on demographics and other characteristics, diagnoses, utilization, pharmacy use, and costs. Pharmacy information includes medication name, fill date, drug class, days supply, and other instructions.

The study population included all veterans receiving a diagnosis of schizophrenia or schizoaffective disorder (*International Classification of Diseases* code 295.xx, except for 295.5) between October 1, 1998, and September 30, 1999. This baseline year defined participant inclusion, with a beginning population of 96 742. Patients were excluded if they (1) died during the 40-month study (9539); (2) had more than 100 inpatient days during any 1 period (2021); or (3) had missing service connection (SC) data or switched copayment status after the cost increase (4521). Besides having a limited opportunity to receive outpatient prescriptions, patients who died or experienced lengthy inpatient stays most likely were extremely ill veterans with unique utilization patterns. Attrition analyses revealed minimal demographic or utilization differences between excluded and retained patients.

### Study Design

A quasi-experimental, retrospective, pre-post longitudinal design evaluated effects of the copayment policy change. Adjusted utilization and cost outcomes were examined during the 20 months before the new policy implementation on February 1, 2002, and the 20 months afterward. These two 20-month periods were subdivided into four 10-month periods (T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, and T<sup>4</sup>) to better examine longitudinal effects and to observe trends not directly associated with the policy change.

Service connection is the percentage of a patient's disability attributable to military service. By congressional mandate, an SC of 50% or more establishes a medication copayment waiver. Copayment veterans had an SC of less than 50% and therefore were subject to copayments throughout the study. Exempt individuals, who had an SC above the Millennium Bill waiver level, never faced copayments and served as a natural control group for comparing the effects of the policy change. Although it was conceivable that patients near the

cutoff mark might occasionally receive extra benefits because of implementation laxity or having multiple SC levels for different diagnoses, this scenario is uncommon among veterans with schizophrenia. A sensitivity analysis specifically examined a third "middle" group (SC of 1%-49%), with no significant outcome differences. As a result, this small group was combined with veterans whose disability was completely non-SC to form the final analytical copayment cohort.

### Dependent Variables

We examined 7 primary outcomes during each 10-month period: total prescription fills, medical and psychotropic fills separately, outpatient visits, psychiatric admissions, inpatient days among those admitted, and pharmacy costs. The 2 inpatient outcomes represent all acute psychiatric care, including all bedsection codes except for nursing home and residential rehabilitation—VA treatment domains with minimal mental health care but extremely long medical stays. Unfortunately, we were not able to examine ED visits in this study because of data limitations and the fact that veterans frequently use non-VA urgent care facilities. This potentially important outcome is further considered in the Discussion section. We used 30-day prescription fill equivalents, rather than a unique count; this method adjusts for trends toward 60- and 90-day prescriptions by aligning this outcome with the actual copayment: \$7 per 30-day supply. Unusual supply days were rare and rounded up to the nearest 30-day increment. The psychotropic category was defined by a list of 71 specific drugs recommended by psychiatry and pharmacy consultants ([Appendix](#) available at [www.ajmc.com](http://www.ajmc.com)), with medical drugs comprising all other prescriptions. Accounting for an \$840 annual copayment cap, prescriptions were truncated at 120 total fills per patient (\$840 divided by \$7). This truncation needed to be done in 2.6% of cases, evenly split between the copayment and the exempt groups.

Potential clinical ramifications associated with cost-related prescription changes were gauged by changes in outpatient visits, the risk of psychiatric admission, and the number of inpatient days. Costs reflect VA outpatient pharmacy charges, adjusted to 1999 dollars per the Consumer Price Index medical services component.

### Independent Variables

In addition to the literature, the Health Belief Model helped guide construction of the analytical models regarding risk factors and an individual's ability to remain adherent (eg, patient characteristics, cognitive problems, complexity of medication regimen). Demographic variables included sex, ethnicity (white, African American, Hispanic, other), age

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group (18-44 years [young], 45-64 years [middle], 65+ years [old]), marital status, and urban residency. Region of country was added to explore national policy implementation differences. Recognizing reliance on VA care by study veterans, an indicator of system connection and utilization consistency was created. "Tenure" was defined by how many years a patient utilized some VA care, adjusting for treatment retention and potential non-VA utilization.

Clinical covariates included a health status marker operationalized by the number of medical or psychiatric diagnoses (0, 1, 2, or 3+), based on a VA comorbidity classification by Wei and colleagues.<sup>41</sup> This covariate addressed illness severity, plus the potential complexity of a medication regimen and the likelihood of remaining adherent after higher copayments. A dichotomous variable, comorbid substance abuse diagnosis, broadly defined as any alcohol or drug abuse or dependence, also was incorporated. Functional status was examined via the Global Assessment of Functioning (GAF), a validated administrative data instrument.<sup>42</sup> After evaluating minimal missing data (2%) and different definitions with no effect on the results, this covariate was incorporated as the patient's highest outpatient GAF value. One omitted potential confounder was income, arguably a major contributor to cost-related prescription changes. This information was missing for nearly 50% of this sample; however, minimal income variation exists across veterans with schizophrenia (95% earn less than \$26 000 per year), and few seek non-VA care or prescriptions,<sup>43</sup> especially considering the relatively inexpensive drugs.

### Analysis

Descriptive baseline and bivariate statistics were followed by adjusted mean outcome values for both patient groups across each study period. Longitudinal multivariate analyses used a mixed-models technique for all dependent variables except for the dichotomous psychiatric admission outcome, where a 2-part Heckman model accounted for a high percentage of 0 values (no utilization). These analyses recognized the effect of time and included a copayment status by time interaction term to test differences between groups. Because of skewed pharmacy costs, a log transformation of this variable was incorporated.

This study received human subjects approval from the Ann Arbor VA Research & Development committee and the University of Michigan Human Subjects Protection office.

## RESULTS

After exclusions, the final sample size was 80 668. As **Table 1** indicates, the mean age was 52.8 years; patients were

predominantly male (95%), white (53%), unmarried (73%), and urban residents (79%). These veterans had numerous comorbidities (mean of 2), 33% had 3 or more, and 25% had received a substance abuse diagnosis. They frequently utilized VA care, averaging 49.4 outpatient visits and 27.8 inpatient days among the 19% admitted. Functional status was low, with a mean GAF of 49.3. With few exceptions, the copayment ( $n = 40\,737$  [50.5%]) and exempt ( $n = 39\,931$  [49.5%]) groups were demographically similar, though clinical characteristics and utilization patterns differed. Substance abuse was more prevalent in copayment veterans, but medical comorbidities were more common in exempt patients, including the mean number (2.1 vs 1.8) and the percentage with 3 or more (36% vs 31%). Exempt veterans utilized more health services, with longer VA tenures (9.3 vs 8.4 years).

Adjusted mean longitudinal values for all 7 outcomes are presented in **Table 2** and the **Figure**, with full multivariate results in **Tables 3A, 3B, and 3C**. Beginning with prescriptions, total and medical fills were very similar: exempt veterans gradually increased overall pharmacy utilization throughout the study, from 52.0 to 61.1 fills, and from 34.9 to 42.7 for medical fills alone (10-month gains of 4.3%-6.1% and 5.9%-6.9%, respectively). Conversely, utilization growth in the copayment group slowed after the cost increase (time by group interactions,  $P < .01$  across all time periods). After rising 8% during T<sup>2</sup>, the mean number of prescription fills fell immediately after the copayment increase (4%-5%) before recovering slightly, at least for medical drugs.

Psychotropic drugs presented a strikingly different picture. Whereas exempt patients continued a steady, albeit slower, growth (0.7%-3.7%), copayment veterans sharply altered their fill patterns in periods T<sup>3</sup> and T<sup>4</sup>. Specifically, after an increase of 12.9% to 14.0% just before the policy change, the copayment veterans obtained 6.3% fewer psychotropic prescriptions immediately after the cost increase, followed by a substantial 19.5% drop in the final period (all time by group interactions,  $P < .0001$ ). This 25% total decline was the most noticeable change observed across all outcomes.

Regarding potential ramifications, no differences were observed for outpatient visits, as the number of visits for all patients consistently decreased between 5.1% and 6.7% per period. However, the risks of psychiatric admission diverged slightly for the 2 groups. Although the rate of psychiatric admission for exempt veterans decreased by 9.4% after the policy change, the copayment group was 5% more likely to have a psychiatric admission (all  $P < .05$ ). The same was true for inpatient days, though with no statistical significance: admitted exempt patients averaged 3% fewer days and copayment veterans had increased lengths of stay by that amount.

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■ **Table 1.** Descriptive Data and Bivariate Comparison, by Group

Patient Characteristic	All Patients	Group 1 (Copay)	Group 2 (Exempt)	P
<b>No. (%)</b>	80 668	40 737 (50.5)	39 931 (49.5)	
<b>Age</b>				
Mean (SD), y	52.8 (10.7)	52.8 (10.3)	52.7 (11.1)	.6652
Young (0-44 y)	24.1%	24.4%	23.9%	.3785
Middle (45-64 y)	58.9%	58.5%	59.3%	
Old (65+ y)	17.0%	17.1%	16.8%	
<b>Female</b>	5.3%	5.3%	5.3%	.8446
<b>Marital status</b>				
Married	27.4%	20.7%	34.1%	<.001
Divorced/separated	38.7%	36.5%	41.1%	
Never married	33.9%	42.8%	24.8%	
<b>Ethnicity</b>				
White	53.2%	53.4%	52.9%	.0235
African American	27.3%	27.7%	26.9%	
Hispanic	8.2%	6.0%	10.3%	
Other/unknown	11.4%	12.9%	9.9%	
<b>Urban resident</b>	78.9%	79.2%	78.5%	.1876
<b>Region</b>				
West	18.8%	19.2%	18.4%	.0305
South	38.8%	34.8%	42.7%	
Midwest	21.3%	24.6%	18.1%	
Northeast	21.1%	21.4%	20.8%	
<b>Tenure within VA system (past 10 y)</b>	8.9	8.4	9.3	<.001
<b>Substance abuse, any diagnosis</b>	25.3%	30.4%	20.1%	<.001
<b>Medical and psychiatric comorbidities</b>				
Mean No. of conditions (SD)	1.97 (0.87)	1.83 (0.79)	2.12 (0.95)	<.001
0	25.8%	29.4%	22.2%	<.001
1	21.6%	21.5%	21.6%	
2	19.2%	18.5%	19.9%	
3+	33.4%	30.6%	36.3%	
<b>Global Assessment of Functioning, mean outpatient score (SD)</b>	49.3 (16.5)	49.8 (16.6)	48.8 (16.1)	.0018
<b>Inpatient psychiatric treatment</b>				
Any admission	19.3%	17.8%	20.7%	<.001
Mean No. of days (SD) among patients with any admission	27.8 (18.3)	28.2 (18.9)	27.5 (17.9)	.0410
<b>Total outpatient stops</b>				
Any outpatient utilization	99.3%	99.3%	99.4%	.8724
Mean No. of visits (SD)	49.4 (28.4)	48.6 (29.7)	50.2 (27.9)	.0204

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■ **Table 2.** Longitudinal Mean Outcomes (Adjusted), by Group\*

Outcome	Mean (SD)			
	T <sup>1</sup>	T <sup>2</sup>	T <sup>3</sup>	T <sup>4</sup>
<b>Total pharmacy fills</b>				
All patients	47.2 (37.6)	50.5 (38.4)	50.6 (37.8)	51.3 (38.2)
Group 1 (copay)	42.4 (34.5)	45.9 (36.1)	43.7 (35.2)	41.7 (33.8)
Group 2 (exempt)	52.0 (39.0)	55.3 (40.3)	57.6 (40.9)	61.1 (42.6)
<b>Medical fills</b>				
All patients	32.2 (18.9)	34.7 (21.1)	35.1 (21.9)	36.9 (22.5)
Group 1 (copay)	29.5 (17.5)	31.9 (16.8)	30.6 (16.0)	31.2 (16.7)
Group 2 (exempt)	34.9 (20.2)	37.5 (22.8)	39.7 (30.4)	42.7 (34.1)
<b>Psychiatric fills</b>				
All patients	15.0 (9.5)	15.9 (9.9)	15.5 (10.1)	14.4 (9.4)
Group 1 (copay)	12.9 (8.0)	14.0 (8.4)	13.1 (7.8)	10.6 (7.3)
Group 2 (exempt)	17.2 (13.5)	17.8 (13.3)	17.9 (13.3)	18.3 (13.6)
<b>Total outpatient stops</b>				
All patients	35.8 (22.4)	33.4 (23.4)	31.5 (20.7)	29.9 (20.5)
Group 1 (copay)	35.2 (21.9)	32.6 (21.6)	30.5 (20.3)	28.8 (19.8)
Group 2 (exempt)	36.5 (23.0)	34.1 (23.1)	32.6 (22.5)	31.2 (22.1)
<b>Any psychiatric admittance</b>				
All patients	12.9%	12.1%	12.0%	11.8%
Group 1 (copay)	12.8%	12.0%	12.3%	12.6%
Group 2 (exempt)	13.1%	12.2%	11.7%	11.0%
<b>Inpatient psychiatric days</b>				
All patients	19.3 (12.8)	19.4 (13.4)	19.3 (13.8)	19.5 (13.9)
Group 1 (copay)	18.7 (12.8)	18.8 (12.9)	19.0 (13.2)	19.4 (13.0)
Group 2 (exempt)	20.0 (13.5)	20.1 (13.7)	19.6 (13.2)	19.5 (12.9)
<b>Pharmacy costs</b>				
All patients	\$1437 (\$1233)	\$1534 (\$1277)	\$1574 (\$1285)	\$1626 (\$1365)
Group 1 (copay)	\$1261 (\$1088)	\$1322 (\$1084)	\$1333 (\$1129)	\$1353 (\$1104)
Group 2 (exempt)	\$1627 (\$1344)	\$1749 (\$1397)	\$1805 (\$1429)	\$1895 (\$1466)

\*T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, and T<sup>4</sup> represent four 10-month periods resulting from subdivision of the two 20-month periods before and after the copayment policy change.

Finally, pharmacy costs mirrored total prescriptions. The mean costs for both groups increased over time, from \$1627 to \$1895 for exempt veterans and from \$1261 to \$1353 for copayment veterans. Yet although the former increased 9% after 2002, the copayment group growth was only 2%, the difference primarily attributable to psychiatric drugs (all  $P < .0001$ ).

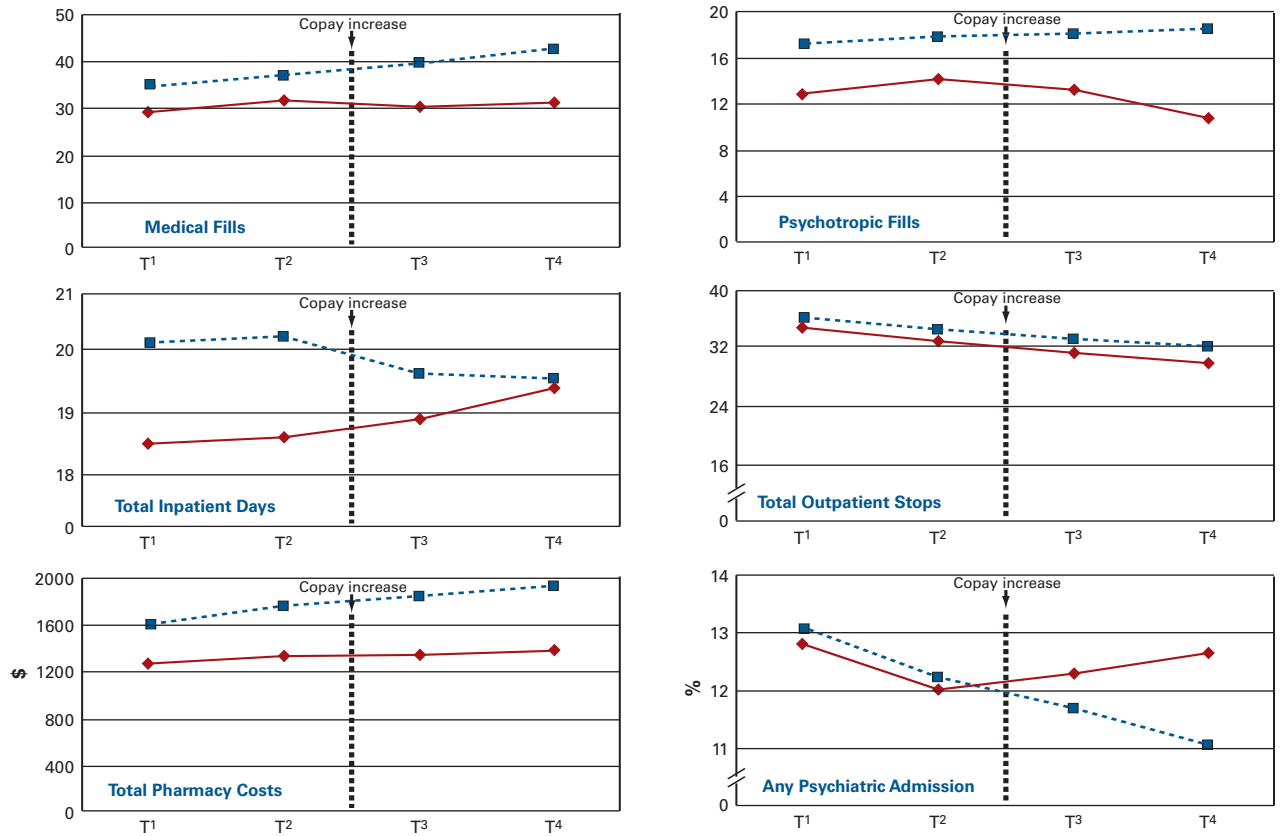
Two key patient factors predicting utilization were substance abuse and the number of comorbidities. Dual-diagnosis patients averaged 2.6 fewer fills than veterans diagnosed only with schizophrenia, their admission risk was 2 times greater

(odds ratio [OR] = 2.31), and they averaged 13 more outpatient visits. For each additional condition, medical fills increased by 12.3. Inpatient utilization was minimally affected, but outpatient stops averaged 6.6 more per comorbidity.

Women consistently filled more prescriptions, 6.4 total fills and 1.7 psychotropic fills, and used more healthcare services. Ethnic minorities had lower pharmacy utilization, but only African Americans faced elevated admission risk (OR = 1.2). Outpatient visits were between 2.9 and 7.3 lower for all 3 ethnic groups compared with white veterans. Middle-aged and older veterans averaged more medical pre-

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■ **Figure.** Adjusted Longitudinal Means, by Copayment Status



T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, and T<sup>4</sup> represent four 10-month periods resulting from subdivision of the two 20-month periods before and after the copayment policy change. Blue lines indicate exempt. Red lines indicate copayment.

scriptions than younger patients. However, this was not so for psychotropic drugs: the older group received 5.3 fewer fills than younger patients. Psychiatric admissions also dropped with age, by nearly 25% in the middle group (OR = 0.8) and half in older veterans (OR = 0.5). Nonsignificant factors included functional or marital status, urban residency, and VA tenure.

In addition to the subanalysis regarding middle SC veterans, another exploratory analysis was conducted. Though not a rigorous cost-offset model, we calculated the approximate VA net revenue change presumably attributable to the new policy. Assuming pharmacy costs would continue increasing at prevailing rates without copayment constraints, in the T<sup>4</sup> period alone slightly more than \$4 million in pharmacy savings was realized. Yet the major VA benefit was copayment revenue: even with reduced psychotropic fills, the extra \$5 charge translated into an additional \$8.2 million. This \$12.2-million single-period sum translates to a \$14.7-million annual VA revenue gain in just this study population.

## DISCUSSION

To our knowledge, this is the first study to disseminate findings pertaining to a copayment increase within a large national healthcare system. Veterans with schizophrenia, possessing minimal social or financial resources, are already poorly adherent and highly dependent on VA care, and require substantial treatment resources. Their psychiatric and medical conditions affect functional and occupational skills, rendering them vulnerable to additional stressors such as higher costs for essential medications.

We found that total prescription reductions after the cost increase were approximately 9% in the copayment group, similar to previous studies in other populations. Yet the intriguing result here was which medications were filled less frequently. Patients overwhelmingly restricted psychotropic utilization, and the 25% refill decline warrants attention. This decrease is especially striking considering that the medical-fills decline in T<sup>3</sup> was slightly reversed during the final

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■ **Table 3A.** Multivariate Results and Longitudinal Models: Total, Medical, and Psychiatric Fills\*

Covariate	Total Pharmacy Fills (Intercept = 13.02)		Medical Fills (Intercept = 3.35)		Psychiatric Fills (Intercept = 7.90)	
	Parameter Estimate (SE)	P	Parameter Estimate (SE)	P	Parameter Estimate (SE)	P
Exempt group	6.44 (0.44)	<.0001	4.15 (0.35)	<.0001	4.51 (0.17)	<.0001
Time by copay group (T <sup>1</sup> )	3.89 (0.41)	<.0001	4.10 (0.34)	<.0001	0.59 (0.18)	<.0001
Time by copay group (T <sup>2</sup> )	2.61 (0.35)	<.0001	2.34 (0.29)	<.0001	0.73 (0.16)	<.0001
Time by copay group (T <sup>3</sup> )	0.88 (0.26)	.0007	0.70 (0.22)	.0014	0.39 (0.12)	<.0001
Female	6.37 (0.90)	<.0001	5.89 (0.71)	<.0001	1.72 (0.34)	<.0001
African American	-5.42 (0.45)	<.0001	-1.18 (0.36)	.0010	-5.05 (0.17)	<.0001
Hispanic	-2.01 (0.72)	.0052	-1.15 (0.57)	.0422	-1.98 (0.27)	<.0001
Other ethnic	-5.53 (0.67)	<.0001	-3.21 (0.52)	<.0001	-3.40 (0.25)	<.0001
Middle age	6.42 (0.47)	<.0001	7.02 (0.37)	<.0001	0.09 (0.18)	.5939
Older age	3.61 (0.64)	<.0001	8.63 (0.51)	<.0001	-5.27 (0.24)	<.0001
Medical comorbidities	11.49 (0.17)	<.0001	12.32 (0.13)	<.0001	0.91 (0.06)	<.0001
Never married	-2.79 (0.39)	<.0001	-4.03 (0.31)	<.0001	0.55 (0.15)	.0002
Tenure (VA system)	1.46 (0.10)	<.0001	0.95 (0.08)	<.0001	0.66 (0.04)	<.0001
Substance abuse diagnosis	-2.62 (0.46)	<.0001	-1.69 (0.36)	<.0001	-1.11 (0.17)	<.0001
Urban resident	-2.35 (0.48)	<.0001	-2.15 (0.38)	<.0001	-0.51 (0.18)	.0045

\*Model significance was set at  $P < .001$ . For definitions of T<sup>1</sup>, T<sup>2</sup>, and T<sup>3</sup>, see the footnote to Table 2.

period, but the 6% initial psychotropic decrease actually tripled in T<sup>4</sup>. This result suggests that an extended follow-up might reveal further evidence of foregoing drugs to treat schizophrenia, depression, and other mental illnesses. Veterans are quite possibly making medication decisions based on treatment preferences or health beliefs (ie, choosing drugs for medical rather than psychiatric conditions, with immediate cost barriers trumping longer term consequences).

Clinical ramifications, at least 20 months after the copayment increase, seem relatively minor. The 3% to 5% increase in psychiatric admission rates and inpatient days, though statistically significant for the former outcome, is not dramatic; it represents a minimally higher risk, and merely a 0.5-day average greater length of stay. However, it counters recent inpatient trends and the VA's deinstitutionalization efforts, and translates into hundreds of psychiatric admissions every year. Although the admission risk change is rather small, the trajectory is troubling; given existing adherence problems, any deleterious outcome serves as a cautionary indicator.

A final important consideration is that these results do not warrant the conclusion that reductions in psychotropic prescriptions are necessarily evidence of decrements in care (ver-

sus simply a more efficient use of pharmacy services). For example, quality improvements would certainly be defined as eliminating combination antipsychotic fills or unnecessary adjunctive medications. Furthermore, antipsychotic prescriptions might conceivably be more sensitive to copayments than other psychotropics, with possibly even greater clinical ramifications. Future analyses breaking out certain drug classes are needed, undoubtedly supplemented by medical chart reviews, to gain a fuller perspective on the situation.

Several limitations of this administrative database study should be mentioned. First is the aforementioned inability to delve into psychotropic medication subgroups (eg, antipsychotics, mood stabilizers). Second, although inpatient utilization is frequently a proxy for illness severity, it is an insensitive marker of clinical status, possibly underestimating adverse events stemming from higher copayments and lower medication adherence. Again, ED visits were not investigated here; because the link between higher drug costs, poorer adherence, and deteriorating symptoms might easily translate to more urgent care visits, healthcare organizations must seriously consider this potential ramification. Likewise, we did not analyze exacerbated symptomology, deteriorating functioning, and



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other negative clinical outcomes. Declining outpatient visits, however, does indicate less provider contact and monitoring, perhaps later contributing to ED visits or admissions. In general, the sharp reduction in necessary medications and treatment potentially creates an environment for more health consequences.

The results also do not address the effect of higher copayments on certain subgroups, although medication reductions occurred after adjusting for demographic characteristics. Based on the literature and multivariate coefficients here, we hypothesize that certain individuals are particularly sensitive to medication costs. Because aging is associated with additional illness burden, pharmacy needs often simultaneously increase exponentially. Furthermore, incomes and prescription benefits are limited in elderly patients, and this has severe implications for responses to copayment changes, as older individuals face difficult economic and health decisions.

Similarly, because ethnic minorities already use and have financial access to fewer prescription drugs,<sup>44</sup> their lower utilization in this study is not surprising. But the medication decisions are interesting, as the parameter estimates for all minority patients compared with white patients were significantly larger for psychiatric fills, with much smaller differences on medical drugs. Although African Americans faced greater admission risks, the other ethnic groups were far less likely than white veterans to be hospitalized. Utilization patterns raise intriguing questions about the diversity of health beliefs, medication preferences, and treatment priorities, with possible ethnic differences regarding copayment adjustments.

Veterans with multiple medical or mental illnesses are particularly vulnerable to copayment changes because of the volume of necessary medications. These sicker patients are undoubtedly affected by higher drug costs and subsequent consequences. Recognizing its influence on the precarious

■ **Table 3B.** Multivariate Results and Longitudinal Models: Outpatient Stops and Pharmacy Costs\*

Covariate	Outpatient Stops (Intercept = 8.42)		Pharmacy Costs (Intercept = 4.41)	
	Parameter Estimate (SE)	P	Parameter Estimate (SE)	P
Exempt group	2.98 (0.59)	<.0001	0.68 (0.03)	<.0001
Time by copay group (T <sup>1</sup> )	2.51 (0.58)	<.0001	0.49 (0.02)	<.0001
Time by copay group (T <sup>2</sup> )	1.89 (0.40)	.0002	0.32 (0.02)	<.0001
Time by copay group (T <sup>3</sup> )	1.06 (0.35)	.0044	0.19 (0.02)	<.0001
Female	8.00 (1.17)	<.0001	0.22 (0.06)	<.0001
African American	-3.23 (0.59)	<.0001	-0.45 (0.03)	<.0001
Hispanic	-2.88 (0.94)	.0021	-0.04 (0.04)	.3850
Other ethnic	-7.33 (0.87)	<.0001	-0.42 (0.04)	<.0001
Middle age	2.85 (0.61)	<.0001	0.04 (0.03)	.1499
Older age	3.84 (0.84)	<.0001	0.74 (0.04)	<.0001
Medical comorbidities	6.56 (0.22)	<.0001	0.41 (0.01)	<.0001
Never married	5.06 (0.51)	<.0001	-0.05 (0.02)	.0508
Tenure (VA system)	1.12 (0.13)	<.0001	0.12 (0.01)	<.0001
Substance abuse diagnosis	12.86 (0.60)	<.0001	-0.13 (0.03)	<.0001
Urban resident	7.10 (0.62)	<.0001	-0.14 (0.03)	<.0001

\*Model significance was set at  $P < .001$ . For definitions of T<sup>1</sup>, T<sup>2</sup>, and T<sup>3</sup>, see the footnote to Table 2.

nature of adherence and hospitalization, substance abuse also imparts a special danger here. Dual-diagnosis patients were twice as likely to experience an admission than individuals with schizophrenia alone. This “double jeopardy”<sup>45</sup> renders veterans particularly susceptible to adverse ramifications.

## HIGHER COPAYMENTS AS HEALTH POLICY

From the VA's perspective, balancing its mission and budgetary responsibilities, these results imply the Millennium Bill copayment increase has been effective even among veterans with schizophrenia. Curbing pharmacy costs while focusing limited resources on the highest-priority veterans, the new policy was implemented with relatively minimal clinical consequences. If so, then nearly \$15 million in revenue and pharmacy savings support arguments the policy has been reasonably successful to date.

However, recognizing the high illness burden, low economic status, and medication adherence problems of this population, any further obstacle to appropriate treatment holds special significance. Patients suffering from schizophre-

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■ **Table 3C.** Multivariate Results and Longitudinal Models: Inpatient Days and Admission Risk\*

Covariate	Inpatient Days (Intercept = 17.76)		Any Admission Risk <sup>†</sup> (Intercept = 5.59)		
	Parameter Estimate (SE)	P	Parameter Estimate (SE)	Relative Risk (Exponentiated)	P
Exempt group	0.05 (0.07)	.8420	0.22	1.25 (0.04)	.0019
Time by copay group (T <sup>1</sup> )	-0.61 (0.27)	.0721	0.09	1.09 (0.04)	.0469
Time by copay group (T <sup>2</sup> )	-1.09 (0.41)	.0422	0.06	1.06 (0.04)	.0393
Time by copay group (T <sup>3</sup> )	-0.56 (0.19)	.0362	-0.04	0.96 (0.04)	.0209
Female	2.27 (0.74)	.0060	0.11	1.12 (0.05)	.0325
African American	-0.18 (0.21)	.6525	0.16	1.17 (0.02)	<.0001
Hispanic	-2.14 (0.52)	.0067	-0.27	0.76 (0.05)	<.0001
Other ethnic	-2.41 (0.75)	.0114	-0.51	0.60 (0.06)	<.0001
Middle age	1.76 (0.41)	<.0001	-0.27	0.76 (0.04)	<.0001
Older age	1.18 (0.27)	<.0001	-0.74	0.48 (0.05)	<.0001
Medical comorbidities	-0.67 (0.08)	<.0001	-0.03	0.97 (0.01)	.0008
Never married	2.52 (0.36)	<.0001	-0.02	0.98 (0.02)	.3500
Tenure (VA system)	0.11 (0.09)	.2692	0.02	1.02 (0.01)	.0002
Substance abuse diagnosis	0.35 (0.24)	.3650	0.84	2.31 (0.02)	<.0001
Urban resident	-0.79 (0.38)	.1006	0.02	1.02 (0.03)	.5342

\*Model significance was set at  $P < .001$ . For definitions of T1, T2, and T3, see the footnote to Table 2.  
<sup>†</sup>The parameter estimates for the "any admission risk" outcome were derived from a logit model and were converted into exponentiated relative risk coefficients here.

nia might be unique in their response to medication costs; an absence of severe consequences probably cannot be viewed as an exceptionally positive outcome, for the additional admission risk is disquieting. Ramifications not immediately captured in administrative data could further challenge sanguine interpretations, justifying a cautious approach to policy implementation and evaluation.

Other unresolved questions are whether uniform copayment policies are appropriate and whether it was wise to jump straight to \$7 charges. This abrupt increase tripled out-of-pocket costs and provoked resistance from veterans and their advocates. Perhaps other options were available. These include tiered copayments, a sliding scale based on income, a gradual increase from \$2 over time, or linking future increases to inflation. Fendrick and colleagues proposed copayments based on potential drug benefits (ie, higher charges for medications with lower benefits).<sup>46</sup> Such approaches balancing need, effectiveness, and economic factors represent alternative perspectives on this debate.

Donabedian eloquently argued that the primary purpose of healthcare benefits, including copayments, is to help equitably redistribute finite resources across the entire population,

especially among the most needy.<sup>47</sup> The VA endeavors to honor this principle while remaining cognizant of its stewardship responsibilities and mission to serve deserving veterans. We note that the copayment group represents fewer than 1% of all veterans treated within the VA, raising a broader perspective issue regarding policy equity. The association between medication charges, cost-related restrictions, and health ramifications extends beyond the scope of this study. The vast majority of mental health treatment expenditures fall within the public sector, including Medicaid as well as the VA.<sup>48</sup> The issue of addressing medication costs while maintaining the quality of care for these vulnerable patients is increasingly critical.

We recognize that prescription fills and adherence are not synonymous. Pharmacy data do not reflect the amount of medication consumed, nor how patients manage prescription gaps or utilize non-VA benefits. The latter issue is problematic if veterans have coinsurance or become eligible for Medicare. Yet as in Medicaid populations, this issue is less pertinent for VA patients with schizophrenia. One study determined that 23% of veterans with psychiatric conditions seek non-VA care,<sup>43</sup>

## Medication Copayment Increase

but a schizophrenia diagnosis (and ethnic minority status) greatly reduced this cross-system use. These veterans are highly dependent on VA treatment, validated by their SC and system tenure. The \$7 copayment remains considerably lower than other systems charge. It is doubtful that study patients utilize many non-VA pharmacy or other services.

Potential adjustments in provider behavior, such as altering prescribing patterns, represent another unexplored dynamic. Besides offering alternative treatment to drugs when possible (eg, cognitive-behavioral therapy, often effective for schizophrenia), physicians can possibly assist patients by reducing medication frequencies or eliminating nonessential prescriptions. Unlike their patients, physicians are rather naïve about medication costs: 80% admitted little knowledge regarding the cost of many drugs. Fortunately, 88% believed cost was important when writing prescriptions, and were willing to balance cost versus efficacy to help patients afford drugs.<sup>49</sup>

Follow-up studies should address limitations and elicit additional details regarding these findings. Subanalyses could focus on groups potentially more sensitive to medication costs (older patients, minorities, patients with multiple comorbidities), along with studying other health utilization outcomes. There should be a more detailed cost-effectiveness study comparing revenue gains with additional inpatient costs. Examining specific classes of psychotropic medications (eg, antipsychotics alone) would also be helpful. Finally, extending the project for several more years would enable the VA to better recognize longer term outcomes.

## CONCLUSION

In conclusion, this study provides important insights into the effect of a medication copayment increase, yielding additional fuel for ongoing policy discussions regarding potential benefits and ramifications. The sharp decrease in psychotropic prescription fills, coupled with a slightly increased admission risk, is troubling. Although it appears that the Millennium Bill indeed stemmed accelerating pharmacy costs, perhaps the clinical consequences have yet to be fully realized. Budgetary concerns are clearly a reality within the VA, as they are for any healthcare organization. The increasingly visible specter of rising pharmacy costs, far exceeding treatment expenditures, could not be ignored.

Future copayment increases are inevitable and remain a significant issue faced by all veterans, not only those suffering from serious chronic conditions such as schizophrenia. Yet because these individuals are possibly more sensitive to bene-

### Take-away Points

This study showed that higher medication copayments for veterans with schizophrenia yielded a sharply reduced number of psychiatric drug refills, with slightly higher admission rates. Potential policy lessons learned include:

- Healthcare benefit decisions are best made at the intersection of clinical and financial implications.
- Patients who have multiple illnesses and drug costs face difficult decisions.
- “One-size fits all” policies may inequitably serve certain disadvantaged patients.

fit changes, policies applicable to nearly 5 million other veterans might not be universally appropriate. This issue is especially relevant within an organization responsible for a rapidly aging population during ongoing Medicare prescription debates, as the VA anticipates more patients transferring into an already overburdened system.

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