Unintended Consequences of a Medicaid Prescription Copayment Policy

Daniel A. Lieberman, MD, Jennifer M. Polinski, ScD, MPH,† Niteesh K. Choudhry, MD, PhD,† Jerry Avorn, MD,† and Michael A. Fischer, MD, MS†*

Background and Objectives: Medication copayments can influence patient choices. We evaluated 2 copayment policies implemented by Massachusetts Medicaid incentivizing the use of selected generic medications.

Research Design and Measures: In 2009, Massachusetts Medicaid copayments were $1 for generics and $3 for brands. On February 1, 2009, copayments for generic antihypertensives, antihyperlipidemics, and hypoglycemics (target medications) remained at $1, whereas copayments for all nontarget generics increased to $2 (policy #1) and $3 on July 1, 2010 (policy #2). Using state-level, aggregate prescription data, we developed interrupted time-series models with controls to evaluate the impact of these policies on use of target generics, target brands, and nontarget essential medications (defined as medications required for ongoing treatment of serious medical conditions).

Results: After policy #1, target generic use increased by 0.93% ($P < 0.001$) with a subsequent quarterly slope decrease of -0.16% ($P < 0.01$); policy #2 led to a slope increase of 0.20% ($P < 0.01$) for target generics; increase in target generics attributable to policy changes was 28,000 prescriptions per year. Neither policy affected target brand use. For nontarget essential generics, there was a -0.27% ($P < 0.001$) quarterly slope decrease after policy #1 and a 0.32% ($P < 0.01$) slope increase after policy #2 with total decrease attributable to policy changes of 127,300 prescriptions per year. For nontarget essential brands, there was a level increase of 0.91% ($P < 0.001$) after policy #1 with increased use attributable to policy changes of 98,300 prescriptions per year.

Conclusions: Two copayment policies designed to encourage use of selected generic medications modestly increased their use; however, there was a shift in other essential medications from generics to brands, which could increase Medicaid costs. When adjusting copayments, careful consideration must be given to unintended consequences of specific policy structures.

Key Words: health policy, Medicaid, copayments, prescription drugs, pharmacy benefits

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Prescription copayments can affect medication use and have been used to encourage patients and providers to choose specific medications. Prior research has documented the impact of copayments on medication use in a variety of settings, demonstrating that changing required copayments can have an immediate impact on medication use and potentially on clinical outcomes.[1–3] Some prior studies have raised concerns that increasing patient cost-sharing may impede beneficial drug use and cause harm that outweighs reductions in drug costs.[4,5]

Most state Medicaid programs require copayments for prescription medications, although copayments vary considerably from state to state.[6] The federal government restricts the maximum copayment for Medicaid programs; for many years the maximum has been $3 per prescription.[7] Given that Medicaid recipients have limited disposable income, even small copayment changes can substantially alter patient behavior. Copayments as low as $0.50 have been shown to change prescription utilization by Medicaid recipients.[3,8]

Copayment structures are frequently based on medication costs faced by public or private insurers, with lower copayments for generic medications and higher copayments for more expensive branded medications. More recently some insurers have implemented value-based insurance designs (VBIDs), lowering or even removing costs for medications that are highly effective.[9,10] It is not known whether such policies can be effective for Medicaid patients, many of whom have minimal disposable income. We examined the impact of 2 recent policies implemented

From the *Division of Emergency Medicine, Harborview Medical Center, University of Washington, Seattle, WA; and †Division of Pharmacoepidemiology and Pharmacoeconomics, Brigham and Women's Hospital and Harvard Medical School, Boston, MA.

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Reprints: Michael A. Fischer MD, MS, Division of Pharmacoepidemiology and Pharmacoeconomics, Brigham and Women s Hospital and Harvard Medical School, 1620 Tremont Street, Suite 3030, Boston, MA 02120. E-mail: mfischer@partners.org.

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by Massachusetts Medicaid (MassHealth) requiring lower copayments for selected classes of cost-effective cardiovascular medications.

METHODS

In 2009 and 2010, Massachusetts Medicaid (MassHealth) implemented new copayment policies that favored generic medications for managing common cardiac risk factors. At the beginning of 2009, copayments were $1 for all generic drugs and $3 for all branded drugs. On February 1, 2009, MassHealth changed prescription copayments to favor generic antihypertensives, antihyperlipidemics, and hypoglycemics (target generic medications).[11] New copayments were $1 for target generic medications, $2 for generic medications in other classes (nontarget generic medications), and $3 for branded medications. On July 1, 2010, copayments for nontarget generics were further increased from $2 to $3.[11] Throughout the study period, copayments for target generic medications and branded medications remained constant at $1 and $3, respectively. After the second change, copayments for generic and branded nontarget medications were the same, eliminating patient financial incentives to prefer generics among these classes.

We obtained medication utilization data from the Center for Medicare and Medicaid Services, which provides quarterly data on aggregate drug use by state Medicaid programs.[12] These state-level data include the number of prescriptions filled, the number of medication units dispensed, and the Medicaid reimbursement for each medication, grouped by National Drug Code (NDC). We merged Medicaid data by NDC with the National Drug Data File from First Databank to include information on brand/generic status and therapeutic class.[13] No patient-level data were included in analyses.

The World Health Organization defines a list of *essential medications* based on their safety and efficacy for treating conditions important for the public health.[14] Prior studies examining the impact of cost-sharing policies have also defined essential medication lists, again based on the importance of the agents for preventing clinically significant morbidity and mortality for common conditions.[4,5] We adapted these consensus definitions to create an essential medication list for the purposes of this analysis. We did not include the medications targeted by the MassHealth copayment policies in this list. We also excluded from the essential medications list frequently overused medications, such as antiulcer medications, antidepressants, antibiotics, analgesics, nonsteroidal anti-inflammatory drugs, stimulants, anxiolytics, and some antiepileptics often prescribed for neuropathic pain.[15–18]

For this analysis, *essential medications* included the following agents: antipsychotics, antiparkinsonion agents, loop diuretics, antianginal agents, bronchodilators, oral corticosteroids, antiepileptics (excluding gabapentin, pregabalin, benzodiazepines, and barbiturates), anticoagulants, antiretrovirals, antitubercular agents, antiarrhythmics, bone resorption inhibitors, digoxin, gout preventative agents, thyroid hormone replacement, lithium, and immunosuppressants.

Outcomes evaluated were the percentage of filled prescriptions accounted for by: target generic medications, target branded medications, nontarget essential generic medications, nontarget essential branded medications, and all branded medications. We calculated outcomes for 6 calendar quarters before the first copayment change (baseline: July 2007–December 2008), between the first and second copayment changes (policy #1: January 2009–June 2010), and after the second copayment change (policy #2: July 2010–September 2011). We identified 2 states (Colorado, Minnesota) with copayment structures identical to Massachusetts's initial policy ($1 for generic drugs, $3 for branded drugs) and no copayment policy changes during this period. The supplemental digital content (methods) (Supplemental Digital Content 1, http://links.lww.com/MLR/A694) shows additional information about state copayment policies. The trends in medication use over the study period were similar in the 2 control states, hence we used average rates of study outcomes from these states as a control series.

We developed segmented linear regression models with an autoregressive correlation structure and lag times of one quarter after each policy change, adjusted for seasonality.[19–21] Models included terms for the temporal relationship of each quarter with implementation of each policy, including immediate (*level*) change and ongoing change over time (*slope*). We hypothesized that these policies might change prescription-filling behavior both immediately after implementation and over time. Immediate changes would be seen when patients presenting to the pharmacy were required to pay higher copayments, which could lead them to abandon prescriptions. Sustained effects over time could be seen in patients initiating new prescriptions if the copayment changes were incorporated into physicians' prescribing decisions or patient prescription-filling behaviors. The use of control states allowed us to account for underlying trends in drug use during the study period. For complete model details see supplemental digital content (methods) (Supplemental Digital Content 1, http://links.lww.com/MLR/A694). We used the t test results based on estimated β-coefficients and SEs from linear models to determine statistical significance at a $P < 0.05$. Analyses were conducted with SAS version 9.2 (SAS Institute Inc.).

To approximate the impact of copayment policy changes on prescription utilization, we calculated the change in prescription use attributable to copayment policy implementation, that is, the difference between the observed utilization and the expected utilization had the policy not gone into effect (the counterfactual). We then adjusted this difference between actual prescription use and expected prescription use to arrive at an annual estimate of policy impact on the number of prescriptions.

RESULTS

In the third quarter of 2007, targeted generic medications accounted for 12.8% of prescriptions covered by MassHealth and 8.5% of prescriptions in the 2 control states (Fig. 1). Over the study period, the proportion of Medicaid drugs accounted for by these medications increased by

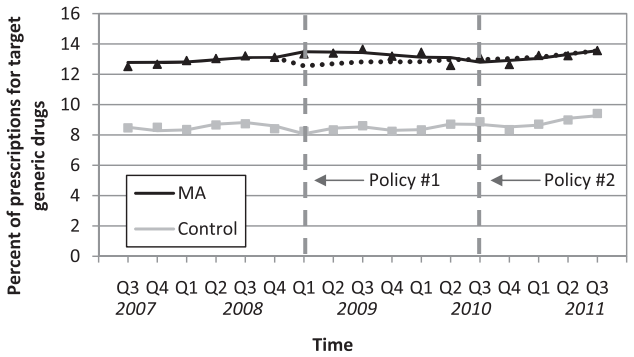

FIGURE 1. Percent of prescriptions accounted for by target generic drugs (antihypertensives, antihyperlipidemics, and hypoglycemics) before and after implementation of Massachusetts's copayment policies. Triangles represent the actual percentage of prescriptions for drug classes. Solid lines represent predicted utilization based on models. Dotted line represents predicted utilization in Massachusetts if copayment policies had not been implemented. Time is measured in calendar quarters. The average of medication use in 2 states (Colorado, Minnesota) with unchanged copayment structures identical to Massachusetts's initial policy was used as a control series.

approximately 1% in both Massachusetts and the control states. Table 1 summarizes model results for level and slope change parameters after the first and second policy changes for all outcomes; these parameters reflect the changes in Massachusetts after adjusting for the underlying trends in control states. After the first copayment change, we found an immediate level increase of 0.93% [95% confidence interval (CI), 0.62, 1.24; $P<0.001$] in the percentage of prescriptions for target generic drugs compared with prepolicy levels, and a subsequent quarterly slope decrease of −0.16% (95% CI, −0.25, −0.068; $P=0.003$) (Table 1 and Fig. 1). After the second copayment change, there was a 0.20% (95% CI, 0.054, 0.35; $P=0.016$) slope increase and no significant level change ($P>0.10$) in the use of these medications. Calculating the difference between the observed use of target generic drugs and the expected use had neither policy been implemented demonstrated that an additional 28,000 target generic prescriptions (95% CI, −78,800, 134,800) were dispensed annually as a result of both policies. For target branded medications, there were no significant changes in level or slope after both policy changes.

Figure 2 shows the patterns of use of nontarget essential medications. At the start of the study period, nontarget essential generics (Fig. 2A) accounted for approximately 7% of prescriptions for both MassHealth and the control states, with similar initial growth rates. After policy implementation the rates diverged, with final rates of 10.1% in the control states and 8.6% in Massachusetts. Model results for nontarget essential generic medications (Table 1) showed a −0.27% (95% CI, −0.37, −0.17; $P<0.001$) slope decrease and no significant level change after the first policy change. After the second policy change, there was a 0.32% (95% CI, 0.15, 0.49; $P=0.002$) slope increase and no significant level change for these drugs. The decreased use of nontarget essential generic drugs attributable to both policy changes was 127,300 prescriptions annually (95% CI, −210,900, −43,700).

TABLE 1. Impact of 2 Massachusetts Copayment Policy Changes on the Percentage of Prescriptions Filled

	Impact of Policy Change #1		Impact of Policy Change #2	
Outcome	**Estimate**	**95% Confidence Interval**	**Estimate**	**95% Confidence Interval**
Target generic medications[†]				
Change in level	0.930**	0.620, 1.239	−0.156	−0.667, 0.355
Change in slope	−0.158**	−0.248, −0.068	0.204*	0.054, 0.354
Target brand medications[†]				
Change in level	−0.090	−0.342, 0.163	0.221	−0.164, 0.605
Change in slope	0.040	−0.032, 0.112	−0.041	−0.160, 0.078
Nontarget essential generic medications[‡]				
Change in level	−0.173	−0.529, 0.184	0.136	−0.438, 0.711
Change in slope	−0.268**	−0.371, −0.165	0.318**	0.147, 0.489
Nontarget essential brand medications[‡]				
Change in level	0.905**	0.524, 1.286	−0.257	−0.876, 0.363
Change in slope	0.085	−0.026, 0.195	−0.056	−0.239, 0.126
Brand medications				
Change in level	−1.349**	−2.231, −0.467	1.529*	0.109, 2.948
Change in slope	0.532**	0.277, 0.787	−0.258	−0.682, 0.167

Interrupted time-series analyses modeling the impact of 2 consecutive copayment policy changes on the proportion of prescriptions for selected groups of medications. The average of medication use in 2 states (Colorado, Minnesota) with unchanged copayment structures identical to Massachusetts's initial policy was used as a control series. "Level" refers to the immediate impact of copayment policy changes on the percentage of medication use. "Slope" refers to the subsequent rate of change per calendar quarter in the percentage of use resulting from the policy changes.

*$P<0.05$.

**$P<0.01$.

[†]Target medications: antihypertensives, antihyperlipidemics, and hypoglycemics.

[‡]Nontarget essential medications: antipsychotics, antiparkinsonion agents, loop diuretics, short-acting antianginal agents, short-acting bronchodilators, long-acting bronchodilators, oral corticosteroids, antiepileptics (excluding gabapentin, pregabalin, benzodiazepines, and barbiturates), anticoagulants, antiretrovirals, antitubercular agents, antiarrhythmics, bone resorption inhibitors, long-acting antianginal agents, digoxin, gout preventative agents, thyroid hormone replacement, lithium, and immunosuppressants.

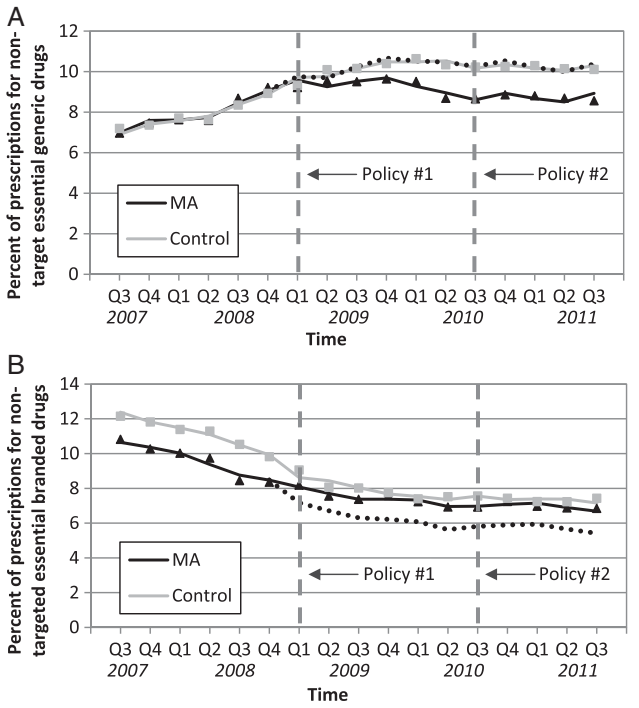

FIGURE 2. Percent of prescriptions accounted for by nontarget essential generic drugs and nontarget essential branded drugs before and after implementation of Massachusetts's copayment policies. A, Percent of prescriptions for nontarget essential generic drugs. B, Percent of prescriptions for nontarget essential branded drugs. Triangles represent the actual percentage of prescriptions for drug classes. Solid lines represent predicted utilization based on models. Dotted line represents predicted utilization in Massachusetts if copayment policies had not been implemented. Time is measured in calendar quarters. The average of medication use in 2 states (Colorado, Minnesota) with unchanged copayment structures identical to Massachusetts's initial policy was used as a control series. Nontarget essential medications include antipsychotics, antiparkinsonion agents, loop diuretics, antianginal agents, bronchodilators, oral corticosteroids, antiepileptics (excluding gabapentin, pregabalin, benzodiazepines, and barbiturates), anticoagulants, antiretrovirals, antitubercular agents, antiarrhythmics, bone resorption inhibitors, digoxin, gout preventative agents, thyroid hormone replacement, lithium, and immunosuppressants.

For nontarget essential branded medications (Fig. 2B), the proportion of prescriptions was initially 1.3% higher for the control states than MassHealth; however, the rate was only 0.6% higher in the control states at the end of the study period. Models (Table 1) showed a level increase of 0.91% (95% CI, 0.52, 1.29; $P<0.001$) and no significant slope change after the first policy change. After the second policy change, there were no significant level or slope changes for these drugs. The increased use of nontarget essential branded medications attributable to policy changes was 98,300 annually (95% CI, 57,000, 140,000).

For branded drugs (Fig. 3), Massachusetts initially had considerably lower use rates of 32.0% as compared with 39.8%

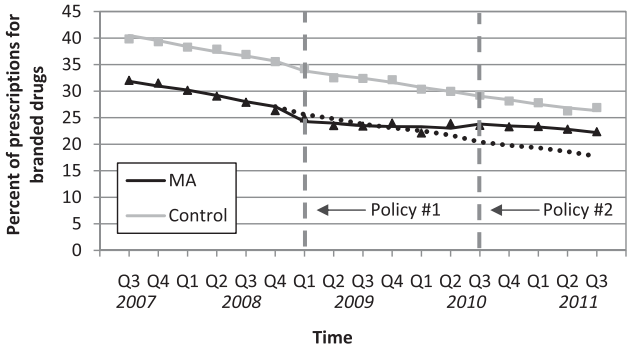

FIGURE 3. Percent of prescriptions accounted for by branded drugs before and after implementation of Massachusetts's copayment policies. Triangles represent the actual percentage of prescriptions for drug classes. Solid lines represent predicted utilization based on models. Dotted line represents predicted utilization in Massachusetts if copayment policies had not been implemented. Time is measured in calendar quarters. The average of medication use in 2 states (Colorado, Minnesota) with unchanged copayment structures identical to Massachusetts's initial policy was used as a control series.

in the control states; however, by the end of the study period that difference was reduced to 4.5%. Model results (Table 1) showed a level decrease of −1.35% (95% CI, −2.23, −0.47; $P=0.008$) and slope increase of 0.53% (95% CI, 0.28, 0.79; $P<0.001$) after the first policy change. After the second policy change, there was a 1.53% (95% CI, 0.11, 2.95; $P=0.049$) level increase and no significant slope change for these drugs. The increased use of branded drugs attributable to both policy changes was 272,100 prescriptions annually (95% CI, −65,700, 610,000). Complete parameter estimates for all models can be found in supplemental digital content (Supplemental Digital Content 1, Table 1, http://links.lww.com/MLR/A694). Using 2009 enrollment figures for MassHealth, the 2 policies resulted in the annual filling of 1 additional target generic prescription for every 35 non-elderly enrollees and 1 additional branded prescription for every 3.6 non-elderly enrollees.[22]

DISCUSSION

The implementation by Massachusetts Medicaid of 2 consecutive copayment policies designed to encourage the use of selected generic medications (target generic medications) only modestly increased utilization of those drugs but had unintended consequences for other medications. In particular, the copayment structure decreased and subsequently eliminated incentives for patients to use generic rather than branded drugs among all other medication classes. After policy implementation, we observed decreased use of nontarget essential generics and increased use of branded medications, including essential branded medications that were not targeted by the policy. The increased use of branded medications was considerably greater than the increased use of nontarget generic medications, as the policy resulted in the filling of 1 additional target generic prescription for every 35 non-elderly enrollees and 1 additional branded prescription for every 3.6 non-elderly enrollees.

Both public and private insurers have used patient cost-sharing policies such as copayments for many years, with the level of copayment or cost-sharing frequently reflecting medication cost. Recently some insurers have implemented or considered VBID, linking the patient's share of costs to the effectiveness, or clinical value, of the medication.[23,24] The policies implemented by MassHealth in 2009 and 2010 reflect the principles of VBID, creating the lowest barrier for medications that are highly effective at preventing cardiovascular disease.

The VBID model has been used most extensively in private insurance plans; experience in public systems such as Medicaid is limited. Accordingly, our results provide important insights and caveats when considering the implementation of VBID-based approaches for vulnerable populations. The VBID approach may be constrained in this case by Medicaid regulations limiting maximum copayments.[7] If the policy required higher copayments for branded medications among nontarget medications, the observed increase in branded medication use might not have occurred; however, Medicaid patients by definition have limited financial resources and such an approach would raise important concerns about equity.

There are limitations that must be kept in mind when interpreting our findings. In the states that we studied, we collected data on copayment policies. It is possible that other Medicaid policy changes differing between MassHealth and the control states may have affected use of the medications we studied. In particular, Massachusetts was in the process of implementing a statewide health care reform to provide near-universal coverage at this time. This included a significant Medicaid expansion, which might change the mix of medications.[25] Medicaid programs receive rebates from drug companies that may differ between branded and generic medications and the terms of those arrangements are not publicly available, hence we are unable to comment on the overall financial impact of these policy changes.

The interrupted time-series analysis with a control series does account for underlying differences between states and for changes that occur over time across all states; however, we cannot exclude the possibility that external factors might have altered these outcomes. The available data included only aggregate medication use, as we were not able to obtain quarter-by-quarter information on Medicaid enrollment for the study period. Accordingly, major changes in the demographics or clinical profile of enrollees might confound the observed associations. By using an outcome measure that expresses medications as a proportion of a total, we intended to approximate medications changes and/or substitutions that might be occurring in response to policy changes, an approach that has been used in multiple prior studies.[19,20] We defined essential medications based on WHO consensus documents and prior publications, but some classes may be both essential and overused. For example, antipsychotic medications are frequently overused, but given their clinical importance for the large proportion of Medicaid patients with significant psychiatric disease, we chose not to exclude these medications from our analyses.

Although we did not have individual-level data, these results suggest that for nontarget medications patients may have filled prescriptions for branded drugs rather than generics, which could decrease cost-effectiveness of care and increase Medicaid costs. These results also confirm that copayment changes as low as $1 can substantially impact the behavior of Medicaid recipients.[3,8] When adjusting copayments, careful consideration must be given to potential unintended consequences of specific policy structures. Future research examining the clinical and economic impact of such policies, including patient-level analyses, could facilitate sound pharmaceutical policy design.

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