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Impact of Two Medicaid Prior-Authorization Policies on Antihypertensive Use and Costs Among Michigan and Indiana Residents Dually Enrolled in Medicaid and Medicare: Results of a Longitudinal, Population-Based Study

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Abstract

Background—In response to rising pharmaceutical costs, many state Medicaid programs have implemented policies requiring prior authorization for high-cost medications, even for established users. However, little is known about the impact of these policies on the use of antihypertensive medicines in the United States.

Objective—The aim of this longitudinal, population-based study was to assess comprehensive prior-authorization programs for antihypertensives on drug use and costs in a vulnerable Medicaid population in Michigan and Indiana.

Methods—A prior-authorization policy for anti-hypertensives was implemented in Michigan in March 2002 and in Indiana in September 2002; Indiana also implemented an antihypertensive stepwise-therapy requirement in July 2003. Our study cohort included individuals aged 18 years in Michigan and Indiana who were continuously enrolled in both Medicaid and Medicare from July 2000 through September 2003. Claims data were obtained from the Centers for Medicare and Medicaid Services. We included all antihypertensive medications, including diuretics, angiotensin-converting enzyme inhibitors, calcium channel blockers, β -blockers, α -blockers, and angiotensin II receptor blockers. We used interrupted time-series analysis to study policy-related changes in the total number and cost of anti-hypertensive prescriptions.

Results—Overall, 38,684 enrollees in Michigan and 29,463 in Indiana met our inclusion criteria. Slightly more than half of our cohort in both states was female (53.29% in Michigan and 56.32% in Indiana). In Michigan, 20.23% of patients were aged \geq 65 years; 77.44% were white, 20.11%

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were black, and the remainder were Hispanic, Native American, Asian, or of other or unknown race. In Indiana, 20.07% were aged ≥ 65 years; 84.93% were white, 13.64% were black, and the remainder were Hispanic, Native American, Asian, or of other or unknown race. The implementation of both policies was associated with large and immediate reductions in the use of nonpreferred medications: 83.33% reduction in the use of such drugs in Michigan (-84.30 prescriptions per 1000 enrollees per month; $P < 0.001$) and 35.76% in Indiana (-64.45 prescriptions per 1000 enrollees per month; $P < 0.001$). As expected, use of preferred medications also increased substantially in both states ($P < 0.001$). Overall, antihypertensive therapy immediately dropped 0.16% in Michigan ($P = 0.04$) and 1.82% in Indiana ($P = 0.02$). Implementation of the policies was also associated with reductions in pharmacy reimbursement of \$616,572.43 in Michigan and \$868,265.97 in Indiana in the first postpolicy year.

Conclusions—Prior authorization was associated with lower use of nonpreferred antihypertensive drugs that was largely offset by increases in the use of preferred drugs. The possible clinical consequences of policy-induced drug switching for individual patients remain unknown because the present study did not include access to medical record data. Further research is needed to establish whether large-scale switches in medicines following the inception of prior-authorization policies have any long-term health effects.

Keywords

prior authorization; Medicaid; anti-hypertensive; drug utilization; costs

INTRODUCTION

Rising drug costs are a major concern in nearly all US health insurance systems, including Medicaid programs.¹ Between 1994 and 2004, Medicaid drug expenditures grew $\sim 15.4\%$ annually, leading many states to implement cost-control measures.² One popular approach has been prior-authorization policies that require prescribers to receive permission before dispensing specific medications.^{3,4} In particular, many Medicaid programs and Medicare Part D plans have instituted prior-authorization requirements for drugs that treat hypertension. For example, at least 32 state Medicaid programs have prior-authorization programs in place for angiotensin II receptor blockers (ARBs).⁵ These policies often require stepwise therapy in which patients are required to try one medication class before being permitted to receive another. Antihypertensives are a natural target for such policies because there are many different therapies within each class, often with comparable therapeutic effects and a wide range of costs.⁶

Drugs for cardiovascular conditions are the most widely prescribed agents in Medicaid, representing 17.9% of all prescriptions in 2004.⁷ Hypertension is a highly prevalent condition that forms a major component of these costs. An estimated 65 million US adults had hypertension in 1999 and 2000, and rates of control among community-dwelling people aged >60 years range from 23% to 38%.^{8,9} This high prevalence has created a considerable burden for the health care system, with costs totaling US \$63.5 billion in 2006.¹⁰ Approximately one third of this expenditure was for medications, and evidence suggests that closer adherence to evidence-based clinical guidelines could significantly reduce costs, making them an obvious target for cost-control measures.⁶

Research on other medication classes suggests prior-authorization requirements may reduce both medication use and costs. For example, the establishment of a prior-authorization requirement for nongeneric NSAIDs in the Tennessee Medicaid system was associated with a 19% drop in the number of days of therapy prescribed and a 53% reduction in costs.¹¹ Similarly, prior authorization for cyclooxygenase-2 inhibitors was associated with an 18% reduction in per-prescription costs across several Medicaid programs.¹² Finally, a prior-

authorization requirement for proton pump inhibitors implemented in the Georgia Medicaid system was associated with a 7% reduction in the number of prescriptions and a 50% reduction in expenditures.¹³ However, the effect of prior-authorization policies on drug utilization and expenditure is not universal across drug classes. Studies of prior-authorization requirements for antipsychotic medications in 3 states did not find any significant reduction in pharmacy costs.^{14,15} Moreover, a study of prior authorization of controlled-release oxycodone found only small cost savings.¹⁶ Thus, the effects of prior-authorization policies on drug use and costs appear to be class specific. There is also some evidence that the impact of a prior-authorization policy can vary, based on when and how it is implemented.¹⁷

Previous research has not thoroughly explored the longitudinal impact of prior-authorization policies on antihypertensive use and expenditures. One serious concern about prior authorization is that limited formularies might lead to suboptimal matching of patients with appropriate medication, leading to poorer disease management.¹⁸ For asymptomatic conditions such as hypertension, administrative restrictions may be disruptive to treatment, even with a range of therapeutic alternatives.¹⁹ One previously published study of prior authorization for ARBs found that stepwise therapy policies were associated with small decreases in utilization, whereas less restrictive policies were not.² However, this study only examined one class of antihypertensive medications. As policies are often implemented across many classes simultaneously and users may switch between classes, it is important to assess their overall impact. The objective of this longitudinal, population-based study was to assess the effects of comprehensive prior-authorization programs for antihypertensives on drug use and costs in a vulnerable Medicaid population in Michigan and Indiana.

PATIENTS AND METHODS

Study Setting

We examined the impact of prior-authorization requirements targeting antihypertensives that were implemented in 2 different Medicaid programs: Michigan and Indiana. The prior-authorization policy for anti-hypertensives in Michigan was implemented in March 2002 and affected a number of agents across a range of drug classes. However, an analysis of the Michigan policy found that the prior-authorization requirements were particularly restrictive for cardiovascular medicines in comparison with other drug classes.¹⁹ There were also concerns that the Michigan prior-authorization policy was poorly implemented, leading to confusion among both patients and providers.¹⁹

Indiana Medicaid first required prior authorization for some antihypertensive agents 6 months later, in September 2002. Initially, the policy affected only certain angiotensin-converting enzyme (ACE) inhibitors, but it was quickly expanded to cover numerous antihypertensive classes, including ARBs, β -blockers (BBs), and calcium channel blockers (CCBs). Indiana also coupled its prior-authorization requirement for ARBs with a stepwise-therapy requirement started in July 2003. Under this program, patients were required to try an ACE inhibitor before being granted prior authorization to obtain an ARB.⁵ Such stepwise-therapy requirements are a common component of Medicaid preferred drug lists in the United States.¹⁴

Data Sources

Our study cohort included all individuals aged ≥ 18 years in Michigan and Indiana, who were dually enrolled in Medicaid and Medicare programs continuously from July 2000 through September 2003. This time frame provided ≥ 20 months of observation leading up to the implementation of either policy and ≥ 1 year of follow-up after implementation. As in

previous work, we excluded dually enrolled patients covered by either Medicaid or Medicare managed-care programs because the data capture used in this study design might not have represented the complete claims history of such patients.²⁰ For the same reason, we also excluded individuals enrolled solely in Medicaid in both states, because managed-care programs covered the majority of these individuals. We used administrative claims data from Medicaid and Medicare fee-for-services enrollees in 2 states purchased from the Centers for Medicare and Medicaid Services. This data use was reviewed and found to meet federal regulatory criteria exempting it from review by the institutional review boards at both Harvard Pilgrim Health Care Institute and Kaiser Permanente Northern California.

In our analysis of drug utilization, we included all antihypertensive medications, including diuretics, ACE inhibitors, CCBs, BBs, α -blockers, and ARBs. Based on the individual state policies, we classified each drug into the following categories: (1) *nonpreferred drugs* that were subject to prior authorization; (2) *preferred drugs* for which prior authorization was not required; and (3) *unlisted* antihypertensives that were not explicitly designated as either nonpreferred or preferred drugs in the state's Medicaid system, and were therefore not subject to prior authorization.

Measures

To estimate the impact of both state policies on overall antihypertensive utilization in a comparable manner, we analyzed the number of prescriptions per 1000 enrollees per month in both states. Second, we analyzed the same rate of preferred, nonpreferred, and unlisted drugs separately to assess changes in their use resulting from the policies. Finally, we calculated the total reimbursement for antihypertensive medications per 1000 enrollees per month to assess pharmacy reimbursement. We converted all costs to 2003 US dollars using the Consumer Price Index.²¹

Statistical Analysis

We used interrupted time-series analysis to assess the impact of prior authorization in both states.²² This method simultaneously controls for the baseline (prepolicy) level and trend of each outcome and estimates postpolicy changes in both the level and the trend. Because the 2 states' policies were implemented 6 months apart, we analyzed them as 2 distinct interventions in separate models, but assessed all outcomes as rates to make them directly comparable. All models were fit using maximum likelihood generalized least squares models, and we controlled for autocorrelation by including any significant autoregressive parameters up to 12 months. All analyses were conducted using SAS 9.1 (SAS Institute Inc., Cary, North Carolina).

RESULTS

Sample Characteristics

Descriptive characteristics of our cohort in both states are detailed in Table I. There were 38,684 enrollees in Michigan and 29,463 in Indiana who met our study inclusion criteria. Slightly more than half of our cohort in both states was female (53.29% [20,614/38,684] in Michigan and 56.32% [16,595/29,463] in Indiana), consistent with the previously published observation that Medicaid traditionally covers more adult females than males.²³ In Michigan, 20.23% of subjects (7827/ 38,684) were aged ≥ 65 years; 77.44% (29,957 subjects) were white, 20.11% (7781) were black, and the remainder were Hispanic (0.90% [348]), Native American (0.56% [218]), Asian (0.25% [96]), or of other (0.54% [207]) or unknown (0.20% [77]) race. In Indiana, 20.07% (5913/29,463) were aged ≥ 65 years; 84.93% were white (25,022 subjects), 13.64% (4018) were black, and the remainder were

Hispanic (0.55% [163]), Native American (0.14% [41]), Asian (0.21% [61]), or of other (0.33% [97]) or unknown (0.21% [61]) race.

Prepolicy Medication Use

Table I also shows the overall level of treatment with antihypertensive medicines in our study cohort. Two months before the implementation of the policy in Michigan (January 2002), the overall proportion of patients receiving 1 antihypertensive was 32.27% (12,484/38,684) in Michigan and 31.83% (9378/29,463) in Indiana. The proportion of patients receiving 1 prescription within the major antihypertensive classes was also similar between states (Table I). However, there were several differences in utilization of the specific drugs that were subsequently subject to prior authorization under the different state policies. Table II shows the top 20 antihypertensive drugs by pharmacy reimbursement from July 2000 through February 2002 (ie, the prepolicy period in Michigan). During this time period, drugs subsequently subject to prior authorization represented 19.30% of all antihypertensive prescriptions and 31.36% of antihypertensive pharmacy reimbursements. These numbers varied by class. For example, 89.12% of ARB prescriptions in the prepolicy period were for agents that were later subject to prior authorization, whereas diuretics did not appear to be affected by the policy. The policy in Indiana was comparatively more restrictive; 30.88% of all anti-hypertensive prescriptions received in the prepolicy period were subject to subsequent prior authorization, representing 46.13% of total prepolicy pharmacy reimbursements.

For some drug classes, the differences in the scope of the prior-authorization policies were substantial. For instance, Indiana's preferred drug list included only generic ACE inhibitors, whereas Michigan's list included some branded drugs. As a result, 85.31% of the pre-policy prescriptions for ACE inhibitors in Indiana were subject to prior authorization after the policy, versus only 36.34% in Michigan.

Overall Antihypertensive Use

The implementation of the prior-authorization policies appeared to have only a small effect on the overall extent of antihypertensive use in either state. Figure 1 shows the time series of the rate of antihypertensive prescribing in both states, before and after their respective policies were enacted. Use of antihypertensives rose over the study period in both states. Our time-series analyses indicated that there was no statistically significant immediate change in utilization (-4.07 prescriptions per 1000 enrollees per month [95% CI, -13.34 to 5.20]; $P = \text{NS}$) in Michigan, but there was a significant decline in trend of prescriptions per 1000 enrollees per month (-0.94 [95% CI, -1.85 to -0.04]; $P = 0.04$), representing a drop of 0.16% in the first month. In contrast, our model suggested an immediate decrease in utilization of 15.67 prescriptions per 1000 enrollees per month in Indiana (95% CI, -29.15 to -2.19 ; $P = 0.02$); this represented a lasting 1.82% reduction in the number of antihypertensive prescriptions in Indiana. However, there was no significant change in the trend (0.60; 95% CI, -1.16 to 2.35).

Use of Preferred and Nonpreferred Agents

In contrast to the relatively small effect on the overall level of antihypertensive use, the policies had a marked effect on drug choice between preferred and nonpreferred agents.

As shown in Figure 2, controlling for baseline trends, use of nonpreferred drugs in Michigan dropped 84.30 prescription per 1000 enrollees per month (95% CI, -91.92 to -76.77 ; $P < 0.001$), an immediate reduction of 83.33%. There was a slight increase in trend of 0.81 prescription per 1000 enrollees per month (95% CI, 0.14 to 1.48; $P = 0.02$). The drop in the utilization of nonpreferred drugs was offset by an almost identical increase in the

prescription rate of preferred drugs of 82.65 per 1000 enrollees per month (95% CI, 67.38 to 97.92; $P < 0.001$), with a slight decrease in trend of 1.77 prescriptions per 1000 enrollees per month (95% CI, -3.12 to -0.42; $P = 0.01$). Finally, there were no significant changes in either the level or trend in the rate of drugs that were not listed on the formulary (data not shown).

A similarly large shift between nonpreferred and preferred drugs occurred in Indiana, as shown in Figure 3. Following the implementation of prior authorization, there was an immediate drop in utilization of nonpreferred agents of 64.45 prescriptions per 1000 enrollees per month (95% CI, -75.31 to -53.60; $P < 0.001$), a reduction of 35.76%. We found no significant change in trend (estimate 0.15 prescription per 1000 enrollees per month; 95% CI, -1.14 to 1.44). This drop in the use of non-preferred agents was partially offset by an immediate level increase in the use of preferred medications of 54.91 prescriptions per 1000 enrollees per month (95% CI, 42.56 to 67.27; $P < 0.001$). There was a small but nonsignificant decrease in trend (-1.30 prescriptions per 1000 enrollees per month; 95% CI, -2.77 to 0.18). There was no change in the utilization level or trend of drugs not listed in the formulary (for both; data not shown). These estimates did not total the overall uncontrolled change estimates because of the inclusion of autoregressive parameters.

Pharmacy Reimbursements

This switch from nonpreferred to preferred drugs was associated with reductions in pharmacy reimbursements. Figure 4 shows the overall pharmacy reimbursement per 1000 enrollees per month in both states. After prior authorization was introduced, and controlling for baseline trends, there was an immediate reduction in cost in both states and a leveling of reimbursements over time. In Michigan, the immediate reduction in cost was -\$808.63 per 1000 enrollees per month (95% CI, -\$1261.27 to -\$356.00; $P < 0.001$) and a further reduction in trend of -\$83.16 per month afterward (95% CI, -\$127.02 to -\$39.30; $P < 0.001$). Similarly, in Indiana, there was an immediate reduction of -\$1559.00 per 1000 enrollees per month (95% CI, -\$2414.03 to -\$703.97; $P < 0.001$) and a further reduction in trend of -\$137.97 per month thereafter (95% CI, -\$239.74 to -\$36.20; $P = 0.01$). Overall, in the year after the policies were introduced, these reductions equated to pharmacy reimbursement savings of \$616,572.43 in Michigan and \$868,265.97 in Indiana, or \$16,189.80 and \$29,469.71 per 1000 enrollees, respectively.

DISCUSSION

Prior-authorization policies in Medicaid have been controversial because they could potentially inhibit the use of evidence-based therapies.¹⁸ Our analysis of 2 distinct policies at the population level found evidence of only minor changes in overall antihypertensive use, despite major shifts between preferred and nonpreferred medications. However, we could not assess the appropriateness of these medication choices. These findings are consistent with research on reference pricing policies for ACE inhibitors, for which policy-prompted medication switches were not associated with decreases in drug use, but rather with substantial reductions in drug costs.^{24,25} The comparatively more restrictive policy in Indiana was associated with a small decrease in overall antihypertensive use, similar to previous findings on more restrictive prior-authorization policies for ARBs.⁵ However, the more restrictive policy in Indiana was associated with an almost 2-fold greater decrease in pharmacy reimbursement per enrollee.

This study has several limitations. First, we examined only the impact of the policies on population-level indicators of drug use and costs. Whether or not the policy-induced drug switching we observed had clinical consequences for individual patients remains unknown. However, a previously published study of reference pricing for ACE inhibitors found no

evidence that switching led to negative clinical outcomes.²⁴ Similarly, we did not have access to detailed medical record data, so were unable to assess the impact of the policy on such clinical outcomes as blood pressure or incidence of side effects. Furthermore, our follow-up periods were 18 months and 12 months for Michigan and Indiana, respectively, so we could not observe changes in outcomes beyond these relatively short periods. If the policy led to the use of less optimal medications for particular patients, it might influence long-term outcomes, such as myocardial infarction or stroke. Data limitations also limited our ability to study individuals who were not dually eligible for Medicare and Medicaid, so it is unclear whether our results would extend to the remainder of the Medicaid population.

Second, there are additional costs and benefits of prior authorization that we could not observe. For instance, patients and their physicians likely faced time costs because of the forms and telephone calls necessitated by these policies.¹⁸ A 2005 survey of physicians in 9 states estimated they faced a mean annual cost of \$1569 per year to comply with Medicaid prior-authorization policies for antihypertensives and statins.²⁶ Also, we did not include any estimates of the administrative cost of prior authorization for state Medicaid agencies. Our study did not include any data about supplemental rebates that Michigan and Indiana may have negotiated with manufacturers in exchange for placement of their products as preferred drugs on state formularies. Such rebates, which are confidential, would likely make the net cost savings to each state higher than we estimated.

We hypothesize that the difference in policy effects between this class of medications and other classes results from unique differences between medicines and the conditions that they treat. For drugs primarily used for symptomatic conditions, such as NSAIDs and cyclooxygenase-2 inhibitors, previous interrupted time-series studies of Medicaid enrollees have reported reductions in use after the introduction of prior-authorization policies.^{11,13} In contrast, prior-authorization policies for atypical antipsychotics, anticonvulsants, and antidepressants have been associated with smaller changes in overall utilization in interrupted time-series studies of Medicaid patients.^{14,15,20,27,28} However, these policies have been associated with small but significant unintended consequences for the seriously mentally ill, such as decreased adherence, discontinuation of essential medications, and reductions in use of necessary drugs during new episodes of illness.^{14,20,27,28} Thus, it would appear that prior authorization may not sharply influence overall level of drug use when the drug is for a chronic, rather than symptomatic, condition, and when there are readily available, clinically comparable medicines that do not require prior authorization. The differences in policy impact between drug classes may also be due to the different patient populations in question; individuals with serious mental illness may be more vulnerable to changes in medication accessibility.

CONCLUSIONS

Prior authorization was associated with lower use of nonpreferred antihypertensive drugs that was largely offset by increases in the use of preferred drugs. The possible clinical consequences of policy-induced drug switching for individual patients remain unknown because the present study did not include access to medical record data. Further research is needed to establish whether large-scale switches in medicines following the inception of prior-authorization policies have any long-term health effects.

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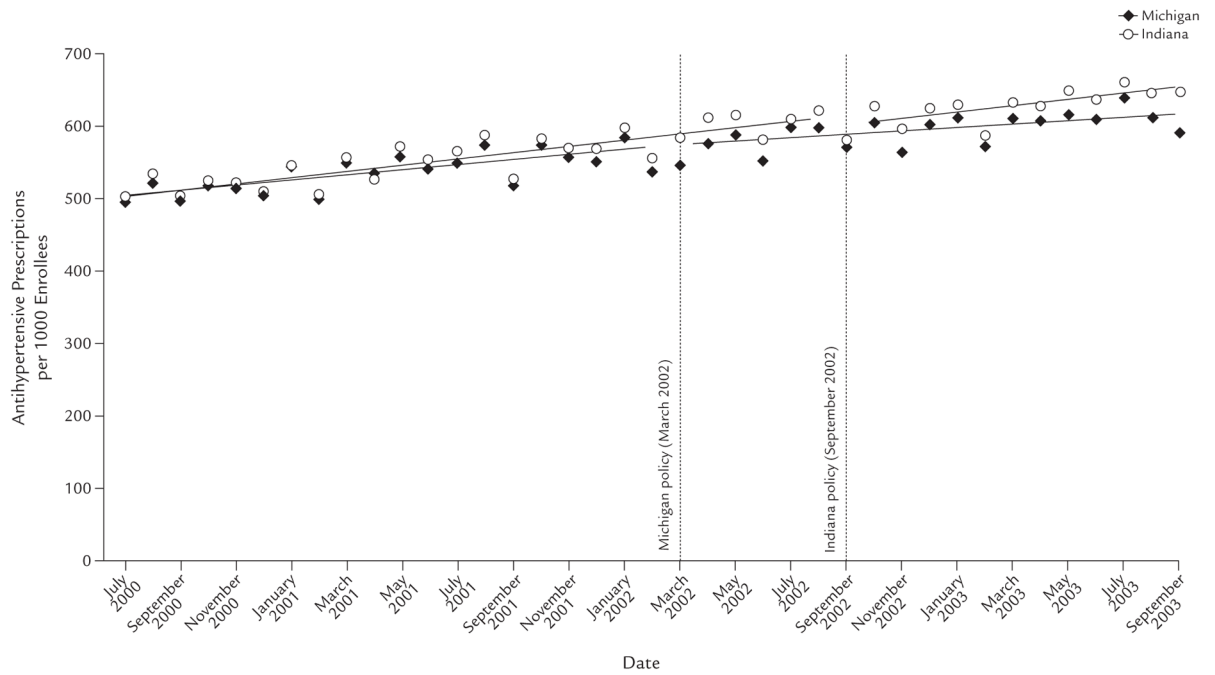


Figure 1. Number of antihypertensive prescriptions per 1000 subjects in Michigan and Indiana among those aged 18 years who were dually enrolled in both Medicare and Medicaid programs continuously from July 2000 through September 2003, and were included in a retrospective data analysis to assess the impact of implementing prior-authorization policies for antihypertensive agents in these states' Medicaid programs in March 2002 and September 2002, respectively.

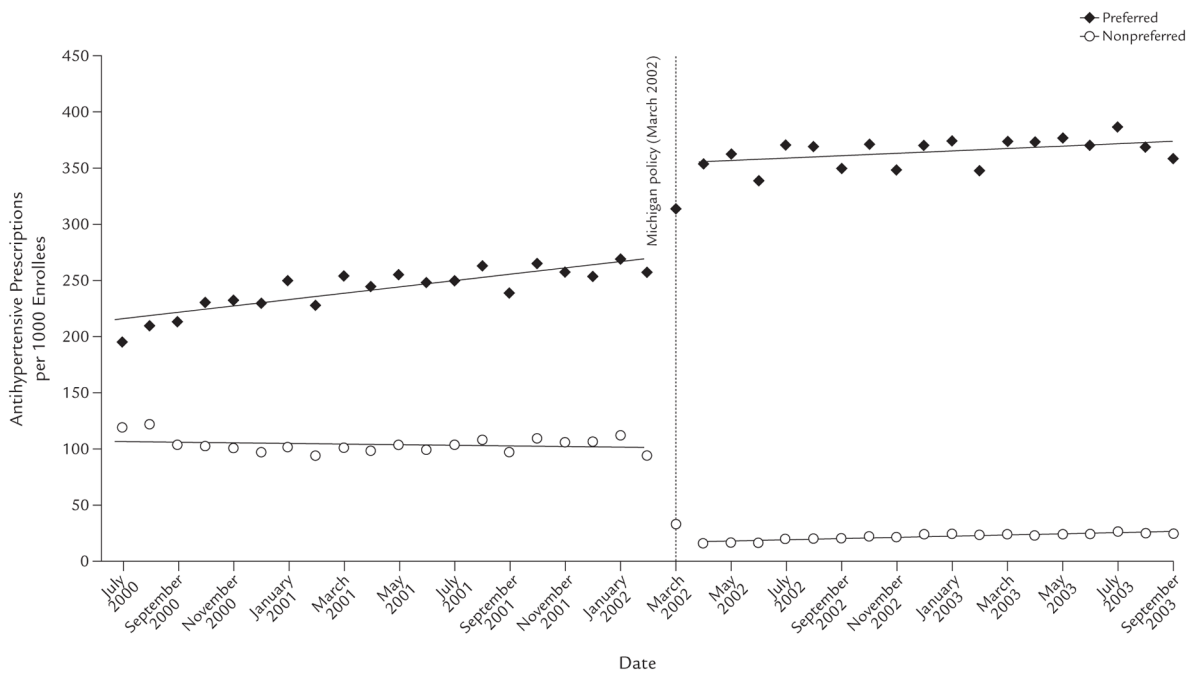


Figure 2. Number of antihypertensive prescriptions per 1000 subjects, by prior-authorization status, in Michigan among those aged 18 years who were dually enrolled in both Medicare and Medicaid programs continuously from July 2000 through September 2003, and were included in a retrospective data analysis to assess the impact of implementing prior-authorization policies for antihypertensive agents in the state’s Medicaid programs in March 2002.

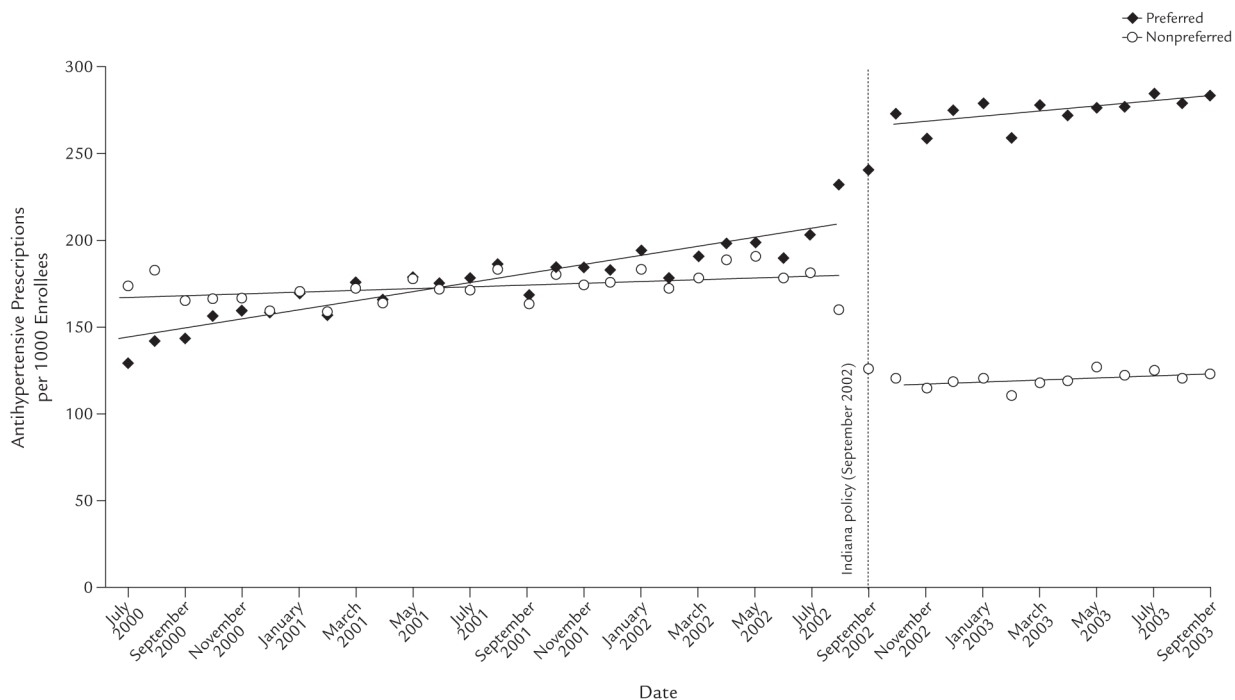


Figure 3. Number of antihypertensive prescriptions per 1000 subjects, by prior-authorization status, in Indiana among those aged 18 years who were dually enrolled in both Medicare and Medicaid programs continuously from July 2000 through September 2003, and were included in a retrospective data analysis to assess the impact of implementing prior-authorization policies for antihypertensive agents in the state’s Medicaid programs in September 2002.

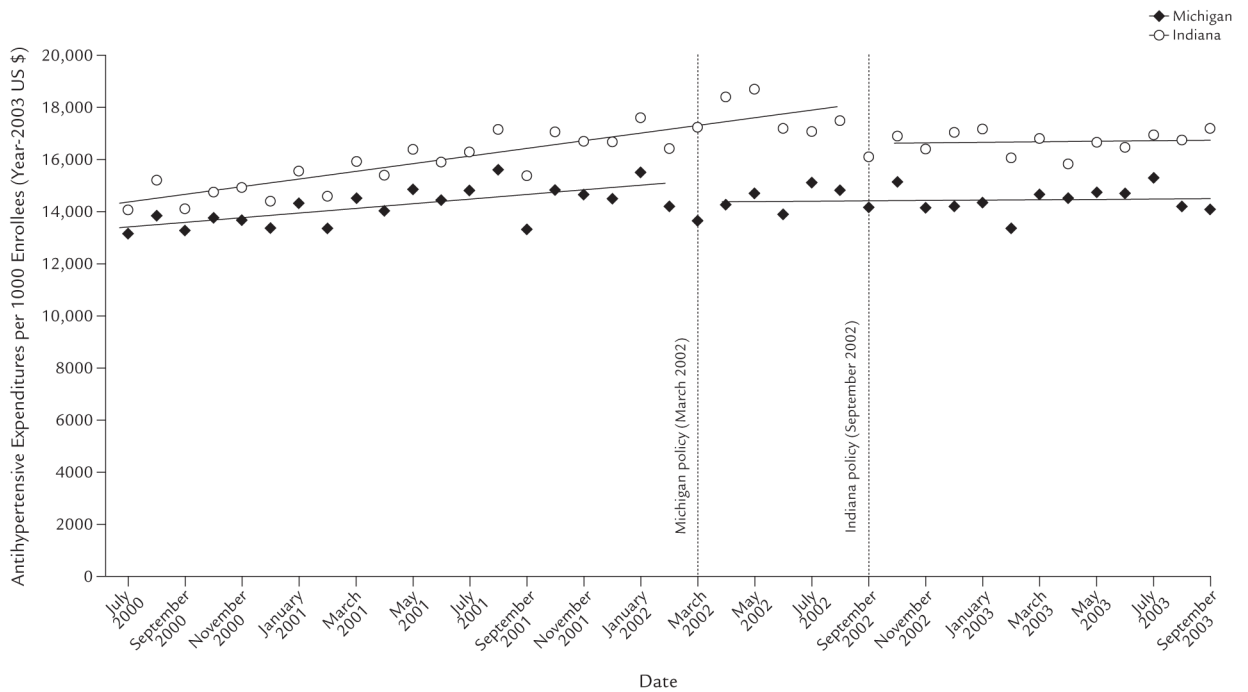


Figure 4. Total reimbursement of antihypertensive medications per 1000 subjects in Michigan and Indiana among those aged 18 years who were dually enrolled in both Medicare and Medicaid programs continuously from July 2000 through September 2003, and were included in a retrospective data analysis to assess the impact of implementing prior-authorization policies for antihypertensive agents in these states' Medicaid programs in March 2002 and September 2002, respectively.

Table I

Descriptive characteristics of subjects in Michigan and Indiana aged 18 years who were dually enrolled in both Medicare and Medicaid programs continuously from July 2000 through September 2003, and were included in a retrospective data analysis to assess the impact of implementing prior-authorization policies for antihypertensive agents in these states' Medicaid programs in March 2002 and September 2002, respectively. Values are shown as number (%) of individuals.

Characteristic	Michigan (n = 38,684)	Indiana (n = 29,463)
Sex		
Female	20,614 (53.29)	16,595 (56.32)
Male	18,070 (46.71)	12,868 (43.68)
Age group, y		
18–44	13,936 (36.03)	10,229 (34.72)
45–64	16,921 (43.74)	13,321 (45.21)
65	7827 (20.23)	5913 (20.07)
Race		
White	29,957 (77.44)	25,022 (84.93)
Black	7781 (20.11)	4018 (13.64)
Hispanic	348 (0.90)	163 (0.55)
Native American	218 (0.56)	41 (0.14)
Asian	96 (0.25)	61 (0.21)
Other	207 (0.54)	97 (0.33)
Unknown	77 (0.20)	61 (0.21)
Antihypertensive use in January 2002*		
Overall	12,484 (32.27)	9378 (31.83)
Diuretic	5391 (13.94)	4464 (15.15)
ACE inhibitor	4637 (11.99)	3155 (10.71)
CCB	4142 (10.71)	3013 (10.23)
-Blocker	3323 (8.59)	2398 (8.14)
ARB	1047 (2.71)	1037 (3.52)
-Blocker	586 (1.51)	441 (1.50)
Other antihypertensive	925 (2.39)	627 (2.13)

ACE = angiotensin-converting enzyme; CCB = calcium channel blocker; ARB = angiotensin II receptor blocker.

* Patients may have received >1 antihypertensive agent.

Table II

Reimbursement for antihypertensive medications among subjects in Michigan and Indiana aged 18 years who were dually enrolled in both Medicare and Medicaid programs continuously from July 2000 through September 2003, and were included in a retrospective data analysis to assess the impact of implementing prior-authorization (PA) policies for antihypertensive agents in these states' Medicaid programs in March 2002 and September 2002, respectively. Table shows top 20 antihypertensives before implementation of the PA requirement.

Drug	Baseline Use From July 2000 Through February 2002		Subsequent PA Status	
	Total Reimbursement*	Prescriptions, No.	Michigan	Indiana
Calcium channel blockers				
Amlodipine	2,528,277	48,591	–	PA required
Diltiazem [†]	764,043	17,536	–	PA required
Nifedipine	711,765	11,385	–	–
Diltiazem [‡]	555,727	10,489	–	–
Amlodipine/benazepril	482,320	7733	PA required	PA required
Nifedipine	414,624	6498	PA required	PA required
Verapamil	332,999	18,906	–	–
ACE inhibitors				
Lisinopril [§]	1,368,245	39,122	–	PA required
Quinapril	755,776	20,444	PA required	PA required
Enalapril	711,275	21,593	–	–
Lisinopril ^{//}	577,257	17,205	PA required	PA required
Ramipril	317,986	7834	PA required	PA required
Angiotensin II receptor blockers				
Losartan	569,171	11,299	PA required	–
Valsartan	306,714	6944	PA required	–
-Blockers				
Metoprolol	501,066	18,921	PA required	–
Propranolol	332,747	17,334	–	–
Atenolol	314,631	44,878	–	–
-Blockers				
Carvedilol	426,276	4692	–	–
Diuretics				
Furosemide	596,391	110,240	–	–
Torsemide	371,659	9362	–	–

ACE = angiotensin-converting enzyme.

* Adjusted to year-2003 US \$ using the Consumer Price Index.²¹

[†] Diltiazem brands requiring prior authorization in Indiana were Dilacor XR[®] (Watson Pharmaceuticals, Inc., Corona, California); Cardizem[®] (Abbott Laboratories, North Chicago, Illinois); and Tiazac[®] (Forest Pharmaceuticals, Inc., St. Louis, Missouri).

[‡] The diltiazem brand *not* requiring prior authorization in Indiana was Cartia XT[®] (Watson Pharmaceuticals, Inc.).

[§] The lisinopril brand *not* requiring prior authorization in Michigan was Zestril[®] (AstraZeneca Pharmaceuticals LP, Wilmington, Delaware).

//The lisinopril brand requiring prior authorization in Michigan was Prinivil[®] (Merck & Co., Inc., Whitehouse Station, New Jersey).