

HEALTH POLICY

Variation in Estimated Medicare Prescription Drug Plan Costs and Affordability for Beneficiaries Living in Different States

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BACKGROUND: Medicare Part D prescription drug plans (PDPs) implemented in January 2006 are designed to improve beneficiaries' access to pharmaceuticals and use market competition to yield affordable drug costs. Variations in estimated PDP costs for beneficiaries living in different states have not previously been characterized.

OBJECTIVE: To describe variations in the estimated costs of PDPs (plan premium, copays, and coinsurance) within and across states.

DESIGN: To estimate PDP costs based on 4 actual patient cases that exemplify common conditions and prescription drug combinations for Medicare beneficiaries, we used the online tool provided by the Centers for Medicare and Medicaid Services.

MEASUREMENTS: Principal study outcomes included (a) variation across states in the estimated annual cost of the lowest-cost PDP for each case and (b) variation in the estimated affordability of the lowest-cost PDPs across states, based on cost-of-living-adjusted median income for zero-earner households.

RESULTS: For all 4 patient cases, we found substantive within-state and between-state differences in the estimated costs of Medicare PDPs incurred by beneficiaries. The estimated annual costs to beneficiaries of the lowest-cost PDPs varied across states by as much as \$320 for medications in the least expensive scenario, and by as much as \$13,000 for the most expensive scenario. On average across states, a beneficiary with cost-of-living-adjusted median income would expect to spend 3%–28% of annual income to pay for medications in the lowest-cost PDPs in the 4 patient cases. The affordability of the lowest-cost plans varied across states, and for 2 of the 4 cases the lowest-cost PDP estimates were negatively correlated with cost-of-living-adjusted median income.

CONCLUSIONS: Substantive differences in estimated PDP costs are evident across states for patients with common Medicare conditions. Importantly, the lowest-cost plans were not proportionally affordable with respect to state-specific cost-of-living-adjusted median income. Refinement of the Medicare drug program may be needed to improve national balance in PDP affordability for beneficiaries living in different states.

KEY WORDS: Medicare; Part D; prescription drug plans; costs; income.
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INTRODUCTION

The Medicare Prescription Drug Improvement and Modernization Act (MMA) of 2003 guaranteed a drug benefit in the form of prescription drug plans (PDPs) available to all program beneficiaries as of January 1, 2006.¹ The legislation addressed a major problem in the pre-MMA era, namely that 9 out of 10 Medicare beneficiaries take prescription medications but more than one-quarter had no coverage to help them afford the costs of their medications, as well as those of necessities such as food or heat.^{2–6}

Through Medicare PDPs, program beneficiaries purchase their prescription drugs through cost-sharing arrangements that, under the standard benefit structure described in the MMA, vary with the beneficiary's increasing annual out-of-pocket medication expenses.¹ A central tenet of the MMA is that market competition among PDPs will yield affordable prescription drug coverage for Medicare beneficiaries.⁷ According to the Centers for Medicare and Medicaid Services (CMS), there is some evidence already that market pressures have brought the average PDP premium below predicted levels.^{8,9}

Most analyses of PDPs have yielded aggregate national predictions^{8,10,11} and have not explored possible state-to-state differences in PDP costs for beneficiaries that may be market-related. Between-state differences are likely, given known state and regional differences in health care utilization and costs for Medicare beneficiaries.^{12–14} Only one prior study of which we are aware has examined PDP costs across states,¹⁵ but only analyzed 5 states and did not consider whether known

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differences in PDP formularies and tiered pricing¹⁶ would lead to cost variability among PDPs.

Although cost may not be the only factor that beneficiaries consider in selecting a PDP, between-state variation in the costs of PDPs for patients with identical medication needs has potential clinical and policy implications. Patients with less affordable plans may be more likely to forgo their medications²⁻⁶ and may incur greater health risks for themselves and higher direct medical costs for the Medicare program. Moreover, if between-state differences in plan affordability for otherwise identical medications are perceived as inequitable

within a federally administered program, public and legislative support for the MMA as currently structured may decline.

With these implications in mind, we examined the estimated costs of PDPs across states in 4 patient case scenarios that exemplify common medical circumstances for Medicare beneficiaries. Rather than develop our own model of such costs, we used an online tool provided by the CMS that was designed to help beneficiaries determine differences in the expected costs of their medications under different PDPs available in their states of residence.

Patient Case Scenarios	Medications*
<p>Case 1 66-year-old man with hypertension, type 2 diabetes, hyperlipidemia, and depression</p>	<p>Atenolol 50 mg po daily Lisinopril 20 mg po daily Metformin 500 mg po twice daily Atorvastatin (Lipitor®) 10 mg po daily Sertraline (Zoloft®) 100 mg po daily</p>
<p>Case 2 66-year-old man with hypertension, poorly controlled diabetes, hyperlipidemia, and depression</p>	<p>Atenolol 50 mg po daily Lisinopril 20 mg po daily Metformin 500 mg po twice daily Atorvastatin (Lipitor®) 10 mg po daily Sertraline (Zoloft®) 100 mg po daily Insulin lispro (Humalog®) insulin 300 units per month Insulin glargine (Lantus®) insulin 1000 units per month</p>
<p>Case 3 72-year-old woman with recent non-ST elevation myocardial infarction, cardiomyopathy (ejection fraction of 15%), and hyperlipidemia</p>	<p>Lisinopril 40 mg po daily Spironolactone 25 mg po daily Carvedilol (Coreg®) 6.25 mg po twice daily Clopidogrel (Plavix®) 75 mg po daily Simvastatin (Zocor®) 40 mg po daily</p>
<p>Case 4 78-year-old woman with osteoporosis, hypertension, and chronic pain from compression fractures and arthritis</p>	<p>Alendronate (Fosamax®) 70 mg po once weekly Calcitonin intranasal spray 1 spray daily Diltiazem (Cardizem CD®) 300 mg po daily Morphine sulfate extended release 15 mg po twice daily</p>

Medications are listed as generic name, with the brand name included if generic forms were not available. *Medications for each patient also included enteric-coated aspirin, which did not have different dose selections available in the online tool and was therefore excluded from the cost analysis. For Case 4, the patient also was taking multivitamins, calcium/Vitamin D supplementation, and over-the-counter non-steroidal anti-inflammatory agents, all available without a prescription.

Figure 1. Patient case scenario descriptions and medication lists.

METHODS

Data Sources

We obtained expected PDP costs from the Medicare Part D Prescription Drug Plan online comparison tool provided by CMS (<https://www.medicare.gov/MPDPF/Public/Include/DataSection/Questions/Questions.asp>). This tool helps beneficiaries identify the PDP licensed in their zip code of residence that will have the lowest estimated annual cost, given their anticipated medications. PDP availability is specific to 34 CMS regions, which in many instances map to individual states but in some cases map to more than one state (e.g., North Dakota and South Dakota are included together, and have the same PDPs available). For each of 4 patient case scenarios, we entered information about the prescription medications as part of a “general plan search,” through which the tool provided a listing of available PDPs in each state and the District of Columbia (hereafter referred to as the “51 states”), along with the estimated annual cost to the Medicare beneficiary for each available PDP based upon the selected medications.

Case Scenarios

For the 4 patient case scenarios (Fig. 1), we chose actual patients of the authors (MMD and LKH) with conditions most common among community-dwelling Medicare beneficiaries (hypertension, arthritis, heart disease, diabetes, and osteoporosis), and who are also typical in having two or more chronic conditions.¹⁷ We used actual lists of prescription medications from these patients; generic substitution was assumed, when possible. We also intentionally used a pair of scenarios (cases 1 and 2) that would illustrate the cost implications of PDP selection for a patient with worsening severity of disease (diabetes) within a single plan year to examine the implications of needing to make changes in medications that could potentially be anticipated by patients and their physicians.

Data Analysis

For each of the patient cases in each state, using the Medicare Part D plan comparison tool we identified the estimated annual cost to a beneficiary of the lowest- and highest-cost PDPs available in state, along with the names of these lowest- and highest-cost PDPs. All data regarding estimated costs of PDPs were gathered in December 2005, at a time of peak interest in Part D plans immediately prior to implementation of the new program. Of note, the cost calculated by the online tool is the estimated annual total cost to the beneficiary for the specified medications, including the PDP premium, copays, and coinsurance amounts.

From this information, we generated 2 primary outcomes of interest: (a) variation across states in the estimated annual cost of the lowest-cost PDP for each patient case and (b) variation in the affordability of the lowest-cost PDPs across states for each patient case. Affordability was defined as the estimated cost of the lowest-cost PDP, divided by the median income for zero-wage-earner households in each state¹⁸ adjusted for state-specific cost-of-living.¹⁹ We refer to this denominator as the cost-of-living-adjusted median income (COLA-MI). We examined the correlation of COLA-MI with PDP costs using pairwise Pearson correlation statistics. As an additional sec-

Table 1. Estimated Annual Cost of Prescription Drug Plans for Patient Case 1 with Diabetes (Managed with Oral Agent) and Hypertension, by State

State	Comparison within states			Comparison across states
	Lowest-cost plan name*	Lowest-cost plan cost (\$)	Cost difference (highest-cost plan–lowest-cost plan)	Lowest-cost plan compared to lowest-cost plan meant
AL	A	912	1,270	60
AK	B	1,028	1,726	176
AZ	A	790	1,553	-62
AR	A	862	1,423	10
CA	A	790	1,532	-62
CO	A	824	1,731	-28
CT	A	831	1,408	-21
DE	A	797	1,447	-55
DC	A	806	1,441	-46
FL	A	813	3,867	-39
GA	A	953	1,533	101
HI	B	992	1,435	140
ID	A	804	1,586	-48
IL	A	890	1,421	38
IN	A	868	1,372	16
IA	A	760	1,607	-92
KS	A	842	1,448	-10
KY	A	865	1,375	13
LA	A	926	1,298	74
ME	B	1,042	1,233	190
MD	A	806	1,441	-46
MA	A	831	1,408	-21
MI	A	903	1,304	51
MN	A	751	1,616	-101
MS	A	868	1,418	16
MO	A	870	1,424	18
MT	A	756	1,611	-96
NE	A	751	1,616	-101
NV	C	990	1,355	138
NH	B	1,042	1,232	190
NJ	A	796	1,412	-56
NM	A	856	1,550	4
NY	A	719	1,513	-133
NC	A	934	1,329	82
ND	A	756	1,611	-96
OH	A	894	1,329	42
OK	A	854	287	2
OR	A	826	1,743	-26
PA	A	860	1,350	8
RI	A	826	1,413	-26
SC	A	937	1,570	85
SD	A	760	1,607	-92
TN	A	889	1,293	37
TX	A	844	1,449	-8
UT	A	783	1,607	-69
VT	A	826	1,413	-26
VA	A	848	1,419	-4
WA	A	826	1,743	-26
WV	A	847	1,363	-5
WI	A	866	1,471	14
WY	A	760	1,607	-92
US Mean		852	1,494	

*Plan name legend: A = Humana Prescription Drug Plans Standard; B = Community Care Rx Basic; C = First Health Premier.

†Lowest-cost plan in each state–mean lowest-cost plan for US overall.

ondary outcome of interest, we examined the difference between the estimated costs of the lowest- and highest-cost PDPs for each patient case within each state, as a measure of financial risk to Medicare beneficiaries.

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RESULTS

For all 4 patient cases, we found substantive differences in the estimated costs and affordability of Medicare PDPs for beneficiaries, based on their states of residence.

Patient Case 1: Diabetes (Oral Agent), Hypertension, Hyperlipidemia, and Depression

The mean estimated cost of the lowest-cost PDP for this patient across all states was \$852 (Table 1). The estimated cost of the lowest-cost PDP ranged among states from \$133 less than the US mean (New York) to \$190 more than the US mean (Maine, New Hampshire). In all but 5 states, the lowest-cost PDP was the same plan (coded in Table 1 as Plan "A"). Of note, plans with the same name operating in different states had estimated annual costs that fell on both sides of the national mean (e.g., Plan A in Michigan and Minnesota).

On average, within each state the highest-cost PDPs were estimated to be almost \$1,500 more expensive than the lowest-cost PDPs (identities and estimated annual costs of the highest-cost PDPs for all 4 cases are available from the corresponding author upon request).

Patient Case 2: Diabetes (Oral Agent + Insulin), Hypertension, Hyperlipidemia, and Depression

For this patient, the mean estimated annual cost for the lowest-cost PDP across all states was \$1,878 (online Table A Supplementary Material in Appendix). Estimated costs of the least expensive PDPs ranged around this US mean from \$379 less (New York) to \$190 more (North Carolina).

In only 3 states did the lowest-cost plan change from patient 1 to patient 2. In other words, if the patient in case 1 had needed to add insulin in the middle of a plan year, she/he would still have had the optimal plan from the perspective of her/his estimated costs in 48 of 51 states (online Table A Supplementary Material in Appendix). The highest-cost PDPs for this case were more than \$1,700 more expensive than the lowest-cost PDPs in each state, on average.

Patient Case 3: Ischemic Heart Disease, Cardiomyopathy, and Hyperlipidemia

For this patient, the mean estimated annual cost for the lowest-cost PDP was \$2,326, and the states' lowest-cost PDPs varied around this mean from \$254 less (Iowa, Minnesota, Montana, Nebraska, North Dakota, South Dakota, Wyoming) to \$822 more (Hawaii) (online Table B Supplementary Material in Appendix). None of the plans that were lowest-cost for cases 1 and 2 were also lowest-cost for case 3. However, similar to the dominant plan pattern, we observed for cases 1 and 2, for case 3 in all but 7 states the lowest-cost PDP had the same name (Plan "O"). On average, the highest-cost PDPs for this patient were more than \$1,900 more expensive than the lowest-cost PDPs in each state.

Table 2. Estimated Annual Cost of Prescription Drug Plans for Patient Case 4 with Osteoporosis, Hypertension, and Chronic Pain, by State

State	Comparison within states		Comparison across states	
	Lowest-cost plan name*	Lowest-cost plan cost (\$)	Lowest-cost plan compared to lowest-cost plan mean†	
AL	V	4,538	13,867	-3,608
AK	B	17,180	698	9,034
AZ	V	4,734	18,226	-3,412
AR	O	16,800	6,384	8,654
CA	V	4,460	13,406	-3,686
CO	O	16,748	1,186	8,602
CT	V	4,768	18,195	-3,378
DE	V	4,774	19,165	-3,372
DC	V	4,856	19,083	-3,290
FL	O	16,814	2,564	8,668
GA	V	4,516	13,484	-3,630
HI	V	4,457	13,523	-3,689
ID	V	4,475	13,471	-3,671
IL	O	16,827	1,124	8,681
IN	O	16,892	1,149	8,746
IA	V	4,491	13,502	-3,655
KS	O	16,742	1,235	8,596
KY	O	16,889	1,152	8,743
LA	O	16,928	1,097	8,782
ME	V	4,508	13,402	-3,638
MD	V	4,543	13,407	-3,603
MA	V	4,515	13,355	-3,631
MI	W	4,113	13,806	-4,033
MN	V	4,491	13,502	-3,655
MS	O	16,834	1,214	8,688
MO	O	16,769	1,208	8,623
MT	V	4,491	13,502	-3,655
NE	V	4,491	13,502	-3,655
NV	V	4,479	13,409	-3,667
NH	V	4,508	13,396	-3,638
NJ	V	4,531	13,337	-3,615
NM	O	16,809	1,074	8,663
NY	V	4,522	13,642	-3,624
NC	V	4,524	13,509	-3,622
ND	V	4,491	13,502	-3,655
OH	O	16,856	1,079	8,710
OK	O	16,786	1,209	8,640
OR	O	4,470	13,470	-3,676
PA	V	4,523	13,374	-3,623
RI	V	4,515	13,355	-3,631
SC	V	4,520	13,459	-3,626
SD	V	4,491	13,502	-3,655
TN	V	4,538	13,507	-3,608
TX	V	4,507	13,455	-3,639
UT	V	4,475	13,471	-3,671
VT	V	4,515	13,355	-3,631
VA	V	4,502	13,402	-3,644
WA	V	4,470	13,470	-3,676
WV	V	4,523	13,374	-3,623
WI	O	16,779	1,200	8,633
WY	V	4,491	13,502	-3,655
US		8,146	10,382	
Mean				

*Plan name legend: B = Community Care Rx Basic; O = Humana Prescription Drug Plans Complete; V = Advantage Freedom; W = Prescription Blue Option 1.

†Lowest-cost plan in each state—mean lowest-cost plan for US overall.

Patient Case 4: Osteoporosis, Hypertension, and Chronic Pain

The mean estimated annual cost for the lowest-cost PDPs across all states for this patient was \$8,146 (Table 2). The estimated costs of lowest-cost plans for this case varied more widely around this mean than for the other cases, from \$4,033 less (Michigan) to \$9,034 more (Alaska). In addition, there was more variation among the lowest-cost PDPs identified in each state for this patient, with only 34 states having the most common lowest-cost plan (Plan “V”) as the lowest-cost PDP. The medication responsible for this substantial variation in overall PDP cost was largely attributable to differences in price for nasal calcitonin. On average, in each state the highest-cost PDPs cost almost \$10,400 more than the lowest-cost plans.

Affordability of Lowest-Cost PDPs

The lowest-cost PDPs for case 1 would, on average, consume 2.9% of the annual income for a beneficiary with COLA-MI in each state (Table 3). Across the states, the share of COLA-MI needed to pay for the lowest-cost PDPs for patient 1 ranged from 2.2% to 10.6%. The correlation of estimated costs for the lowest-cost PDPs with COLA-MI for case 1 was -0.34 ($P=.01$); that is, in states with lower COLA-MI, the lowest-cost PDPs were actually *more* expensive, not just in proportional terms but in direct comparison. For example, COLA-MI is lower in Mississippi (\$20,602) than in Minnesota (\$32,448) (Table 3), but the estimated cost for the lowest-cost PDP is higher in Mississippi than in Minnesota (Table 1).

The addition of insulin to the medical regimen (case 2) increased the share of annual income to 6.4% on average, ranging from 5.0% to 23.9% across the states. The correlation of lowest-cost PDPs with COLA-MI was also negative ($r=-.25$) but not statistically significant ($P=.08$).

For case 3, the affordability of the lowest-cost PDPs was 8.0% of COLA-MI as a mean (range 6.0%–29.5%). The correlation of lowest-cost PDPs with COLA-MI was -0.35 ($P=.01$).

For case 4, the mean lowest-cost PDP nationally would consume 27.9% of the annual household income for the COLA-MI beneficiary (range 12.9%–81.7%). There was no significant correlation ($r=.09$) of the lowest-cost PDPs with COLA-MI.

DISCUSSION

Interstate Variation in Expected PDP Costs

The Medicare Part D prescription drug benefit offers beneficiaries the promise of coverage for increasingly expensive medications, when many have lacked such coverage in the past.² Overall, the implementation of this program has the potential to improve the access of many beneficiaries to their prescription medications.^{7–10,15} Although cost may not be the only consideration for beneficiaries as they select their PDPs, high prescription drug costs were a major motivation for the MMA^{7,8} and we expect that many beneficiaries heavily weigh the anticipated cost of a PDP in their decision-making process. Whether beneficiaries seek information online or via telephone inquiries to CMS, their eventual source of information about

Table 3. Affordability of Lowest-Cost Medicare Prescription Drug Plans in Each State, for Each Patient Case

State	COLA-MI (\$)	Estimated proportion of COLA-MI for zero-earner households to be spent on lowest-cost PDP			
		Case 1	Case 2	Case 3	Case 4
AL	23,758	0.038	0.086	0.098	0.191
AK	24,555	0.042	0.083	0.127	0.700
AZ	33,818	0.023	0.051	0.067	0.140
AR	28,619	0.030	0.068	0.081	0.587
CA	20,491	0.039	0.087	0.108	0.218
CO	28,999	0.028	0.062	0.078	0.578
CT	28,848	0.029	0.068	0.079	0.165
DE	28,721	0.028	0.060	0.078	0.166
DC	7,595	0.106	0.239	0.295	0.639
FL	33,016	0.025	0.050	0.071	0.509
GA	20,390	0.047	0.100	0.122	0.221
HI	17,562	0.056	0.114	0.179	0.254
ID	33,100	0.024	0.055	0.067	0.135
IL	30,453	0.029	0.062	0.077	0.553
IN	28,805	0.030	0.064	0.084	0.586
IA	30,069	0.025	0.061	0.069	0.149
KS	36,420	0.023	0.051	0.062	0.460
KY	23,937	0.036	0.075	0.101	0.706
LA	23,272	0.040	0.082	0.105	0.727
ME	24,307	0.043	0.084	0.118	0.185
MD	25,515	0.032	0.071	0.088	0.178
MA	16,872	0.049	0.116	0.134	0.268
MI	31,569	0.029	0.063	0.074	0.130
MN	32,448	0.023	0.054	0.064	0.138
MS	20,602	0.042	0.091	0.114	0.817
MO	31,253	0.028	0.062	0.073	0.537
MT	30,006	0.025	0.059	0.069	0.150
NE	32,336	0.023	0.054	0.064	0.139
NV	20,900	0.047	0.096	0.105	0.214
NH	27,109	0.038	0.076	0.106	0.166
NJ	30,435	0.026	0.063	0.072	0.149
NM	21,475	0.040	0.087	0.108	0.783
NY	23,754	0.030	0.063	0.092	0.190
NC	23,197	0.040	0.089	0.103	0.195
ND	33,576	0.023	0.053	0.062	0.134
OH	29,944	0.030	0.063	0.079	0.563
OK	29,256	0.029	0.064	0.079	0.574
OR	31,670	0.026	0.062	0.070	0.141
PA	26,516	0.032	0.073	0.087	0.171
RI	26,979	0.031	0.071	0.084	0.167
SC	29,649	0.032	0.068	0.082	0.152
SD	30,618	0.025	0.060	0.068	0.147
TN	26,811	0.033	0.070	0.090	0.169
TX	20,530	0.041	0.089	0.113	0.220
UT	33,023	0.024	0.052	0.068	0.136
VT	27,152	0.030	0.070	0.084	0.166
VA	27,758	0.031	0.071	0.083	0.162
WA	28,336	0.029	0.069	0.078	0.158
WV	26,718	0.032	0.069	0.086	0.169
WI	29,548	0.029	0.063	0.078	0.568
WY	34,699	0.022	0.053	0.060	0.129
US Mean	29,228	0.029	0.064	0.080	0.279

Affordability is equal to the estimated annual cost of lowest-cost PDP in a state for a given patient case divided by COLA-MI in that state. COLA-MI cost-of-living-adjusted median income for zero-earner households, PDP prescription drug plan.

anticipated PDP costs is the same tool we used to derive the measures in this study.

Our findings suggest a need for further Medicare Part D program refinement to ensure nationwide balance in PDP affordability. This is the first study to characterize state-to-

state variation in expected PDP costs—ranging from hundreds to thousands of dollars per person annually—for Medicare beneficiaries with identical sets of prescriptions. Consider, for example, two beneficiaries living in the neighboring states of Florida and Georgia (different CMS regions), both of whom resemble the patient in case 4 with regard to their chronic conditions and prescription medications. For the lowest-cost plan, the Florida resident will expect to pay \$16,814, while the Georgia resident will expect to pay \$4,516. Despite higher COLA-MI in Florida than in Georgia, Florida median-income Medicare beneficiaries would expect to pay about 29% more of their annual median income (in absolute terms) for this plan than would Georgia Medicare beneficiaries.

Whether costs of the PDP on average consume as little as 3% of COLA-MI on average (case 1) or as much as 28% (case 4), state-to-state variation in PDP affordability may have clinically meaningful effects for Medicare beneficiaries. The greatest concern, based on prior literature regarding seniors and their medication use with regard to cost barriers,³⁻⁶ is that beneficiaries in states with less affordable plans will cut back on either their medications or their spending on essentials (food, utilities) to make ends meet. In work by Heisler and colleagues,⁶ annual differences in pharmaceutical spending of \$300–\$600 were associated with 4-fold-higher odds of reducing the purchase of necessities and a 2-fold-higher odds of restricting their own medication use. A \$300 difference is smaller than the variation in least to most expensive lowest-cost PDPs across states for all the patient cases we considered. Therefore, PDP cost variation across states that we report may be behaviorally and clinically meaningful.

State-to-state differences in PDP costs are certainly expected, based on prior literature regarding state and regional differences in Medicare costs related to health care utilization,¹¹⁻¹³ and also based on stipulations in the MMA that PDPs would act as independent bargaining units with pharmaceutical manufacturers.⁷⁻⁹ Nevertheless, prior projections about the impact of PDPs for beneficiaries^{8,10} and commentary about the advantages and disadvantages of the MMA⁷ have not previously centered on how the Part D benefit would differentially affect otherwise similar beneficiaries in different states. Nor have prior studies illustrated, as our analysis does, that market forces for PDPs are generating circumstances in which individuals in states with lower COLA-MI may, counterintuitively, expect to pay substantively higher proportions of their income for the lowest-cost PDPs (cases 1 and 3), not just because their incomes are lower but because the plans are actually priced higher.

Our results indicate that market pressures *within* states that may reduce drug plan costs do not, at this early phase of the program, yield similar results *across* states. This finding is similar to an analysis of plans in 5 states¹⁵ that found between-state differences of less than \$200 for beneficiaries, based solely on their anticipated aggregate medication expenditures. We believe that our between-state comparisons revealed wider disparities because we explicitly considered specific medications, the costs of which may vary considerably across plans because of differences in formularies and discounts with pharmaceutical houses.¹⁶

Variation in estimated affordability of PDPs across states raises questions about how the lay public may perceive the equity of this federal program. Between-state variations in PDP affordability may prompt future calls for a restructuring of Part

D to allow for Medicare to negotiate with pharmaceutical manufacturers as a single entity, as is the case for the Veterans Administration. Some analysts have asserted that single-entity bargaining would not be as effective in lowering prices as PDP-level bargaining.⁹ On the other hand, a recent single-market comparison of Medicare prescription discount programs (predecessors of PDPs) found that savings in drug costs through market competition were smaller than savings from the Veterans Administration acting as a large purchaser.²⁰

Intrastate Variation in Expected PDP Costs

Another key finding in this analysis is the considerable intrastate variation in expected PDP costs for all 4 case scenarios. The difference between the expected annual costs of the lowest- and highest-cost PDPs may be considered a financial risk for incompletely informed beneficiaries. The size of this risk was about \$1,500 on average for the least expensive case scenario (case 1), and exceeded \$10,000 on average for the most expensive combination of medications (case 4).

The variable size of this risk illustrates the critical importance for Medicare beneficiaries of using available tools and resources to select the PDP that will best suit them. While the online tool provided by CMS appears easy to use, a recent national study revealed that less than one-third of seniors have ever gone online.²¹ Although assistance via telephone and other avenues are available for Medicare beneficiaries, lay press reports indicated that agencies have struggled to meet the demand from beneficiaries for information tailored to their medical needs and combinations of prescription medications.^{22,23} These challenges, however, may be ameliorated in the future because of cumulative experience of CMS staff in managing Part D, and because the key transition period for Part D in 2005–2006 involving the enrollment of >30 million Medicare beneficiaries is now past.⁹

Study Limitations

Our findings must be interpreted with some caveats inherent to the study design. We considered 4 case scenarios based on actual patients, but in so doing limited our findings only to standardized patients and could not incorporate potentially meaningful variations in clinical care strategies (e.g., broader use of generic substitution) that might have affected our findings regarding variation in PDP costs within or across states.

In addition, because we considered patients' lists of medications but did not have information about costs incurred by these patients in the pre-MMA era, we could not assess state-to-state variations in costs in both the pre-MMA and MMA eras. It is possible that the interstate variation we observe regarding lowest-cost PDPs is similar to variations in costs borne by beneficiaries living in different states in the pre-MMA era.

Another study limitation, inherent to the implementation of PDPs, is that costs can change at any time as a result of renegotiated prices between PDPs and pharmaceutical manufacturers (e.g., related to the approval of new generic formulations) within a given plan year. We did not explicitly include this scenario in our analysis; future studies of Medicare beneficiaries' experiences with PDPs will provide the opportunity to examine this aspect of uncertainty in the program. To the extent that plan costs change, the relative affordability of plans across states will change accordingly.

Conclusions

The affordability of Part D PDPs varies for Medicare beneficiaries living in different states, in some instances quite markedly, for reasons that are likely attributable to the market-based principles of the MMA. In addition, intrastate variation in expected plan costs presents possible financial risks to beneficiaries as they choose their PDPs.

Variations in plan affordability may affect Medicare beneficiaries' use of medications under the MMA. Although some variation in plan costs may be expected based on market differences, the extent to which PDP affordability varies across states may influence the success of Part D as a major reform of the Medicare program.

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ELECTRONIC SUPPLEMENTARY MATERIAL

Below is the link to the electronic supplementary material. Table A. Estimated Annual Cost of Prescription Drug Plans for Patient Case 2 with Diabetes (Oral Agent & Insulin) and Hypertension, by State (DOC 60.4 kb) Table B. Estimated Annual Cost of Prescription Drug Plans for Patient Case 3 with Ischemic Heart Disease, Cardiomyopathy, and Hyperlipidemia, by State (DOC 60.4 kb)

REFERENCES

1. **Iglehart JK.** The new Medicare prescription-drug benefit—a pure power play. *N Engl J Med.* 2004;350:826–33.
2. **Safran DG, Neuman P, Schoen C, et al.** Prescription drug coverage and seniors: findings from a 2003 national survey. *Health Aff.* 2005;W5:152–66.
3. **Piette JD, Heisler M, Wagner TH.** Problems paying out-of-pocket medication costs among older adults with diabetes. *Diabetes Care.* 2004;27:384–91.
4. **Piette JD, Heisler M, Horne R, Alexander GC.** A conceptually based approach to understanding chronically ill patients' responses to medication cost pressures. *Soc Sci Med.* 2006;62(4):846–57.
5. **Tseng C-W, Brook RH, Keeler E, Steers WN, Mangione CM.** Cost-lowering strategies used by Medicare beneficiaries who exceed drug benefit caps and have a gap in drug coverage. *JAMA.* 2004;292:952–60.
6. **Heisler M, Wagner TH, Piette JD.** Patient strategies to cope with high prescription medication costs: who is cutting back on necessities, increasing debt, or underusing medications? *J Behav Med.* 2005; 28:43–51.
7. **Kennedy EM, Thomas B.** Dramatic improvement or death spiral—two members of Congress assess the Medicare bill. *N Engl J Med.* 2004; 350:747–51.
8. **Bach PB, McClellan MB.** Medicare drug benefit: a prescription for a modern Medicare program. *N Engl J Med.* 2005;353:2733–5.
9. **Bach PB, McClellan MB.** The first months of the prescription-drug benefit—a CMS update. *N Engl J Med.* 2006;354:2312–4.
10. Kaiser Family Foundation. Prescription drug coverage for Medicare beneficiaries: an overview of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003. Available at: <http://www.kff.org/medicare/upload/Prescription-Drug-Coverage-for-Medicare-Beneficiaries-An-Overview-of-the-Medicare-Prescription-Drug-Improvement-Act-2003.pdf>. Accessed December 19, 2005.
11. **Stuart B, Simoni-Wastila L, Chauncey D.** Assessing the impact of coverage gaps in the Medicare Part D drug benefit. *Health Aff.* 2005; W5:167–79.
12. **O'Connor GT, Quinton HB, Traven ND, et al.** Geographic variation in the treatment of acute myocardial infarction: the Cooperative Cardiovascular Project. *JAMA.* 1999;281:627–33.
13. **Guadagnoli E, Landrum MB, Normand SL, et al.** Impact of underuse, overuse, and discretionary use on geographic variation in the use of coronary angiography after acute myocardial infarction. *Med Care.* 2001;39:446–58.
14. **Wennberg DE, Kellet MA, Dickens JD, et al.** The association between local diagnostic testing intensity and invasive cardiac procedures. *JAMA.* 1996;275:1161–4.
15. **Kravitz RL, Chang S.** Medicare drug benefit: promise and perils for patients and physicians. *N Engl J Med.* 2005;353:2735–9.
16. **Hoadley J, Hargrave E, Cubanski J, Neuman T.** An in-depth examination of formularies and other features of Medicare drug plans. Available at: <http://www.kff.org/medicare/upload/7489.pdf>. Accessed June 26, 2006.
17. Centers for Medicare and Medicaid Services. Medicare current beneficiary survey data: self-reported health conditions and risk factors of non-institutionalized Medicare beneficiaries, by living arrangement and age, 2002. Available at: <http://www.cms.hhs.gov/apps/mcbs/CMSsrc/2002/sec2.pdf>. Accessed December 20, 2005.
18. U.S. Census Bureau. American Community Survey, 2004: median income for zero wage-earner households, by state. Available at: <http://www.census.gov/hhes/www/income/statemedfaminc.html>. Accessed June 20, 2006.
19. National Association of Realtors. The salary calculator. Available at: <http://www.homefair.com/homefair/calc/salcalc.html?type=to>. Accessed June 20, 2006.
20. **Hayes JM, Walczak H, Prochazka A.** Comparison of drug regimen costs between the Medicare prescription discount program and other purchasing systems. *JAMA.* 2005;294:427–8.
21. Kaiser Family Foundation. Online health information poised to become important resource for seniors, but not there yet. Available at: <http://www.kff.org/entmedia/entmedia011205nr.cfm>. Accessed December 20, 2005.
22. **Adams B, Hamilton C.** Drug plans' complexity hampers sign-ups. *Salt Lake Tribune*, December 18, 2005. Available at: http://www.sltrib.com/portlet/article/html/fragments/print_article.jsp?article=3320969. Accessed December 21, 2005.
23. **Pear R.** Drug changes are looming, and providers seek answers. *New York Times*, December 19, 2005. Available at: <http://www.nytimes.com/2005/12/19/politics/19nursing.html?pagewanted=print>. Accessed December 21, 2005.