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Impact of Medicare Part D Plan Features on Use of Generic Drugs

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Abstract

Background—Little is known about how Medicare Part D plan features influence choice of generic vs. brand drugs.

Objectives—Examine association between Part D plan features and generic medication use.

Methods—Data from a 2009 random sample of 1.6 million fee-for-service, Part D enrollees >65 years, who were not dually eligible or receiving low-income subsidies, was used to examine the association between plan features (generic cost-sharing, difference in brand and generic copay, prior authorization, step therapy) and choice of generic antidepressants, antidiabetics, and statins. Logistic regression models **accounting for plan-level clustering** were adjusted for sociodemographic and health status.

Results—Generic cost-sharing ranged from $0 to $9 for antidepressants and statins, and from $0 to $8 for antidiabetics (across 5th-95th percentiles). Brand-generic cost-sharing differences were smallest for statins (5th-95th percentiles: $16-$37) and largest for antidepressants ($16-$64) across plans. Beneficiaries with higher generic cost-sharing had lower generic use (adjusted odds ratio [OR] = 0.97, 95% confidence interval [CI] =0.95-0.98 for antidepressants; OR = 0.97, CI =0.96-0.98 for antidiabetics; OR = 0.94, CI =0.92-0.95 for statins). Larger brand-generic cost-sharing differences and prior authorization were significantly associated with greater generic use in all categories. Plans could increase generic use by 5-12 percentage points by reducing generic cost-sharing from the 75th ($7) to 25th percentiles ($4-$5), increasing brand-generic cost-sharing

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differences from the 25th ($25-$26) to 75th ($32-$33) percentiles and using prior authorization and step therapy.

Conclusions—Cost-sharing features and utilization management tools were significantly associated with generic use in three commonly-used medication categories.

Keywords

Medicare Part D; cost-sharing; prior authorization; step therapy; generic drugs

Increasing generic drug use has the potential to reduce prescription drug costs without harming quality, because generic equivalents are typically as effective as their brand counterparts[1,2] and are available at a quarter of the cost.[3] In fact, aggressive generic substitution has been a key driver of the lower than expected growth in prescription drug spending in Medicare Part D.[4] However, studies point to opportunities for substantial additional savings in Medicare from greater *therapeutic* substitution (switching from a brand drug to the generic version of another drug in the same class).[5,6] Because consumers face much lower cost-sharing for generics, increasing their use may reduce cost-related non-adherence,[7] and lead to substantial welfare gains to beneficiaries.[8]

Choice of generic drugs is shaped by patient characteristics[9-12] and provider preferences.[13,14] In Medicare, differences in Part D plan features may also be an important determinant of drug choice. In 2009, there were 1,689 Medicare Part D stand-alone prescription drug plans (PDP) which differed in premiums, formularies, cost-sharing, use of utilization management tools, and other features.[15] There was 4-fold variation across Part D plans in cost-sharing for the top ten brand drugs in 2009. For example, cost-sharing for Lipitor ranged from $21 to $77 across plans.[16]

There is strong evidence that demand for drugs is sensitive to cost-sharing and utilization management tools (e.g., prior authorization).[17-26] Yet, few studies have examined the association between Part D plan features and choice of generic vs. brand drugs. Hoadley and colleagues, using 2008 Medicare data, found low or zero cost-sharing for generic statins could increase their use from 51% to 88% and could result in substantial savings.[27] It is not clear whether these findings generalize to other medications. We used 2009 Medicare data to examine whether cost-sharing for generic and brand drugs and use of utilization management tools (prior authorization or step therapy) were associated with choice of generic antidepressants, oral antidiabetics, and statins [3-hydroxy-3-methylglutaryl coenzyme A (HMG CoA) reductase inhibitors]. We focused on these categories because they are widely used by older adults, account for a large share of drug spending,[28,29] and include multiple brand and generic options with different levels of generic penetration. We hypothesized that lower cost-sharing for generic drugs, larger cost-sharing differences between brand and generic drugs, and use of prior authorization and step therapy for brand drugs would lead to greater generic use.

Methods

Data sources

We analyzed data from the Centers for Medicare and Medicaid Services (CMS) for a 10% sample of 2009 Medicare beneficiaries (N = 4,891,885) who were continuously enrolled in feefor-service Parts A and B and a stand-alone Part D plan (N = 1,529,825) that year. We did not request data on Medicare Advantage enrollees because complete medical claims are not available for those enrollees. The Prescription Drug Event (PDE) file contains information for each prescription on date of fill, National Drug Code (NDC), days supply, total cost, amount paid by the PDP and beneficiary (i.e., cost-sharing), benefit phase in which the claim occurred (e.g., initial coverage limit, coverage gap, or catastrophic phase), whether the plan required prior authorization/step therapy for the drug, and encrypted identifiers for the prescriber, pharmacy, and plan. We used the Plan Characteristics file to obtain the plan's monthly premium, deductible, and whether the plan covered generics in the gap. We obtained the primary dispenser type (e.g., retail, mail order) from the Pharmacy Characteristics file. We obtained the specialty of the provider prescribing the medication from the Prescriber Characteristics file. The Medi-Span® database was used to determine the drug name, category, dose, brand or generic status, and active ingredient by NDC.[30] From the Medicare Denominator file we obtained beneficiaries' demographics, ZIP code, Part D dual eligible status, and low-income subsidy (LIS) status. We obtained information on beneficiaries' diagnoses and health care utilization from the claims files. We used 2010 Census data to get ZIP code-level information on education (proportion with high school education) and median household income.[31]

We assigned beneficiaries to one of 306 Dartmouth Atlas of Health Care hospital-referral regions (HRRs) based on ZIP code[32] to adjust for additional regional factors that might affect.

Study sample

We excluded low-income subsidy recipients and dual eligibles who faced low or no cost-sharing and beneficiaries under 65 years eligible for Medicare based on disability whose drug utilization patterns may differ substantially from those of older adults (N = 761,070). We further excluded beneficiaries who switched plans during the year (N = 20,825), or were residents of US territories (N = 3,468). We limited analyses to individuals with at least one prescription drug event for antidepressants, oral antidiabetics, or statins during the year (see **Appendix A** for list of drugs). We eliminated a small number of enrollees (<1% of users in each category) who were in PDPs with low enrollment due to difficulty in estimating cost-sharing for generic and brand drugs.

Dependent variable

Our primary outcome was whether a beneficiary's first prescription within a specific category in 2009 was for a generic. Most of the study sample used only generics or only brand drugs throughout the year (90.7% of antidepressant users, 79.9% of antidiabetic users, and 93.8% of statin users). In sensitivity analyses described in the statistical analysis section we used alternate specifications.

Key independent variables

The main predictors of interest were calculated at the plan-level for each therapeutic category separately. All prescriptions were standardized to a 30-day supply (i.e., a 90-day supply equaled three prescriptions). First, we calculated median cost-sharing for a generic prescription in the plan by therapeutic category in 2009. We used only prescription drug events from the initial coverage phase since cost-sharing is 100% in the coverage gap and uniform across plans after catastrophic coverage is in effect. Median instead of mean cost-sharing was used because of the skewed distribution. Overall, 89% of the claims had flat copayment and 11% had coinsurance. Our second key independent variable was the difference between the plan's median cost-sharing for a brand drug and the plan's median cost-sharing for a generic drug in the same category. We did not classify brand drugs into multiple categories (e.g., preferred vs. non-preferred brand drugs) because plans frequently assigned more than one drug type to a tier. Thus, it was not feasible to distinguish between preferred or non-preferred brands if a tier contains more than one type. Finally, we included separate indicators of whether the plan required prior authorization or step therapy for at least one brand drug in the category.

Covariates

Covariates included other plan features (indicators of deductible, gap coverage, and premium level) and beneficiaries' demographic and socioeconomic characteristics (sex, age, race/ethnicity, and ZIP code-level education and income). We adjusted for a number of indicators of health status including person-level prescription-drug Hierarchical Condition Category (RxHCC) scores based on patients' claims (inpatient, outpatient, carrier, home health agency, and hospice claims),[33] which is a measure of health status and predictive of drug spending and is used to adjust PDP payments.[34] In addition, we included a variable for end-stage renal disease (ESRD) eligibility and a set of disease-specific comorbidities for each drug category to adjust for clinical severity (see **Table 1**). We included separate indicators for whether the beneficiary had at least one hospitalization or emergency department visit in the year. To adjust for differences in drug choice by provider specialty we included a variable indicating whether the beneficiary received at least one prescription from a specialist (e.g., geriatric psychiatry, psychiatry, advanced practice psychiatric nurses for antidepressant users; endocrinology for antidiabetic users; cardiology for statins). HRR indicator variables were added to address additional regional factors affecting use of generic vs. brand drugs.[35]

Statistical analysis

We used logistic regression models with robust standard errors clustered at the plan-level to estimate the association between plan features and whether a beneficiary's first prescription was for a generic drug. Regressions were performed at the person-level, adjusting for all covariates discussed above. Correlations among plan features were tested using variance inflation factor (VIF) diagnostics.[36] All VIFs were smaller than 2.7 indicating that the plan features were not too highly correlated to be included in the models.

We conducted sensitivity analyses altering the specification of the dependent variable, and the analytic sample. First, we used the last prescription filled in the year instead of the first

as the dependent variable for generic use, an outcome variable used in previous studies.[27] Second, we conducted an analysis restricting the sample to beneficiaries who did not switch drugs between generic and brand medications throughout the year. **Third, multiple concurrent medication use** is common among antidepressant (13.1%) and antidiabetic (36.0%) users. Therefore, we conducted an analysis in which the dependent variable was 'generic drug use only' in the category. The results for all of these analyses were similar to the main analysis and thus are not reported. We considered a sensitivity analysis for one of our key independent variables where instead of the difference in brand vs. generic cost-sharing in the category, we used the ratio; however, the ratio of brand to generic was too highly correlated with cost-sharing for generic drugs to be included in the same model.

To ease interpretation of the findings, we calculated marginal effects of plan features on the use of generic drugs for 16 hypothetical scenarios with different plan features for each drug category, adjusting for all other covariates. To predict rates of generic use, we chose different combinations of the 25^{th} and 75^{th} percentiles of the cost-sharing for generic drugs, the 25^{th} and 75^{th} percentiles of the brand-generic cost-sharing differential, and whether or not prior authorization or step therapy was used for brand drugs.

Analyses were performed using SAS (Version 9.3, SAS Institute, Cary, NC) and STATA (Version 12.0, Stata Corporation, College Station, TX). The study was deemed exempt from Human Subject Review by our Institutional Review Board.

Results

Sample characteristics and plan features

Our study sample included 142,767 beneficiaries using antidepressants, 101,841 using antidiabetics, and 318,934 using statins in 2009 (**Table 1**). More than one-quarter (27.5%) of the antidepressant users had at least one hospitalization as did 22.1% of antidiabetic and 19.7% of statin users.

The mean absolute cost-sharing for generics was similar across the three therapeutic categories [$6 for antidepressants ($5^{th}$-$95^{th}$ percentiles: $0-$9), $5 for antidiabetics ($5^{th}$-$95^{th}$ percentiles: $0-$8), and $6 for statins ($5^{th}$-$95^{th}$ percentiles: $0-$9)] (**Table 2)**. Mean cost-sharing differences between brand and generic drugs were also similar across the three drug categories ($32 for antidepressants, $31 for antidiabetics, $28 for statins) but varied substantially across plans (5^{th}-95^{th} percentiles: $16-$64 for antidepressants, $16-$49 for antidiabetics, and $16-$37 for statins).

The proportion of beneficiaries in plans requiring prior authorization varied across the categories, with 41.9% in plans using prior authorization for at least one antidiabetic agent vs. only 6.2% in plans requiring prior authorization for antidepressants and 6.7% for statins (see Appendix A). A large proportion of beneficiaries were in plans with step therapy requirements (53.2% for antidiabetics, 44.8% for antidepressants, and 40.1% for statins). More than one fifth of beneficiaries enrolled in plans with a deductible. The proportion of users enrolled in plans with any gap coverage was 17.2% for antidepressants and 17.6% for antidiabetics vs. 14.6% for statins. The monthly premium varied substantially across plans

(5^{th}-95^{th} percentiles: $24-$81 for antidepressant users and antidiabetic users, $24-$78 for statin users).

Effects of plan features

Effects of Part D plan features on generic use were similar across the three drug categories in 2009 (**Table 3**). After adjustment for demographic, socioeconomic, and health status and comorbidities, beneficiaries in plans with higher average generic cost-sharing were less likely to use generics than those in plans with lower cost-sharing for antidepressants (odds ratio [OR] per $1 increase= 0.97, 95% confidence interval [CI] = 0.95-0.98, p<0.05), antidiabetics (OR = 0.97, CI = 0.96-0.98, p<0.05), and statins (OR = 0.94, CI = 0.92-0.95, p<0.05). Beneficiaries in plans with larger within-category cost-sharing differences between brand and generic drugs were more likely to use generic drugs than those in plans with smaller differences (antidepressants: OR per $1 increase= 1.01, CI = 1.01-1.02; antidiabetics: OR = 1.01, CI = 1.01-1.02; statins: OR = 1.02, CI = 1.01-1.02; p<0.05 for all). Enrollees in plans with use of prior authorization had significantly higher odds of using generics for antidepressants (OR = 1.29, CI = 1.15-1.44, p<0.05), antidiabetics (OR = 1.14, CI = 1.09-1.20, p<0.05), and statins (OR = 1.12, CI = 1.00-1.27, p<0.05) compared to their counterparts in plans without prior authorization requirement. Beneficiaries in plans using step therapy were more likely to use generic antidepressants (OR = 1.07, CI = 1.02-1.13, p<0.05) and generic statins (OR = 1.13, CI = 1.08 – 1.19, p<0.05), but these policies were not significantly associated with use of generic antidiabetics (OR = 1.04, CI = 0.99 – 1.09, p = 0.15).

Other plan features also had a significant impact on the use of generic drugs (**Table 3**). Beneficiaries in plans with no deductible were more likely to use generics than those in plans with deductibles across all three categories. Beneficiaries in plans that covered some drugs in the coverage gap had increased odds of using generic statins (OR = 1.24, CI = 1.04-1.47, p<0.05), but were no more likely to use generic antidepressants (OR = 1.09, CI = 0.90-1.30, p=0.38) or antidiabetic drugs (OR = 1.03, CI = 0.86-1.24, p = 0.74). Beneficiaries enrolled in plans with higher premiums using antidepressants or statins were less likely to use generics than those in plans with lower premiums, possibly because beneficiaries able to pay premiums at $50+/month might be less sensitive to out-of-pocket spending. However, plan premium was not associated with generic vs. brand use for antidiabetics.

Prediction of generic use associated with plan features

Table 4 shows the predicted rates of generic use in the three studied drug categories in several hypothetical Part D plans that vary by the key features of interest (cost sharing and utilization management tools). Plans could potentially increase generic use from 75.3% to 83.3% for antidepressants, from 79.0% to 84.2% for antidiabetics, and from 55.9% to 67.4% for statin drugs by reducing generic cost-sharing from the 75^{th} ($7) to 25^{th} percentiles ($4-$5), increasing brand-generic cost-sharing differences from the 25^{th} ($25-$26) to 75^{th} ($32-$33) percentiles and using prior authorization and step therapy requirements. (**Appendix B** contains predictions for all hypothetical plans).

Discussion

We found that rates of generic drug use for common chronic conditions are closely related to Part D plan features in Medicare. Specifically, low cost-sharing for generics, large differentials in cost-sharing for generic vs. brand drugs, and tools such as prior authorization and step therapy were associated with higher generic drug use. Our analysis points to potential opportunities for savings[5] through altering benefit design in Part D plans.

Previous studies have reported positive associations between brand-generic cost-sharing differentials and use of generics in employment-based insurance.[37] Our findings are similar to those reported by Hoadley.[27] Using more recent data (2009), two additional drug categories, and adjusting for a richer set of health and socioeconomic status measures, our study confirms the association between benefit design in Part D plans and use of generic drugs. It is notable that our findings were quite consistent across the three drug categories in spite of differences in the formulary requirements for these categories, the potential for within-category polypharmacy, and differing generic availability. Specifically, when the Part D program was established in 2006, antidepressants were designated as a “protected class” requiring Part D plan formularies to cover all or substantially all drugs in the category[38] to ensure access, although CMS recently proposed a rule to eliminate protected status for antidepressants.[39] While antidepressants have similar comparative effectiveness, on average, these agents are not equally effective at the individual-level and patients with depression may try multiple antidepressants before finding one that works.[40,41] As a result, physicians may be reluctant to engage in therapeutic substitution in this category. It is possible that beneficiaries with poorly controlled diabetes would be prescribed multiple oral antidiabetic agents, some of which have no generic equivalents. If choice of plan is correlated with diabetes severity our estimates of the effect of plan features may be biased. We addressed this issue by adjusting for a rich set of diabetes severity indicators (including several complications, overall comorbidity, and receiving antidiabetic prescriptions from an endocrinologist). Finally, while the overall rate of generic drug use was slightly lower in the statin class due to fewer available generic equivalents during our study period, the magnitude of the effects of our key plan features was similar to the other two categories.

The Medicare Prescription Drug and Modernization Act (MMA) created a market for prescription drug coverage that was meant to provide multiple plan choices to beneficiaries so they could find a plan that best met their needs. Our findings point to relatively small variation in some plan features (e.g., plans’ cost-sharing for generic antidepressants ranged only from $5 to $7 in the 25th and 75th percentiles, respectively) and more variation in others (e.g., the cost-sharing difference between brand and generic drugs ranged from $26 to $33 for antidepressants in the 25th and 75th percentiles). It is possible that our findings on the relationship between plan features and generic use could be partly due to selection bias if beneficiaries who are more likely to use generics chose plans with lower generic cost-sharing. However, the evidence on factors driving plan choice points to this bias being minimal. Research suggests that Part D plan choice is driven largely by plan premiums and that beneficiaries actually fail to pay sufficient attention to cost-sharing and utilization management tools when selecting plans.[42,43] The typical beneficiary, who faces a choice of 40 plans on average, seldom chooses the optimal plan (i.e., the one with the lowest out-of-

pocket spending for someone with their drug utilization).[43,44] Furthermore, beneficiaries are reluctant to switch plans in response to changes in their medication needs or plan options over time.[45,46] We are, therefore, reasonably confident that potential selection bias should be minimal after adjusting for the many plan- and beneficiary-level covariates in our analyses.

It is possible that some standardization of pharmacy benefit designs under Part D (e.g., requiring all plans to have very low cost-sharing for generics) may save money for the Medicare program and beneficiaries. However, Medicare policy has consistently favored a more market-based approach to plan benefit design. Alternatively, CMS could add efficiency measures to its performance measurement for Part D plans: the Star Rating system, information available to consumers on the Medicare Drug Plan Finder website and used by CMS to terminate contracts with poorly performing Part D plans. The Star Rating system, which has been found to be associated with beneficiaries' enrollment decisions,[47] has 4 domains for quality measurement: 1) drug plan customer service; 2) member complaints, problems getting services, and improvement in the drug plan's performance; 3) member experience with the drug plan; and 4) patient safety and accuracy of drug pricing.[48] The rating system does not currently evaluate generic vs. brand drug use, which could be a potential measure of efficiency. If Part D plans are rewarded for more generic use, they might change their cost-sharing to drive greater use of generic drugs by their enrollees.

Our study has important limitations. First, while we adjusted for patients' socio-demographic characteristics and health status, provider-level factors, which also influence prescribing decisions,[49] were limited to specialty of the prescriber. Second, we restricted the sample to those with 12 months continuous enrollment whose medication use patterns may differ from other Medicare beneficiaries. Third, we measured plan's utilization management for at least one brand drug in the drug category using the PDE file. If no enrollees in a particular plan filled the drug requiring prior authorization or step therapy by the plan we would not observe the utilization management requirement for that drug and may thus underestimate use of and effects of these tools. Fourth, use of specific utilization management tools (e.g., prior authorization) vary from year to year so our findings may not generalize to other years. Fifth, it is difficult to predict beneficiaries' behavioral responses in drug categories where polypharmacy is common (e.g., antidiabetics). If beneficiaries respond to reductions in generic drug copays by combining a generic with a brand drug to treat the same condition instead of substituting the generic for the brand, changes in cost-sharing features may not result in savings. Finally, if beneficiaries purchased generic drugs at discounted prices without using the plan (e.g., $4 generic programs), use of generic drugs would be underestimated. Since use of these programs was relatively limited among elderly beneficiaries at the time,[50] their impact on our findings should be minimal.

In conclusion, lower cost-sharing for generic drugs, larger brand-generic cost-sharing differences, and use of prior authorization and step therapy requirements were associated with greater use of generic drugs in three widely used drug categories in Part D. Modifying the benefit design and utilization management of Medicare prescription drug plans might increase generic use, which could generate substantial savings for the Medicare program and for beneficiaries.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Characteristics of the study sample*

Characteristic	Antidepressants (N=142,767)	Antidiabetics (N=101,841)	Statins (N=318,934)
Demographic and socioeconomic characteristics			
Mean age (SD)	76.6 (7.9)	75.4 (7.0)	75.6 (7.1)
Female sex (%)	73.8	53.7	58.4
White race (%)	97.0	91.8	94.9
Proportion of population in ZIP code who are high school graduate or higher (%)	87.3 (7.9)	86.1 (8.3)	87.3 (8.0)
Median household income in $ (SD) †	57,298 (22,974)	55,067 (21,546)	58,115 (23,581)
Health services utilization in 2009			
At least one hospitalization (%)	27.5	22.1	19.7
At least one emergency department visit (%)	38.4	30.2	27.7
At least one prescription by mail order (%)	10.0	13.1	14.7
At least one specialist visit (%)	7.6	6.7	14.7
Health status			
RxHCC score (SD)‡	1.13 (0.42)	1.17 (0.35)	1.02 (0.35)
End-stage renal disease (ESRD) (%)	0.55	0.52	0.48
Disease-specific comorbidities			
Delirium, dementia, and amnestic and other cognitive disorders (%)	17.2		
Anxiety disorders (%)	20.2		
Bipolar disorders (%)	2.9		
Depressive disorders (%)	38.0		
Schizophrenia and other psychotic disorders (%)	5.0		
Diabetic neuropathy (%)		15.0	
Diabetic nephropathy (%)		5.8	
Diabetic retinopathy (%)		15.4	
Diabetes with peripheral vascular disease (%)		8.4	
Insulin use during the year (%)		15.0	
Hyperlipidemia (%)		84.2	92.2
Type 2 diabetes (%)		97.4	34.6
Coronary heart disease (%)			39.9
Stroke/TIA (%)			8.3
Medication use in the year (%)			
Only generic drugs	73.4	70.4	58.7
Only brand drugs	17.3	9.5	35.1
Both generic and brand drugs	9.3	20.1	6.2

*Figures with parentheses are means and SDs.

†Household income is based on the median income of the patient's geographic area according to ZIP code and 2010 U.S. Census data.

[‡]Prescription-drug Hierarchical Condition Category (RxHCC) scores are based on diagnoses from 2009 inpatient, outpatient, carrier, hospice, and home health agencies claims and are normalized to equal 1.00 on average for all Medicare Part D enrollees, with a range in the study sample of 0.37 to 5.90. Higher scores indicate an increase likelihood of higher drug spending and poorer health status.

Table 2

Plan features for the study sample*

Variable	Antidepressants	Antidiabetics	Statins
Cost-sharing for a generic drug ($)			
5th percentile	0	0	0
25th percentile	5	4	5
Mean	6	5	6
Median	7	7	7
75th percentile	7	7	7
95th percentile	9	8	9
Cost-sharing difference between brand and generic drugs ($)			
5th percentile	16	16	16
25th percentile	26	26	25
Mean	32	31	28
Median	31	31	31
75th percentile	33	33	32
95th percentile	64	49	37
Prior authorization (%)	6.2	41.9	6.7
Step therapy (%)	44.8	53.2	40.1
Deductible (%)†	21.5	21.8	21.5
Gap coverage (%)‡	17.2	17.6	14.6
Premium per month ($)			
5th percentile	24	24	24
25th percentile	33	33	35
Mean	43	43	42
Median	38	38	38
75th percentile	44	45	43
95th percentile	81	81	78

*Plan features are described at person level.

†In Medicare Part D program, the deductible is a specific amount of money that beneficiaries have to pay for their prescriptions before their Part D plans start to pay their share of enrollees' prescription drug claims. The deductible varies across plans, some plans may have a deductible while others do not; besides, plans can have different amounts for their deductibles.

‡The Medicare Part D standard benefit design requires beneficiaries (except those with low-income-subsidies) to pay for 100% of total prescription costs after their expenditures exceed the initial coverage phase and before reaching the catastrophic coverage limit. This benefit phase is usually called "coverage gap" or "doughnut hole". However, plans can offer alternative benefit designs with gap coverage that covers some drug costs in the gap.

Table 3

Logistic Regression Results--Estimated Effects of Plan Features on the Use of Generic Drugs*

Variables	Adjusted Odds Ratios (95% CI)		
	Antidepressants	Antidiabetics	Statins
Plan cost-sharing features			
Cost-sharing for a generic drug ($)	0.97 (0.95-0.98)†	0.97 (0.96-0.98)†	0.94 (0.92-0.95)†
Cost-sharing difference between brand and generic drugs ($)	1.01 (1.01-1.02)†	1.01 (1.01-1.02)†	1.02 (1.01-1.02)†
Utilization management tools			
Prior authorization (ref=no)			
Yes	1.29 (1.15-1.44)†	1.14 (1.09-1.20)†	1.12 (1.00-1.27)†
Step therapy (ref=no)			
Yes	1.07 (1.02-1.13)†	1.04 (0.99-1.09)	1.13 (1.08-1.19)†
Other plan features			
Deductible (ref=yes)			
No	1.10 (1.01-1.19)†	1.09 (1.01-1.19)†	1.45 (1.33-1.58)†
Gap coverage (ref=no)			
Yes	1.09 (0.90-1.30)	1.03 (0.86-1.24)	1.24 (1.04-1.47)†
Premium ($, ref=$1-<30)			
$30-50/month	0.90 (0.84-0.96)†	1.08 (1.00-1.17)	0.75 (0.69-0.81)†
$50+/month	0.79 (0.66-0.95)†	0.84 (0.69-1.02)	0.56 (0.46-0.67)†
Demographic and socioeconomic characteristics			
Sex (ref=male)			
Female	0.94 (0.91-0.97)†	1.14 (1.10-1.18)†	1.08 (1.06-1.10)†
Race/ethnicity (ref=other)			
Non-Hispanic white	0.81 (0.75-0.88)†	1.00 (0.94-1.06)	0.95 (0.91-0.98)†
Age group (year, ref=65-74)			
75-84	1.05 (1.02-1.09)†	0.99 (0.95-1.03)	1.01 (1.00-1.03)
85+	1.04 (1.00-1.09)†	0.94 (0.89-1.00)	1.10 (1.07-1.13)†
Education (%, ref=other)			
High school graduate or higher	0.99 (0.99-0.99)†	1.00 (0.99-1.00)†	1 .00(0.99-1.00)†
Median household income ($)	1.00 (1.00-1.00)†	1.00 (1.00-1.00)†	1.00 (1.00-1.00)†
Health services utilization			
At least one hospitalization (ref=no)			
Yes	1.06 (1.02-1.10)†	1.04 (0.99-1.09)	1.09 (1.07-1.12)†
At least one emergency department visit (ref=no)			
Yes	1.02 (0.99-1.06)	1.03 (0.98-1.07)	1.05 (1.03-1.07)†
At least one prescription by mail order (ref=no)			

Variables	Adjusted Odds Ratios (95% CI)		
	Antidepressants	Antidiabetics	Statins
Yes	1.15 (1.08-1.22)†	0.94 (0.88-1.01)	1.15 (1.07-1.24)†
At least one prescription by specialist prescribers (ref=no)			
Yes	0.81 (0.76-0.85)†	0.60 (0.57-0.64)†	0.82 (0.81-0.84)†
Health status			
RxHCC score	0.89 (0.86-0.93)†	1.05 (1.00-1.11)	1.27 (1.23-1.31)†
ESRD (ref=no)			
Yes	1.19 (0.98-1.43)	0.65 (0.54-0.79)†	0.99 (0.88-1.10)
Disease-specific comorbidities			
Antidepression specific predictors			
Delirium, dementia, and amnestic and other cognitive disorders (ref=no)			
Yes	0.88 (0.85-0.91)†		
Anxiety disorders (ref=no)			
Yes	1.00 (0.96-1.03)		
Bipolar disorders (ref=no)			
Yes	0.97 (0.90-1.04)		
Depressive disorders (ref=no)			
Yes	0.72 (0.70-0.74)†		
Schizophrenia and other psychotic disorders (ref=no)			
Yes	1.07 (1.01-1.13)†		
Antidiabetes specific predictors			
Diabetic neuropathy (ref=no)			
Yes		0.96 (0.92-1.01)	
Diabetic nephropathy (ref=no)			
Yes		0.76 (0.71-0.81)†	
Diabetic retinopathy (ref=no)			
Yes		0.83 (0.79-0.86)†	
Diabetes with peripheral vascular disease (ref=no)			
Yes		0.99 (0.93-1.05)	
Insulin use during the year (ref=no)			
Yes		0.85 (0.81-0.89)†	
Hyperlipidemia (ref=no)			
Yes		0.89 (0.85-0.94)†	
Type 2 diabetes (ref=no)			
Yes		0.68 (0.61-0.77)†	
Statins specific predictors			
Coronary heart disease (ref=no)			
Yes			0.76 (0.75-0.78)†

Variables	Adjusted Odds Ratios (95% CI)		
	Antidepressants	Antidiabetics	Statins
Stroke/TIA (ref=no)			
Yes			1.03 (1.00-1.06)†
Hyperlipidemia (ref=no)			
Yes			0.87 (0.84-0.90)†
Type 2 diabetes (ref=no)			
Yes			1.00 (0.99-1.03)

*Regression results were adjusted for HRR indicators.

†Statistically significant odds ratios, p<0.05.

Table 4

Prediction of generic use*

Benefit design scenario	Cost-sharing for a generic drug ($)	Cost-sharing difference ($)	Prior authorization	Step therapy	Predicted generic use
Antidepressants					
I	7	26	N	N	75.3%
II	7	33	N	N	77.1%
III	5	26	Y	Y	81.9%
IV	5	33	Y	Y	83.3%
Antidiabetics					
I	7	26	N	N	79.0%
II	7	33	N	N	80.4%
III	4	26	Y	Y	83.0%
IV	4	33	Y	Y	84.2%
Statins					
I	7	25	N	N	55.9%
II	7	32	N	N	58.9%
III	5	25	Y	Y	64.6%
IV	5	32	Y	Y	67.4%

*For each drug category, we calculated marginal effects of plan features on the use of generic drugs (Appendix B displays predicted generic use for all 16 scenarios in each drug category). We chose different combinations of the 25^{th} and 75^{th} percentiles of the cost-sharing for generic drugs, the 25^{th} and 75^{th} percentiles of the cost-sharing difference between brand and generic drugs, and whether or not prior authorization or step therapy was used. All covariates were adjusted for the predictions.