

Relationship Between Generic and Preferred-brand Prescription Copayment Differentials and Generic Fill Rate

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Prescription drug costs increased by 10.6% between 2003 and 2004, and although this spending growth moderated in 2005, near-term growth in prescription drug spending is expected to continue above the rate of overall inflation.^{1,2} To manage these growing costs, plan sponsors are increasingly turning to cost management tools including tiered prescription benefit designs. Tiered benefits are designed to encourage a greater degree of consumerism through establishing financial incentives for members to choose lower cost alternatives. Lower copayments are assigned to generic and preferred-brand alternatives, with higher copayments for nonpreferred-brand drugs.

In the late 1990s, adoption of 3-tier plan designs grew along with the availability of brand and lower cost generic alternatives. Since that time, the adoption of 3-tier or higher plans has increased dramatically, from 27% of covered workers in 2000 to 74% in 2006.³ With this growth in 3-tier plan designs have come questions about the ability of these plans to influence members' choice of lower cost options and whether tiered copayments cause decreased consumption of the higher-tiered medications. To date, there is mixed evidence that tiered copayment designs are providing the financial motivation for members to choose lower cost options. In an evaluation of a health plan that added a 3-tier plan while retaining the older 2-tier plan, Motheral and Fairman found significant decreases in the utilization of third-tier medications but no differences before and after the change in the utilization of generics or preferred brands.⁴ In a follow-up to that study using a longer follow-up period, similar results were found, suggesting that the addition of a third tier did not shift use to the lower tiers, only decreased utilization of medications in the highest tier.⁵

In other studies of employer-sponsored health plans that implemented 3-tier benefit designs, researchers found that patients in the intervention groups (those that changed to a 3-tier design) were significantly more likely to switch to drug therapies in the lower tiers than control group members.^{6,7} Two additional studies have been presented as evidence that 3-tier copayments result in more patients switching to lower cost therapies⁸; however, on closer examination, these studies are inherently inconclusive.^{9,10} Their results relied on increases in the proportion of claims (formulary compliance or percentage of preferred-brand and generic claims) or increases in the probability of filling a

Objective: To evaluate the relationship between generic and brand copayment differentials and generic fill rate (GFR).

Study Design: Cross-sectional.

Methods: Aggregate-level retail prescription utilization and demographic data from 2005 were used. Plan sponsors were included if they were continuously eligible with Express Scripts Inc during 2005, had no benefit change, were commercially insured, offered a subsidized benefit, adopted 1 of 2 standard formularies, and had at least 100 members. The relationship between GFR and model independent variables was examined by generalized linear modeling using a logistic function for GFR.

Results: A total of 3979 plan sponsors met the inclusion criteria. Controlling for plan demographics, factors that significantly and positively impacted generic usage were step therapy, 3-tier plan design, and increased generic and brand copayment differentials. Relative to plans without step therapy, plans with this feature had estimated GFRs that were 2.6 percentage points higher on average ($P < .001$). Relative to plan sponsors with flat 3-tier designs, those with flat 2-tier designs, coinsurance, or tiered coinsurance had GFRs that were 2.0 ($P < .001$), 1.5 ($P < .001$), and 1.2 ($P < .01$) percentage points lower, respectively. Compared with plan sponsors that had a \$0 to \$5 differential between generic and brand copayments, plans with \$11 to \$15, \$16 to \$20, and \$21+ differentials had GFRs that were 1.9, 2.9, and 5.2 percentage points higher on average, respectively (all $P < .001$).

Conclusion: Factors to consider when designing a plan are benefit structure and the financial incentives used to differentiate between generics and brands.

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preferred product versus a nonpreferred product to infer that tiered copayments influenced movement to preferred products. However, the increased formulary compliance rates or increases in the proportion of claims for preferred brands could be because of increases in preferred products or decreases in nonpreferred brands. Caution is warranted in interpreting these results as evidence that tiered benefits influence movement to lower tiers.

One reason for the mixed findings with regard to switching to preferred products after implementation of a 3-tier benefit design could be differences in the financial incentives inherent within the copayment differential between tiers. To date, no study has examined the impact of copayment differential on increased use of preferred-brand or generic products. Given the variety of plan options available to clients (number of tiers, flat vs different forms of coinsurance) and wide variability in copayments applied within flat-copayment plans, the objective of this study was to examine the relationship between plan designs (specifically, the generic and preferred-brand copayment differentials) and the generic fill rate (GFR).

METHODS

Study Data

This study used a cross-sectional design with the unit of analysis at the group or benefit level (ie, plan sponsor). Data included aggregate-level utilization and prescription benefit design information for Express Scripts Inc (ESI) plan sponsors for 2005. ESI is one of the largest pharmacy benefits management companies, with more than 50 million members nationwide. Data included member costs and utilization in 2005 for generics and brands dispensed through the retail delivery channel. All prescription claims were adjusted to 30-day equivalents.

Plan sponsors were included for analysis if they were continuously eligible with ESI during 2005, did not experience a benefit design change during the year, represented a commercially insured plan (ie, no Medicare or Medicaid), offered a subsidized benefit to their members (ie, excluding “cash and carry”), adopted 1 of 2 ESI standard formularies, and had at least 100 members enrolled in their plan.

STUDY VARIABLES

The dependent variable, GFR, was calculated as total number of generic retail prescriptions divided by the total number of retail prescriptions for the plan sponsor. Independent variables included average age, percent female, adoption of step therapy, prescription drug benefit type, retail generic and preferred-brand copayment differential, the geo-

graphic region of the plan sponsor, per-member per-month (PMPM) retail utilization, formulary type, and the number of members enrolled in January 2005. The relationship between GFR and predictor variables was limited to the retail setting because of differences in copayments and copayment structures between the retail and the home delivery settings (ie, flat copayments with home delivery and coinsurance with retail purchases).

Average age was calculated as the total sum of member years of age in January 2005 divided by the total number of members in January 2005. The percentage of female members was calculated as the total number of females divided by the total number of members in January 2005.

Step therapy is a point-of-sale program designed to encourage patients new to therapy to begin with therapeutically equivalent, lower cost medications (typically generics) before “stepping up” to more expensive branded alternatives.

Prescription drug benefit type was categorized into flat-dollar 3-tier, flat-dollar 2-tier, flat coinsurance, and tiered coinsurance. Tiered coinsurance includes both 2- and 3-tier designs and is structured using different coinsurance rates for generics and brands. The generic and preferred-brand copayment differential was calculated as the difference between the average member payment for retail preferred brands and the average member payment for generic prescriptions. The copayment differential was based on generic and preferred brands rather than nonpreferred brands because 2-tier designs do not have nonpreferred-brand usage and because among plan designs with nonpreferred-brand usage, 90% of all prescription claims were for generic or preferred brands. Copayment differentials were categorized into 5 groups: \$0 to \$5, \$6 to \$10, \$11 to \$15, \$16 to \$20, and \$21+.

Geographic location was included to account for a previously documented relationship between geographic location and GFR.¹¹ Eligibility data were used to categorize plans into 1 of 4 US Census regions based on the state of residence for a majority of their members. If the plan sponsor did not have a majority of its members in any 1 region, it was classified as a “national” plan.

The 2 standard formularies were similar in terms of the number and types of drugs included, with formulary A containing 1043 products and formulary B containing 1151 products. Both formularies were considered open, with formulary B containing an additional 105 single-source branded products and an additional 3 multisource branded products.

Generic fill rate can increase for 2 reasons: when generic utilization increases more than brand utilization or when brand prescriptions decrease more than generic prescriptions

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increase. This later scenario is more likely to occur in plans with higher copayments for brands, where decreases in utilization would be expected as a result of these copayments. Because copayment differential is highly correlated with brand copayments, we included the average total PMPM utilization within the model to control for overinflation of GFR due to the scenario of decreased use of brands and no corresponding increase in use of generics. PMPM utilization was calculated as the total number of 30-day-equivalent prescriptions divided by the total number of member months. Finally, average monthly membership was included to control for possible variation in GFR due to plan enrollment size.

Statistical Analyses

Because the dependent variable, GFR, was a proportion strictly bound between 0 and 1, using ordinary least squares regression would violate both normality and homoscedasticity assumptions. Therefore, a generalized linear model using a logistic function of $GFR/(1 - GFR)$ was used. The effects of step therapy, benefit type, region, and copayment differential were estimated by holding the remaining covariates at their mean in the regression equation and calculating the predicted GFR at each level. All analyses were conducted using SPSS 12.0 (SPSS Inc, Chicago, Ill).

This study was not submitted to an institutional review board; however, all regulations related to the Health Insurance Portability and Accountability Act were followed.

RESULTS

Beginning with a sample of 10 792 plan sponsors receiving prescription benefit services through ESI for all of 2005, a total of 2940 did not meet the inclusion criteria of offering an

integrated and subsidized benefit within the commercially insured market. Of the 7852 plan sponsors remaining, 5118 had adopted 1 of 2 ESI standard formularies. Finally, 1139 plan sponsors were excluded because their average membership was less than 100, leaving a final sample of 3979.

Demographics

The unweighted average age across all plan sponsors was 36 (SD = 10.0) years, and the average percent female was 50 (SD = 8.5) (Table 1). Fewer than 5% of plan sponsors had at least 1 step therapy program and 51% had a flat 3-tier pre-

■ **Table 1.** Plan Sponsor Characteristics (N = 3979)

Characteristic	Mean (SD)	
Age, y	35.8 (10.0)	
Percent female	49.6 (8.5)	
PMPM utilization	0.83 (0.5)	
No. of members	2453 (21 526)	
	No. (%)	Generic Fill Rate (SD)
No. of step therapy programs		
None	3786 (95.1)	51.3 (6.4)
One or more	193 (4.9)	54.0 (5.8)
Formulary A		
Formulary B	1322 (33.2)	49.8 (7.0)
Formulary B	2657 (66.8)	52.3 (5.9)
Plan type		
Three-tier flat	2020 (50.8)	52.9 (7.0)
Two-tier flat	1407 (35.4)	49.2 (6.8)
Flat coinsurance	339 (8.5)	51.5 (6.2)
Tiered coinsurance	213 (5.4)	53.0 (5.3)
Geographic region		
Midwest	1113 (28.0)	52.7 (5.5)
West	463 (11.6)	54.7 (6.6)
Northeast	920 (23.1)	48.9 (7.2)
South	1159 (29.1)	51.1 (5.7)
National	324 (8.1)	51.2 (5.5)
Preferred-brand-generic copayment differential		
\$0-\$5	536 (13.5)	47.6 (7.1)
\$6-\$10	690 (17.3)	49.2 (6.2)
\$11-\$15	1165 (29.3)	51.6 (5.7)
\$16-\$20	914 (23.0)	52.6 (5.2)
\$21+	673 (16.9)	55.0 (5.9)
PMPM indicates per member per month.		

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scription drug benefit. The highest proportion of plan sponsors had generic and preferred-brand copayment differentials between \$11 and \$15 (29.3%). The lowest proportion of plan sponsors was located in the West (12%), with only 8% represented nationally.

Predictors of Generic Fill Rate

Results from the generalized linear model indicate that increases in average age, percent female, and PMPM utilization decrease the odds of generic use, whereas average plan

enrollment did not significantly influence the odds of generic use (Table 2). Compared with plan sponsors in the Midwest region, those in the Western region had an increase in the estimated average GFR of 1.7 percentage points, whereas plan sponsors located in the South and Northeast, and those with a national location had significant decreases in their GFRs (2.3%, 3.3%, and 2.4%, respectively).

Controlling for plan demographics and utilization, several plan design factors significantly and positively influenced the probability of filling generic prescriptions. These included step therapy, prescription drug benefit type, and generic/preferred-brand copayment differential. Plan sponsors with at least 1 step therapy program in place showed an average GFR that was 2.7 percentage points higher than that of sponsors with no step therapy program. Compared with plan sponsors with flat-dollar 3-tier benefit designs, plan sponsors with flat-dollar 2-tier benefit designs, flat coinsurance, and tiered coinsurance had estimated GFRs that were 2.0, 1.5, and 1.2 percentage points lower, respectively.

Compared with plan sponsors with a \$0 to \$5 copayment differential, those with differentials between \$11 and \$15 had an increase in their average estimated GFR of 1.9 percentage points, those with differentials between \$16 and \$20 had an estimated increase of 2.9 percentage points, and those with differentials of \$21 and higher showed an increase of 5.2 percentage points.

DISCUSSION

We limited our analysis to retail claims only, which may have biased upward the retail GFR for clients with a higher proportion of claims for home delivery, because home delivery has a disproportionately higher mix of long-term branded medications. We evaluated the impact that home delivery penetration had on retail GFR by including this variable in our model and found that the proportion of home delivery penetration had no significant impact on retail GFR.

The results of this study suggest that several factors influence the selection of generic medications, including plan sponsor demo-

■ **Table 2.** Regression Model Predicting Generic Prescription Use (N = 3979)

Independent Variable	Parameter Estimate	P
Intercept	0.520	
Age	-0.016	<.000
Age squared	0.000	<.000
Percent female	-0.001	<.005
PMPM utilization	-0.112	<.000
No. of members	0.000	.349
Formulary A	Reference	
Formulary B	-0.003	.813
No. of step therapy programs		
None	Reference	
One or more	0.107	<.000
Benefit type		
Three-tier flat	Reference	
Two-tier flat	-0.082	<.000
Coinsurance, flat	-0.061	<.000
Coinsurance, tiered	-0.050	.005
Geographic region		
Midwest	Reference	
West	0.068	<.000
Northeast	-0.134	<.000
South	-0.091	<.000
National	-0.095	<.000
Preferred-brand–generic copayment differential		
\$0-\$5	Reference	
\$6-\$10	0.013	.349
\$11-\$15	0.075	<.000
\$16-\$20	0.117	<.000
\$21+	0.210	<.000

PMPM indicates per member per month.

graphics, prescription drug benefit design, and the financial incentive created through higher copayment differentials. The finding of lower GFR as age increases is consistent with previous research showing that older patients tend to utilize more medications in select chronic-therapy classes for which fewer generic alternatives are available.¹²

Plan sponsor benefit design appears to influence selection of generics in several ways. First, implementation of step therapy programs was found to significantly increase the likelihood of generic claims. Prescription step therapy programs have been shown to be effective tools for encouraging greater use of generics, with 30% of patients with a step therapy edit converting to a generic alternative affected by step therapy.¹³

Another aspect of the prescription drug benefit that influenced selection of generics was how the copayment was structured. Our findings suggest that flat-dollar 3-tier prescription benefit designs increase the likelihood of generic usage compared with flat-dollar 2-tier and coinsurance prescription benefit designs. To our knowledge, this is the first study to examine this relationship, and it is unclear what may be influencing greater generic use under a 3-tier benefit design. One could hypothesize that members are less aware of the potential savings from generics under a coinsurance design compared with a flat-dollar 3-tier design, where a clear delineation of price points is given to members, or that members have less of a financial incentive to choose generics under a 2-tier design, where copayments tend to be lower.

To our knowledge, this is the first cross-sectional study to examine the relationship between generic and preferred-brand copayment differentials and use of generic medications. Although findings do suggest that creating the financial incentive to select lower cost agents through greater copayment differentials influences the likelihood of selecting generic medications, it is important to note that the copayment differential is only one of several factors influencing the likelihood of switching to lower tiered medications. In a study of more than 3800 members enrolled in a managed care plan, survey respondents rated perceptions of medication safety and effectiveness, the medical condition being treated, and the opinion of their physician as more important than cost in the decision to switch to formulary medications.¹⁴

Although this study evaluated the overall impact of copayment differential between preferred-brand and generic medications, further research should examine how this pattern may vary across therapy classes. Also intriguing is the interac-

Take-away Points

This study provides insight into how the choice of pharmacy plan design features affects utilization of generic medications.

- Flat-dollar 3-tier copayments are associated with greater generic utilization than flat-dollar 2-tier copayments or flat coinsurance.
- Establishing copayments is an important factor in encouraging greater generic utilization. Specifically, the greater the difference between generic and preferred-brand copayments, the greater probability generics will be used.
- Implementing programs such as step therapy plays a role in increasing generic utilization.

tion of patients' willingness to pay for branded medications and perceptions of safety, effectiveness, and physician recommendations. Continuing in this vein of research will provide greater insight into the factors influencing patients' prescription-purchasing behaviors.

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