© Health Research and Educational Trust
DOI: 10.1111/1475-6773.12831
RESEARCH ARTICLE

Simulating Variation in Families' Spending across Marketplace Plans

Yuting Zhang, Seo Hyon Baik , and Samuel H. Zuvekas

Objective. To examine variations in premium and cost-sharing across marketplace plans available to eligible families.

Data Sources. 2011–2012 Medical Expenditure Panel Survey (MEPS), 2014 health plan data from healthcare.gov, and the 2011 Medicare Part D public formulary file.

Study Design. We identified a nationally representative cohort of individuals in the MEPS who would have been eligible for marketplace coverage. For each family, we simulated the total out-of-pocket payment (premium plus cost-sharing) under each available plan in their county of residence, assuming their premarketplace use.

Data Collection/Extraction Methods. Confidential state and county of residence identifiers were merged onto MEPS public use files and used to match MEPS families to the plans available in their county as reported in the publicly available data from healthcare.gov.

Principal Findings. We found substantial variation in total family health care spending, especially premium component, across marketplace plans. This is true even within a plan tier of the same minimum actuarial value, and for families eligible for subsidies. Variation among families with income below 250 percent of the FPL is larger than variation among families with higher income.

Conclusions. Our simulations show substantial variations in net premium and out-of-pocket payments across marketplace plans, even within a plan tier.

Key Words. Health insurance exchanges, health insurance marketplace, simulation

The Health Insurance Marketplace was established as a key component of the Affordable Care Act's (ACA) expansion of coverage. In 2015, 9.5 million Americans enrolled in marketplace plans (Department of Health and Human Services 2015). All marketplace plans cap out-of-pocket (OOP) costs for care at no more than \$6,600 for an individual and \$13,200 for a family (2015 figures; the OOP caps vary by year and do not apply for services that are not covered by plans) and must provide at least 10 essential benefits.

Eligible individuals can choose marketplace plans that are offered in their counties of residence. The number of plans that are available to individuals varies considerably across counties. For example, in the 2014 health plan data for 36 states that provided health plan data to Healthcare.gov (Healthcare.gov 2014), people living in Florence, Wisconsin, only had two plans to choose from, and people living in Seminole, Florida, had 158 plans to choose. The median and mean numbers of plans by county are 25 and 28, respectively.

To facilitate comparison across plans, the Centers for Medicare and Medicaid Services (CMS) categorized all plans into four tiers: bronze (least comprehensive), silver, gold, and platinum (most comprehensive), with minimum actuarial values of 60, 70, 80, and 90 percent, respectively. Premiums are higher for more comprehensive plans.

Although plans within the same tier should be comparable on average because they have similar actuarial values, plans can use a wide variety of tools to design the benefit structure in order to attract some individuals or deter others. For example, a recent study examined the variability in drug coverage in the exchanges and found wide variation in out-of-pocket costs across and within four tiers of drug coverage (Buttorff et al. 2015). In addition, actuarial values are defined as the average percentage a plan will pay for covered services of a representative population. However, for each individual the actual percent the plan covers varies by the particular services the person uses.

To our knowledge, no studies have examined the variations across marketplace plans in total consumer out-of-pocket payments combining premium with cost-sharing on the basis of their actual health care consumption. If we found wide variations across plans in total family health care spending, it is possible that families can save substantially by carefully comparing plans and choosing the most appropriate plan to satisfy their health care needs, to the extent that families can anticipate their needs in comparing plans in the marketplace. In addition, because the government provides substantial subsidies in premium and cost-sharing reduction to low-income families who choose plans in the marketplace, if we found large variations, it is also possible that the government could save by providing tools to help families make plan choices. In this paper, we simulated consumer spending (premium plus cost-

Address correspondence to Yuting Zhang, Ph.D., Department of Health Policy and Management, University of Pittsburgh, 130 De Soto Street, Crabtree Hall A664, Pittsburgh, PA 15261; e-mail: ytzhang@pitt.edu. Seo Hyon Baik, Ph.D., is with the Lister Hill National Center for Biomedical Communications (LHNCBC), National Library of Medicine (NLM), National Institutes of Health (NIH), Bethesda, MD. Samuel H. Zuvekas, Ph.D., is with the Center for Financing, Access and Cost Trends, Agency for Healthcare Research and Quality, Rockville, MD.

sharing) for marketplace eligible families drawn from the nationally representative Medical Expenditure Panel Survey (MEPS), for every marketplace plan available in each respondent's county of residence.

METHODS

Data Sources

We used three main sources of data: 2011 and 2012 Medical Expenditure Panel Survey (MEPS) data—we pooled 2 years of MEPS data to increase sample sizes for the simulations, 2014 health plan data from healthcare.gov (Healthcare.gov. 2014), and the 2011 Medicare Part D public formulary file.

MEPS Data. We used the MEPS data for two purposes. First, we used the MEPS to identify our marketplace study sample, which contains individuals who would have been eligible to purchase private health plans through the marketplace instead of Medicaid or Medicare. We included (1) nonelderly adults (aged 18 or older and <65) whose income is above state-specific Medicaid thresholds after the Medicaid expansion, and children aged 18 or less in families with income above the expanded Children's Health Insurance Program (CHIP) threshold in the state the family resides; and (2) ever uninsured, a holder of a nongroup insurance policy, or coverage through self-employment (McGuire et al. 2013). In addition, we excluded those who had offers of coverage from either their own employer or through a spouse's or parent's employer (Buettgens, Dorn, and Moody 2012; Selden et al. 2015) or were covered by Medicare due to disability status.

Second, we used the MEPS to identify the medical care services and medications used by our marketplace study sample. We simulated costs based on two scenarios: (1) postmarketplace consumption equal to premarketplace actual consumption of health care observed in the MEPS; (2) increased consumption caused by the new marketplace insurance (induced demand). (Methods for calculating induced demand are provided in Appendix S1.)

Health Plan Benefit Data. We obtained the 2014 qualified health plan benefit data from healthcare.gov for 36 states that provided health plan data to the Department of Health and Human Services (there were some anomalies with premium data in Virginia, so we excluded this state). Health plan benefit data include each plan's age-varying premium, deductible, maximum out-of-pocket, and copayment or coinsurance before and after deductible for all

health care services: outpatient services provided by primary care physicians or specialists, emergency room visits, inpatient services by facility and physician, and prescription drugs. All plans offer four tiers of drug coverage, with an increasing coinsurance or copayments in the order of generic, preferred brand, nonpreferred brand, and specialty drugs (Healthcare.gov. 2014). According to family income level, we calculated out-of-pocket premiums net of federal premium tax credits; we also applied cost-sharing reduction subsidies, which were only offered to people who purchased silver plans.

Public Formulary File. The benefit data do not provide formulary information for marketplace plans, so it is difficult to know whether a drug is covered by a plan and which tier the drug is on. However, the majority of firms that offer health plans in the exchanges also offer Part D plans (based on our analyses using Part D public formulary file), and insurers often use the same formulary for different plans (based on our communications with pharmacy executives at local insurers). Thus, we used Medicare Part D public formulary file as a proxy for drug formularies used by health plans in the marketplace. Specifically, for each plan in the marketplace, we matched the Part D formulary file by the same insurer. For the plans that do not have a corresponding Part D plan, we examined the most frequent tier a drug belongs to using all Part D plans and assigned that tier to the drug. This way, we can simulate whether a particular drug is covered by a marketplace plan and which tier the drug is on, so that the copayment/coinsurance level for the drug can be determined. (Additional details are provided in Appendix S2.)

Simulations Based on Current Health Care Services Use and Plan Benefit Data

We simulated total family out-of-pocket health care spending, as well as its two components—net premiums and out-of-pocket cost-sharing—for each available plan in the county where the family resided. We used the MEPS health insurance eligibility units to define families as the unit of observations for health insurance decisions. For our purpose here, a family only includes those individuals eligible to purchase plans on the marketplace. For instance, if only one adult in a two-adult family was eligible, we only included the eligible one in our analyses.

We used the following algorithm to simulate total costs for each family for all plans available in its county of residence. First, we calculated the plan premiums for each individual based on his or her age and county of residence using the CMS standard age curves for plans on the marketplace (Centers for

Medicare & Medicaid Services 2013). The family plan premium is the sum of premiums for each eligible individual in a family according to the marketplace premium calculation, but the deductible for a family plan is often lower than the sum of deductibles of individual plans. In addition, we applied the ACA premium tax credits that are offered to all eligible Americans making between 100 percent (or 138 percent for those resided in states with Medicaid expansion) and 400 percent of FPL to compute net out-of-pocket premiums (Appendix S3, Table S2).

Second, we simulated the out-of-pocket payments for all medical care services and prescription drugs each individual used for every available plan. Copays or coinsurance differ by plans, type of services (e.g., doctor visits, emergency room visits, and prescription drugs), type of providers (primary care physicians and specialists), tiers of prescription drugs (generic, preferred brand, nonpreferred brand, and specialty), and facility (cost per day for inpatient services or cost per inpatient stay). We obtained the number of each type of visits from MEPS data and applied copays from health plan benefit data to get out-of-pocket payments. For services with coinsurance instead of copayments, we used the total expenditures in the MEPS data and applied coinsurance. All spending was adjusted to 2014 levels using service-specific medical and prescription drug price indices recommended by MEPS (Agency for Health Care Research and Quality 2015; Dunn, Grosse, and Zuvekas 2018).

For individuals with family income between 100 percent and 250 percent of the FPL, we applied the ACA *reduced cost-sharing subsidies* to their available silver plans (Appendix S3, Table S3; Gabel et al. 2016). Under provisions of the ACA, certain preventive care services are not subject to cost-sharing, including deductibles and copayments. We identified these preventive care services and applied zero payments. For services not covered by the plan or used before the deductible amount, we used total expenditures as total out-of-pocket payments. For individuals reaching their maximum out-of-pocket thresholds, we used their plans' maximum out-of-pocket payments as their total annual payments. For plans that have different maximum out-of-pocket thresholds for prescription drugs and medical care services, we calculated them separately.

Except for catastrophic plans, almost every plan on the marketplace has embedded deductibles, which contain individual-level deductibles within a family plan structure. Each family member who meets the individual deductible has additional expenses covered by the plan (with relevant copays and cost-sharing), even though the family deductible has not been met. On the other hand, if the family deductible has been met, all individuals in the family

have additional expenses covered by the plan, even though some individuals in the family may not have met the individual deductibles. Thus, for families with more than one eligible individual, we applied embedded deductibles and out-of-pocket maximum assumptions for all plans except for catastrophic plans (Appendix S4).

Statistical Analyses

We determined the degree of variation in total family health care spending, as well as variation in out-of-pocket net premium and cost-sharing after subtracting government subsidies, among all plans and also within each plan tier. Specifically, for each family, we first identified the minimum, 25th percentile, median, mean, 75th percentile, and maximum plan in terms of total family payment, as well as net premium and cost-sharing, among all plans available to the family. Then over all families, we calculated the means and standard errors for each of the minimum, 25th percentile, median, mean, 75th percentile, and maximum amounts. Means and standard errors were calculated using population weights for the health insurance eligibility unit head as described in the MEPS documentation. Rather than use the standard MEPS Public Use File designed for national estimates, AHRQ statisticians provided us with a set of population weights that poststratify the MEPS sample to the Current Population Survey state by state (Sommers 2005). Applying these MEPS state weights to our sample improves the representativeness of the sample for the 35 states providing qualified health plan data that are included in our analyses. Standard errors were also adjusted for the complex stratified and clustered, random sample design of the MEPS, which also accounts for the repeated observations in the sample (Williams 2000; Agency for Healthcare Research and Quality 2017).

We presented these means and standard errors separately for total family payment, net premiums and cost-sharing. In addition, we reported variations in premium and cost-sharing, stratified by family income, and by quartile of family's premarketplace actual total health care spending (inclusive of out-of-pocket payments and other payers). (We also reported variations across plans among families with spending in the top 10th percentile.) The simulated plan premiums and out-of-pocket cost-sharing were computed using *SAS 9.4* (SAS Institute Inc., Cary, NC, USA). All statistical analyses were conducted using *Stata 14.1/MP* (StataCorp LLC, College Station, TX, USA).

STUDY RESULTS

Characteristics of the Study Population

There were 3,553 eligible families in our study sample from 2 years of MEPS data—1,080 of these families contributed observations in both 2011 and 2012. Table 1 reports the summary of characteristics of our study samples. Of families identified as eligible to purchase marketplace coverage, 90 percent were identified as such because they were uninsured, while 10 percent were considered eligible because they held nongroup coverage or coverage through self-employment. Over half of families (59.3 percent) in our study sample had family incomes below 250 percent of the FPL.

Actuarial Values of Simulated Plans

The average actuarial values for bronze, silver, gold, and platinum plans in our simulation based on premarketplace actual use are 51.1 percent, 74.0 percent, 74.4 percent, and 83.6 percent, respectively. They are in line with the required minimum actuarial values for each plan tier. The simulated actuarial

Table 1: Summary of Characteristics of Study Samples

	<i>All</i>	<i>Single Adults</i>	<i>Other Families</i>
Sample size, <i>n</i>	3,553	2,512	1,041
Family members, %			
One adult only	72.0	100.0	—
One adults, ≥ 1 dependents	5.1	—	18.3
Two adults only	16.9	—	60.5
Two adults, ≥ 1 dependents	5.9	—	21.3
Eligibility for the marketplace			
Uninsured, %	90.0	90.3	89.2
Nongroup coverage, or self-employed	10.0	9.7	10.8
Income, %			
Expanded Medicaid—250% FPL	59.3	61.5	49.9
250% – 400% FPL	22.0	21.3	24.7
>400% FPL	18.6	17.2	25.4
Region, %			
South	10.8	11.7	9.8
Midwest	23.8	24.8	22.5
East	57.0	56.5	58.0
West	8.4	7.0	9.7
Family with ≥ 1 member with poor health, %	20.7	17.9	28.0
Family with ≥ 1 member with ≥ 2 chronic conditions, %	25.4	22.4	33.3

value for silver plans is >70 percent because of the reduced cost-sharing for low-income families.

Variation in Spending across Available Plans

Our simulations show substantial variation in family total health care spending (net premiums plus cost-sharing) across available plans. We present our results in the figures herein and more detailed numbers including sample sizes in Tables S4–S9 (means are reported in Tables S4a–S9a and standard errors are reported in Tables S4b–S9b.)

If all families had chosen the least expensive plan available to them on the basis of total payment (net premium plus cost-sharing with their current medical care consumption), the mean total family spending would be \$2,385 (Total\$ bar for all plans in Figure 1), assuming their premarketplace spending. In contrast, if all families had chosen the most expensive plan available to them with their current medical care use, the mean total family spending amount would be \$6,744 (Total\$ bar for all plans in Figure 1), or 2.8 times higher than the mean least cost plan amount. Decomposing total spending into its two components, our simulations also show substantial variation in family premiums and out-of-pocket cost-sharing amounts across available plans, especially with large variation in premiums (Premium and OOP \$ bars in Figure 1).

Wide variations in family spending also exist within plan tiers except for platinum, despite requirements of similar target actuarial values in each tier. For example, if families only chose from bronze plans based on their premarketplace spending levels, the mean family spending of the most expensive plans would be \$4,463 (Figure 1 for Bronze plans), 1.7 times higher than the mean family spending of the least expensive plans of \$2,661 (Figure 1 for Bronze plans). Gold plans showed variation similar to bronze plans (with higher average premiums but lower average out-of-pocket costs), but variation across platinum plans was smaller. Simulated numbers based on induced demand are similar (Appendix S1).

Variation in Premium and Cost-Sharing across Available Plans, Stratified by Family Income

Figure 2 shows substantial variation in family total health care spending, net premiums and cost-sharing amounts across all available plans as well as within plan tiers, stratified by family income. Among families with income below 250

Figure 1: Variations in Simulated Spending across Plans Available to Each Family, by Plan Tier

Notes. Premiums and out-of-pocket spending are net of tax credits and cost-sharing subsidies. Gray area denotes 25th–50th percentiles, and black area denotes 50th–75th percentiles. The three numbers shown on each bar are mean max, mean median, and mean min.

There are three reasons why the min and max values for one plan tier are not necessarily the same for all plans across all tiers. First, as also described above, what is represented on the graphs is not the absolute max (min) across all plans for all families, but the average across all people of the max (min) amount across plans available to that family. Second, not all families have access to all tiers of plans—for example, some regions did not offer platinum plans—so there is a composition issue in play as well. Third, in rare instances the min (or max) cost of plans available to a particular family in one tier might be higher than the next tier up. For example, there are cases where a particular company did not offer a bronze plan in a particular county, but its silver plan was cheaper than the plans offered by its competitors even in the bronze tier.

percent of the FPL, we observed substantial variations in both premiums and cost-sharing amounts, even among silver plans from which these families obtained cost-sharing reduction. Among families with income >400 percent of the FPL, who do not receive government subsidies, the variations in both premiums and cost-sharing amounts are smaller than families with lower income. Results are similar when we break down our study sample to single adults and other families with one or more than one adult (Tables S6–S9).

Variation in Premium and Cost-Sharing across Available Plans, Stratified by Premarketplace Total Family Health Care Spending

Figure 3 shows variations in simulated family total health care spending, premium, and cost-sharing across all plans available to families, stratified

Figure 2: Variations in Simulated Spending across Plans Available to Each Family, Stratified by Family Income

by quartile of family total health care spending. Families in the first quartile of their premarketplace total health care spending all paid zero cost-sharing, but their simulated premiums ranged from a mean minimum of \$1,294 to a mean maximum of \$4,578, with the median of \$2,705, among the plans available to them. Simulated premiums among families in the fourth quartile ranged from \$2,222 to \$7,772, and cost-sharing ranged from \$794 to

Figure 2: *Continued*

Notes. (A) Families with income below 250 percent of the FPL. (B) Families with income between 250 percent and 400 percent of the FPL. (C) Families with income above 400 percent of the FPL. Premiums and out-of-pocket spending are net of tax credits and cost-sharing subsidies. Gray area denotes 25th–50th percentiles, and black area denotes 50th–75th percentiles. The three numbers shown on each bar are mean max, mean median, and mean min.

FPL, federal poverty line.

There are three reasons to explain why the min and max values for one plan tier are not necessarily the same for all plans across all tiers. First, as also described above, what is represented on the graphs is not the absolute max (min) across all plans for all families, but the average across all people of the max (min) amount across plans available to that family. Second, not all families have access to all tiers of plans—for example, some regions did not offer platinum plans—so there is a composition issue in play as well. Third, in rare instances the min (or max) cost of plans available to a particular family in one tier might be higher than the next tier up. For example, there are cases where a particular company did not offer a bronze plan in a particular county, but its silver plan was cheaper than the plans offered by its competitors even in the bronze tier.

\$4,191. Among families with premarketplace spending in the top 10th percentile, mean minimum, median, and maximums were \$2,376, \$4,950, and \$8,257 for simulated premiums, and \$1,079, \$3,284, and \$6,579 for simulated cost-sharing, respectively.

We also reported variations in simulated premium and cost-sharing among silver tier plans, the most popular metal tier, among families with income below 250 percent of the FPL who received cost-sharing reduction if they chose silver plans, stratified by quartile of family total health care spending (Figure 4). Simulated silver plan premiums among low-income families in the fourth quartile ranged from \$1,322 to \$3,726 and cost-sharing, again after the

Figure 3: Variations in Simulated Premium and Cost-Sharing across All Plans, Stratified by Premarketplace Total Family Health Care Spending

Notes. Premiums and out-of-pocket spending are net of tax credits and cost-sharing subsidies. Gray area denotes 25th–50th percentiles, and black area denotes 50th–75th percentiles. The three numbers shown on each bar are mean max, mean median, and mean min.

cost-sharing reduction subsidy, ranged from \$717 to \$1,775. Among low-income families with premarketplace spending in the top 10th percentile, mean minimum, median, and maximums were \$1,275, \$2,520, and \$3,700 for simulated premiums, and \$1,025, \$1,675, and \$2,443 for simulated cost-sharing, respectively. Results based on induced demand assumption are similar (Appendix S1).

DISCUSSION

Our simulations find substantial variation in out-of-pocket premiums, cost-sharing, and total out-of-pocket health care spending families face across plans based on their current health care use. This is true even within a particular metal tier, especially the bronze, silver, and gold levels, and for low-income families eligible for substantial government subsidies. We reported results stratified by family income and total family health care spending and found that variations across plans among families with income below 250 percent of the FPL are larger than variations among families with higher income, and the higher family health care spending, the larger variations across plans. We also found that, on average, the majority of total family spending is on premiums instead of cost-sharing.

Figure 4: Variations in Simulated Premium and Cost-Sharing across Silver Plans among Families with Income below 250 percent of the FPL, Stratified by Premarketplace Total Family Health Care Spending

Notes. Premiums and out-of-pocket spending are net of tax credits and cost-sharing subsidies. Gray area denotes 25th–50th percentiles, and black area denotes 50th–75th percentiles. The three numbers shown on each bar are mean max, mean median, and mean min.

By design, marketplace plans within the same plan tier should be comparable because they have the same minimum actuarial values. However, it is clear that plans configure their benefit packages in multiple ways to get to the same actuarial level. For example, some plans may rely on a high deductible but have relatively comprehensive coverage after the deductible, while other plans in the same tier may have low deductibles but significantly higher cost-sharing after the deductible. Similarly, although the government sets the out-of-pocket maximums, plans can offer a lower out-of-pocket cap with a higher premium. As a result, individual consumers can face very different premium and cost-sharing amounts for the same level of medical care use.

Our study has several limitations. First, our health care use data are based on 2011 and 2012 MEPS data and do not necessarily represent utilization in 2014, although there was little growth in utilization per person over this period among covered populations (Martin et al. 2016). Second, because we do not observe any discounts associated with gaining insurance among the previously uninsured, we may overestimate the out-of-pocket spending in the marketplace. However, we believe the potential bias is small, for two reasons: First, we found that the ratios of payments to charges were similar among the uninsured and those with private insurance in the MEPS data; and second, we get very similar results in the induced

demand scenario, which does apply discounts (Appendix S1). Third, our simulations assume that individuals' health care consumption is constant across plans. If individuals use more services under the more comprehensive plans, we may underestimate the variation across plans. Fourth, our simulation model only considers costs and not the quality of care and the composition of provider networks. Fifth, although the MEPS data are a stratified and clustered probability sample and designed to be nationally representative and generalizable to the U.S. civilian noninstitutionalized population (Cohen et al. 1996), our data on plans and premiums are only from the states participating in the federally facilitated marketplaces. Applying the MEPS state weights improves the generalizability of our results for the population residing in those 35 states, but our results cannot be generalized to the other states. Furthermore, estimates based on these state weights may incompletely approximate estimates based on a true state-based sample design. Sixth, and most important, individuals and families do not know their future health care spending with certainty, so our estimates based on actual past spending do not account for risk aversion. Risk-averse individuals are willing to pay more on insurance to cover their future risk, but we do not observe individual risk preferences. When choosing plans, families must take into account that their future medical care needs may be much higher than their current needs. Thus, our simulations are intended to simply illustrate the variation in out-of-pocket spending that could occur across the plans available to each family based on the current distribution of spending.

The choices families face on the exchange are complicated. It is difficult to easily characterize potential health care needs. A recent study shows that individuals suffer large consequences from wrong choices in making complicated decisions: Sixty-one percent of employees from a Fortune 50 company chose suboptimal plans and these mistakes led to overspending equivalent to 42 percent of the cost of their yearly insurance premiums (Bhargava and Loewenstein 2015). Thus, developing better tools to help shoppers estimate their total annual costs based on their consumption needs is important (Ubel, Comerford, and Johnson 2015). As of February 2015, 87 percent of enrollees on the marketplace obtained government subsidies (Assistant Secretary for Planning and Evaluation 2014; Department of Health and Human Services 2015). Thus, if the government could facilitate individuals to choose the best plan, the potential savings to the government could be substantial. Indeed, the government has developed some new features in its 2016 version of health insurance plans and prices at healthcare.gov. For example, individuals can now choose to report an estimate of total yearly costs of all plans available to

them on the basis of their expected health care needs with three options: low, medium, and high expected needs. Typical low expected needs with this tool is described as three doctor visits, one lab or diagnostic test, five prescription drugs, and minimal other medical expenses; and high expected needs as 18 doctor visits, 11 laboratory or diagnostic tests, 32 prescription drug fills, 2 days in the hospital, and \$13,800 in other medical expenses.

There are also some state-specific programs created to help consumers to choose health care coverage. A recent study showed that programs are most effective in helping consumers if they are based in local communities, well-coordinated, and able to maintain ongoing relationships with consumers (Grob and Schlesinger 2015). With these tools, consumers may get better at choosing plans as they learn to navigate the marketplace and gain experiences with plans (Ketcham et al. 2012).

In sum, our simulations show substantial variations in total family health care spending, as well as its components—premium and out-of-pocket payments—across private health plans on the marketplace based on individuals' use of health care services. This is true even within a particular metal tier, especially the bronze, silver, and gold levels, and for low-income families eligible for premium and cost-sharing subsidies. In fact, variations across plans among families with income lower than 250 percent of the FPL are largest compared to families with higher income. In addition, the majority of total family spending is on premiums instead of cost-sharing and therefore variation in premium is in general larger than variation in cost-sharing. Because premiums are known ahead of time, it is possible that families can save substantially by carefully comparing plans and choosing the most appropriate plan, to the extent that families can anticipate their needs in comparing plans in the marketplace.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: This paper represents the views of the authors, and no official endorsement by the Agency for Healthcare Research and Quality, National Institutes of Health, or the Department of Health and Human Services is intended or should be inferred. We gratefully acknowledge Steven Hill, Paul Jacobs, Thomas Selden, and Joel Cohen for their very helpful comments. No other disclosures.

Disclosures: None.

Disclaimer: None.

REFERENCES

- Agency for Health Care Research and Quality. 2015. "Using Appropriate Price Indices for Analyses of Health Care Expenditures or Income across Multiple Years" [accessed on December 30, 2015]. Available at http://meps.ahrq.gov/mepsweb/about_meps/Price_Index.shtml
- Agency for Healthcare Research and Quality. 2017. "Accounting for Clustering in the Analysis of MEPS Data: Frequently Asked Questions" [accessed on October 17, 2017]. Available at https://meps.ahrq.gov/survey_comp/hc_clustering_faq.pdf
- Assistant Secretary for Planning and Evaluation. 2014. "ASPE Marketplace Summary Enrollment Report and CMS March Medicaid/CHIP Enrollment Report" [accessed on July 29, 2014]. Available at http://aspe.hhs.gov/health/reports/2014/MarketPlaceEnrollment/Apr2014/ib_2014Apr_enrollment.pdf
- Bhargava, S., and G. Loewenstein. 2015. "Choosing a Health Insurance Plan: Complexity and Consequences." *Journal of the American Medical Association* 314 (23): 2505–6.
- Buettgens, M., S. Dorn, and H. Moody. 2012. "Access to Employer-Sponsored Insurance and Subsidy Eligibility in Health Benefits Exchanges: Two Data-Based Approaches" [accessed on January 13, 2013]. Available at <https://www.urban.org/research/publication/access-employer-sponsored-insurance-and-subsidy-eligibility-health-benefits-exchanges-two-data-based-approaches>
- Buttorff, C., M. S. Andersen, K. R. Riggs, and G. C. Alexander. 2015. "Comparing Employer-Sponsored and Federal Exchange Plans: Wide Variations in Cost Sharing for Prescription Drugs." *Health Affairs (Millwood)* 34 (3): 467–76.
- Centers for Medicare & Medicaid Services. 2013. "State Specific Age Curve Variations" [accessed on May 20, 2013]. Available at <http://www.cms.gov/CCIIO/Programs-and-Initiatives/Health-Insurance-Market-Reforms/Downloads/state-specific-age-curve-variations-08-09-2013.pdf>
- Cohen, J. W., A. C. Monheit, K. M. Beauregard, S. B. Cohen, D. C. Lefkowitz, D. E. Potter, J. P. Sommers, A. K. Taylor, and R. H. Arnett 3rd. 1996. "The Medical Expenditure Panel Survey: A National Health Information Resource." *Inquiry* 33 (4): 373–89.
- Department of Health and Human Services. 2015. "News Release, Nationwide 9.5 Million Consumers Are Signed Up for Health Insurance Marketplace Coverage" [accessed on October 20, 2015]. Available at <http://www.hhs.gov/news/press/2015pres/01/20150127b.html>
- Dunn, A., S. D. Grosse, and S. H. Zuvekas. 2018. "Adjusting Health Expenditures for Inflation: A Review of Measures for Health Services Research in the United States." *Health Services Research* 53 (1): 175–96. <https://doi.org/10.1111/1475-6773.12612>
- Gabel, J., H. Whitmore, M. Green, A. Call, S. Stromberg, and R. Oran. 2016. "The ACA's Cost-Sharing Reduction Plans: A Key to Affordable Health Coverage for Millions of U.S. Workers" [accessed on June 28, 2016]. Available at <http://www.commonwealthfund.org/publications/issue-briefs/2016/oct/aca-cost-sharing-reduction-plans>

- Grob, R., and M. Schlesinger. 2015. "Educating, Enrolling, and Engaging: The State of Marketplace Consumer Assistance under The Affordable Care Act." *Health Affairs* 34 (12): 2052–60.
- Healthcare.gov. 2014. "2014 FFM Qualified Health Plans Data Sets for Researchers" [accessed on May 22, 2014]. Available at <https://http://www.healthcare.gov/health-plan-information/>
- Ketcham, J. D., L. Claudio, J. M. Eugenio, and M. C. Roebuck. 2012. "Sinking, Swimming, or Learning to Swim in Medicare Part D." *American Economic Review* 102 (6): 2639–73.
- Martin, A. B., M. Hartman, J. Benson, A. Catlin, and t. N. H. E. A. Team. 2016. "National Health Spending in 2014: Faster Growth Driven by Coverage Expansion and Prescription Drug Spending." *Health Affairs* 35 (1): 150–60.
- McGuire, T. G., J. Glazer, J. P. Newhouse, S. L. Normand, J. Shi, A. D. Sinaiko, and S. H. Zuvekas. 2013. "Integrating Risk Adjustment and Enrollee Premiums in Health Plan Payment." *Journal of Health Economics* 32 (6): 1263–77.
- Selden, T. M., L. Dubay, G. E. Miller, J. Vistnes, M. Buettgens, and G. M. Kenney. 2015. "Many Families May Face Sharply Higher Costs If Public Health Insurance for Their Children Is Rolled Back." *Health Affairs (Millwood)* 34 (4): 697–706.
- Sommers, J. P. 2005. "Producing State Estimates with the Medical Expenditure Panel Survey, Household Component. Methodology Report No. 16. Agency for Healthcare Research and Quality" [accessed on October 18, 2005]. Available at http://meps.ahrq.gov/mepsweb/data_files/publications/mr16/mr16.pdf
- Ubel, P. A., D. A. Comerford, and E. Johnson. 2015. "Healthcare.gov 3.0 — Behavioral Economics and Insurance Exchanges." *New England Journal of Medicine* 372 (8): 695–8.
- Williams, R. L. 2000. "A Note on Robust Variance Estimation for Cluster-Correlated Data." *Biometrics* 56 (2): 645–6.

SUPPORTING INFORMATION

Additional supporting information may be found online in the supporting information tab for this article:

- Appendix SA1: Author Matrix.
- Appendix SA2:
- Appendix S1. Induced Demand Calculation.
- Appendix S2. How to Calculate the Patient's Out-of-Pocket Spending for Prescription Drugs.
- Appendix S3. Two Types of Subsidies Provided on the Marketplace.
- Appendix S4. Embedded Deductible Plans and Out-of-Pocket Maximums.

Table S1. Predictive Mean Matching OLS Regressions on Square Root of Total Health Care Spending.

Table S2. Premium Caps Based on Federal Poverty Line for Premium Tax Credits in 2014.

Table S3. How Does the Cost-Sharing Reduction Level Affect Cost-Sharing Charges?

Table S4a. Variations in Simulated Spending across Plans Available to Each Family, Stratified by Family Income.

Table S4b. Standard Errors for Table S4a. Variations in Simulated Spending across Plans Available to Each Family, Stratified by Family Income.

Table S5a. Variations in Simulated Premium and Cost-Sharing across All Plans, Stratified by Pre-marketplace Total Family Healthcare Spending.

Table S5b. Standard Errors for Table S5a. Variations in Simulated Premium and Cost-Sharing across All Plans, Stratified by Pre-Marketplace Total Family Healthcare Spending.

Table S6a. Variations in Simulated Spending across Plans Available to Each Family, Stratified by Family Income, Single Adult.

Table S6b. Standard Errors for Table S6a. Variations in Simulated Spending across Plans Available to Each Family, Stratified by Family Income, Single Adult.

Table S7a. Variations in Simulated Spending across Plans Available to Each Family, Stratified by Family Income, Single Adult, Two or More Family Members.

Table S7b. Standard Errors for Table S7a. Variations in Simulated Spending across Plans Available to Each Family, Stratified by Family Income, Single Adult, Two or More Family Members.

Table S8a. Variations in Simulated Premium and Cost-Sharing, Stratified by Pre-Marketplace Total Family Healthcare Spending, Single Adult.

Table S8b. Standard Errors for Table S8a. Variations in Simulated Premium and Cost-Sharing, Stratified by Pre-Marketplace Total Family Healthcare Spending, Single Adult.

Table S9a. Variations in Simulated Premium and Cost-Sharing, Stratified by Pre-Marketplace Total Family Healthcare Spending, Two or More Family Members.

Table S9b. Standard Errors for Table S9a. Variations in Simulated Premium and Cost-Sharing, Stratified by Pre-Marketplace Total Family Healthcare Spending, Two or More Family Members.