Evaluating an Alternative Data Source for Editing MEPS Drug Prices

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I. Introduction

The Medical Expenditure Panel Survey (MEPS) Prescribed Medicines (PMED) file is a unique data resource that provides detailed information on prescription drug use and expenditures for a nationally representative sample of persons in the U.S. civilian, noninstitutionalized population. When it was initially fielded in 1996, the MEPS was the first national survey to collect detailed information on drug purchases from pharmacy providers frequented by household sampled persons. This information, which is collected by a linked survey of pharmacy providers, includes the quantity purchased, the total retail price, the total amount paid by source of payment, and the pharmacology of each drug, as summarized by the National Drug Code (NDC). Constructing the MEPS PMED files using both household- and pharmacy-reported data involves many complex data editing and matching tasks (Moeller et al. 2001). Data quality is critical because the MEPS is used for national estimates, behavioral modeling, and policy simulations, including analyses of prescription drugs. This study is part of ongoing efforts by staff in AHRQ's Center for Financing, Access, and Cost Trends (CFACT) to continually assess and improve the quality of the editing process for the MEPS prescribed medicine data.

A key aspect of data quality is identifying implausible outliers in the payment data. Outlier prices may be caused by transcription errors in reported prices or quantities, by incomplete reporting of payments, or by other reporting errors. The goal of editing drug prices in the MEPS PMED files is to increase the overall quality of the data while accurately representing the dispersion in prices that occurs in the retail market for drugs. The average wholesale price (AWP) was the benchmark adopted in 1996 to identify outlier prices in the MEPS, and is still used today. The AWP is an NDC-level list price for drugs sold by wholesalers to retail pharmacies. Although in practice the AWP does not necessarily reflect what pharmacists pay for drugs, it has been used as a basis for payments to retail pharmacy providers by both public and private insurers (Congressional Budget Office 2007). To screen for price outliers, each retail unit price (RUP) in the pharmacy data is compared with the average wholesale unit price (AWUP) for that NDC. For most drugs, units are pills, but they can also be milliliters for liquids, etc. Outlier prices are then edited by adjusting the reported price or quantity (Moeller et al. 2001).

The central motivation for examining an alternative to the AWP is that the relationship between RUP and AWUP may have changed since the beginning of MEPS. There are two specific reasons for concern. First, since the AWP is a list price (not an average of transaction prices) it may be subject to manipulation and strategic behavior that could alter the AWUP-RUP relationship. In fact, a trial court found that three pharmaceutical companies caused the publication of inflated AWPs for some drugs, leading to settlement agreements to change the methods used for calculating some AWPs (United States District Court District of Massachusetts 2007). It remains uncertain, however, to what extent private and public insurers may have adjusted their payment methods in response to changes in the AWP. Second, studies have shown the relationship between RUP and AWUP varies by the patent status of the drug. In particular, for single source drugs, AWP was shown to be a good predictor of pharmacy acquisition costs, and ultimately of retail prices. Pharmacy acquisition costs averaged about 80 percent of AWP for single source drugs and this percentage showed relatively little variation across drugs. By contrast, pharmacy acquisition costs for generic drugs averaged about 30 to 40 percent of AWP and there was substantial variation in this percentage across drugs (Congressional Budget Office 2007, Levinson 2005, Sugerman-Broznan and Woolman 2009). Separating plausible prices from outliers is more difficult for generics than brand name drugs due to the greater dispersion in the distribution of generic prices around their AWP.

The purpose of this study is to assess the feasibility of replacing AWUPs with median retail prices estimated from the MarketScan Outpatient Pharmaceutical Claims database. We use medians rather than means to avoid undue influence from outliers. Because the MarketScan data contain adjudicated claims for millions of people with private employment-related insurance, we assume they provide an accurate and valid benchmark for the MEPS pharmacy-reported drug pricing for the MEPS sample representing the population with private employment-related insurance. However, the MEPS includes persons with other sources of prescription drug coverage as well as the uninsured. Thus, the first component of our evaluation is to determine the extent to which MarketScan price data can be generalized to other populations. While we do not have data for all payers, we are able to compare the distribution of prices in the MarketScan and the Medicare Part D program (unfortunately, the Medicare administrative data are not available in time to use directly to edit the MEPS). For each acquisition in both the MarketScan and Medicare claims, we calculate the ratio of retail unit price to the observed NDC-level median retail unit price. We then compare the distributions of this price dispersion observed in both data sets separately for brand name and generic drugs.

In the second component of our evaluation, we determine whether thresholds that suggest outlier unit prices derived from retail prices outperform thresholds derived from AWP. To derive the outlier thresholds based on retail prices, we use validation data for a sample of MEPS Medicare beneficiaries matched to their Medicare claims. Here, we take advantage of the fact that we can compare the price as measured in MEPS to the true retail price for each prescription drug for persons in this validation sample. The newly derived editing rules based on median RUP and the previous rules based on AWUP are both set to maximize the accuracy of the MEPS data. Nonetheless, our expectation is that using the median RUP rather than the AWUP would yield greater accuracy, particularly for generics. In particular, we expect that the distribution of prices around the median RUP has less dispersion than the distribution of prices around the AWUP. If so, then the rules using the median RUP would better differentiate plausible prices and outliers, thereby facilitating the creation of more accurate data. Therefore, we implement the two sets of editing rules on the validation data set and compare the accuracy of the resulting prices.

II. Previous Evaluations

Two prior studies have evaluated the quality of the MEPS prescription drug data. First, Zodet et al. (2009) provided a detailed examination of the process of identifying and editing outliers in the retail prices reported by pharmacy providers. The purpose of that study was to determine whether the editing rules implemented for the 1996 MEPS data were still valid for the 2006 and subsequent years of MEPS prescribed medicines data. The central strategy of that exercise was to compare distributions of RUPs in the 2006 MEPS data to distributions of RUPs reported in the 2006 MarketScan data. Observed discrepancies in acquisition prices between the MEPS and MarketScan were traced to the editing rules for identifying price outliers in the MEPS Pharmacy Component (PC). Based on these findings we proposed modifications to the MEPS price editing rules that more accurately reflected the current RUP-AWUP relationship overall, and by patent status, while continuing to benchmark to other national data sources. The new editing rules were implemented beginning with the 2007 MEPS.

The second study, summarized in Hill et al. 2011, assessed these revised editing procedures using a sample of MEPS Medicare beneficiaries matched to their Medicare Part D data. Both total drug expenditures for matched beneficiaries and prices for matched drug acquisitions were similar across the data sets, but additional refinements were identified to further improve the data. These changes were implemented with the 2009 MEPS. However, the new rules continue to rely on the AWUP and have not alleviated our concerns that 1) this metric may be subject to manipulation and strategic behavior that could alter the RUP-AWUP relationship and 2) the correlation between RUP and AWUP is weak for generic drugs.

III. Methods

A. Overview

Since the inception of the MEPS in 1996 outlier drug prices have been identified by examining the distribution of the ratio of RUP and AWUP (i.e., RUP/AWUP) which we have referred to as the PRATIO. Unit drug prices are considered outliers if their PRATIO falls outside of established thresholds (i.e., less than or greater than established lower and upper boundaries). Changes were made to these threshold levels based on the two previous evaluations. We now evaluate whether outlying drug prices can be identified as well or better if we utilize a median RUP rather than the AWUP. We perform two analytic tasks to do this evaluation. First, we assess the reasonableness of using the MarketScan (private payers) data as a proxy for Medicare payers. In doing so, we compare the RUP/median RUP ratio from the MarketScan data to the ratio from the Medicare prescription drug claims provided by the Centers for Medicare & Medicaid Services (CMS). Second, we evaluate the potential impact of any rule modifications brought about by the outlier thresholds suggested by the new price to median price

ratio (i.e., RUP/median RUP). As part of this phase we assess the accuracy of the MEPS price data and compare resulting average retail prices derived under both sets of editing criteria (i.e., RUP/AWUP and RUP/median RUP).

B. Data

We use four data sets of retail drug purchases in 2007: the MarketScan Outpatient Pharmaceutical Claims data, a sample of Medicare prescription drug claims, pharmacy reported drug purchases collected as part of the MEPS pharmacy follow-back survey, and pharmacy reported purchases for a sample of MEPS Medicare beneficiaries who are matched to their Medicare claims records.

MarketScan

The 2007 MarketScan Outpatient Pharmaceutical Claims data contain approximately 198 million adjudicated drug claims for more than 16 million people. As such, we assume these data to be accurate and valid and that they reliably capture retail drug price. These data come from a larger set of databases collectively referred to as the MarketScan Databases. The MarketScan databases capture, from private insurance claims records, person specific information for multiple dimensions of health care services (e.g., clinical utilization, expenditures, insurance plan enrollment, etc.). The data comprise people with private, employment-related insurance coverage, predominantly from large employers. The employers are, however, a convenience sample. For this analysis we selected a 10 percent sample of the outpatient pharmacy claims. These acquisition-level data include the price paid for the medication and the quantity dispensed. These are final claims, reflecting any adjustments to payments by the insurers to the pharmacies. The recorded prices are the retail prices paid to pharmacies, which is the same price concept sought by the MEPS PC.

Using the MarketScan data the median retail unit price was calculated for NDCs with at least 100 acquisitions. We then calculated the retail unit price to median retail unit price ratio (i.e., RUP / median RUP). Computation of this ratio did result in some missing values. These occurred for NDCs with missing RUP information or when the median RUP was zero (i.e., $0.00). In a production setting we would sample claims within NDCs to minimize NDCs with insufficient sample. Patent status for each NDC in the MarketScan data is provided by MarketScan from the RED BOOK™. Some NDCs did change patent status during the year. A side analysis demonstrated that the median RUP was not sensitive to these changes. Thus, NDCs with multiple patent statuses were characterized by their modal status. After excluding NDCs with fewer than 100 purchases, NDCs not found in the MEPS pharmacy follow-back survey, and records with missing RUP to median RUP ratios, the analytic data file contained approximately 17.6 million adjudicated prescribed medicine claims.
The NDC-level median RUP is derived from the MarketScan data and is used as the denominator for all price to median price ratios calculated for each data source.

Medicare Claims CMS provided us claims data for a five percent random sample of Medicare beneficiaries. These claims files contain drug claims from all plans in the Medicare prescription drug program. As with the MarketScan data, prices are the amounts paid to pharmacies.

MEPS PC MEPS data for this project come from the 2007 MEPS Pharmacy Component (MEPS-PC). The MEPS-PC is a survey of pharmacy providers identified by household respondents during the series of MEPS Household Component (HC) interviews. For each round of the HC, respondents are asked to provide the name(s) of any prescribed medication that they or their family members purchased or obtained during the reference period for the survey round. Various information regarding reported medications is collected: 1) whether or not any free samples of the medication were obtained, 2) the name(s) of any health problem(s) for which the medication was prescribed, 3) the number of times the medication was obtained/purchased, 4) when the person first used the medication, and 5) the names, addresses, and types of pharmacies that filled the prescriptions. During the third and fifth round interview, unless all their acquisitions were free samples, respondents are asked to sign permission forms authorizing contact with these pharmacies and the release of their pharmacy records. The pharmacies for sample members who grant this permission are then sent a follow-back mail survey.

The mailing sent to the pharmacies includes a cover letter from the Department of Health and Human Services briefly describing the scope of the study, a printed listing of the persons for whom information is requested as well as copies of their signed permission forms, and instructions on how to provide the data. The pharmacies are asked to provide information about each prescription filled or refilled for each listed patient.

The pharmacies can provide the data by either submitting a detailed computer printout for each drug acquisition or by completing a questionnaire booklet for each acquisition. A few large chains provide electronic data. (Starting with the 2009 data cycle, some pharmacies provided information to a data collection specialist on the phone.) The requested data include:

1) the date the prescription was filled or refilled, 2) the NDC, 3) the medication name, 4) the strength of the medicine, 5) the quantity dispensed, 6) sources of payment, and 7) the payment amount made by each source.

The data collected from the pharmacies are ultimately matched to the prescribed medicines listed by respondents in the HC. The payment data obtained in the PC are the primary source of price information for the matched HC acquisitions. The PC data are also used to impute payment data for HC acquisitions not matched to PC acquisitions. Detailed documentation on how the HC and PC data are matched, as well as imputation strategies, is provided in Moeller et al. (2001).

We utilize a production version of the 2007 MEPS PC, an acquisition-level file (i.e., one record for each fill/refill of a prescription from the pharmacy). The file includes the retail unit price variable (RUP), constructed as the sum of payments for the prescription divided by the quantity dispensed (e.g., number of pills or milliliters).

As part of our efforts to assess the effects of using the MarketScan median unit price, we use this file to evaluate the impact of alternative rules on prices. While estimates based on this file are not nationally representative, they have in previous analyses (Zodet et al. 2009) suggested the direction of potential effects on the data ultimately released to the public. Median RUPs from the MarketScan data were merged onto the MEPS PC file by matching NDCs. The 2007 MEPS PC has 212,705 records, and 192,304 records (90% of all records) with median prices from the MarketScan data are used in the analysis.

MEPS PC linked to Medicare Claims The fourth analytic file is based on a sample of MEPS-HC Medicare beneficiaries linked with Medicare claims. This validation sample was constructed using the 2007 MEPS PC and their matched Medicare claims from CMS (a separate sample from the above mentioned 5 percent) and was used to assess the effects of alternative rules on data accuracy. Under a Data User Agreement between AHRQ and CMS, beneficiaries from the MEPS HC were matched to Medicare enrollment data. (Details are in Hill et al. 2011.) Among the matched beneficiaries in Part D, the fills and refills reported by the PC pharmacies were matched to those reported by the Part D plans. Date, NDC, therapeutic class, drug, dose form, strength, and drug name were used to match the fills. Median RUPs from the MarketScan were merged onto the linked file by matching NDCs. The sample has 18,001 matched fills with median unit prices from MarketScan. We study the 15,375 fills that have complete or partial payment data from the PC, and the 2,626 lacking any payment data are excluded. The matched file with complete or partial data, however, has only 7% of all PC records.

C. Analytic Methods

The first phase of our study is to assess the reasonableness of using the MarketScan data (i.e., private claims) as a proxy, not only for private payers, but also Medicare payers. To address this part of the analysis we use methods that are purely descriptive in nature. For each data source (i.e., MarketScan, MEPS PC, and Medicare), we calculate mean and median purchase prices across patent status and payer. We then plot density distributions to compare the distributions of the RUP to median RUP ratios observed in the MarketScan and Medicare claims data.

The analysis for phase two, assessing the impact of alternative editing criteria on the accuracy of the PC data, relies on the sample of MEPS Medicare beneficiaries linked to their matched Medicare claims. We first report the accuracy of the unedited data using two criteria: (1) exact agreement on price between the MEPS-PC data and the Medicare claims, and (2) Lin's concordance correlation coefficient. Lin's concordance correlation coefficient combines measures of precision and accuracy for continuous variables, and it is scaled from −1 (perfect disagreement) to +1 (perfect agreement) (Lin 1989). We then assess the accuracy if the data were edited using thresholds determined using the AWUP and the median unit price. Comparing rules based on the AWUP and median unit price indicates which approach better differentiates between accurate and outlier prices. Thresholds for identifying outliers are determined separately for RUP / AWUP ratio and the RUP / median RUP ratio. Both sets of thresholds maximize the number of acquisitions for which the editing decision is correct. Specifically, the editing decision for the acquisition is correct if either (1) it is not flagged as an outlier and the MEPS-PC price differs from the claims data price by less than 10% or $5, or (2) it is flagged as an outlier and the MEPS-PC price differs from the claims data price by more than 10% and $5. Conversely, incorrect editing decisions are those (1) where the pharmacy and claims data differ but the record is not edited, and (2) the pharmacy and claims data agree but the fills are nonetheless flagged for editing. The thresholds differ by patent status due to the differences in the dispersion of prices by patent status. They also differ by the apparent completeness of the data collected from the pharmacies. For example, outlier editing thresholds for underreported payments are higher for records missing third party payment amounts; meaning more of the data will be edited. The two measures of data accuracy, agreement rates and Lin's concordance correlation, are then calculated for the data edited each way. Tests compare the accuracy of (1) the edited and unedited data and (2) the two sets of edited data. Bootstrapping is used to identify statistically significant differences in Lin's concordance correlation coefficient between the two sets of editing rules.

Finally, we compare prices under the alternative editing rules using the much larger MEPS-PC sample. We present mean prices overall and by patent status, and test for differences using a paired difference in means test.

IV. Results

Table 1 shows summary measures of retail price for prescribed medicines and the distribution of purchases across patent status for the MEPS PC, MarketScan, and Medicare data. The summary statistics for the MEPS PC data are displayed by sources of payment. The percent distributions of acquisitions by patent status are fairly consistent between the MEPS PC and MarketScan data, not only for purchases covered by private insurance, but also for those covered by Medicare and Medicaid. While there is some small degree of variation across data source and payer type, the majority of prescription drug purchases were for generic medications (56-63 percent of purchases). Approximately one-third of the drug purchases were for single source brand name drugs; the remaining 4-8 percent of total purchases were for originator drugs (i.e., brand name drugs for which the patent has expired; generally face direct competition from generics).

Mean retail prices for single source and originator drugs were higher for MarketScan compared to the prices in the MEPS PC for people with private insurance data: $154 vs. $117 and $86 vs. $46 respectively. Within the MEPS PC, mean retail prices for single source drugs were lower for purchases covered by private payers than those covered by either Medicare or Medicaid: $117 vs. $128 and $180 respectively. The mean retail price for originator drugs was similar for Private and Medicaid covered purchases, but higher for Medicare purchases: $46 and $45 vs. $54. The MEPS average retail price for originator drugs paid for by Medicare was lower than what was observed in the Medicare claims data: $54 vs. $87. The mean retail price for Generic purchases was relatively consistent across data file/payment source.

Figure 1 overlays Medicare and MarketScan densities of RUP/median RUP for single source (brand name) drugs. For the most part, the density distributions are very similar. The vast majority of prices are within 20 percent of the median unit price; most are even closer. The plot seems to demonstrate that prices paid by private payers are sometimes lower than what are paid by Medicare. Nonetheless, Figure 1 suggests that the retail unit price to median retail unit price thresholds established to identify outlier unit prices can be the same for Medicare and private insurance payers. Figures 2 and 3 show the overlaid densities for originator and generic drugs, respectively. As with Figure 1 these densities from the Medicare data and the MarketScan data are very similar. In particular, the overlaid distributions for generic drugs are nearly identical. Based on these three figures, we feel comfortable using the MarketScan median RUP as a quality benchmark and replacement for the AWUP, not only for drug purchases covered by private payers, but also for Medicare payers; especially for generic medications.

Turning to the validation sample, the thresholds for lower outliers based on the AWUP and median RUP are shown in Table 2. The thresholds vary by patent status and whether the pharmacy reported the third party payment amount was positive, zero, or missing. Fills with complete payment data from pharmacies have very low thresholds because payments reported by the pharmacies rarely disagree with those in the validation data. For fills with missing payment data, the reported out-of-pocket amounts seldom equal the total price in the validation data; hence the higher thresholds indicate most would be edited. Zero third party payment data may be accurate or arise when the pharmacy only reports an out-of-pocket amount. This is a more ambiguous situation, and the thresholds lie between those for complete and missing data. The thresholds are lower for generics than single source brand name drugs, because there is more price dispersion for generics.

Very high thresholds identify the few fills for which the pharmacies reported overly high prices. These cases are rare, making it difficult to specify a precise threshold. For all patent statuses, the thresholds selected are RUP/AWUP>10 and RUP/median RUP>10. When only one pill was reported, the error is assumed to be in quantity, not price. Fills with acquisition prices less than $16 are not edited, because prices of $16 or less are consistent with pharmacies' one-price generic programs, and dispensing fees may greatly exceed the wholesale costs of some drugs. For example, one chain pharmacy will fill a 90-day supply of selected generics for $15.99, while other chains charge less.

Using the matched set of Medicare claims, Table 3 compares accuracy of the unedited prices and prices edited using both sets of outlier thresholds. Focusing on Lin's concordance correlation coefficient, a broad measure of accuracy, the unedited prices are significantly less accurate than the edited prices, and editing results in highly accurate prices. Editing, however, slightly reduces the percentage of records with prices that exactly agree with the claims data. For single source brand name drugs, using the median RUP to edit prices results in a statistically significantly higher Lin's concordance correlation coefficient. The sample of brand name originators is smaller (N=1,145), the two sets of editing rules have statistically similar Lin's concordance correlation coefficients; although the exact match rate is slightly lower for the rules based on the median RUP. For generics, in terms of exact matches, the editing rules based on the median RUP from MarketScan result in statistically significantly greater accuracy than the editing rules based on the AWUP, but the difference is small and the

difference in Lin's concordance correlation coefficients is also small and not statistically significant. Under both sets of editing rules, generics remain less accurate than brand name drugs.

Using the larger sample of MEPS PC data, Table 4 shows the potential impact of switching to rules based on the MarketScan median RUP on average prices. Mean generic prices would be unchanged. Mean brand name prices would fall by 3.1 percent for single source drugs and 6.5 percent for originators. Overall, mean prices in the MEPS PC would be 2.7% lower.

V. Conclusion

Currently, the MEPS PC relies on the AWUP as a benchmark for identifying outliers. We assessed a potential alternative benchmark: median unit prices calculated from the MarketScan's database of private claims. Both the AWUP and median RUP are at the NDC level. We calculated unit prices relative to the median in both MarketScan and Medicare claims data and showed graphically that the distribution of unit prices for people with private insurance in the MarketScan is similar to the distribution found among Medicare beneficiaries with Part D coverage. This suggests that the median RUP from the MarketScan may be useful for editing prices paid by two sources (private and Medicare) that paid for 59.8 percent of drug expenditures in the population covered by the MEPS in 2009. Then we compared the accuracy of editing rules based on the AWUP and median RUP using a sample of MEPS PC data validated by matching to Medicare Part D claims. In this selected sample, we found that using the median RUP instead of the AWUP would slightly increase the accuracy of edited prices for generics and single source brand name drugs. After applying both sets of editing rules to the MEPS prescription drug data, we found edited generic prices would not change, but the prices of brand name drugs would be somewhat lower. Based on these data from 2007, it would be feasible but not particularly necessary to change the unit price benchmarks for editing the MEPS. Changes would likely improve accuracy slightly, but increase processing costs and create a small break in the comparability over time in the prices of brand name drugs and aggregate expenditures.

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Table 1. Characteristics of prescription pharmacy purchases

Patent Status	Percent distribution of purchases by patent status[1]		
	MEPS PC, 2007	**MarketScan, 2007**	**Medicare Claims, 2007**
	Privately Insured		
Single Source	32.3%	33.7%	
Originator	8.3%	4.8%	
Generic	55.9%	57.3%	
	Medicare		
Single Source	30.5%		31.5%
Originator	7.0%		4.0%
Generic	59.0%		62.9%
	Medicaid		
Single Source	29.9%		
Originator	5.6%		
Generic	58.6%		

	Summary of retail prices								
	MEPS PC, 2007			**MarketScan, 2007**			**Medicare Claims, 2007**		
	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median
	Privately Insured								
Single Source	$117	$182	$88	$154	$243	$102			
Originator	$46	$108	$21	$86	$121	$41			
Generic	$22	$89	$11	$25	$44	$13			
	Medicare								
Single Source	$128	$156	$97				$137	$150	$101
Originator	$54	$80	$22				$87	$93	$58
Generic	$20	$32	$11				$21	$33	$11
	Medicaid								
Single Source	$180	$276	$112						
Originator	$45	$58	$29						
Generic	$20	$34	$12						

Sources: Authors' calculations from the Medical Expenditure Panel Survey Pharmacy Component (MEPS PC), 2007 and MarketScan Outpatient Pharmaceutical Claims, 2007

[1]Remaining proportion of NDCs were classified as "Other"

Table 2. Outlier Editing Thresholds for Underreported Payments

Patent Status and Third Party Payer Amount	Using RUP / AWUP	Using RUP / median RUP_{MS}
Generics		
Positive third party amount	<.03 & price <$2	<.02
Zero third party amount	<.03	<.25
Missing third party amount	<.15	<.35
Brand Name Originators		
Positive third party amount	<.20 & price <$2	<.02
Zero third party amount	<.20	<.03
Missing third party amount	<.70	<.90
Single Source Brand Name		
Positive third party amount	<.65 & price <$10	<.02
Zero third party amount	<.65	<.80
Missing third party amount	<.75	<.90

MS = MarketScan

Table 3. Agreement Rates in Validation Data Using Pharmacy-Report Prices and After Editing

			Edited Using			
	Pharmacy Reports		RUP / AWUP		Using RUP / median RUP_{MS}	
	Exact	Lin's concordance	Exact	Lin's concordance	Exact	Lin's concordance
Overall	42.2%	.743	41.9%**	.922**	42.0%**	.953**†
Patent Status						
Single Source Brand Name	37.0%	.708	37.1%	.900**	36.9%††	.941**†
Brand Name Originators	60.3%	.563	60.4%	.950**	58.8%**††	.968**
Generic	42.9%	.579	42.3%**	.877**	42.8%**††	.885**

MS = MarketScan

Sources: Authors' calculations from 2007 Medical Expenditure Panel Survey Pharmacy Component matched to Medicare claims files. Median RUPs calculated using MarketScan Outpatient Pharmaceutical Claims, 2007. N=15,375.

Notes: AWUP = retail unit price /average wholesale unit price. RUP = retail unit price.

** = statistically significantly different from unedited pharmacy reports at the .01 level.

† = statistically significantly different from data edited using the AWUP at the .05 level.

†† = statistically significantly different from data edited using the AWUP at the .01 level.

Table 4. Mean Prices per Fill Under Two Sets of Editing Rules

	Edited Using		Percent Difference
	RUP / AWUP	Using RUP / median RUP_{MS}	(Median RUP_{MS}/AWUP)
Overall	$66.67	$64.86††	−2.7%
Patent Status			
Single Source Brand Name	$150.71	$146.05††	−3.1%
Brand Name Originators	$63.19	$59.08††	−6.5%
Generic	$22.22	$22.23	+.0%

Sources: Authors' calculations from 2007 Medical Expenditure Panel Survey Pharmacy Component. Median RUPs calculated using MarketScan Outpatient

MS = MarketScan

Pharmaceutical Claims, 2007. N=192,304.

†† = statistically significantly different from data edited using the AWUP at the .01 level.

Figure 1. Density distributions of RUP / median RUP_{MS} for single source drugs.

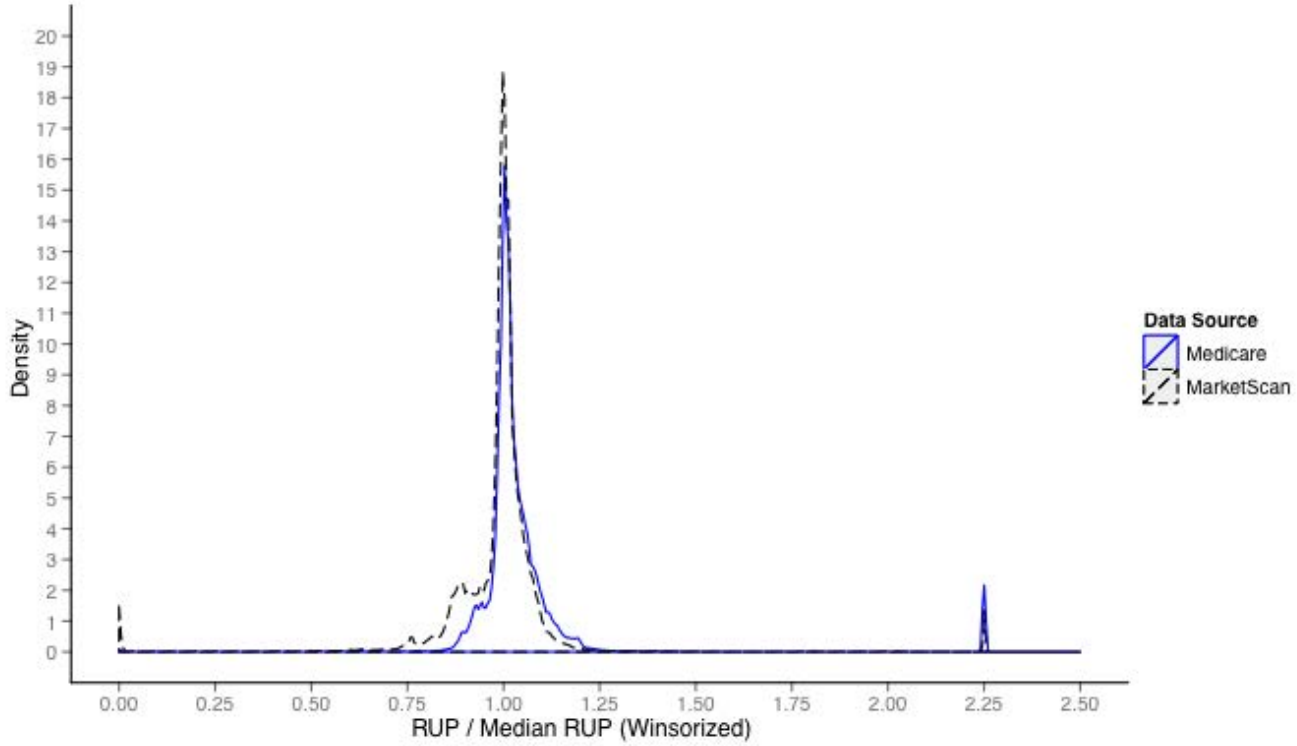

Figure 2. Density distributions of RUP / median RUP_{MS} for originator drugs.

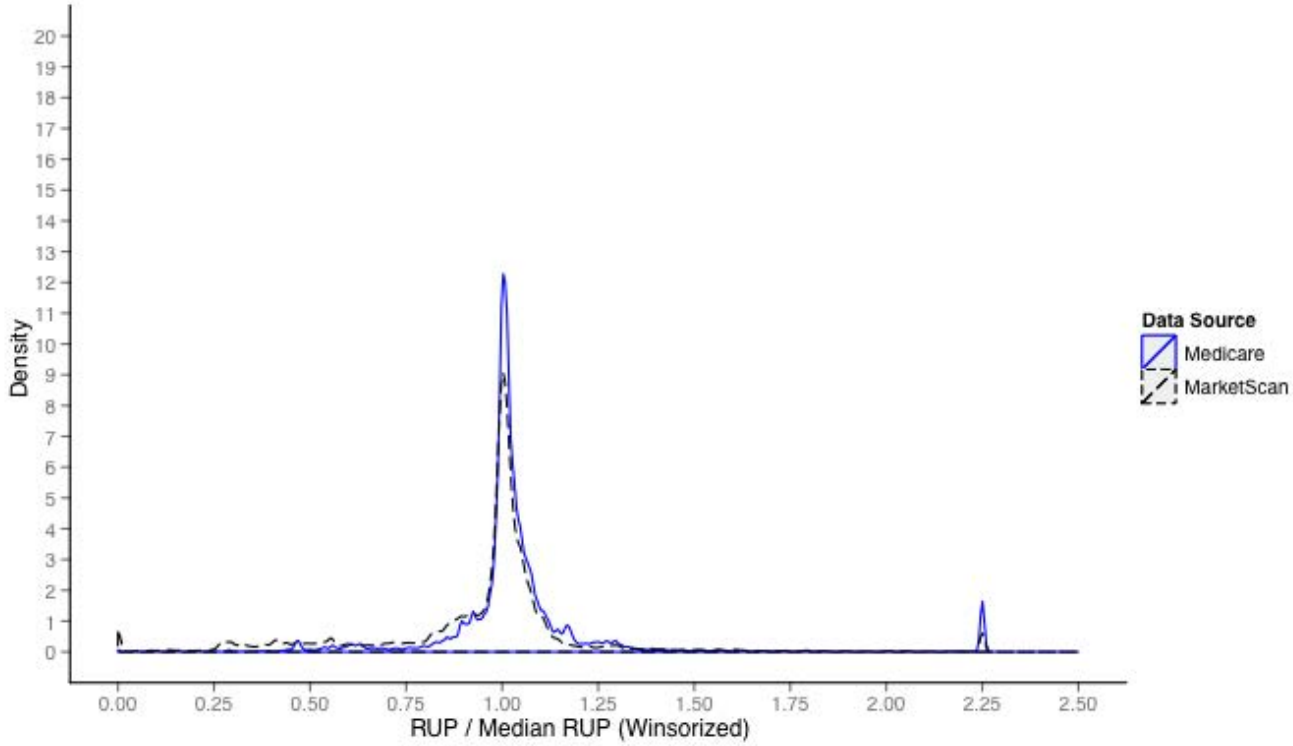

Figure 3. Density distributions of RUP / median RUP_{MS} for generic drugs.