The Spread: Pilot Study of an Undocumented Source of Pharmacy Benefit Manager Revenue

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ABSTRACT

Objective: To document the difference between what pharmacy benefits management companies (PBMs) charge employers and what they pay dispensing pharmacies for the drug ingredient portion of prescription transactions (the "spread").

Design: Descriptive, cross-sectional study.

Participants: Two large employer groups, each of which used a different PBM, and six independent community pharmacies participating in these plans during 2002.

Interventions: Two sets of financial records issued by each of two PBMs were reviewed retrospectively, including 129 line-item prescription transactions billed to the employer and the line-item transaction information that accompanies the PBM payment to the dispensing pharmacy.

Main Outcome Measure: Spread between drug ingredient cost billed to the employer by the PBM and drug ingredient cost paid to the dispensing pharmacy by the PBM for brand name versus generic drug products.

Results: For both PBMs, the mean (± SD) spread was $12.29 ± 27.93 per prescription, with a range of –$1.67 to $201.65. Considering all 129 transactions, the mean spreads for brand name and generic medications were significantly different from one another, with mean (± SD) spreads of $4.65 ± 10.47 and $23.45 ± 39.47 per prescription, respectively. The two PBMs differed significantly in their spreads for brand name drugs ($3.20 ± 2.85 and $5.93 ± 14.12), but the spreads for generic products did not achieve statistical significance in absolute dollars ($10.83 ± 13.58 and $31.74 ± 48.11) because of their greater variation (as reflected in the larger standard deviations). However, the percentages difference for generic products differed significantly.

Conclusion: This pilot study indicates the possibility of substantial and widely varying differences in the spread and spread percentage between PBMs for brand name and generic medications. A more transparent business model for the PBM industry could produce better relations with PBM clients and business partners, including community pharmacies.

Keywords: Pharmacy benefits management, drug costs and expenditures, health care costs, generic drugs, employers, community pharmacy.

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See related editorial on page 10.

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Prescription drug costs continue to attract media scrutiny as the impact of increasing health care costs on our nation's economy remains dominant in major U.S. newspapers' domestic policy coverage.[1-6] Prescription drug costs are conspicuous in this coverage because of the synergy between two current trends: the rate of increase in costs to employers for employee prescription benefits and an increase in public sentiment favoring provision of some kind of Medicare prescription drug benefit and relief from escalating prescription drug prices. In examining increased prescription costs to employers, the purpose of this pilot study was to investigate potential sources of inefficiency in the current pharmacy benefit model that may merit further and more exhaustive investigations.

The current infrastructure for administration of employee prescription benefits in the United States generally uses a PBM as a critical component. In this important and central role as a pharmacy network specialist and claims processor, the PBM typically executes contracts with an employer who pays for the pharmacy benefit and a network of dispensing pharmacies. People in the managed care industry are commonly aware of a difference between what employers are charged for drug ingredient costs and what PBMs pay dispensing pharmacies for the same drug ingredients,[7–9] but the magnitude of this difference has not been measured objectively.

This difference is termed the "spread" or sometimes the average wholesale price (AWP) spread. We define *spread* as "the difference between the drug ingredient cost billed to the employer by the PBM and the drug ingredient cost the PBM pays to the dispensing pharmacy for that line item." It is not a factor in any copayment, dispensing fee, or transaction fee provision.

AT A GLANCE

Synopsis: By reconciling the amounts paid by two PBMs to dispensing pharmacies with the amounts billed to employer–payers for 129 prescriptions, these authors calculated the gross profit realized by the intermediaries in each transaction. This "spread" varied considerably and seemingly erratically for both single-source and generic drug products.

Analysis: *Given the prominent and growing role that PBMs play in the prescription drug industry, a more transparent business model for PBMs could help reduce confusion and consternation by patients, pharmacists, and payers. While America's free enterprise system is driven by the profit motive that is both recognized and accepted, these data are reminiscent of the days when state legislatures were requiring pharmacies to post price lists for medications in an effort to reduce consumer concern about the costs of their prescriptions.*

Objectives

In considering how and under what circumstances spread may be incorporated into prescription payment transactions, questions arise as to whether the dollar amounts of spread and/or percentages of these differences (spread percentages) differ significantly according to drug category, PBM, or both. To systematically address such queries, the following research questions and hypotheses were generated:

- *Research Question 1:* Independent of PBM, is there a significant difference between the spreads charged on brand name versus generic drugs?

Hypothesis 1: There is no significant difference in spread between brand name and generic drugs.

H1a: There is no significant difference in dollar amount between the spread charged on brand name versus generic drugs.

H1b: There is no significant difference between the spread percentage ($100 \times$ spread / [drug ingredient cost dollar amount paid to the pharmacy by PBM]) charged on brand name drugs versus generic drugs.

- *Research Question 2:* Is there a significant difference between PBMs in their spreads?

Hypothesis 2: There is no significant difference between PBMs in their spreads.

H2a: There is no significant difference between PBMs in the spread for brand name drugs.

H2b: There is no significant difference between PBMs in the spread for generic drugs.

H2c: There is no significant difference between PBMs in the spread when all drugs are considered.

- *Research Question 3:* Is there a significant difference between PBMs in the spread percentage?

Hypothesis 3: There is no significant difference between PBMs in the spread percentage.

H3a: There is no significant difference between PBMs in the spread percentage on brand name drugs.

H3b: There is no significant difference between PBMs in the spread percentage on generic drugs.

H3c: There is no significant difference between PBMs in the spread percentage when all drugs are considered.

Methods

Two basic sources of information were needed to permit an audit of the spread on a series of prescription transactions:

1. Employers' line-item prescription transaction invoices received from PBMs each month
2. Dispensing pharmacies' itemized lists of prescription transactions received with PBMs' monthly payments

We obtained line-item prescription transaction invoices for two large employers who used different PBMs. These employers' invoices covered 1 month during 2002. From the employers' invoic-

es, we could identify dispensing pharmacies by their National Association of Boards of Pharmacy (NABP) identification numbers.

Since many chain pharmacy companies reconcile their PBM-generated prescription payments at the corporate rather than individual store level, we decided to avoid the time-consuming steps encountered in trying to gain permission at the corporate level and confine our focus for this pilot study to independent community pharmacies. Initially, seven such pharmacies agreed to participate in the pilot study. We focused our pharmacy inquiry on states in which we had support of the state's pharmacy organization or other recognized pharmacy leaders. Within the four states where we had support, the six highest volume pharmacies for the two employers were contacted. The highest volume pharmacies were identified by the number of prescription transactions associated with each NABP number.

We solicited participation of dispensing pharmacies by telephone. During the initial telephone calls, we introduced ourselves to the pharmacy owner or manager, presented our institutional affiliation, and described the study. This introductory phone call was followed by a fax transmission or e-mail message to the pharmacy. This communication included a one-page description of the study and our credentials. After the contacted pharmacist was oriented to the aim of the project and comfortable with participation, an investigator faxed the pharmacy a worksheet of all prescription transactions for the chosen 1-month period that had been identified from an employer's invoice. The worksheet provided drug name and strength, quantity, date of service, ingredient cost billed by the PBM to the employer, the name of the PBM, and the pharmacy's prescription number. It had a blank space for the ingredient cost paid to the pharmacy by the PBM.

Pharmacists were asked to refer to their PBM payment notice for these same prescription transactions and dates of service, record the dollar amount the pharmacy was paid for drug ingredient cost on each of the transactions, then fax the completed worksheet back to the investigators. If participating pharmacists wanted to fax their payment notice, we asked them to obliterate any patient-identifying information on these printouts before doing so. For their own convenience, all respondents chose the option of faxing documents to the investigators.

Analysis of variance (ANOVA) was used to determine the significance of differences for spreads found among brand name, multisource brand name, and generic medications and between the PBMs included in this study. The level of significance was set at $P < .05$. The one-sample Kolmogorov-Smirnov [KS] test for normality was used to determine the reliability of the ANOVA tests for these data, and the Mann–Whitney U test was used as needed to analyze data not meeting the KS requirements for normality of data.

Results

Of seven pharmacists who initially agreed to participate, one pharmacist did not send information when it was requested. Thus, we report in this article the transactions based on prescriptions dispensed by six pharmacies.

In all reported cases, the pharmacists faxed a copy of their PBM invoices rather than completing our worksheet. Thus, for each of the prescriptions in our pilot project, we had not only a self-report of the drug ingredient cost paid to the pharmacy but also physical evidence in the form of the line-item prescription transaction record the PBM sent with the pharmacy's monthly payment. We were able to match up the pharmacy payment with the employer's bill. These transactions were matched on prescription number, date, drug name, drug strength, NDC number, drug quantity, and days' supply.

From these participating pharmacies, information was collected for 129 prescriptions that had been dispensed for employees of two companies, each served by a different PBM (PBM 1, n = 71; PBM 2, n = 58). Examples of the kinds of spreads we found are presented in Table 1.

Table 2 presents a summary of results for the PBMs combined and PBMs 1 and 2 separately. Drugs are categorized as generic, multisource brand, and single-source brand.

Based on the combined data for both PBMs, ANOVA identified significant differences among the generic, multisource brand name, and single-source brand name categories for both the dollar amount spread (d.f. = 2, $F = 7.99$, $P = < .01$) and the spread percentage (d.f. = 2, $F = 21.33$, $P < .001$).

For PBM 1 (Table 2), ANOVA revealed significant differences in the spread among drug categories ($F = 5.07$, $P = < .01$) and in the spread percentage between drug categories ($F = 14.66$, $P < .001$).

For PBM 2 (Table 2), ANOVA identified differences among drug categories ($F = 5.64$, $P = < .01$) and in the spread percentage among drug categories ($F = 15.93$, $P < .001$).

However, in examining the distributions of the spread and spread percentage variables for the entire sample taken as a whole, neither the spread (skewness = 4.75) nor the spread percentage (skewness = 4.18) were found to be normally distributed (KS test for normality, $P < .001$ for both spread and spread percentage). The KS tests were repeated for subgroups, and the distributions were found to be abnormal for the PBM 1 and PBM 2 subgroups ($P < .001$ for both spread and spread percentage in each subgroup).

In situations where the assumption of normality essential to ANOVA is violated, a more conservative approach is the use of nonparametric analysis. Further, in view of the small subsample of multisource brand name drugs in an already very small sample, the single-source brand name and multi-source brand name categories were collapsed to form a name-brand category. Mann–Whitney U tests were then conducted to examine differences in spread and spread percentage between the brand and generic drug categories, spread between PBMs, and spread percentage between PBMs.

Results pertinent to our first research question ("Does spread differ significantly between drug categories independent of PBM?") and its associated hypotheses are presented in Table 3. From these tests, it can be seen that the brand name versus gener-

Table 1. Examples of Spread Based on Drug Ingredient Costs[a]

Drug, Strength, Quantity, and Date of Service	Ingredient Amount Billed to Employer ($)	Ingredient Amount Paid to Pharmacy ($)	Amount of Spread ($)
Amoxicillin 250 mg #60 01/06/02	11.00	5.00	6.00
Alprazolam 0.25 mg #90 01/31/02	17.00	4.00	13.00
Lipitor 10 mg #30 2/02/02	62.00	60.00	2.00
Prilosec 20 mg #60 03/18/02	250.00	242.00	8.00
Atenolol 100 mg #90 08/29/02	80.00	7.00	73.00
Celebrex 100 mg #30 07/04/02	44.00	43.00	1.00
Furosemide 80 mg #90 09/03/02	36.00	7.00	29.00
Monopril 40 mg #30 10/25/02	29.00	29.00	0
Propoxyphene N/APAP 100/650 #200 11/22/02	104.00	40.00	64.00
Ranitidine 300 mg #90 12/26/02	215.00	15.00	200.00

[a]Drug ingredient costs for both employer billing and payment amounts have been rounded to the nearest dollar to protect the anonymity of the pharmacist and employer participants in this study.

ic comparison for both spread and spread percentage differed significantly in all categories. For PBM 1, PBM 2, and for both PBMs taken together, the differences between brand name and generic products for both spread and spread percentage were highly significant ($P < .01$).

Results pertinent to the second and third research question ("Does spread differ significantly between PBMs?" and "Does spread percent differ significantly between PBMs?") and their associated hypotheses are presented in Table 4. The two PBMs did not differ significantly ($P = .938$) in the spread for brand name drugs. PBM 1 and PBM 2 did, however, differ significantly ($P < .01$) in the spread percentage for brand name drugs. For the spread on generic drugs, the difference between PBMs was not significant ($P = .083$), yet the comparison of PBMs on generic drugs spread percentage was significant ($P < .001$). When considering brand name and generic drugs together, the differences between the PBMs examined were not significant for either spread or spread percentage.

Discussion

The pharmacy benefit is currently in the spotlight because of its escalating cost, the desire of Americans for relief from high pre-

Table 2. Spread Statistics for Two PBMs by Drug Category

Drug Category	No. Prescriptions	Spread Mean (± SD), Range, Median ($)	Spread Percentage Mean (± SD), Range, Median (%)
Both PBMs			
Generic	53	23.45 ± 39.47 0–201.65 10.09	213.37 ± 270.07 0–1328.86 161.72
Multisource brand	6	2.75 ± 3.00 0–7.95 2.12	25.50 ± 45.13 0–116.74 7.94
Single-source brand	70	4.65 ± 10.47 –1.67–71.11 2.21	8.58 ± 17.01 –4.37–103.74 3.47
All prescriptions	129	12.29 ± 27.93 –1.67–201.65 3.46	93.50 ± 199.94 –4.37–1328.86 4.47
PBM 1			
Generic	32	31.74 ± 48.11 0–201.65 11.77	291.01 ± 317.45 0–1328.86 171.68
Multisource brand	2	4.30 ± 5.17 0.64–7.95 4.30	60.08 ± 80.12 3.43–116.74 60.08
Single-source brand	37	5.93 ± 14.12 –1.67–71.11 2.21	11.09 ± 22.56 –4.37–103.70 3.45
All prescriptions	71	17.52 ± 36.01 –1.67–201.65 3.96	138.63% ± (253.71) –4.37–1328.86 35.81
PBM 2			
Generic	21	10.83 ± 13.58 0–61.86 $7.2)	95.05 ± 95.38 0–358.18 54.00
Multisource brand	4	1.97 ± 1.92 0–3.66 ($2.12)	8.21 ± 7.63 0–16.97 7.94
Single-source brand	33	3.20 ± 2.85 0.65–15.08 2.43	5.77 ± 6.00 2.29–32.37 4.11
All prescriptions	58	5.88 ± 9.15 0–61.86 3.09	38.27 ± 71.26 0–358.18 71.26

scription drug prices, and the potential expansion of the pharmacy benefit through a Medicare pharmacy program. If a research initiative on a statistically valid sample indicates that a significant spread exists, such a measure could become an additional metric for evaluating PBMs.

Through this pilot study, we identified significant differences in ingredient costs charged to employer payers when comparing spread and spread percentage between brand name and generic drugs for two PBMs. Spread and spread percentage difference appeared on the generic side of the brand name/generic dichoto-

Table 3. Mann-Whitney U Tests with Z-Scores Comparing Spread and Spread Percentage of Brand Name Versus Generic Drugs for Two PBMs

Spread Category	Hypothesis Tested	Mann-Whitney U [Z-Score] (P value, 2-tailed)
Spread dollars for PBM 1 (n = 71)	H1a	204.0 [–4.85] (< .001)
Spread percentage for PBM 1 (n = 71)	H1b	63.0 [–6.48] (< .001)
Spread dollars for PBM 2 (n = 58)	H1a	200.0 [–3.05] (.002)
Spread percentage for PBM 2 (n = 58)	H1b	178.0 [–3.40] (.001)
Spread dollars for both PBMs (n = 129)	H1a	795.5 [–5.83] (< .001)
Spread percentage for both PBMs (n = 129)	H1b	464.0 [–7.42] (< .001)

my—an area that otherwise represents the greatest cost-saving opportunities to employers and is the focus of "lower copayment for generic drug" incentives given to employees. When comparing PBMs head-to-head, the only significant differences found were in the spread percentage for brand name and generic drug categories when considered individually. For all drugs taken together, there was no difference between the two PBMs.

For the PBMs and prescriptions analyzed in this pilot study, these results show significant differences in spread and spread percentage when comparing generic and brand name drugs, but essentially no difference between PBMs. The wider ranges in spread opportunities available with generic drugs are, in part, explained by the disparity between generic drug acquisition cost and the published generic AWP. The PBM explicitly states terms of generic pricing in the contracts to both the employers and pharmacies, but we have found that employers are generally unaware of the possible spread with generic drug differential contracting. If this observation proves to be generally correct, it would seem that employers need to become more aware of how reimbursement arrangements are made and that they should insist on full disclosure of the individual prescription payment amounts made to pharmacies.

The literature has indicated the spread is an economic necessity for PBMs, who use spread revenue to subsidize areas of loss to the PBM, such as artificially low administration fees.[7–9] Recently, the PBM industry has been the focus of lawsuits from employer groups and organized pharmacies over drug-switching programs, drug manufacturer rebate practices, and spread pricing. If these lawsuits represent a demand by clients and business partners of PBMs for a transparent business model, then a move toward a more understandable and comprehensible model of operation with sustainable, up-front administration fees could benefit the PBM industry. Further, since markets run more efficiently with a more complete flow of information between buyer and seller, a move toward a transparent model would likely benefit employers and pharmacies as well.

Limitations

The results presented and the statistical significance of data in this small sample have severe limitations that are clearly associated with the extremely limited number of prescription transactions and PBMs studied. As such, the results of this pilot study should not be considered indicative of either typical prescription transactions or PBMs in general. Whether the observed differences in spread and spread percentage between drug categories are indeed indicative of typical industry practices does, however, merit more extensive investigation. The research questions, hypotheses, and strategy for data analysis presented in this paper represent the

Table 4. Mann-Whitney U Tests with Z-Scores Comparing PBMs for Spread and Spread Percentage Categories

Category	Hypothesis Tested	Mann-Whitney U [Z-Score] (Significance, 2-tailed)
Brand name drugs spread (PBM 1, n = 39; PBM 2, n = 37)	H2a	7.14 [–0.78] (.938)
Brand name drugs spread percentage (PBM 1, n = 39; PBM 2, n = 37)	H3a	336.0 [–2.34] (.019)
Generic drugs spread (PBM 1, n = 32; PBM 2, n = 21)	H2b	240.5 [–1.74] (.082)
Generic drugs spread percentage (PBM 1, n = 32; PBM 2, n = 21)	H3b	134.5 [–3.67] (< .001)
All drugs spread (PBM 1, n = 71; PBM 2, n = 58)	H2c	1736.0 [–1.53] (.126)
All drugs spread percentage (PBM 1, n = 71; PBM 2, n = 58)	H3c	1753.0 [–1.45] (.147)

approach we intend to pursue in future studies involving more than two PBMs and much larger numbers of prescription transactions.

Conclusion

This pilot study indicates the possibility of significant differences in the spread and spread percentage between PBMs for various types of medications (specifically the brand name and generic categories). As an industry under scrutiny that is an increasingly important part of the pharmaceutical distribution market, PBMs may need to consider a more transparent and comprehensible business model that does not contain erratic and seemingly random variations between the amounts paid to pharmacies for drug ingredients and the amounts charged to employers for those ingredients.

References

1. Greenhouse S. Union at G.E. plans strike on health fee. New York Times. January 8, 2003:A12.
2. Pear R. Spending on health care increased sharply in 2001. New York Times. January 8, 2003:A12.
3. Freudenheim M. States organizing a nonprofit group to cut drug costs. New York Times. January 14, 2003:A1.
4. Freudenheim M. As drug patents end, costs for generics surge. New York Times. December 27, 2002:A1.
5. White R. Employers expect to spend more on health care. Los Angeles Times. December 9, 2002:C1.
6. Freudenheim M. Small employers severely reduce health benefits. New York Times. September 6, 2002:C1.
7. Kaupp GS. Were health plans better off before electronic claims processing? Manag Care Interface. 2001;14:41–42.
8. Makoid MC, Garis RI. Inside the high cost of prescription drugs. Creighton University Magazine. Omaha, NE: Creighton University; Fall 2001:16–23.
9. Martin SS. PBM industry today: who's managing drug costs? Manag Care. 2001 (Dec);10(12):36–38.

PHARMACY THROUGH THE AGES

A Home for APhA

James H. Beal, the first editor of the *Journal of the American Pharmaceutical Association*, wrote in November 1912 of the need to bring the library, archives, laboratories, and journal into a centralized location, a permanent and properly equipped association home. Discussion for the creation of a headquarters waxed and waned until the early 1920s. In December 1924 Henry Armitt Brown Dunning, a graduate of the Maryland College of Pharmacy and a partner in the manufacturing firm of Hynson, Westcott & Dunning, was named as the chair of the pharmacy headquarters campaign committee. Within months Dunning had organized a fundraising campaign with the avowed goal of raising $1 million. In 1926 Dunning was named the Remington medalist for his work in securing the funding necessary for a headquarters building; at the conclusion of his Remington address, he announced that sufficient funds had been raised or pledged to see the construction to an end.

The general membership voted to determine the location of the headquarters. Nine cities submitted proposals to serve as headquarters. A ballot listing the cities with their relative advantages was sent to the members. The five cities receiving the most votes were Washington, D.C.; Cincinnati, Ohio; Madison, Wis.; Chicago, Ill.; and St. Louis, Mo. In Cincinnati, the American Druggists' Fire Insurance Company offered to donate a floor on their new building and provide free heat and light as well. The new building was located only four blocks from the Lloyd Library, where John Uri Lloyd, the second Remington Medalist and APhA Past President, had developed a world-class collection of pharmacy books and journals. A second ballot was sent to the membership, and the two cities receiving the most votes were Washington and Chicago. On the third ballot, Washington was the preference of the majority, making the city the future home of the APhA headquarters, the American Institute of Pharmacy.

Groundbreaking for what would be the only private building on Constitution Avenue took place on July 1, 1932. The completed building was formally dedicated on May 9, 1934, during the annual APhA meeting.

Dennis B. Worthen, PhD, is Lloyd Scholar, Lloyd Library and Museum, Cincinnati, Ohio, and JAPhA *Contributing Editor,* Heroes of Pharmacy. *Illustration courtesy of the Lloyd Library and Museum.*