
Who Cares What It Costs to Dispense a Medicaid Prescription?

Jo Ann Lamphere-Thorpe, M.S., William P. Johnston, Ph.D.,
Kerry E. Kilpatrick, Ph.D., and G. Joseph Norwood, Ph.D.

Results of a 1992 Medicaid cost-of-dispensing study among North Carolina pharmacies are presented. The estimated statewide weighted average cost incurred by pharmacies to dispense a prescription was \$5.37 in 1991. The variation in dispensing costs found among pharmacies of various sizes, organizational types, and locations is identified. Higher average dispensing costs were reported for large chain pharmacies and those pharmacies in urban areas. Considering the potential for expanded prescription drug benefits under a reformed health care system, the implications of the study's findings for pharmacy payment policy are discussed.

BACKGROUND

The Clinton Administration has proposed that prescription drug benefits be included as part of a reformed health care system and, for the elderly, that their prescriptions be covered by the Medicare program. Concern has been expressed by some policymakers about whether it is possible to prudently implement this benefit for all Americans. State Medicaid programs, with their range of experience in setting payment policies for prescription drugs, may provide the best clues currently available about what the future will hold if and when expanded drug benefits for all take effect.

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Prescription drugs, once viewed as a minor benefit expenditure by both private and public payers, have come under scrutiny in recent years because of their escalating cost. Since 1982, prescription drugs have been the most rapidly inflating component of the health care sector (Schondelmeyer and Thomas, 1990). Nearly one-half the growth of drug expenditures during this period has been the result of industry-specific price inflation, rather than general economywide inflation or volume increases resulting from utilization or population changes (Sonnefield et al., 1991).

Nowhere has the tension of affordability in drug benefit costs become more apparent than in State-operated Medicaid prescription drug programs, the costs of which rose to \$4.42 billion in 1990 from \$1.60 billion in 1982, an annual rate of increase of 13.6 percent (National Pharmaceutical Council, 1991). The cost per prescription, rather than the number of beneficiaries or utilization per beneficiary, has been shown to be the major factor responsible for the increased expenditures nationally in the Medicaid drug program. The driving force appears to be cost increases in the manufacturing rather than the retail sector. Expenditures under Medicaid for drugs and their acquisition increased 86.5 percent from 1982 through 1988. In contrast, pharmacists' professional fees increased 15.1 percent nationally during the same period (Schondelmeyer and Thomas, 1990).

Because of the substantial price increases and taxpayers' resistance to expanded

public program expenditures during the 1980s, States have resorted to cost-cutting measures in the Medicaid prescription drug program. These measures have included constructing formularies or limited lists of approved drugs, requiring prior approval, raising the coinsurance paid by beneficiaries, limiting the number of covered prescriptions, and reducing pharmacy payments. These measures often have the unfortunate effect of reducing the access of poor Americans to medically necessary prescriptions. Similarly, pharmacists report they have experienced increased claims denial and a continued erosion of their Medicaid profit margins during this period.

Provisions of the Omnibus Budget Reconciliation Act of 1990 included a soon-to-expire 3-year moratorium on reductions in Medicaid payment for pharmaceuticals. The moratorium was intended in part to compel review of the adequacy of payment rates to pharmacists (section 4401 [d][4]). This question of payment adequacy is an important one, given the concurrent fiscal constraints of third-party payers, particularly Medicaid, and claims by retail pharmacists that inadequate payment is forcing them to withdraw participation from the Medicaid program. Medicaid's payment policy to the retail pharmacy sector is of special significance because private third-party payers often mimic their own States' Medicaid payment methods for prescription drugs. Thus, Medicaid policy has a powerful multiplicative effect among retail pharmacies.

Retail prescriptions represent approximately 70-75 percent of prescription drugs dispensed in the United States (Schondelmeyer and Thomas, 1990). Because of the importance of the retail market as a distribution vehicle for prescription drugs, the adequacy of third-party payment in this market is an

important concern. As the proportion of self-pay prescriptions has been declining, mechanisms used to calculate product and overhead expenses (also called professional or dispensing fees) in third-party payment formulas have had profound implications for the continued economic survival of individual pharmacies throughout the country.

Although analyses of the profitability of chain pharmacies generally have been favorable, information is less encouraging regarding the status of independent retail pharmacies throughout the Nation. Their profitability seems to have been declining over the past three decades. Despite growth in the average retail prescription price, the average independent pharmacy had an estimated 2.9-percent net profit (before taxes) in 1990, down from 5.8 percent in 1965 (Varnell, 1991).¹ As in other sectors of the economy, the retail prescription market has been undergoing substantial transformation. This includes the changing organizational structure of retail operations (especially the increased presence of large chain pharmacies and entities selling only specialized pharmaceutical products), the dramatic increase in drug product costs, and the growth of third-party coverage for pharmaceuticals. Just how these changes are influencing the relative well-being of different pharmacy operations remains a matter of debate.

These environmental changes highlight the importance of up-to-date cost-finding at the individual pharmacy level, a huge undertaking considering the vast number of pharmacies and the diverse methods of accounting. Recognizing the vital health

¹ However, net profit rates (the ratio of net profits and sales) may be an incomplete measure of a pharmacy's profitability over time, especially if the cost of goods sold is rising rapidly. Data from an Eli Lilly survey of independent pharmacies show that the rate of return to net worth (the ratio of net profits and net worth) has been fairly stable over the past 30 years, and that the rate of return to working capital has fallen only slightly (Varnell, 1991).

care and economic role retail pharmacies play in the State, the General Assembly of North Carolina adopted legislation in 1991 requiring that a study be conducted to determine the cost of filling a prescription by pharmacies throughout the State. The legislation was supported by the North Carolina Pharmaceutical Association. Findings of the study were to be used to establish an updated dispensing fee component in the Medicaid payment formula for prescription drugs—already among the five highest in the Nation (National Pharmaceutical Council, 1991).

At the time the study was mandated, the State had some concerns about both the cost of its Medicaid prescription drug program and the relative well-being of pharmacies throughout the State. North Carolina's Medicaid payments for prescribed drugs had been rising faster than the national average from 1986 through 1990, averaging 22 percent annually, compared with 16 percent nationally. North Carolina ranked 15th among all States in total Medicaid drug expenditures by 1990 (National Pharmaceutical Council, 1991). Medicaid expenditures for prescription drugs had risen by 1991 to more than \$120 million. (This figure does not include expenditures for inpatient prescription drugs.) Forty-one percent of this total represented expenditures on behalf of the aged, with an additional 32 percent for the blind and disabled (Division of Medical Assistance, 1991).

Medicaid payments to retail pharmacies in North Carolina have been calculated for years as the sum of an estimated drug-acquisition cost and a dispensing fee, with an allowance for some profit, for the majority of prescriptions dispensed. The dispensing-fee component is established on the basis of an estimated cost to dispense a

prescription by an average pharmacy. With some variation, this basic formula is used by the majority of public and private payers for pharmaceutical drugs throughout the United States.

It is generally recognized that both the ingredient cost and dispensing fee must be considered when reviewing total prescription payment to pharmacies. The ingredient cost for each individual product is also known as an estimated acquisition cost, derived from the State's best estimate of the price pharmacists typically pay for the ingredient. Many State Medicaid programs rely on industry pricing guides of average wholesale price to estimate ingredient payment amounts to pharmacies because the actual price that is paid by pharmacies is unknown. There is some evidence and widespread belief that pharmacists' actual purchase costs differ markedly from published average wholesale prices, depending on the volume of purchases made by pharmacies from a drug wholesaler (Kreling, 1989). Pharmacy chains and large super discount stores are believed to enjoy the most favorable wholesale pricing. That is one reason why States are concerned about the other portion of prescription payment—dispensing fees. If smaller and/or rural independent pharmacies—often those with a high volume of Medicaid claims—receive a smaller ingredient discount than do chains, then adequately paying for their costs of dispensing becomes a sensitive issue of what is equitable and what constitutes "fair" compensation for less favorable ingredient-purchasing terms.

It is important to consider the tendency of States to pay more generously for one component of costs (e.g., ingredient) and less generously for the other (e.g., dispensing) under Medicaid programs. The relative generosity of payment for the two

components of pharmacy payment surely creates different economic incentives at the retail level. If paid "too generously" for dispensing costs, pharmacies may be discouraged from being cost-efficient with respect to overhead costs. Similarly, pharmacies may not seek the maximum discounts when purchasing ingredients if paid "too well" for the acquisition cost of drugs. Both the absolute level and the distribution of a State's Medicaid payment method must be considered in assessing pharmacy participation and beneficiary access.

Scores of dispensing-cost studies (of uneven quality) have been published during the past 20 years for various purposes and payers throughout the country. The major difference in these studies has been the formula used to allocate costs (such as personnel and rent) between the prescription department and other departments of the pharmacy. This use of various cost-allocation methods in different studies has impeded the ability to compare and understand real differences among pharmacies in their costs of dispensing drugs. To compound this limitation in comparability, various States have used different methods of measuring the cost of dispensing a prescription. This has resulted in widely different estimates of dispensing costs.

Herman and Zabloski (1978) reviewed 29 dispensing-cost studies representing data sets from 1963 to 1976 in the United States and Canada. These studies varied in sample size and selection, response rates, and dispensing-cost models used. The authors noted higher dispensing costs in professional, independent, and clinic

pharmacies than in other settings, a positive correlation between dispensing costs and prescription prices, and a negative correlation between dispensing cost and prescription volume. They also found that pharmacies offering professional services beyond preparation of prescriptions had higher dispensing costs. More recent published investigations of dispensing costs include those conducted in Oregon (Sullivan and Strandberg, 1987), Louisiana (Siecker and Stockwell, 1987), and Tennessee (Roberts et al., 1987). The Tennessee study found dispensing costs for chain pharmacies to average \$0.71 higher than those of other retailers. Carroll's (1991) study of 35 selected independent pharmacies in Virginia contradicted the findings of the Tennessee study; Carroll surmised that a major reason independent pharmacies' third-party dispensing costs were higher than those of chains was the lack of scale economies in the independent setting.

DATA AND METHODS

Model of Dispensing Cost

A prescription's selling price at the retail level includes the following components: the drug's estimated acquisition cost; the dispensing cost (which includes items such as pharmacists' salaries, supplies, and rent); and some calculation of net profit. The sum of a prescription's dispensing cost and net profit allowance yields what is referred to as the pharmacist's professional, or dispensing, fee. This dispensing fee has been illustrated by Herman and Zabloski (1978) as:

$$\overbrace{\text{Drug Acquisition Cost} + \text{Dispensing Cost}}^{\text{Breakeven Cost}} + \text{Net Profit} = \text{Retail Prescription Price} \\ \underbrace{\hspace{10em}}_{\text{Gross Margin (Dispensing Fee)}}$$

By necessity, most cost-of-dispensing studies have imposed strict and somewhat arbitrary rules in order to create some uniformity among the pharmacies being evaluated. This is in part the result of a lack of uniform cost accounting methods in the pharmacy sector. In more extensive studies, researchers have attempted to develop improved and increasingly detailed cost-accounting methodologies in order to more accurately measure prescription-related pharmacy costs. The model used in the legislatively mandated North Carolina study (see Technical Note) was an adaptation of Gagnon's (1979) cost-of-dispensing formula. It should be noted that the unit of analysis in the North Carolina study was the individual pharmacy, rather than the prescription, which allowed the influence of each pharmacy—regardless of its sales volume—to be equally felt.

Survey Design and Data Collection

The principal means of collecting the cost data required by the State was a mail survey designed to capture up-to-date information available in the pharmacy owner's 1991 tax returns submitted to the Internal Revenue Service. Given the conflicting objectives of obtaining both detailed cost data and an adequate response rate, deriving as much information as possible from Federal tax returns was considered the best approach. Other than tax records, no other source of information was known to exist on prescription-related pharmacy overhead costs statewide.

The North Carolina Pharmacy Dispensing Cost Survey had five data sections:

1. Service characteristics: ownership and sales volume information, such as number of prescriptions and revenue by payer (yielded an inadequate response for meaningful analysis); extent of prescription

service to nursing homes (considered important because of the high volume of Medicaid drug claims paid on behalf of nursing home patients); and information on the kinds and frequency of patient counseling services provided by pharmacists. Considered important by pharmacists and Federal policymakers alike, the intent was to incorporate this information into data analysis to determine whether a relationship existed between dispensing costs and the provision of these (now mandated) services. Response to this question was inadequate to conduct the planned analysis.

2. Worksheet: for identifying and allocating personnel (salary and benefit) costs to prescription and non-prescription activities in the pharmacy. The labor cost category included overtime expenses, where reported, and drawings or salaries from owner pharmacists, as well.

3. Cost report for pharmacy operations: designed to correspond precisely to Federal tax forms. Pharmacists completed whichever form corresponded to their incorporation status (e.g., partnership, corporation). Again, pharmacists were asked to break out prescription from non-prescription activity. It should be noted that if a pharmacy's tax year was different from the 1991 calendar year, an inflation-factor adjustment was made to that response; different multipliers were calculated by the research team, depending on the quarter in which the company's costs were allocated.

4. Section to allow reconciliation with tax return information and clarification of any financial data: if needed.

5. Section devoted to determining prescription charges recorded for one randomly sampled day of the year for 100 prescriptions: as originally envisioned, to provide a valid estimate of the average selling price of prescription drugs, as well as any

differences in the selling price by payer class. These data will be explored, in all likelihood, in a subsequent study.

As this study's cost-finding and allocation rules have been described elsewhere (Kilpatrick, Norwood, and Thorpe, 1992), only a few categories of expenses germane for results presented here are highlighted.

- The study's methodology made explicit the headquarters or central office costs of chain pharmacies, with the intention that this cost category be applied uniformly across all reporting chain entities. A proportion of expenses for the central and regional offices was allocated to each individual store based on its percentage of total sales for the corporation or region.
- Because of the major influence of labor costs on the cost of dispensing, every effort was made to be as accurate as possible in their allocation. Salary and benefit expenses were allocated individually for pharmacy personnel according to the proportion of total store hours the employee worked in the prescription department.
- In the allocation of overhead costs, some disagreement exists among pharmacists and others about the inclusion of advertising costs. Although advertising is considered a legitimate business expense, the relationship between advertising and the activity of dispensing drugs to Medicaid patients remains unclear. This ambiguity required the cost data to be analyzed in two ways, including and excluding the advertising cost category.

In designing the survey instrument, considerable attention was given to the ease with which pharmacists could record the requested information as well as how data and company accounting could be verified. Included with the survey were letters of transmittal from the State's Division

of Medical Assistance, Pharmaceutical Association, and Board of Pharmacy, as well as the study's co-principal investigators. These letters described the purpose of the study, the uses of the data, and the investigators' pledge of confidentiality. Although the survey was designed to be filled out by a typical pharmacist manager, the surveys were often completed at corporate headquarters, as in the case of several chain pharmacies.

In addition to the data obtained through mail surveys, a team of investigators visited randomly chosen pharmacies to verify the accuracy of the financial and operational data from the completed surveys. The purpose of the site visits was not to make modifications in the data but rather to establish some bounds so that judgments could be made about how valid the survey reports were. Tax returns were reviewed to verify the reasonableness of what was reported in the survey.

Much of the field verification effort was focused on the methods of financial reporting by the chain pharmacies because their financial picture and organization were found to be different from the independent pharmacies. In some cases, financial data were reported from a chain based on individual store profit-and-loss statements. In other cases, the data were allocated from central offices based on the percent of sales of an individual sampled store. Every effort was made to ensure that the information across chains was considered in a similar manner.

The design of the survey and all data collection, verification, field audits, and analyses were conducted during the first 6 months of 1992.

Sample

The original sample was drawn from a computer-generated list of 1,642 pharmacies

provided by the State's Division of Medical Assistance. The criteria used to select the statewide stratified random sample of pharmacies were: To be included, the pharmacy must be located within the State, have dispensed at least one Medicaid prescription in 1991, and be paid on the basis of estimated acquisition cost plus a dispensing fee. These criteria excluded some pharmacies, such as those operated by hospitals and inpatient mental health providers, but ensured that smaller and rural pharmacies could be represented in the sample. Both independent and chain pharmacies were included, as were pharmacies supplying medications exclusively to nursing home patients. Included in the original sample were 660 individual pharmacies, representing nearly 40 percent of the sampling universe.

Standard techniques were employed to verify the accuracy of the computer-generated list, including checks for pharmacy addresses, in-state status and institutional type, and checks that clinics and inpatient hospitals were omitted, even those with nursing home beds. When there were discrepancies in institutional type information, an attempt was made to be consistent with the North Carolina Board of Pharmacy's definitions.

To ensure that the sample was representative of the State as a whole and reduce variances in sample estimates, the pharmacy population was stratified in a multistage approach. The pharmacies were divided into three distinct and equally sized geographic regions. The pharmacies were then proportionally allocated into additional strata. This stratification occurred after the nursing home pharmacies were removed from the regional group and sampled in their entirety.²

The remaining pharmacies were divided into sampling groups that were differentiated by their urban-rural status, type of

pharmacy, and dollar volume of prescriptions dispensed. Areas in which pharmacies were located were designated as "urban" if their metropolitan statistical area had in it a city of at least 50,000 population or if there was an urbanized area with a total population of 100,000. Pharmacy type included "independent" and "chain." Independent included those pharmacies with one to three individual stores. If the pharmacy was part of an entity with four or more pharmacies, it was defined as a chain. Pharmacies were also stratified into equally sized groups with a designation of low, medium, or high volume of Medicaid claims. For the purpose of this study, low volume included those pharmacies with fewer than 550 claims for one-half of a year, medium had 550-1,649, and high volume included those pharmacies with 1,650 claims or more.

The next step was sample reduction and weighting. Because of the large number of pharmacies selected for the mail survey in some chains, it was recognized that an unacceptable amount of work could have been created for respondents, resulting in a potentially lower response rate. Therefore, at the request of the chain respondents (method similar to the Schafermeyer, Schondelmeyer, and Thomas [1990] study), the size of the chain subsample was reduced by approximately 75 percent using random sampling techniques. The resulting sample size was considered sufficient to allow required analysis, and chain store officials did not express concern that the sample reduction would adversely impact the representativeness of their stores' financial experience.

²It was believed that these pharmacy operations were different in scope and cost structure from typical retail pharmacies; therefore, a more accurate analysis could be conducted if this small but significant group were sampled and analyzed as a distinct group.

Table 1
Distribution of Responses, by Owner Type and Location

Characteristic	Sample	Percent	Usable Responses	Percent
Owner Type				
Total	494	99.9	214	100.0
Independent	294	59.5	121	56.5
Chain	182	36.8	87	40.7
Nursing Home	18	3.6	6	2.8
X ² = 1.55 (2 degrees of freedom)				
Location				
Total	494	100.0	214	100.0
Urban	218	44.1	91	42.5
Rural	276	55.9	123	57.5
X ² = 0.22 (1 degree of freedom)				

SOURCE: (Kilpatrick, Norwood, and Thorpe, 1992).

Of the pharmacies selected for the sample, 27 were dropped from the sample because they had been open less than 1 year and had insufficient cost information, or they had been closed since the time the State's computer list was printed. The result was a net sample size of 494 pharmacies. More than 43 percent ($n = 214$) of pharmacies in the reduced sample returned usable responses.

Because a large portion of pharmacy managers did not return completed questionnaires, it was necessary to test for possible non-response bias. The pharmacy sample selected to be surveyed was representative of the whole population of pharmacies in North Carolina that met the research criteria already described. To determine whether respondents were representative of the sample, chi-square tests were performed. The unweighted distribution of pharmacies in the sample was compared with the unweighted distribution of responses with respect to two characteristics: ownership type and urban-rural location. No bias was found in the probability of responding based on ownership type or location (Table 1). However, the possibility that within these strata, response bias occurred is an important question in a

study such as this one. Although information was not sufficient on all the pharmacies in the sampling frame to conduct some selection-correction technique to test this possibility, we would hypothesize that some of our findings could be overstated, particularly the negative aspects of Medicaid participation for providers. These issues are discussed more fully later. A general comment is warranted concerning the study's struggle to achieve an adequate response rate. The maxim of third-party health care payment specialists is this: In the industry, they will show you their books when they are losing money. It is entirely possible that many pharmacies are flourishing financially with third-party payments and that the retail prescription drug sector has overstated its concerns.

Although most pharmacists contacted for this study expressed support for documenting dispensing costs, more than one-half did not complete the survey, despite its legislative backing. Pharmacists from more than 10 percent of the sample either called to explain why they were unable to participate or returned blank surveys with a curt refusal. The reasons offered (in about the same frequency) for non-participation included: (1) outright refusal of

proprietor, district manager, or partners to disclose information requested; (2) inability to provide information because of insufficient recordkeeping or computerization; (3) time and staffing constraints; and (4) other, including a belief that the sampled pharmacy was somehow "different" and should be omitted from the sample. It would be reasonable to conclude that, for many of these pharmacies, the risk of trying to document their revenues and costs (especially related to third-party activity) was considered greater than the risk of not adequately justifying (from a larger pharmacy community point of view) a higher dispensing fee through the Medicaid program.

Data Analysis

Descriptive statistics on the operating characteristics of respondent pharmacies were first calculated. These characteristics included pharmacy and prescription department sales volume, ratio of prescription department to total store sales and area, number of prescriptions dispensed, and total expenses per prescription. For any particular variable, unweighted data were used in the frequency distributions of pharmacies and in the calculation of mean values (and are presented in Table 2).

Next, the average cost and weighted average cost incurred by pharmacies statewide to dispense a prescription were calculated. These average costs were compared among pharmacies of different geographic areas, ownership type, and various volumes of prescription sales, as well as by payer class. To estimate the difference in the dispensing cost by payer class (self-pay, Medicaid, other third-party), a question was included in the survey asking the relative amount of time pharmacists spent dispensing prescriptions to patients with different payment sources.

This self-reported time was indexed with a weight equal to one for self-pay prescriptions. This information was sought to comply with contract requirements. In the absence of a validated time-and-motion study, extreme caution should be used in assessing pharmacists' perception of time differences by payer source in filling a prescription and processing a payment claim. One reason is that a pharmacist might not know a consumer's insurance status and whether a prescription is ultimately paid by a third party; bias could be positive or negative. Second, a pharmacist, dissatisfied with third-party payment in general (and Medicaid in particular), might tend to exaggerate the relative time cost associated with filling a particular prescription. A final reason for potential bias in self-reporting is that a pharmacist may believe that consumers whose prescriptions are covered by Medicaid are more time-consuming.

Finally, a multivariate regression analysis was conducted to ascertain the significance of a variety of factors in predicting the dispensing cost in an individual pharmacy. Among these factors were total number of prescriptions dispensed annually, whether the pharmacy was in an urban or rural area, type of pharmacy ownership, the region of the State in which the pharmacy was located, and the mix of payers. Using these factors as independent variables and the dispensing cost per prescription as the dependent variable yielded a regression model of the following form:

$$\begin{aligned} \text{COST} = & \text{CONSTANT} + B_1 * \text{TOTALRX} \\ & + B_2 * (\text{TOTALRX})^2 + B_3 * \text{URBAN} \\ & + B_4 * \text{CHAIN} + B_5 * \text{PROPMED} \end{aligned}$$

Table 2
Selected Results of Surveyed Pharmacies in North Carolina¹

Operating Statistics	Location		Ownership				Number of Prescriptions		
	Urban (n = 91)	Rural (n = 123)	Independent (n = 121)	Small Chain (n = 7)	Large Chain (n = 80)	Nursing Home (n = 6)	Fewer Than 20,000 (n = 47)	20,001 - 40,000 (n = 112)	More Than 40,000 (n = 55)
Net Total Sales									
Entire Store	\$1,205,826	\$1,126,594	\$907,559	\$1,364,097	\$1,469,939	\$1,890,452	\$644,440	\$970,659	\$1,987,248
Prescription Department	709,861	750,549	728,829	889,200	648,973	1,763,582	335,890	622,004	1,295,403
Ratio of Prescription Department Area to Total Store Area	0.18	0.18	0.24	0.12	0.04	0.92	0.19	0.19	0.16
Number of Prescriptions	32,689	36,342	32,942	40,714	32,761	92,146	15,013	28,914	63,650
Total Expenses per Prescription									
Non-Labor	\$1.64	\$1.31	\$1.59	\$1.49	\$1.17	\$2.23	\$1.80	\$1.41	\$1.22
Labor	4.07	3.62	3.49	3.68	4.38	2.78	4.98	3.77	2.90
Average Dispensing Cost	\$5.71	\$4.93	\$5.08	\$5.17	\$5.55	\$5.01	\$6.78	\$5.18	\$4.12

¹Unweighted 1991 averages.

NOTE: Chain size refers to the number of pharmacies under the same ownership; "small chains" include pharmacies with 4-10 stores and "large chains" have 11 or more stores.

SOURCE: (Kilpatrick, Norwood, and Thorpe, 1992).

where:

- COST** = the average dispensing cost per prescription for an individual pharmacy,
- CONSTANT** = the intercept or constant term in the equation,
- TOTALRX** = a continuous variable, the total number of prescriptions dispensed for the pharmacy,
- URBAN** = 1 if the pharmacy is in an urban area, 0 if otherwise,
- CHAIN** = 1 if the pharmacy is a chain of 4 or more stores, 0 if otherwise, and
- PROPMED** = the proportion of prescriptions filled that were Medicaid.

RESULTS

Pharmacy Characteristics

The average sales volume reported for the prescription department was \$733,276 in 1991, an amount that is consistent with national averages for prescription department sales. The average volume of prescription sales was highest for those pharmacies exclusively serving nursing homes; the second-highest volume was among small chain (4-10) pharmacies. Large chain pharmacies reported the lowest volume of prescription sales, on average. Results of these and other unweighted frequency distributions are shown in Table 2.

In this study, the average prescription department's size was 18 percent of the total store's area; wide variation was found by ownership type. Large chain pharmacies had a ratio of 0.04 and independent pharmacies had a ratio of 0.24. As prescription department (and total pharmacy sales) volume increased, in general and not holding other factors constant, the ratio of prescription

department to total store area decreased. Although prescription departments utilized a small proportion of total floor space, they yielded a large percentage of the total pharmacies' sales volume. Three-quarters of pharmacies reported that prescription department sales made up 47 percent or more of their total sales volume. This underscores the traditional and continuing importance of the prescription department in North Carolina pharmacies.

When the dispensing costs for all pharmacies in the study were averaged, the mean was \$5.19 statewide. Higher average dispensing costs were reported for large chain pharmacies (\$5.55), pharmacies in urban areas (\$5.71), and pharmacies with a low prescription volume (\$6.78). By type of ownership, large chain pharmacies were followed by small chain (\$5.17), independent (\$5.08), and pharmacies serving nursing home patients (\$5.01). The average dispensing cost was lowest in rural areas (\$4.93) and for those pharmacies with a large volume of prescriptions (\$4.12). Differences in dispensing costs among geographic regions throughout the State were not significant. If these simple averages had been weighted by the number of pharmacies within each category of location, ownership, or prescription volume, one could expect a slight increase in calculated dispensing costs.

To adjust the statewide average for possible response bias, the weighted average statewide dispensing cost was calculated. This was accomplished by incorporating into estimated dispensing cost averages proportional weights to correspond to the distribution of stratified pharmacies in the original universe from which the study's sample was derived. The estimated statewide average cost incurred by pharmacies to dispense a prescription was \$5.37 in 1991. (If advertising costs were

included in this calculation, the estimated dispensing cost rose to \$5.55.)

The weighted average is a better estimate of pharmacy dispensing costs in this study because it more accurately accounts for chain activity. In the reduced sample that was used, the effect of independent pharmacy dispensing costs may bias downward the statewide estimate. The independents constituted more than 50 percent of the sample—although they make up less than one-half of the retail pharmacies in the State—and their dispensing costs were lower. Because of the consistent manner in which costs were allocated by corporate headquarters for chain pharmacies randomly selected by the survey team, no response bias is believed to exist for chain entities in calculating their dispensing costs.

When analyzed by different levels of prescription volume, the weighted average dispensing cost changed. For pharmacies with up to 20,000 prescriptions dispensed annually, the average cost rose (in comparison to the mean for all pharmacies) to \$6.36; for pharmacies with more than 60,000 prescriptions, however, the average cost dropped to \$2.84. The economies of scale that can be achieved with high-volume prescription sales are obvious.

Labor expenses were responsible for more than two-thirds of the average pharmacy dispensing costs; as a percent of total dispensing costs, they ranged from a low of 55 percent in nursing home pharmacies to a high of 78 percent in large chain pharmacies. Labor expenses per prescription dropped as a pharmacy's prescription volume increased. This makes sense because, as a pharmacy's labor costs (whatever they may be) are spread out over a larger volume of prescriptions, the unit labor cost diminishes.

Whether higher average dispensing costs reported for large chain pharmacies compared with independent pharmacies is

real or an artifact of different accounting methods is unknown. During the study's verification of data, much attention was focused on the financial reporting by the chain pharmacies because their financial picture and organization were found to be quite different from those of the independent pharmacies. In some cases, financial data were reported from a chain based on individual store profit-and-loss statements. In other cases, the data were allocated from the central office based on the percent of sales for an individual sampled store. Although the allocation of corporate overhead to individual stores raised the average chain dispensing cost, it did not raise the labor component of dispensing costs. This is because corporate overhead was allocated in the study in the "other/non-labor cost" category. Therefore, factors other than corporate overhead may explain the higher labor component of dispensing costs in chain pharmacies. In all likelihood, independent pharmacies may not have recognized their "true" labor costs given the nature of many family-owned businesses. It is clear that additional study is needed to more fully understand why dispensing costs are higher or lower in certain kinds of pharmacies.

Although this finding should be interpreted with caution for reasons discussed, the cost of dispensing was highest, on average, for Medicaid prescriptions (\$5.85) and other third-party payers (\$5.69) and lowest for those prescriptions paid out-of-pocket (\$4.47). This finding is consistent, however, with that of a national study of chain pharmacies where the average dispensing cost for third-party prescriptions exceeded that for private-pay prescriptions by \$1.25 (Schafermeyer, Schondelmeyer, and Thomas, 1990).

Researchers and pharmacists alike believe that the dispensing cost in an

Table 3
Results of Regressing Dispensing Costs On Selected Independent Variables

Variable	Mean	Estimate	T-Statistic
Intercept		8.061140	20.997
TOTALRX	34,788.60	-0.000117	-9.076
SQTOTRX	1.749154E9	6.804606E-10	6.729
URBAN	0.467	0.35337	1.720
CHAIN	0.406	0.368304	1.788
PROP MED	0.13	1.583474	1.517
Adjusted R-squared	0.3738		

SOURCE: (Kilpatrick, Norwood, and Thorpe, 1992).

individual pharmacy is dependent upon a variety of factors. To test the hypothesis that factors such as prescription volume, the mix of payers, the pharmacy's location (urban versus rural), and pharmacy ownership are predictive of pharmacy dispensing costs, a simple multivariate regression analysis was conducted (Table 3). Results indicate that about 40 percent of the variation of the dispensing costs among pharmacies could be explained by these factors.

One effect measured in the regression model is the volume effect. This is highly significant in both the linear and quadratic term ($p < .0001$). As the number of prescriptions dispensed increases, the cost per prescription decreases. A 1-percent increase in volume drives the dispensing cost down about 0.07 percent. This is because fixed and semivariable costs are absorbed by a larger volume of dispensed prescriptions. Being located in an urban area adds about \$0.35 ($p = .09$) to the cost of dispensing a prescription, after controlling for ownership. Similarly, being a chain pharmacy adds about \$0.37 ($p = .08$) to the dispensing cost. The reader is cautioned not to use the regression equation to estimate dispensing costs for pharmacies with a total volume greater than approximately 86,000 prescriptions. The particular functional form chosen to fit the data could give specious results beyond that point.

POLICY IMPLICATIONS

Through the years, many surveys have been sponsored to estimate the cost of dispensing prescriptions under State Medicaid programs. Most of these studies have ignored fundamental policy concerns, such as the equity impact of single payment rates to different types of pharmacies. To begin to address these questions, this study assessed the cost of dispensing Medicaid prescriptions among pharmacies of various sizes, locations, and types. The information is timely. With Clinton Administration support for prescription drug benefits under a reformed health system, it can be expected that increasing attention will be focused on both the absolute and relative costs of all aspects of pharmaceutical supply and distribution in the upcoming months.

This study improved upon the approach and methods used by other States in their evaluation of pharmacy dispensing costs. The sample design was broad-based and representative of the entire State. Respondents included both chain and independently operated pharmacies. The study's methods allowed for comparison of the cost of dispensing among different types of ownership and by selected geographic and financial variables. Finally, the study's findings indicate opportunities for

potential modification of payment policies for pharmaceutical services, especially in regard to Medicaid.

The first policy question is definitional: What is a prescription dispensing cost? Traditionally, all expenses that were reported as part of a pharmacy's prescription department overhead have been considered business expenses to be paid for through direct or third-party payment. Yet, some rationale must be articulated to justify all these expenses as costs related to dispensing prescriptions. In the absence of a health care payer that is national in scope (such as Medicare) and that offers payment for prescription drugs, no uniform and accepted guidelines exist concerning what exactly constitutes a dispensing cost. Should third-party payers all include the same costs in their cost-of-dispensing calculations? What about chain pharmacies' corporate overhead? What types of central and regional corporate expenses should be included as costs of dispensing prescriptions among multistore operations, and to what extent? These questions warrant further investigation by policymakers, pharmacists, and pharmaceutical corporate leaders alike.

An example of a business expense that may not be at all related to the cost of dispensing a medically prescribed drug is advertising. The relationship between a pharmacy's advertising costs and the business of dispensing drugs to Medicaid patients is unclear. Advertising is geared to merchandise for which demand can be created and is directed at those consumers with disposable income (not the poor). Not controlling for other factors, this study found that the cost of dispensing a prescription rose by nearly \$0.20, on average, if advertising costs were included in the calculations. This is a non-trivial consideration when multiplied by the huge volume of drugs dispensed each year.

Another policy question relates to whether and how pharmacies should be compensated for the cost of their third-party prescription business. Third-party programs affect the operation of retail pharmacies by influencing the prices paid for prescription drugs. Such programs also increase administrative expenses and time associated with filling and processing a claim for a third-party prescription. Based on evidence from the literature and interviews with pharmacists, it is believed that the primary difference between out-of-pocket and third-party dispensing costs is related primarily to relative time and labor costs rather than any fixed structural cost.

Results of this study indicate the estimated dispensing cost for a prescription paid by a third party may be more than 25 percent higher than that for a self-pay prescription. If Medicaid or other third-party payment is not generating a positive margin for pharmacies—or at least permitting them to break even—then access of beneficiaries to appropriate and cost-effective medication may be impeded. Whether or not payment should explicitly recognize the additional paperwork and time costs associated with securing payment for a third-party prescription, whether it be Medicaid or private insurance, and the potential effect of that decision on a pharmacy's willingness to participate in a third-party program is a matter that warrants serious discussion.

Another conceptual issue is the inconsistent ways that pharmacies are defined for board registration or quality assurance and rate regulation purposes. What characteristics define a "retail pharmacy"? Definitional clarity is important because different types of organizational structures are known to have different economies of operation. Establishing fair payment policies for these different kinds of pharmacies depends on

understanding the nature of what they are and establishing clear operational definitions. In the future, these definitions will become increasingly important as new (and profitable) companies are spun off from existing pharmacies and health care institutions to sell emerging biomedical technologies or specialized services.

Medicaid policy currently recognizes differences in prescription drug costs among various health care providers and retail pharmacies. Medicaid payment should neither reward inefficiency nor create excess profit. This study surveyed retail pharmacies with no identifiable walk-in consumer activity; the pharmacies were entities with huge volumes of prescription sales and with revenues derived only from prescription sales to institutionalized nursing home patients. The average dispensing costs of these pharmacies were less than the Medicaid payment they received. This finding is important considering its financial impact on the Medicaid program. Nearly all of the largest Medicaid payments to North Carolina pharmacies in 1991 went to pharmacies whose only business was supplying prescriptions to nursing home patients.

It is difficult to draw conclusions about the relative well-being of different types of pharmacies, particularly small-town independent pharmacies, in an era of tightening third-party payment. There seems to be no question that, overall, prescription-related sales are more important to the independent pharmacy, as a percentage of revenue, than to chain pharmacies. It was not surprising, then, to find that independents seemed more wary about the influence of third-party payment decisions than did chain pharmacies.

A final policy question relates to the professional-fee component of third-party pharmacy payment. It is uncertain whether this dispensing cost add-on to some estimate of a drug's acquisition cost to pharmacies is the optimal way to structure

a cost-effective or reasonable payment mechanism, whether it be Medicaid or another third-party payer. The focus on a pharmacist's dispensing costs makes good managerial sense but, given pharmacists' lack of comparable data on their full costs (including true drug acquisition costs), policymakers might rethink the utility of a professional dispensing fee.

One should use caution in interpreting this study's results, as well as other cost-of-dispensing surveys. The lack of uniform accounting principles for pharmacies remains a serious barrier to any meaningful measurement and comparison of costs within and among pharmacies in the 50 States. A more precise and improved third-party payment formula for dispensing and drug-acquisition costs might depend upon the adoption of such standards. In meeting the challenges of anticipated health care reform, pharmacists might reconsider their aversion to such financial standards as well as their future role as health care providers.

The method Medicaid uses to pay pharmacies for prescription drugs has a powerful multiplicative effect on other third-party payment policies, the viability of retail pharmacies, and the access of sick and poor Americans to pharmacists and medically necessary prescriptions. Furthermore, decisions made by Medicaid programs about how to pay for ingredient and dispensing costs creates different economic incentives at the retail level. In the absence of a national prescription drug benefit program, the diversity of State Medicaid programs provides valuable data and experience and the best clues as to how to structure expanded prescription drug benefits under a reformed health care system. Attention from Federal policymakers and Medicaid officials is essential if some of the issues raised by this cost-of-dispensing study are to be resolved.

TECHNICAL NOTE

Model of Prescription Dispensing Cost

$$\text{AvgCost}_i = (A^i + B^i + C^i + D^i) * I^i / Rx^i$$

where:

- i = 1, ... , 214 pharmacies providing usable responses
- A^i = costs allocated to prescription department on square-footage basis
- B^i = costs allocated to prescription department on percent of sales
- C^i = costs solely in prescription department
- D^i = total prescription department labor costs
- I^i = inflation adjustment where required
- Rx^i = total prescription volume for i^{th} pharmacy

$$\text{Statewide weighted Average Cost} = \frac{214}{\sum_{i=1} W^i} \text{AvgCost}^i$$

where:

- W^i = sampling weight for the i^{th} respondent pharmacy

For additional information see (Kilpatrick, Norwood, and Thorpe, 1992).

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Reprint Requests: Jo Ann Lamphere-Thorpe, M.S., Alpha Center, 1350 Connecticut Avenue NW., Suite 1100, Washington, DC 20036.