

AWPM  
H64  
1975

THE COST OF DISPENSING A PRESCRIPTION  
IN WISCONSIN IN 1973  
BY  
PAUL ARTHUR HOLBERG

A thesis submitted in partial fulfillment of the  
requirements of the degree of

MASTER OF SCIENCE  
(Pharmacy Administration)  
at the  
UNIVERSITY OF WISCONSIN  
Madison

1975

APPROVED: Robert W. Hemmel

DATE: 7 May 75

## ACKNOWLEDGEMENTS

The author is especially appreciative for the guidance, assistance, and patience given by Professor Robert W. Hammel during this study. His capacity to apply scientific methods to seek solutions to the problems of the pharmacy profession will serve as an inspiration always.

Special acknowledgements are made to the American Foundation for Pharmaceutical Education whose Graduate Fellowship aided the author in his academic endeavors, to the Wisconsin Pharmaceutical Association for its interest and support, and to the Wisconsin Pharmacy Foundation which helped finance the research project.

Grateful appreciation is extended to my parents who instilled in me the belief that difficulties and disappointments can be overcome through persistence and determination.

Finally, sincere thanks to the pharmacists who provided the primary data upon which the analyses are based, and to Professor Kenneth W. Kirk who helped with computer programs for data tabulation and analysis.

## TABLE OF CONTENTS

ACKNOWLEDGEMENTS .....	ii
TABLE OF CONTENTS .....	iii
LIST OF TABLES .....	vi
CHAPTER ONE: INTRODUCTION .....	1
Need for Study .....	1
Study Objectives .....	5
Definitions .....	6
Research Hypotheses .....	7
CHAPTER TWO: LITERATURE REVIEW .....	10
The American College of Apothecaries Cost of Dispensing Formula .....	11
The Canada Cost of Dispensing Formula .....	11
The California Cost of Dispensing Formula .....	12
The Kansas Allocation Formula .....	12
The Wisconsin Cost of Dispensing Formula .....	14
Michigan Cost of Dispensing Formula .....	17
The National Pharmacy Insurance Council (NPIC) Study .....	19
The Ontario Dispensary Fee Review .....	24
The Texas Cost of Dispensing Study .....	25
CHAPTER THREE: METHODOLOGY .....	29
Data Collection Instrument .....	29
Sample Selection .....	30
Statistical Methods Utilized .....	32
Major Limitations of the Study .....	33

CHAPTER FOUR: FINDINGS .....	35
Test of Hypotheses .....	35
HYPOTHESIS I - Measure of Precision .....	35
HYPOTHESIS II - Stability of COD(WIS) .....	37
HYPOTHESIS III - Adequacy of Present WMAP Dispensing Fee .....	39
HYPOTHESIS IV - Significance of the Percentage of Prescription Sales Paid by Third Party Programs .....	44
HYPOTHESIS V - Significance of the Number of Prescriptions Dispensed Per Day .....	48
HYPOTHESIS VI - Significance of the Popula- tion of the Area in which Pharmacies are Located .....	52
HYPOTHESIS VII - Significance of the Mean Prescription Price .....	55
HYPOTHESIS VIII - Significance of the Ratio of Prescription Sales to Total Pharmacy Sales .....	57
Other Findings .....	59
Total Net Sales of Pharmacies .....	60
Total Pharmacy Prescription Sales .....	62
Title XIX Prescription Sales Volume .....	62
Prescription Sales for Nursing Home Patients .....	67
Continuing Education Expenses .....	68
Prescription Sales on Credit .....	70
Prescription Delivery .....	73
Full Service Pharmacies .....	75

Professional Employment Expense .....	77
Most Likely COD(WIS) .....	79
Dispensing Fee Projected to 1975 .....	82
CHAPTER FIVE: SUMMARY AND CONCLUSIONS .....	84
BIBLIOGRAPHY .....	90
APPENDICES .....	96
APPENDIX A: COVER LETTER AND QUESTIONNAIRE USED IN THE STUDY TO DEVELOP THE COD(WIS) FORMULA .....	97
APPENDIX B: PRETEST COVER LETTER AND QUESTIONNAIRE ...	101
APPENDIX C: COVER LETTER AND MAIL QUESTIONNAIRE .....	105
APPENDIX D: PROJECTED SAMPLE SIZE REQUIRED .....	107
APPENDIX E: COPY OF THE PUBLISHED APPEAL TO PROSPECTIVE RESPONDENTS .....	110
APPENDIX F: ONE-WAY ANALYSIS OF VARIANCE .....	112

## LIST OF TABLES

Table

1	MEAN NUMBER OF PRESCRIPTIONS DISPENSED PER DAY .....	50
2	UNWEIGHTED MEAN COD(WIS) FOR CATEGORIES OF COMMUNITY POPULATION .....	54
3	UNWEIGHTED MEAN COD(WIS) FOR CATEGORIES OF PRESCRIPTION PRICE .....	56
4	UNWEIGHTED MEAN COD(WIS) FOR CATEGORIES OF (RXS/TS) .....	58
5	MEAN TOTAL NET PHARMACY SALES .....	61
6	PHARMACY PRESCRIPTION SALES .....	63
7	TITLE XIX PRESCRIPTION SALES AS A PERCENT OF TOTAL PRESCRIPTION SALES .....	65
8	TITLE XIX REIMBURSEMENT AS A PERCENT OF TOTAL PRESCRIPTION SALES .....	66
9	PRESCRIPTION SALES TO NURSING HOMES AS A PERCENT OF TOTAL PRESCRIPTION SALES .....	66
10	PHARMACY CONTINUING EDUCATION EXPENSE .....	69
11	PERCENT OF PRESCRIPTION SALES ON PERSONAL CHARGE ACCOUNTS .....	69
12	PERCENT OF PRESCRIPTION SALES ACCOUNTED FOR BY CREDIT CARDS .....	72
13	FULL SERVICE PHARMACIES COMPARED WITH ALL OTHER SAMPLE PHARMACIES .....	76
14	MOST LIKELY COD(WIS) - APPROXIMATE MIDDLE 90 AND 80 PERCENT OF SAMPLE PHARMACIES .....	80

CHAPTER ONE  
INTRODUCTION

A mail survey of a sample of community pharmacies was conducted to estimate the mean cost of dispensing a prescription in Wisconsin and to learn how dispensing costs relate to various service and operational characteristics of these pharmacies.

Need for Study

The need for evaluating the cost of dispensing seems apparent when one compares the stability of the dispensing fee under the Title XIX program of the Social Security Amendments Act of 1965 with increases in the consumer price index over the past decade, as well as reports of pharmacists' increased operating expenses. Coverage under Title XIX, which is referred to as the Wisconsin Medical Assistance Program (WMAP), began on July 1, 1966. A \$2.00 dispensing fee was adopted at that time and has remained constant to date except for a qualified modification in 1971.

As of May 1, 1971, a "special service" pharmacy

classification was added to the WMAP.<sup>1</sup> The management of a pharmacy must provide 24-hour emergency service, emergency prescription delivery service at no additional cost to patrons, a patient drug profile service for all Medicaid recipients, and all pharmacists practicing full-time in the pharmacy must attend and participate in at least four hours of approved continuing education programs each year if the pharmacy is to attain the "special service" classification. Such pharmacies qualify for a \$2.20 dispensing fee. The 20 cent differential in the dispensing fee for these pharmacies appeared to be recognition by the WMAP administrators of the additional cost of providing these services. However, the WMAP has not granted an overall increase in the dispensing fee since the program was initiated.

Increases in dispensing fees have been reported for other programs.<sup>2</sup> A recent report from the American

- 
1. Kenneth W. Kirk, "A Review of Procedures for Pharmacists Who Participate in Wisconsin's Medicaid Program," The Wisconsin Pharmacist (42:10) October 1973, p. 358.
  2. Examples include:
    - (1) A 15 percent increase since 1969 paid by Blue Shield of Michigan as reported in, "How Inflation Can Strip You and what to Do About It," Drug Topics (118:20) October 21, 1974, p. 25.
    - (2) A 7.5 percent increase since 1967 paid by the Title XIX program in Michigan as reported in, "Medicaid Dispensing Fee Raised," Drug Topics (118:18) September 16, 1974, p. 8.
    - (3) A 10 percent increase paid by the Title XIX program in Connecticut as reported in, "Cost Survey Wins Boost in Rx Fees," Drug Topics (118:22) November 18, 1974, p. 10.

Pharmaceutical Association showed Medicaid dispensing fees increased in the five year period, 1969-1973, in only 14 of 26 states listed.<sup>3</sup> The percentage increases for these 14 states ranged from 2.8 to 26.7 percent with a mean increase of 11.1 percent. Generally, even these increased fees for pharmaceutical services have not kept pace with increased costs for other items. For example, from 1969 through 1973 there was a 21.2 percent increase in the consumers' price index for all items.<sup>4</sup>

The last substantive study of the cost of dispensing in Wisconsin was based on data reflecting pharmacy operating costs in 1968.<sup>5</sup> This study is necessary therefore, to evaluate what has happened to the cost of dispensing in Wisconsin since 1968.

Another indication of the need for more current cost of dispensing data is the yearly increase in the percent of prescriptions that are paid for by third parties. This

- 
3. "Immediate Upward Adjustment of Rx Dispensing Fees Paid by the States," Weekly Pharmacy Reports (24:7) February 17, 1975 (p. 3).
  4. The consumers' price index for "All Items" was 109.8 and 133.1 for 1969 and 1973, respectively (based on 1967 prices = 100). U.S. Bureau of the Census, Statistical Abstract of the United States: 1974 (95th Edition), Washington, D.C., 1974, p. 411.
  5. Kenneth William Look, "An Analysis of the Cost of Dispensing Prescriptions in a Sample of Community Pharmacies," unpublished doctoral dissertation, University of Wisconsin, Madison, Wisconsin, 1974.

percentage has increased nationally from 11.9 percent in 1969 to 21.4 percent in 1973 as determined by surveys done for the American Druggist.<sup>6</sup>

The dispensing fees paid by third party programs often are based on precedent rather than on pharmacy accounting or other objective data. The lack of statistical data on the cost of dispensing is a possible reason for dispensing fees being determined in this manner. The percent of prescriptions paid for by third parties is likely to increase rapidly with the passage of a National Health Insurance Program (NHI). Some political observers think enactment of a NHI program is likely in 1975.<sup>7</sup>

The effect NHI would have on the need for cost of dispensing studies was expressed by Robert C. Johnson, President of the American Pharmaceutical Association:

Every community pharmacist in this nation needs to place top priority on conducting a thorough cost analysis of the prescription department. Under a National Health Insurance Program wherein all prescriptions which you dispense are paid for by the federal government there will be no opportunity to balance out-front sales or profits to compensate for prescription loss leaders and vice versa. Nor will there be any private sector prescription income to compensate for the losses that are presently incurred. You must, at once,

---

6. "Third-Party Prescription Ratio Increases to Record 21.4%," American Druggist (169:8) April 15, 1974, p. 14.  
7. "View in Washington: Demo Landslide in 1974 Means Enactment of National Health Insurance," Weekly Pharmacy Reports (23:45) November 11, 1974 (p. 2).

conduct sound economic review, based on acceptable cost-accounting principles to determine the adequacy of your existing fee and make whatever adjustments are necessary to insure your future economic survival under a nationalized health system.<sup>8</sup>

Studies which measure the cost of dispensing are necessary to provide data which could aid meaningful dialogue among pharmacy representatives and those of various third party payment programs. Further:

An individual pharmacist cannot speak effectively on his own behalf. Legal strictures, of course, do limit the extent to which an association can engage in such activity. But there are recorded instances in which an association, by providing reliable statistics and other persuasive arguments, has been instrumental in winning a better deal for pharmacists.<sup>9</sup>

### Study Objectives

This study has four main objectives:

(1) Determine the mean cost of dispensing a prescription for a sample of community pharmacies in Wisconsin and test the relationships between various individual service and operational characteristics and the cost of dispensing for these same pharmacies.

(2) Based on the cost of dispensing, determine a

- 
8. Robert C. Johnson, "Era of Accountability," Address presented to the National Association of Retail Druggists, October 1, 1974, Las Vegas, Nevada, p. 6.
9. Stanley Siegelman, "The State of Pharmacy Today," American Druggist (170:7) October 1, 1974, p. 17.

potentially adequate dispensing fee which would allow for business risk and growth.

(3) Provide financial and cost of dispensing data that would be useful in consultations between representatives of prescription insurance programs and individual pharmacists or pharmaceutical organizations such as the Wisconsin Pharmaceutical Association.

(4) Establish a format and collect data that can serve as a "benchmark" for future cost of dispensing studies that may be done in Wisconsin on a periodic basis for the purpose of trend analysis.

#### Definitions

The following abbreviations will be used throughout this paper:

COD = the cost of dispensing per prescription

PS = proprietor's or manager's salary

PS(% TIME) = PS times the percentage of time spent in prescription department duties

RPh = the total salaries of other professional (pharmacist and pharmacy intern) employees in a pharmacy

RPh(% TIME) = the sum of RPhs' salaries times the percentage of time spent in prescription department duties

nonRPh = the total salaries or wages of nonprofessional employees of a pharmacy

RXS/TS = the ratio of prescription sales to total sales

Rxs = the total number of prescriptions dispensed in a pharmacy in a 12 month period

$\overline{RX}$  = the mean (average) charge to consumers for a prescription

nonlabor = total operating expenses of a pharmacy less all salary and wage expense

COD(WIS) - the cost of dispensing per prescription as determined by taking the sum of PS(% TIME) plus RPh(% TIME) plus nonRPh(RXS/TS) plus nonlabor(RXS/TS) and dividing this sum by the total number of prescriptions dispensed in a 12 month period

DF(WIS-P) = the dispensing fee per prescription determined by the sum of COD(WIS) plus an allowance for business risk and growth equal to 10.5 percent times the sum of COD(WIS) plus the approximate average acquisition cost per prescription

DF(WIS-F) = the dispensing fee per prescription determined by the sum of COD(WIS) plus a fixed allowance (30 cents) for business risk and growth

### Research Hypotheses

The following hypotheses are based on economic and demographic data as reported for a sample of community pharmacies in Wisconsin. The mail survey was conducted in the fall of 1974. The reported information was from each sample pharmacy operation's last fiscal year.

#### HYPOTHESIS I - Measure of Precision

The number of usable responses received for a sample of 640 community pharmacies in Wisconsin will be sufficient to estimate the unweighted mean cost of dispensing per prescription within 10 cents of the true mean for all community pharmacies in the state at a 95 percent level of confidence.

#### HYPOTHESIS II - Stability of COD(WIS)

The unweighted mean cost of dispensing per prescription determined by this study will be equal to or less than the unweighted mean cost

of dispensing per prescription (\$1.77) determined by a similar study of data collected in 1969 at a 95 percent level of confidence.

#### HYPOTHESIS III - Adequacy of Present WMAP Dispensing Fee

The unweighted mean dispensing fee will be less than or equal to \$2.20 at a 95 percent level of confidence.

#### HYPOTHESIS IV - Significance of the Percentage of Prescription Sales Paid by Third Party Programs

The unweighted mean cost of dispensing per prescription for respondents reporting reimbursement for less than 15 percent of their total prescription sales from third party (public and private) payers will equal the unweighted mean cost of dispensing for respondents reporting reimbursement for 15 percent or more of their prescription sales from third party payers at a 95 percent level of confidence.

#### HYPOTHESIS V - Significance of the Number of Prescriptions Dispensed Per Day

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by the number of prescriptions dispensed daily at a 95 percent level of confidence.

#### HYPOTHESIS VI - Significance of the Population of the Area in Which Pharmacies are Located

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by population of the community in which the pharmacies are located at a 95 percent level of confidence.

#### HYPOTHESIS VII - Significance of the Mean Prescription Price

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by the mean reimbursement received per prescription at a 95 percent level of confidence.

HYPOTHESIS VIII - Significance of the Ratio of  
Prescription Sales to Total Pharmacy Sales

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by the ratio of prescription sales to total pharmacy sales at a 95 percent level of confidence.

CHAPTER TWO  
LITERATURE REVIEW

Most COD computations can be expressed in terms of four categories of prescription department expenses: (1) proprietor(s) or manager's salaries (PS), (2) salaried professionals' (pharmacist and intern) salaries (RPh), (3) non-professional employees' salaries or wages (nonRPh), and (4) nonlabor expenses (nonlabor). The formulas presented in this review are expressed as they appear in the literature or as they would appear if separated into these four expense categories. Some of the formulas and studies will be reviewed with a limited amount of detail. These formulas and studies will be denoted with an asterisk (\*) and the reader is referred to the work done by Look for a more detailed review and evaluation.<sup>1</sup>

- 
1. Kenneth William Look, "An Analysis of the Cost of Dispensing Prescriptions in a Sample of Community Pharmacies," unpublished doctoral dissertation, University of Wisconsin, Madison, Wisconsin, 1974, pp. 33-58.

The American College of Apothecaries Cost  
of Dispensing Formula\*

This COD formula was first described by Abrams as:<sup>2</sup>

$$\text{COD(ACA)} = \frac{\text{PS} + (\text{Total operating expenses} - \text{PS})(\text{RXS/TS})}{\text{Rxs}}$$

Since total operating expenses can be expressed as the sum of PS + RPh + nonRPh + nonlabor, an equivalent form of the formula is:

$$\text{COD(ACA)} = \frac{\text{PS}}{\text{Rxs}} + \frac{\text{RPh}(\text{RXS/TS})}{\text{Rxs}} + \frac{\text{nonRPh}(\text{RXS/TS})}{\text{Rxs}} + \frac{\text{nonlabor}(\text{RXS/TS})}{\text{Rxs}}$$

The Canada Cost of Dispensing Formula\*

The Canada cost of dispensing formula is the result of a modification of the COD(ACA) by Fuller.<sup>3</sup> The formula can be written as:

$$\text{COD(CANADA)} = \frac{(\text{Total operating expenses} - \text{PS})(\text{RXS/TS})}{\text{Rxs}} +$$

\$0.50

- 
2. Robert E. Abrams, "The Professional Fee Concept," Bulletin of the Ontario College of Pharmacy (11:3) May 1962, p. 47.
  3. H. J. Fuller, "What Does It Cost to Dispense a Prescription?," Bulletin of the Ontario College of Pharmacy (18:1) January 1969, p. 23.

The formula can be translated to:

$$\text{COD(CANADA)} = \$0.50 + \frac{\text{RPh(RXS/TS)}}{\text{Rxs}} + \frac{\text{nonRPh(RXS/TS)}}{\text{Rxs}} + \frac{\text{nonlabor(RXS/TS)}}{\text{Rxs}}$$

The constant value of 50 cents replaced any allocation of the proprietor's salary. Prices and wages increased since 1962 and Fuller has increased the direct proprietor labor charge to 60 cents<sup>4</sup> and more recently to 80 cents.<sup>5</sup>

The California Cost of Dispensing Formula\*

The California cost of dispensing formula can be represented as:<sup>6</sup>

$$\text{COD(CALIF)} = \frac{\text{PS(\% TIME)}}{\text{Rxs}} + \frac{\text{RPh(\% TIME)}}{\text{Rxs}} + \frac{\text{nonRPh(\% TIME)}}{\text{Rxs}} + \frac{\text{nonlabor(RXS/TS)}}{\text{Rxs}}$$

The Kansas Allocation Formula\*

The Kansas Department of Social Welfare began its annual cost of dispensing surveys in 1970. The findings

---

4. Ibid.

5. H. J. Fuller, "Canadian Community Pharmacy in 1972," The Canadian Pharmaceutical Journal (106:8) August 1973, p. XXVIII.

6. Max Polinsky, "The Professional Fee: Another Look," California Pharmacist (18:5) November 1970, p. 10.

from the 1970 survey were reported by Cotton and Rucker.<sup>7</sup>

The formula used in determining the cost of dispensing requires individual nonlabor expenses incurred by a pharmacy to be allocated to the prescription department by using various ratios or by direct 100 percent allocation. The allocation ratio used depends upon the classification of the individual nonlabor expense item. Cooperating pharmacists were required to report on 49 separate nonlabor expense items.<sup>8</sup>

The ratios used to allocate the nonlabor expense items are (1) the ratio of prescription department sales to total pharmacy sales, (2) the ratio of prescription department area to total area (square feet) of the pharmacy, and (3) the ratio of prescription department inventory to the total pharmacy inventory.<sup>9</sup>

The Kansas cost of dispensing formula, as interpreted by this author, is:

- 
7. Hugh A. Cotton and T. Donald Rucker, "Prescription Cost Determination in Kansas," Journal of the American Pharmaceutical Association (NS12:8) August 1972, pp. 412-415.
  8. For example, see "How to Figure Cost of Filling Rx," American Druggist (161:12) June 15, 1970, pp. 16-19.
  9. For a more detailed explanation of how these ratios are applied to individual pharmacy expense items, see Hugh A. Cotton, "Kansas Experience with the Variable Professional Fee for Title XIX Prescriptions," The Wisconsin Pharmacist (42:9) September 1973, p. 323.

$$\text{COD(KANSAS)} = \frac{\text{PS}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{RPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonRPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonlabor (KAN-ALLOC)}}{\text{Rxs}}$$

The Wisconsin Cost of Dispensing Formula

The Wisconsin cost of dispensing formula was developed by Look from data collected in 1969 by both mail and personal interview surveys of samples of community pharmacy owners or managers in Wisconsin.<sup>10</sup>

Questionnaires were mailed to a systematic sample of 284 community pharmacies on March 4, 1969. The questionnaire (Appendix A) requested operational and financial data for the respondent's pharmacy. Usable replies were received representing data for 75 pharmacies.

Personal interviews were conducted with a sample of 30 pharmacists who had responded to the mail survey. The personal interview respondents were selected to be representative of practitioners in Wisconsin on the bases of geographical location and city size. The personal interviews were undertaken to collect detailed operating cost information which cannot be collected efficiently by mail surveys. The information obtained from the personal interviews was used to determine the "best" estimate of the four

---

10. Look, op. cit., pp. 59-68.

prescription department cost elements per prescription.<sup>11</sup>

Various methods to estimate these same cost elements using mail-collected data then were tested statistically for validity and practicality. The only variable which failed to pass the validity test (a test to check if the mean value calculated from personal interview data equaled the mean calculated from mail-reported data at a 95 percent level of confidence) was nonRPh(% TIME). The mean value of the variable,  $\frac{\text{nonRPh}(\% \text{ TIME})}{\text{Rxs}}$ , when calculated from mail-collected data  $\sqrt{\bar{x}=\$0.04, n=25}$  was significantly less than the mean value calculated from personal interview data  $\sqrt{\bar{x}=\$0.10, n=25}$ .

Respondents reported a smaller percent of time spent in prescription department services by nonprofessional employees in the mail portion of the survey than was reported by the same respondents in the personal interview survey. During the personal interviews, respondents indicated they did not think it "professionally correct" to

- 
11. Look considered the "best" estimates based on the interviews to be as follows:
- (1) Proprietor's or manager's salary times the percent of time spent in prescription department duties per dispensed prescription.
  - (2) The sum of all pharmacists' and interns' salaries times the percent of time spent in prescription department duties per dispensed prescription.
  - (3) The sum of all nonpharmacists' wages and salaries allocated to prescription department services per dispensed prescription.
  - (4) The sum of nonlabor expense items allocated to the prescription department by pharmacist respondents.

admit nonpharmacists spent time performing prescription department duties.<sup>12</sup> Also, pharmacists may not associate many of the prescription department housekeeping and record-keeping functions with prescription department duties. For this reason, a pharmacy owner or manager may under-estimate the percent of time spent by pharmacists, as well as non-pharmacists, in prescription department duties.

The mail-collected cost of dispensing variables then were tested against the "best" estimates (personal interview estimates of the cost of dispensing variables). The mail-collected cost of dispensing variables which were "closest" (on the basis of lowest T scores) to equaling the "best" estimators were (1) PS(% TIME), (2) RPh(% TIME), (3) nonRPh(RXS/TS), and (4) nonlabor(RXS/TS). These variables form the Wisconsin cost of dispensing formula which is:

$$\text{COD(WIS)} = \frac{\text{PS}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{RPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonRPh}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{nonlabor}(\text{RXS}/\text{TS})}{\text{Rxs}}$$

Unweighted mean costs of dispensing calculated from data submitted by mail for the 30 pharmacies included in both the mail and personal interview surveys using the following formulas were: ACA/ $\bar{x}=\$1.80$ , CALIF/ $\bar{x}=\$1.55$ ,

---

12. Look, op. cit., p. 289.

CANADA/ $\bar{x}$ =\$1.517, ALLOC/ $\bar{x}$ =\$1.517,<sup>13</sup> and WIS/ $\bar{x}$ =\$1.767. The "best" estimate of the unweighted mean cost of dispensing for this same sample was \$1.72. Thus, COD(WIS) produced the closest approximation of the "best" estimated unweighted mean cost of dispensing.

Michigan Cost of Dispensing Formulas\*

An indepth study of 20 pharmacies in Michigan was undertaken in 1970.<sup>14</sup> Three cost of dispensing formulas were used. Expressed in the terminology used in this paper, these formulas are:

$$\text{COD(MICH \#1)} = \frac{\text{PS(PE/TE)}}{\text{Rxs}} + \frac{\text{RPh(PE/TE)}}{\text{Rxs}} + \frac{\text{nonRPh(PE/TE)}}{\text{Rxs}} + \frac{\text{nonlabor(MICH \#1-ALLOC)}}{\text{Rxs}}$$

where (PE/TE) equals professional employment costs divided by total employment costs, and nonlabor expenses are

- 
13. COD(ALLOC) is similar to COD(KANSAS) except the ratio of prescription department inventory to total pharmacy inventory is not used in COD(ALLOC) to allocate any of the nonlabor expense items to the prescription department operating costs. COD(ALLOC) makes use of just the sales and area ratios to allocate nonlabor expenses.
14. Sylvester E. Berki, James W. Richards, and H. Ashley Weeks, "Prescription Dispensing in Twenty Pharmacies: Characteristics, Utilizers, Services, and Costs," unpublished paper presented at the American Pharmaceutical Association meeting, San Francisco, Calif., April 1971.

allocated by (1) (PE/TE) times variable joint nonlabor costs, plus (2) the ratio of prescription department floor area to total pharmacy area (RXA/TA) times fixed joint nonlabor costs, plus (3) the value of the prescription department inventory times 0.08.

$$\text{COD(MICH \#2)} = \frac{\overline{\text{PS}}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{RPh}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{nonRPh}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{nonlabor(MICH \#2-ALLOC)}}{\text{Rxs}}$$

In this formula,  $\overline{\text{PS}}$  = the mean proprietor(s) or manager salary found in the survey. The nonlabor expenses are allocated by (1) (RXS/TS) times variable joint nonlabor costs plus (2) (RXA/TA) times fixed joint nonlabor costs.

$$\text{COD(MICH \#3)} = \frac{\overline{\text{PS}}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{RPh}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{nonRPh}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{nonlabor(MICH \#3-ALLOC)}}{\text{Rxs}}$$

This formula allocates nonlabor expenses by (1) (RXS/TS) times variable joint nonlabor costs, plus (2) (RXA/TA) times fixed joint nonlabor costs, plus (3) the value of the prescription department inventory times 0.08.

The Michigan study reported the apparent inability of pharmacy owners or managers to estimate accurately the total pharmacy area. The percentage estimate errors ranged from a 30 percent underestimate to overestimates of 20

percent.<sup>15</sup> Formulas which use the ratio (RXA/TA) will incorporate these errors in the COD calculation.

The National Pharmacy Insurance  
Council (NPIC) Study

The NPIC's Uniform Accounting Manual for Pharmacies is the result of a study funded by the Social Security Administration, Department of Health, Education, and Welfare.<sup>16</sup> One reason pharmacists have been unable to convince third party payers to re-evaluate the adequacy of dispensing fees has been the lack of cost data to substantiate change in the cost of dispensing.

Provider agencies (drug benefit programs) must have a rational and realistic basis for reimbursing pharmacies. The usefulness of industry operational and financial statistics for comparison by the individual pharmacy manager is also recognized. For these reasons, this uniform accounting and reporting system for pharmacies has been written.<sup>17</sup>

The manual outlines and defines an account coding scheme. NPIC recommends all pharmacists adopt this scheme in order to provide uniformity among individual pharmacy

---

15. Ibid., p. 26.

16. Uniform Accounting Manual for Pharmacies, National Pharmacy Insurance Council, Washington, D.C., 1975, p. 1.

17. Ibid., p. 2.

accounting data. The coding scheme is outlined below:<sup>18</sup>

	<u>XXX</u>	-	<u>XXX</u>	-	<u>XX</u>	-	<u>XX</u>
Chain Pharmacy unit code	XXX						
Department code			XXX				
Major account code					XX		
Minor account code							XX

The pharmacy unit number is used to identify individual units for pharmacy operations with multiple outlets. The department code identifies an operating department or cost center. The major account code identifies a transaction as an asset, liability, equity, revenue, or expense. Minor account codes identify specific accounts within a major account group. The numbering scheme for and definition of the major account codes are specified in the manual. The numbering of the minor accounts is left to the discretion of the individual pharmacist.

It would appear difficult, however, to convince pharmacy practitioners to adopt the system as specified in the NPIC manual. It seems more logical to develop a method of collecting cost data which is applicable to a variety of acceptable accounting methods, such as the COD(WIS) formula, than to attempt to convince practitioners to adopt a new and rigid accounting system.

The following methods of allocating expenses to the prescription department are specified in NPIC's manual:

---

18. Ibid., p. 14.

<u>Expense</u>	<u>Method of Allocation</u>
(1) Employment costs	(1) Percent of time in Rx department duties
(2) Operating supplies	(2) Directly to Rx department or to "general and administrative expense" (See item 14)
(3) Communication	(3) Directly to Rx dept. if separate phone line or to "general and administrative expense"
(4) Travel, entertainment, and professional development	(4) Directly to Rx dept. or to other functional area or to "general and administrative"
(5) Advertising	(5) Directly to benefiting operating dept. or on basis of departmental sales
(6) Bad debts and collection expense	(6) Charged to "general and administrative"
(7) Professional services	(7) Directly to dept. incurring the expense or to "general and administrative"
(8) Licenses, dues, subscriptions, and donations	(8) Directly to Rx dept. or to "general and administrative"
(9) General insurance	(9) Charged to "occupancy cost center" (See item 13) if building insurance. Other insurance is charged to "general and administrative" except inventory insurance which is charged to specific operating depts. based on departmental inventory value
(10) Taxes	(10) Land and building taxes charged to "occupancy cost center." Personal property taxes to operating departments on the basis of asset values in each dept.

- |                                   |   |
|-----------------------------------|---|
| (11) Depreciation                 | (11) Distributed to operating departments on basis of property location   |
| (12) Miscellaneous expenses       | (12) Distributed to operating depts. based on nature of expense or to "general and administrative"  |
| (13) "Occupancy cost center"      | (13) Allocated on the basis of dept. square footage to total area of pharmacy   |
| (14) "General and administrative" | (14) Allocated on the basis of: (a) ratio of departmental sales, (b) percentage of administrative employee time identified with operating department or cost center activities, or (c) any other method that meets the individual pharmacist's satisfaction |

The NPIC method of determining dispensing costs can be represented as follows:

$$\text{COD(NPIC)} = \frac{\text{PS}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{RPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonRPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonlabor(NPIC-ALLOC)}}{\text{Rxs}}$$

Nonlabor expenses (items 3-12 described previously in the expense list) are allocated either directly to the prescription or other benefiting department, to the "occupancy cost center," or to "general and administrative" expenses. The allocation of nonlabor expenses frequently is left to the discretion of the individual pharmacist. This reduces the value of the cost of dispensing data to be collected for

comparison among different pharmacy operations. Since the allocation methods are not standardized, one may expect considerable variation in results. An example of the lack of standardization is the three possible means of allocating "general and administrative" expenses.

The NPIC method allocates nonpharmacist employment expenses by the estimated percent of time spent in prescription department duties. Look's study found the percent time estimates for nonpharmacist employment costs collected by mail significantly understate the actual employment costs of nonpharmacists in prescription department duties.<sup>19</sup> Also, Look showed that complex allocation methods, when applied to mail-collected nonlabor expenses, are unnecessary. Allocation of nonlabor expenses to the prescription department was accomplished satisfactorily by using the ratio  $RXS/TS$ .<sup>20</sup>

It seems the NPIC-recommended procedures violate the principle of simplicity for two major reasons. First, the NPIC method requires all pharmacists adopt a new, complicated, and rigidly specified accounting scheme. It is unlikely the recommended accounting scheme would be widely or readily accepted by practicing pharmacists. Second, the NPIC method specifies a complex nonlabor expense allocation procedure when at least one study has shown nonlabor

---

19. Look, op. cit., p. 79.

20. Ibid., p. 81.

expenses can be allocated accurately to the prescription department by using the ratio RXS/TS. Further, one may expect considerable variation in results from the different permissible means of allocating nonlabor expenses.

The Ontario Dispensary Fee Review

The Ontario Pharmacist's Association contracted with an accounting firm to do an indepth cost accounting study of seven pharmacies that represented a cross-section of pharmacy operations in Ontario. Financial data from these pharmacies were obtained by submission of a questionnaire and copies of financial statements, or by on-site inspection of financial records. The formula used to calculate the cost of dispensing, expressed in the terminology used in this paper was:

$$\text{COD(ONTARIO)} = \frac{\text{PS}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{RPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonRPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonlabor(ONT-ALLOC)}}{\text{Rxs}}$$

In this formula, nonlabor expenses are allocated by (1) allocation of nonlabor expenses which "could be identified directly to the dispensary," plus (2) the ratio (RXS/TS) times nonlabor expenses not directly identified with the prescription department, plus (3) the estimate of each pharmacy's credit sales (using a collection rate of 1.5 months) times 0.095, plus (4) the value of the average

prescription department inventory times 0.095.<sup>21</sup>

The financial information collected reflected either 1972 or 1973 costs. These costs were adjusted to reflect more accurately the costs in 1974. Pharmacists' salaries were adjusted to equal \$15,600 a year. The nonlabor costs, except interest, were adjusted by the factor 0.08 to reflect inflationary trends.

The unweighted mean cost of dispensing before any adjustments was \$2.22. The cost of dispensing increased to \$2.53 after adjustments were made for increased pharmacist employment costs and overall increased costs due to inflation through 1973.

An allowance for business risk and growth was calculated by taking 10.5 percent times the average prescription price (\$4.32) in Ontario in 1972. This 45 cent allowance was added to the adjusted cost of dispensing to arrive at a recommended dispensing fee of \$2.98.

#### The Texas Cost of Dispensing Study

In June 1974, the Texas Pharmaceutical Association contracted with the Bureau of Business Research at the University of Texas at Austin to do a cost of dispensing

---

21. Eddis and Associates, "Dispensary Fee Review: February 1974," unpublished report submitted to the Pharmaceutical Services Committee, Ontario Pharmacists' Association, 99 Avenue Road, Toronto, Ontario, February 1974, Appendix II.

study in Texas. The study was completed in November, 1974.<sup>22</sup>

At the time of the study, there were 3,384 pharmacies licensed in Texas, including ten pharmacies in nursing homes. Questionnaires were mailed to ten nursing home pharmacies plus a random sample of 357 of the remaining pharmacies. Usable responses were received for 75 independent pharmacies and four chain pharmacies ("operations generally with more than four units under centralized management"). No responses were received for nursing home or hospital pharmacy operations, and the survey report was limited to information received from the owners or managers of independent pharmacies.

Respondents were asked to provide general information about their pharmacy in addition to financial data classified into five categories: Annual (1) personnel costs, (2) direct pharmacy overhead expenses, (3) indirect housing and equipment expenses, (4) indirect financial and inventory expenses, and (5) indirect business expenses.

The formula used to calculate the COD was:

$$\text{COD(TEXAS)} = \frac{\text{PS(\% TIME)}}{\text{Rxs}} + \frac{\text{RPh(\% TIME)}}{\text{Rxs}} + \frac{\text{nonRPh(\% TIME)}}{\text{Rxs}} + \frac{\text{nonlabor(TEX-ALLOC)}}{\text{Rxs}}$$

---

22. Bryan Adair, "Prescription-Filling Costs of Community Pharmacies in Texas," unpublished report by the Bureau of Business Research, The University of Texas at Austin, November 1974.

This formula allocates nonlabor expenses by (1) 100 percent allocation of direct pharmacy overhead expenses, (2) the ratio (RXA/TA) times indirect housing and equipment expenses, (3) the ratio (RXS/TS) times indirect financial, inventory, and indirect business expenses.

The use of COD (TEXAS) requires respondents to breakdown expenses into 52 individual cost classifications. The author of the Texas report noted, as study limitations, respondent comments which were critical of these expansive classifications, and the low response rate to the study. Look's work showed a high degree of detail in reporting nonlabor expenses is unnecessary.<sup>23</sup> These nonlabor expenses can be allocated as a group using the ratio (RXS/TS) and the results are not significantly different from those obtained using a more complicated and difficult allocation method.

Analysis of data from the 75 community pharmacies indicated the mean COD was \$1.94 in 1973 (the study was done in 1974 but the reported data were from respondents' last accounting period). This was a 32.9 percent increase in the COD since 1965.<sup>24</sup>

Differences between the costs of dispensing were not statistically significant when pharmacies were classified by

---

23. Look, op. cit., p. 125.

24. Charles Alborn Walker, "The Cost of Filling a Prescription in Texas," unpublished master's thesis, University of Texas, Austin, Texas, 1968.

the population of the metropolitan areas in which the pharmacies were located. Those offering customer charge accounts had a statistically significant higher mean COD ( $\bar{x}=\$1.96$ ) than did those not offering this service ( $\bar{x}=\$1.66$ ). Total personnel costs accounted for 66 percent of the cost of dispensing a prescription.

Pharmacists who classified their independent operation as a "professional shop" had a mean ratio (RXS/TS) of 82 percent and a mean COD of \$2.27. The "general retail" classification had a mean (RXS/TS) ratio of 57 percent and a mean COD of \$1.86.

## CHAPTER THREE

### METHODOLOGY

This chapter describes the questionnaire development, sample selection, statistical analyses, and major limitations associated with this cost of dispensing study.

#### Data Collection Instrument

The author utilized the COD(WIS) formula for the following major reasons:

- (1) The formula had been tested and shown to produce statistically valid results when applied to pharmacy operational data collected by mail survey.<sup>1</sup>
- (2) The simplified reporting of operating expense data reduces the likelihood of computation, transposition, and classification errors for these various expense items.
- (3) The necessary data could be collected with a relatively short and uncomplicated questionnaire which would tend to increase the low response rate normally associated with this type of survey.

---

1. For a detailed explanation of the statistical validation of the COD(WIS) formula, see Kenneth William Look, "An Analysis of the Cost of Dispensing Prescriptions in A Sample of Community Pharmacies," unpublished doctoral dissertation, University of Wisconsin, Madison, Wisconsin, 1974, pp. 76-82.

(4) The results of this survey could be compared directly with the results of Look's survey of 1968 data which used the same formula.

The mail survey of community pharmacists was endorsed by the Wisconsin Pharmaceutical Association (WPhA) in June, 1974. The wording of questions was pretested by distribution of the proposed questionnaire (Appendix B) to pharmacists attending three local pharmaceutical association meetings.

The final data collection instrument consisted of four pages printed on one folded sheet of paper. The author wrote, "Your help will be greatly appreciated," on the bottom of each cover letter page (Appendix C). The return envelope included in each mailing was the Wisconsin Pharmaceutical Association's standard postage paid business reply envelope which was imprinted with ATTN. DR. HAMMEL in the lower left hand corner. The outside envelope was addressed to the pharmacy and bore a noncommemorative 10 cent stamp.

#### Sample Selection

A list of address labels for the 1,064 pharmacies registered with the Wisconsin Pharmacy Examining Board was obtained on October 1, 1974. The Board also provided a list of 148 hospital or nursing home pharmacies. These 148 pharmacy names were removed from the master list, leaving 916

independent and chain community pharmacies as the universe for this study. Using a table of random numbers, a single digit (0-9) was assigned to each of the 916 pharmacies. The numbers zero through nine were placed on identical pieces of paper and drawn randomly. Each time a number was drawn, the pharmacies which had that assigned number were included in the sample. The process was repeated until the number of pharmacies included in the sample was approximately equal to the required sample size according to the author's projection plus an overage or safety factor of about 10 percent (Appendix D). This required drawing seven numbers which resulted in 640 pharmacies being included in the sample.

In an attempt to increase the response rate, a letter was sent to the Executive Director of the Wisconsin Pharmaceutical Association requesting pharmacists be notified of the cost of dispensing study and urging questionnaire recipients to participate. The letter and a memo from the Executive Director were published in the October, 1974 issue of The Wisconsin Pharmacist (Appendix E).

The 640 questionnaires were mailed on October 14, 1974. The author asked respondents to return the questionnaires before October 21, 1974. Replies were received from 102 respondents on or before October 21, 1974. Responses were accepted through December 15, 1974. There were 192 (30%) replies for independent and chain pharmacies by this cutoff date. Only 112 or 58.3 percent of the 192 returns were

complete, usable replies. The 112 usable replies represented 17.5 percent of the total sample. However, there were 25 or 28.7 percent more usable responses than the required sample size of 87.

### Statistical Methods Utilized

The Statjob CROSTAB 2 program was used to organize and tabulate the data.<sup>2</sup>

The F-ratio was used to determine if statistically significant differences existed among sample sub-groups. Please see Appendix F for an explanation of one-way analysis of variance and an example of how the F-ratio was applied. The NWAY 1 program in the Statjob series was used for one-way analysis of variance and calculation of F-ratios.<sup>3</sup>

Partial correlation coefficients were determined using the REGAN 2 program in the Statjob series.<sup>4</sup> The computing facilities of the Madison Academic Computing Center were used for computer analyses of these data.

- 
2. CROSTAB 2: Data Tabulation Reference Manual for the 1108, Academic Computing Center, Madison, Wisconsin, 1973.
  3. Preliminary NWAY 1: General Analysis of Variance Reference Manual for the 1108, Academic Computing Center, Madison, Wisconsin, 1970.
  4. REGAN 2: Multiple Linear Regression Analysis Reference Manual for the 1108, The University of Wisconsin Computing Center, Madison, Wisconsin, 1971.

### Major Limitations of the Study

The most evident limitation of this mail survey was the response rate. A total of 192 (30%) responses was received and 112 (17.5%) contained sufficient data to calculate a COD(WIS) and contained no apparent errors. However, demographic and financial data required for some of the analyses in this study were incomplete. This explains the variation in total sample size in some sections of this paper. Low response is a typical problem with most mail surveys and this is especially true of cost of dispensing surveys wherein respondents are asked to provide confidential financial data. Great care was taken to develop a questionnaire that would not require much time or interpretation. To encourage response, the questionnaire was anonymous. Therefore, it was difficult to measure the non-response bias that might exist. The possibility that non-respondents differ from respondents is a limitation of this study. Nevertheless, 25 more usable replies were received than were needed for rigorous statistical analysis.

Another limitation is the small number of pharmacies in a few subgroups that resulted from classification of sample pharmacies in some of the analyses. Unweighted mean COD(WIS) values for some of the subgroups containing a small number of pharmacies are not as meaningful as these same means would be if some of the subgroups' sample size were larger.

In part four of the questionnaire, respondents were asked to report total professional employment costs. It was apparent that respondents reported only salaries in this section and did not include other employment costs such as insurance and fringe benefits. This fact causes an unknown underestimation of the professional employment expense contribution to the cost of dispensing.

It also is possible that human or mechanical errors were made in coding, tabulating, punching, or processing reported data.

## CHAPTER FOUR

### FINDINGS

The findings of this study are based on economic and demographic data from their last fiscal year as reported for a sample of community pharmacies in Wisconsin in a survey conducted in the fall of 1974.

#### Test of Hypotheses

##### HYPOTHESIS I - Measure of Precision

The number of usable responses received for a sample of 640 community pharmacies in Wisconsin will be sufficient to estimate the unweighted mean cost of dispensing per prescription within 10 cents of the true mean for all community pharmacies in the state at a 95 percent level of confidence.

In other words, the number of usable replies for the sample of 640 pharmacies will be large enough and the standard deviation will be small enough to provide a 95 percent confidence interval about the unweighted mean COD(WIS) that is less than or equal to  $\pm 10$  cents. The 95 percent confidence interval can be interpreted to mean that if the study was repeated an infinite number of times and a

95 percent confidence interval was calculated each time, the true population mean value of COD(WIS) would be included in 95 out of every 100 confidence intervals. Since most sampling studies are done only once and one 95 percent confidence interval is constructed, the researcher has a 95 percent probability of successfully constructing a confidence interval which would include the true population mean.

The rationale for Hypothesis I was to measure the precision of the survey. A cost of dispensing survey is of little value if the results are not reproducible with a high degree of certainty. If the unweighted mean COD was \$2.00, but the 95 percent confidence interval was  $\$2.00 \pm \$1.00$ , the \$2.00 mean estimate would lack precision. These hypothetical results would not estimate the unweighted mean for the entire population with precision and would not increase substantially our present knowledge about what the unweighted mean COD actually was.

Applying the COD(WIS) formula to the data collected yielded the following results:

COD(WIS) Summary Data

<u>n</u>	<u>Mean (unweighted)</u>	<u>Median</u>	<u>Mode</u>	<u>Standard Deviation</u>	<u>Range</u>
112	\$2.10	\$2.07	\$1.79(n=4) \$2.08(n=4) \$2.23(n=4)	0.4830	\$0.97-\$3.66

The 95 percent confidence interval can be expressed as:

$$M \pm 1.96(s/\sqrt{n}) = \$2.10 \pm 1.96(0.4830/\sqrt{112}) = \$2.10 \pm \$0.089.$$

Therefore, the 95 percent confidence interval for the unweighted mean COD(WIS) was  $\$2.10 \pm 0.09$  and Hypothesis I was accepted. It can be hypothesized, with 95 percent confidence, that the true unweighted mean for the entire universe of community pharmacies in Wisconsin was within the range of  $\$2.01-\$2.19$ .

#### HYPOTHESIS II - Stability of COD(WIS)

The unweighted mean cost of dispensing per prescription determined by this study will be equal to or less than the unweighted mean cost of dispensing per prescription ( $\$1.77$ ) determined by a similar study of data collected in 1969 at a 95 percent level of confidence.

Acceptance of this hypothesis would indicate the cost of dispensing has remained stable or decreased over the years since Look's study based on 1968 data. For the cost of dispensing to remain stable or decrease, economies of scale in pharmacy operations would have to increase at a rate equal to or greater than the rate at which operational costs have increased. In other words, if the costs attributable to the prescription department for a 12 month period (the numerator in the four prescription department costs) have remained the same or increased at a rate equal to or slower than the increase in the total number of prescriptions dispensed in a 12 month period (the denominator in the four prescription department costs), one would expect the unweighted mean COD to remain the same or to

decrease.

To test Hypothesis II, it was assumed the unweighted mean COD(WIS) equaled \$1.77 and individual COD's were normally distributed about this mean. The critical value which would leave only 5 percent of the population values in the upper tail of the distribution was  $\$1.77 + 1.64$   $(.4830/\sqrt{112})$  or \$1.84. The observed unweighted mean COD (\$2.10) was greater than this critical value (\$1.84) and Hypothesis II was rejected. The probability of observing an unweighted mean COD of \$2.10, given that the unweighted mean is \$1.77, is zero for all practical purposes. Therefore, it can be said with almost 100 percent confidence that the unweighted mean COD(WIS) was not less than or equal to \$1.77.

When the unweighted mean COD(WIS) from Look's study was compared to this finding, the percentage increase in the unweighted mean COD(WIS) was 18.64 percent. There was approximately five years between the two studies. The average uncompounded yearly increase in the unweighted mean COD(WIS) was approximately 3.7 percent. The Texas study found a 32.88 percent increase in the cost of dispensing from 1965 through 1973.<sup>1</sup> Thus, the average uncompounded

---

1. Bryan Adair, "Prescription-Filling Costs of Community Pharmacies in Texas," unpublished report by the Bureau of Business Research, The University of Texas at Austin, November 1974, p. 16.

increase per year, as determined by the Texas survey was about 4.1 percent.

On the basis of these two studies, it appears the cost of dispensing has increased at a rate of approximately 4 percent yearly, about equal to the yearly increase in the cost of living index in this period. The average percentage change per year in consumer prices for all items from 1968 to 1973 was 4.62 percent.<sup>2</sup>

### HYPOTHESIS III - Adequacy of Present WMAP Dispensing Fee

The unweighted mean dispensing fee will be less than or equal to \$2.20 at a 95 percent level of confidence.

This hypothesis was tested to determine if the dispensing fee for "special service" pharmacies for prescriptions dispensed for WMAP (Title XIX) recipients in Wisconsin adequately covered the unweighted mean COD(WIS) plus an allowance for business risk and growth. One formula used to calculate the unweighted mean dispensing fee for pharmacies in 1973 is:

$$DF(WIS-P) = \frac{PS(\% \text{ TIME})}{Rxs} + \frac{RPh(\% \text{ TIME})}{Rxs} + \frac{\text{nonRPh}(RXS/TS)}{Rxs} + \frac{\text{nonlabor}(RXS/TS)}{Rxs} + [10.5\%] [COD(WIS) + (.48)(\bar{RX})]$$

---

2. U.S. Bureau of the Census, Statistical Abstract of the United States: 1974 (95th Edition), Washington, D.C., 1974, p. 405.

Expressed in words, the DF(WIS-P) is the COD(WIS) for respondent pharmacies in the sample, plus 10.5 percent times the sum of the prescription department operating costs  $[\overline{\text{COD(WIS)}}]$  plus the approximate acquisition cost of the prescriptions dispensed  $[(.48)(\overline{\text{RX}})]$ .

Look's survey of 1968 cost data demonstrated the general inability of pharmacists to provide prescription drug acquisition cost data. For this reason, the findings of a 1973 study by a marketing research firm were applied. That market study reported a total of 48 percent of the consumer's prescription dollar in 1973 went to either drug product manufacturers or wholesalers.<sup>3</sup> Thus, 0.48 times a pharmacy's mean prescription price should closely approximate the mean acquisition cost per prescription for that pharmacy.

The 10.5 percent figure was used for two main reasons: (1) the American Pharmaceutical Association is expected to promote an individualized dispensing fee based on the Kansas plan, in conjunction with the maximum allowable cost (MAC) proposal by the Department of Health, Education, and Welfare, that would provide a 10.5 percent return on prescription department operating costs and acquisition cost of drugs

---

3. "Drug Price Info for Doctors," American Druggist (169:12), June 15, 1974, p. 25. Also see "Pharmacy's Share of Prescription Dollar Continues to Rise," P.M.A. Bulletin (74:6), August 1974, p. 3.

dispensed,<sup>4</sup> and (2) 10.5 percent times the mean prescription price was used to calculate an allowance for business risk and growth in the Ontario Dispensary Fee Review Study.<sup>5</sup>

Applying the DF(WIS-P) formula to the collected data yielded the following results:

DF(WIS-P) Summary Data

<u>n</u>	<u>Mean (unweighted)</u>	<u>Median</u>	<u>Mode</u>	<u>Standard Deviation</u>	<u>Range</u>
112	\$2.55	\$2.51	\$2.71(n=4)	0.5562	\$1.27-\$4.33

As explained in the introductory chapter, pharmacists receive either a \$2.00 or a \$2.20 dispensing fee under the WMAP program, with a majority receiving the \$2.20 fee. In stating Hypothesis III, the author assumed an unweighted mean dispensing fee of less than or equal to \$2.20. To test this hypothesis, the dispensing fee value which would leave five percent of the normal distribution above \$2.20 in the upper tail of the distribution was calculated as follows:

$$\$2.20 + 1.64(0.5562/\sqrt{112}) = \$2.20 + \$0.09 = \$2.29$$

Since the observed unweighted mean DF(WIS-P) was \$2.55, which was much greater than \$2.29, Hypothesis III was

- 
4. "APhA Push for Individualized Fees," Weekly Pharmacy Reports (23:48), December 2, 1974 (p. 1).
  5. Eddis and Associates, "Dispensary Fee Review: February, 1974," unpublished report submitted to the Pharmaceutical Services Committee, Ontario Pharmacists' Association, 99 Avenue Road, Toronto, Ontario, February 1974, Appendix II.

rejected. In other words, it can be said the actual unweighted mean DF(WIS-P) was not less than or equal to \$2.20 in 1973 with a 95 percent level of confidence.<sup>6</sup>

When the DF(WIS-P) was calculated for individual pharmacies, only 27 (24.1%, n=112) had a DF(WIS-P) which was less than or equal to \$2.20. Therefore, 85 respondents or about three of every four were not covering their cost of dispensing plus earning an adequate allowance for business risk and growth as determined by DF(WIS-P) when reimbursed for the cost of ingredients and a \$2.20 dispensing fee per prescription by the Title XIX program in Wisconsin.

The other dispensing fee formula used in this study is:

$$\text{DF(WIS-F)} = \frac{\text{PS}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{RPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonRPh}(\text{RXS/TS})}{\text{Rxs}} + \frac{\text{nonlabor}(\text{RXS/TS})}{\text{Rxs}} + \$0.30$$

Expressed in words, DF(WIS-F) is the COD(WIS) for pharmacies in the sample plus a fixed allowance per prescription for business risk and growth equal to 30 cents. This fixed

---

6. Actually, Hypothesis III can be rejected with a confidence level much higher than 95 percent. The Z value of the observed unweighted mean DF(WIS-P), assuming the population mean is \$2.20, is  $\frac{2.55-2.20}{0.5562/\sqrt{112}} = 6.66$ . This large Z value means Hypothesis III would be rejected at a 99 percent confidence level. For a further interpretation of Z values, see William L. Hays and Robert L. Winkler, Statistics: Probability, Inference, and Decision, Holt, Rinehart and Winston, Inc.; New York, 1971, pp. 296-297.

allowance currently is being used in the Kansas Title XIX reimbursement program.<sup>7</sup>

Applying the DF(WIS-F) formula to the collected data yielded the following results:

DF(WIS-F) Summary Data

<u>n</u>	<u>Mean (unweighted)</u>	<u>Median</u>	<u>Mode</u>	<u>Standard Deviation</u>	<u>Range</u>
112	\$2.40	\$2.37	\$2.09(n=4) \$2.38(n=4) \$2.53(n=4)	0.4830	\$1.27-\$3.96

Hypothesis III was rejected when the DF(WIS-F) formula was used to calculate dispensing fees because the observed unweighted mean DF(WIS-F) was \$2.40. The observed unweighted mean DF(WIS-F) would have had to be less than or equal to  $\$2.27 \left[ \$2.20 + 1.64 (0.4830/\sqrt{112}) = \$2.27 \right]$  to accept Hypothesis III.

When the DF(WIS-F) was calculated for individual pharmacies, only 38 (33.9%, n=112) had a DF(WIS-F) which was less than or equal to \$2.20. Therefore, 74 sample pharmacies or about two of every three were not covering their cost of dispensing plus earning a 30 cent allowance for business risk and growth when reimbursed the \$2.20 WMAP dispensing fee.

What are some of the possible consequences of inadequate

---

7. "HEW Eyes Kansas Variable Fee As Answer to MAC-AAC Protests," American Druggist (171:5), March 1, 1975, p. 20.

reimbursement for pharmacists by third party payment programs? In order to maintain an economically viable pharmacy operation, a pharmacy owner or manager could increase the gross margin on prescriptions dispensed to the private paying sector in an attempt to offset losses incurred dispensing prescriptions for third parties. However, pharmacists are not free to set arbitrarily high dispensing fees for the private sector because of price competition in the prescription market.

The pharmacist could attempt to reduce costs as another alternative. To reduce costs, the services offered to patients would have to be reduced. In the words of Linwood F. Tice:

As a further complication, an unqualified fixed fee set by the third party payer tends to discourage quality professional service since it gives an economic edge to the low overhead operator who 'railroads' patients 'a la production line,' with no time spent in counseling, keeping patient records, or otherwise contributing to their health and welfare.<sup>8</sup>

HYPOTHESIS IV - Significance of the Percentage of Prescription Sales Paid by Third Party Programs

The unweighted mean cost of dispensing per prescription for respondents reporting reimbursement for less than 15 percent of their total prescription sales from third party (public and private) payers will equal

---

8. Linwood F. Tice, "The Fixed Professional Fee," American Journal of Pharmacy and the Sciences Supporting Public Health (143:3), May-June 1971, p. 75.

the unweighted mean cost of dispensing for respondents reporting reimbursement for 15 percent or more of their prescription sales from third party payers at a 95 percent level of confidence.

Practicing community pharmacists have noted it costs more to dispense prescriptions for third party payment programs due primarily to the additional administrative time required to prepare and file claim forms. These observations are documented in the literature.<sup>9-12</sup>

In an investigation to determine the amount of time community pharmacists devote to processing third party claims, Dickson and Rodowskas found that "each third-party prescription required about 2.12 minutes of pharmacist time that would not have been necessary if the prescription was paid for by the patient."<sup>13</sup>

This additional time required for prescriptions paid by third parties can be expressed in monetary terms. The

- 
9. "Stores Balk at Low Fees, Heavy Paper Work," Drug Topics (119:2), January 20, 1975, p. 10.
  10. Stanley Siegelman, "Medicaid is Exploiting You," American Druggist (170:1), July 1, 1974, p. 58.
  11. C. R. Jones, "What Pharmacists Think About Prepaid Rx Plans," Pharmacy Times (38:3), March 1972, pp. 30-33.
  12. "Third-Party Rx Paper Work Will Cost \$1.5 Billion," Drug Topics (119:1), January 6, 1975, p. 6.
  13. W. Michael Dickson and Christopher A. Rodowskas, Jr., "Third-Party Prescription Plans: An Exploratory Study of Community Pharmacist Time Allocation," Inquiry, in press.

average salary as reported in this survey for pharmacists in Wisconsin for 1973 was approximately \$16,000. Assuming a 40 hour week and 50 work weeks per year, a pharmacist's salary equals approximately 13.3 cents per minute. Adding to this the costs of social security, unemployment compensation tax, and fringe benefits, one may estimate an average total cost of approximately 16-20 cents per minute for a pharmacist's services. Using the lower estimate of 16 cents, the cost for additional pharmacist time spent on third party prescriptions would be approximately 34 cents per prescription.<sup>14</sup>

These increased administrative expenses should be reflected in the cost of dispensing and, when tested statistically, would result in rejection of Hypothesis IV. The percent of total prescription sales attributable to third party payment programs was used as the indicator for third party prescription volume. The 15 percent dividing point between low and high volume third party prescription pharmacies was based on the belief that this percentage figure would represent the median for pharmacies in Wisconsin. The percentage used to classify the pharmacies was the sum of the percentages reported in Part III - c(4) and c(5) of the questionnaire. (See Appendix C.)

---

14. One survey concluded the cost of processing a claim now is 50 cents. "Opposition Views on MAC Swamp HEW," Drug Topics (119:5), March 3, 1975, p. 5.

The data were tabulated as follows:

<u>Percent of Rxs Accounted for by 3rd Party</u>	<u>n</u>	<u>Unweighted Mean COD(WIS)</u>	<u>Standard Deviation</u>
Less than 15%	35	\$2.00	.4694
<u>15% or more</u>	<u>73</u>	<u>\$2.15</u>	<u>.4903</u>
Total	108	\$2.10	.4867

The F-ratio was calculated to test the significance of the difference between the unweighted mean COD(WIS) for the two subgroups. This ratio was  $F_{(1,106)} = 2.33$ . The critical F-ratio was  $F_{(.05;1,100)} = 3.94$ . Therefore, Hypothesis IV was accepted. The difference between the unweighted mean COD(WIS) for the two subgroups was not statistically significant. The \$0.15 difference between the unweighted mean COD(WIS) could reasonably be expected from chance fluctuations. A possible explanation is, in practice, a high proportion of the extra time required for third party prescriptions (2.12 minutes according to Dickson and Rodowskas) is spent by lower salaried, nonprofessional personnel.

Group classifications were readjusted for further analysis. In this analysis, pharmacies receiving payment for less than 10 percent of their total prescription sales volume from third party payment programs were compared with those receiving payment for 10 percent or more from third parties.

<u>Percent of Rxs Accounted for by 3rd Party</u>	<u>n</u>	<u>Unweighted Mean COD(WIS)</u>	<u>Standard Deviation</u>
Less than 10%	14	\$1.84	.4014
<u>10% or more</u>	<u>94</u>	<u>\$2.14</u>	<u>.4878</u>
Total	108	\$2.10	.4867

For this classification, the F-ratio was  $F(1,106) = 4.90$  which was significant at a 95 percent level of confidence. Therefore, the \$0.30 difference between the two unweighted mean COD(WIS)s for the two subgroups could not be explained by chance fluctuations alone.

Both tests of the data showed a higher mean COD(WIS) for pharmacies with a higher percentage of their total prescription sales accounted for by third party reimbursement programs. However, with the given sized samples, the difference between these means was statistically significant only when the pharmacies were classified into subgroups of less than 10 percent and 10 percent or more of total prescription sales volume paid by third party programs.

#### HYPOTHESIS V - Significance of the Number of Prescriptions Dispensed Per Day

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by the number of prescriptions dispensed daily at a 95 percent level of confidence.

The objective in testing Hypothesis V was to check the relationship, if any, between the unweighted mean COD(WIS)

and the number of prescriptions dispensed per day. To determine if economies of scale have an effect on the COD(WIS) for pharmacies included in this study, the pharmacies were classified according to the number of prescriptions dispensed daily. These categories are comparable to those used in the Lilly Digest in 1974.<sup>15</sup>

The reported number of days open per week was multiplied by 52 weeks to determine the approximate number of days open per year for each pharmacy. The total number of prescriptions reportedly dispensed in each pharmacy in a 12 month period was divided by the approximate number of days each pharmacy was open per year. This figure represented the average number of prescriptions dispensed in each pharmacy per day. The categories of prescriptions dispensed per day and other data are shown in Table 1 (page 50).

For these data, the F-ratio was  $F_{(9,102)} = 2.07$ . The critical  $F_{(.05;9,100)}$  was 1.97. Since the F-ratio calculated from these data ( $F=2.07$ ) exceeded the critical F-ratio (1.97), Hypothesis V was rejected. This means the unweighted mean COD(WIS)s were not equal for at least some of the categories of pharmacies classified by the number of prescriptions dispensed per day. These differences were significant at a 95 percent level of confidence.

---

15. William J. Turene, R.Ph., ed., The Lilly Digest 1974, Eli Lilly and Company: Indianapolis, Indiana, 1974, pp. 20-21.

TABLE 1

## MEAN NUMBER OF PRESCRIPTIONS DISPENSED PER DAY

<u>Number of Rxs Dispensed Per Day*</u>	<u>Number of Pharmacies</u>	<u>Percent of Total</u>	<u>Standard Deviation</u>	<u>COD(WIS)</u>
Less than 40	14	12.50%	0.6526	\$2.41
40-49	16	14.29	0.2987	1.98
50-59	16	14.29	0.3528	2.14
60-69	18	16.07	0.3859	2.14
70-79	6	5.36	0.3454	2.03
80-89	10	8.93	0.4658	2.01
90-99	5	4.46	0.5506	2.38
100-124	10	8.93	0.7174	2.03
125-149	8	7.14	0.4365	1.64
<u>150 or more</u>	<u>9</u>	<u>8.03</u>	<u>0.3521</u>	<u>2.18</u>
TOTAL	112	100%	0.4830	\$2.10

\*The overall unweighted mean number of prescriptions dispensed per day was 81.68.

From Table 1, it is clear there was not a linear relationship among the different categories of pharmacies. In other words, there did not appear to be a consistent increase or decrease in the COD(WIS) as the number of prescriptions dispensed per day increased. This observation was reinforced by the calculated partial correlation

coefficient of  $-0.009$ .<sup>16</sup>

There appears to be four relative maximum points for the COD(WIS) as the number of prescriptions dispensed per day increase. The higher unweighted mean COD(WIS)s appeared in the following categories: less than 40, 50-59 and 60-69, 90-99, and 150 or more. The unweighted mean COD(WIS) decreased in the intervals between these categories. This could be explained by the important effect of personnel employment costs on the cost of dispensing. The Texas cost of dispensing study concluded 66 percent of the average cost of dispensing in Texas resulted from total direct personnel costs.<sup>17</sup> These personnel costs included nonprofessional as well as professional employment costs. In this study, 61.4 percent (\$1.29) of the unweighted mean COD(WIS) was attributed to only direct professional employment expense.<sup>18</sup> As the number of prescriptions dispensed per day increased, the COD(WIS) decreased because the

---

16. The partial correlation coefficient is a measure of the tendency for linear association between the dependent variable  $\overline{\text{COD(WIS)}}$  and one independent variable (in this case, prescriptions dispensed per day) with all other independent variables in the regression equation being held constant. A discussion of regression, correlation, and correlation coefficients and their meaning is described in William L. Hays and Robert L. Winkler, op. cit., beginning on page 597.

17. Bryan Adair, op. cit., p. 13.

18. Professional employment expense was calculated for each respondent as:

$$\frac{\text{PS}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{RPh}(\% \text{ TIME})}{\text{Rxs}} = \text{Professional Employment Expense}$$

professional employment expense was dispersed over a larger number of prescriptions. As prescription volume increased further, points were reached where it likely was necessary to hire additional professional help. These points could account for the observed high points of the COD(WIS) as pharmacies are classified by the number of prescriptions dispensed per day.

HYPOTHESIS VI - Significance of the Population of the Area  
in which Pharmacies are Located

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by population of the community in which the pharmacies are located at a 95 percent level of confidence.

This hypothesis was tested to determine if differences existed in the unweighted mean COD(WIS) when pharmacies were classified according to the population of the community where the pharmacy is located. For the 1968 Wisconsin cost of dispensing study, Look reported the following:<sup>19</sup>

- 
19. Kenneth William Look, "An Analysis of the Cost of Dispensing Prescriptions in a Sample of Community Pharmacies," unpublished doctoral dissertation, University of Wisconsin, Madison, Wisconsin, 1974, p. 102.

<u>City Size</u>	<u>Unweighted Mean COD(WIS)</u>
Less than 25,000	\$1.75 (n=45)
25,000-49,000	\$1.76 (n=17)
50,000-99,000	\$1.77 (n=5)
100,000 or more	<u>\$1.99 (n=8)</u>
Unweighted Mean	\$1.78 (n=75)*

\*The unweighted mean COD(WIS) was \$1.78 when computed from personal interview data for 30 pharmacies and mail-collected data for 45 pharmacies.

The correlation coefficient was  $r = +0.102$ , which implied that mean COD(WIS)s tend to be larger in larger cities. Look recommended this tentative relationship be examined more closely in future studies.

Results which seem to contradict Look's findings were reported in the 1974 cost of dispensing study in Texas.<sup>20</sup> That study indicated pharmacies located in counties having less than 50,000 population had a slightly higher average cost of dispensing (\$1.96, n=37) than did pharmacies located in counties of 50,000 or more population (\$1.91, n=38). The difference between the mean cost of dispensing for the two groups was not statistically significant, however. The reader should note that Look's study used community size as a basis for classification while the Texas study was based on county population classifications.

---

20. Bryan Adair, op. cit., p. 10.

The categories of community population and the respective unweighted mean COD(WIS) for each category are shown in Table 2.

TABLE 2  
UNWEIGHTED MEAN COD(WIS) FOR CATEGORIES OF  
COMMUNITY POPULATION

<u>Community Size</u>	<u>Number of Pharmacies</u>	<u>Standard Deviation</u>	<u>Unweighted Mean COD(WIS)</u>
Less than 2,500	20	0.5142	\$2.12
2,500-4,999	13	0.2990	1.97
5,000-49,999	49	0.3988	2.08
50,000-99,999	9	0.8235	1.98
100,000-500,000	9	0.4079	2.23
<u>more than 500,000</u>	<u>12</u>	<u>0.6372</u>	<u>2.29</u>
Total	112	0.4830	\$2.10

The F-ratio for these data was  $F(5,106) = 0.94$ , which is not significant at a 95 percent level of confidence. Therefore, Hypothesis VI was accepted. There was not a statistically significant difference among unweighted mean COD(WIS)s when pharmacies were classified according to population of the community in which the pharmacies were located.

Although Hypothesis VI was accepted, the data in Table 2 suggest pharmacies located in cities of 100,000 or more population had higher unweighted mean COD(WIS)s than did pharmacies located in cities with population less than

100,000. There are only two cities in Wisconsin that have a population of 100,000 or more. These cities are Madison (1970 population 171,769) and Milwaukee (1970 population 717,371).<sup>21</sup> In the analysis that follows, the unweighted mean COD(WIS) for pharmacies located in Madison and Milwaukee are compared with COD(WIS) for pharmacies in all other communities.

<u>Community Size</u>	<u>Number of Pharmacies</u>	<u>Standard Deviation</u>	<u>Unweighted Mean COD(WIS)</u>
Less than 100,000	91	.4641	\$2.06
<u>100,000 or more</u>	<u>21</u>	<u>.5391</u>	<u>\$2.26</u>
Total	112	.4830	\$2.10

The F-ratio for these data was  $F(1,110) = 3.04$ , which also is not significant at a 95 percent level of confidence (critical  $F(.05;1,100) = 3.94$ ). Although there was a 20 percent difference between the unweighted mean COD(WIS)s for the two classifications, this difference could be due to chance variation alone.

#### HYPOTHESIS VII - Significance of the Mean Prescription Price

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by the mean reimbursement received per prescription at a 95 percent level of confidence.

---

21. The State of Wisconsin 1973 Blue Book: Distributed by Department of Administration, Document Sales and Distribution, 202 S. Thornton Avenue, Madison, Wisconsin, p. 661.

This hypothesis was tested to determine if there was a positive relationship between prescription price and the COD(WIS). The mean prescription price was calculated by dividing total reported prescription sales volume in a 12-month period by the reported number of prescriptions dispensed in the same 12-month period. The mean prescription price categories used to classify the sample pharmacies are shown in Table 3.

TABLE 3

UNWEIGHTED MEAN COD(WIS) FOR CATEGORIES OF  
PRESCRIPTION PRICE

<u>Mean Rx Price</u>	<u>Number of Pharmacies</u>	<u>Standard Deviation</u>	<u>Unweighted Mean COD(WIS)</u>
Less than \$4.00	22	0.3529	\$1.64
\$4.00-\$4.49	28	0.3972	2.06
\$4.50-\$4.99	36	0.2458	2.10
\$5.00-\$5.49	16	0.3949	2.35
<u>\$5.50 or more</u>	<u>10</u>	<u>0.5979</u>	<u>2.85</u>
Total	112	0.4830	\$2.10

The overall mean prescription price was \$4.58 and the mean prescription price range was from \$2.10<sup>22</sup> to \$7.92.

- 
22. This low mean prescription price was reported for a pharmacy which obtained only 5.5 percent of its total volume from the prescription department. Other data on the return indicate the prescription department was used as a loss leader in this high total volume pharmacy. The next lowest reported mean prescription price was \$3.35.

The F-ratio calculated for these data was  $F_{(4,107)} = 26.71$ . This F-ratio was significant at a 95 percent level of confidence  $\sqrt{\text{critical F-ratio is } F_{(.05;4,100)} = 2.467}$ . Therefore, Hypothesis VII was rejected. This means the unweighted mean COD(WIS)s were not equal for all categories of pharmacies classified by their mean prescription prices.

From Table 3, it appears the unweighted mean COD(WIS) increased as the mean prescription price increased (page 56). The partial correlation coefficient for these data was  $r = +0.439$ , indicating a moderately high positive linear relationship between COD(WIS) and mean prescription price. Generally, pharmacy owners or managers charged more per prescription when their costs of dispensing were higher.

#### HYPOTHESIS VIII - Significance of the Ratio of Prescription Sales to Total Pharmacy Sales

The unweighted mean cost of dispensing per prescription will be equal for pharmacies which otherwise differ by the ratio of prescription sales to total pharmacy sales at a 95 percent level of confidence.

For this analysis, some relationship between the ratio of prescription sales to total pharmacy sales and COD(WIS) would be expected simply because this ratio (RXS/TS) is used to allocate nonprofessional employment expenses and nonlabor expenses to the prescription department in the COD(WIS) formula. In the 1968 cost of dispensing study in Wisconsin, the correlation coefficient between (RSX/TS) and COD(WIS)

was  $r = -0.245$ , which suggested that costs of dispensing tend to increase as the ratios of prescription sales to total sales decrease.<sup>23</sup> Table 4 also shows the results of the 1968 Wisconsin study so the reader can compare them with the results of this study.

TABLE 4

UNWEIGHTED MEAN COD(WIS) FOR CATEGORIES OF (RXS/TS)

<u>Ratio of Prescription Sales to Total Sales</u>	<u>1968 Wisconsin Study Unweighted Mean COD(WIS)</u>	<u>Current Study Unweighted Mean COD(WIS)</u>
Less than 30%	\$2.02 (n=15)	\$2.26 (n=17)
30%-39%	1.74 (n=21)	2.08 (n=24)
40%-49%	1.75 (n=18)	2.19 (n=26)
50%-74%	1.68 (n=16)	1.98 (n=35)
75%-100%	<u>1.64 (n=5)</u>	<u>2.09 (n=10)</u>
Unweighted Mean	\$1.78 (n=75)*	\$2.10 (n=112)

\*The unweighted mean COD(WIS) was \$1.78 when computed from personal interview data for 30 pharmacies and mail-collected data for 45 pharmacies.

In contrast, the Texas cost of dispensing study indicated pharmacies with a higher ratio of prescription sales to total sales had higher cost of dispensing. In that study, the respondents classified their pharmacies. Two of the five categories were "general retail"  $\bar{\Delta}$ mean (RXS/TS) =

23. Kenneth William Look, op. cit., p. 108.

57%] and "professional shops" [mean (RXS/TS) = 82%]. The general retail pharmacies had a mean cost of dispensing per prescription of \$1.86 compared to \$2.27 for professional shops.<sup>24</sup>

The F-ratio, when calculated for pharmacies classified in Table 4 by categories of the percent RXS/TS, was  $F(4,107) = 0.96$ , which was not statistically significant (page 58). Therefore, Hypothesis VIII was accepted. This means the differences among unweighted mean COD(WIS)s for the categories of pharmacies classified by (RXS/TS) could be due to chance variation. The partial correlation coefficient, with the dependent and independent variables being COD(WIS) and the ratio (RXS/TS) respectively, was  $r = -0.152$ . The weak correlation coefficient indicates COD(WIS) tends to decrease as the ratio (RXS/TS) increases.

#### Other Findings

The findings reported in this section were not tested in formal research hypotheses. Pharmacy operational variables which could be related to the cost of dispensing are analyzed and, where appropriate, the findings compared with the results of similar or related studies.

---

24. Bryan Adair, op. cit., pp. 9-10.

## Total Net Sales of Pharmacies

The total net sales of the sample pharmacies were classified into eight categories. The results are shown in Table 5 (page 61).

The mean dollar volume of prescription sales for the sample was \$131,060. This figure is comparable to the mean prescription dollar volume (\$127,066) for the 71 community pharmacies in Wisconsin whose financial information was used in the compilation of The Lilly Digest 1974.<sup>25</sup> The unweighted mean ratio of prescription sales to total pharmacy sales was 0.4698 compared to The Lilly Digest 1974 figure of 0.473 for the 71 pharmacies in Wisconsin. The ratio (RXS/TS) tended to decrease as total pharmacy sales increased. This was true even though the unweighted mean number of prescriptions dispensed per day tended to increase as total pharmacy sales increased.

The unweighted mean COD(WIS) for five of the eight categories was within the 95 percent confidence interval (\$2.01-\$2.19) for the total unweighted mean. The differences among mean COD(WIS)s was not statistically significant at a 95 percent level of confidence using the F-ratio test. This means the COD(WIS)s are not dissimilar for pharmacies

---

25. This information was taken from a copy of computer output entitled, "Summary By State, East North Central, Wisconsin, 71 Stores," dated June 12, 1974 (Eli Lilly and Company, Indianapolis, Indiana).

TABLE 5

MEAN TOTAL NET PHARMACY SALES

Total Net Sales	Unweighted Means					
	n	RXS	RXS/TS	Rx Price	Rxs Per Day	COD(WIS)
0-119,949	14	\$ 58,030	0.605	\$4.67	39.9	\$2.24
119,950-159,949	20	\$ 76,940	0.545	\$4.66	50.2	\$2.05
159,950-199,949	10	\$ 98,160	0.541	\$4.56	64.4	\$2.12
199,950-249,949	10	\$113,130	0.506	\$4.35	76.2	\$1.76
249,950-349,949	21	\$122,030	0.431	\$4.49	75.8	\$2.19
349,950-499,949	21	\$166,820	0.415	\$4.51	104.5	\$2.01
499,950-999,949	10	\$231,170	0.344	\$4.70	140.3	\$2.27
999,950- or more	<u>6</u>	<u>\$306,250</u>	<u>0.259</u>	<u>\$4.91</u>	<u>165.0</u>	<u>\$2.17</u>
Total	112	\$131,060	0.4698	\$4.58	81.68	\$2.10

that differ by total net sales at a 95 percent level of confidence.

#### Total Pharmacy Prescription Sales

The total prescription sales volume for the sample pharmacies was classified into seven categories. The results are shown in Table 6 (page 63).

When the unweighted means for COD(WIS) were compared using the F-ratio  $\sqrt{F(6,105)} = 0.477$ , the differences among the means were not statistically significant at a 95 percent level of confidence. Thus, the differences could be due to chance variation alone. A hypothesis that the unweighted mean COD(WIS)s were equal for the different prescription sales categories of sample pharmacies would be accepted at a 95 percent level of confidence.

From the analyses of total pharmacy sales (Table 5) and total prescription sales, it was concluded that the unweighted mean COD(WIS) did not vary as a result of differences in these two variables (page 61).

#### Title XIX Prescription Sales Volume

Hypothesis IV was tested to determine if the unweighted means of COD(WIS) were different for pharmacies categorized by the percent of their total prescription volume attributable to third party payment programs. That analysis included all public and private third party programs. The

TABLE 6

PHARMACY PRESCRIPTION SALES

<u>Total Rx Sales</u>	<u>Unweighted Means</u>					<u>COD(WIS)</u>
	<u>n</u>	<u>Total Sales</u>	<u>RXS/TS</u>	<u>Rx Price</u>	<u>Rxs Per Day</u>	
0-						
49,949	6	\$183,200	0.250	\$3.24	29.7	\$2.08
49,950-						
74,949	23	\$130,600	0.505	\$4.56	41.4	\$2.14
74,950-						
99,949	22	\$276,000	0.440	\$4.57	57.3	\$2.12
99,950-						
124,949	19	\$282,600	0.490	\$4.66	69.4	\$2.16
124,950-						
149,949	10	\$275,800	0.537	\$4.75	84.4	\$2.00
149,950-						
199,949	14	\$446,600	0.447	\$4.42	110.6	\$1.92
199,950-						
<u>or more</u>	<u>18</u>	<u>\$684,400</u>	<u>0.495</u>	<u>\$4.58</u>	<u>169.2</u>	<u>\$2.17</u>
<u>Total</u>	112	\$329,200	0.4698	\$4.58	81.68	\$2.10

Title XIX program in Wisconsin also was considered separately. The results are shown in Table 7 (page 65).

The mean percentage of total prescription sales accounted for by the Title XIX program in Wisconsin was 15.64 percent. The F-ratio for analysis of the variance between the unweighted mean COD(WIS)s for the different categories was  $F(3,105) = 2.53$ , which was not statistically significant at a 95 percent level of confidence. Thus it can be assumed differences in the unweighted mean COD(WIS)s were due to chance.

From Table 7, it appeared the pharmacies in the "less than 10%" category had a lower unweighted mean COD(WIS). This category was compared with pharmacies that derived 10 percent or more of their total prescription volume from the Title XIX program. These findings are shown in Table 8 (page 66).

The F-ratio for these two categories was  $F(1,107) = 8.32$ , which was statistically significant at a 95 percent level of confidence. Pharmacies that derived 10 percent or more of their prescription sales from the Wisconsin Title XIX program had an unweighted mean COD(WIS) which was 29 cents greater than the unweighted mean COD(WIS) for pharmacies in the "less than 10%" category. Although a cause and effect relationship between higher Title XIX prescription sales volume and an increased COD(WIS) was not proven, the findings support the claim that it costs more to

TABLE 7

TITLE XIX PRESCRIPTION SALES AS A PERCENT OF TOTAL PRESCRIPTION SALES

Percent RXS Title XIX	Unweighted Means					
	<u>n</u>	<u>Total Sales</u>	<u>RXS</u>	<u>RXS/TS</u>	<u>Rx Price</u>	<u>COD(WIS)</u>
Less than 10%	29	\$355,400	\$143,300	0.479	\$4.46	\$1.89
10% - 14%	28	\$266,100	\$105,200	0.474	\$4.69	\$2.19
15% - 24%	33	\$340,100	\$144,300	0.437	\$4.51	\$2.17
<u>25% or more</u>	<u>19</u>	<u>\$248,400</u>	<u>\$129,700</u>	<u>0.563</u>	<u>\$4.80</u>	<u>\$2.19</u>
Total	109	\$309,200	\$131,400	0.480	\$4.60	\$2.10

TABLE 8

TITLE XIX REIMBURSEMENT AS A PERCENT OF TOTAL PRESCRIPTION SALES

Percent RXS Title XIX	Unweighted Means					
	<u>n</u>	<u>Total Sales</u>	<u>RXS</u>	<u>RXS/TS</u>	<u>Rx Price</u>	<u>COD(WIS)</u>
Less than 10%	29	\$292,500	\$143,300	0.479	\$4.46	\$1.89
10% or more	80	\$355,400	\$127,100	0.480	\$4.64	\$2.18
Total	109	\$309,200	\$131,400	0.480	\$4.60	\$2.10

TABLE 9

PRESCRIPTION SALES TO NURSING HOMES AS A PERCENT OF TOTAL PRESCRIPTION SALES

Percent RXS Nursing Home	Unweighted Means						
	<u>n</u>	<u>Total Sales</u>	<u>RXS</u>	<u>RXS/TS</u>	<u>Rx Price</u>	<u>Rxs Per Day</u>	<u>COD(WIS)</u>
Less than 5%	52	\$304,400	\$119,100	0.473	\$4.40	75.5	\$2.02
5% or more	51	\$305,700	\$141,000	0.484	\$4.76	86.5	\$2.16
Total	103	\$305,000	\$129,900	0.479	\$4.58	81.0	\$2.09

dispense prescriptions for Title XIX recipients.

The increased COD(WIS) could be due to increased administrative costs, the cost of delays in payment of Title XIX claims, and the cost of unpaid claims that result when pharmacists provide medications and services to persons whose Title XIX eligibility has expired.

#### Prescription Sales for Nursing Home Patients

Respondents were asked to report the dollar volume of prescription sales for nursing home patients for their pharmacy. The dollar figure reported was divided by the reported total prescription sales. The pharmacies then were classified by the percent of their total prescription sales that was for nursing home patients. The results are shown in Table 9 (page 66).

The F-ratio for these data show the difference between the unweighted mean COD(WIS) for the two categories was not statistically significant at a 95 percent level of confidence. Although there was a 14 cent difference between the unweighted mean COD(WIS)s for the two categories of pharmacies, this difference could be due to chance variation alone.

This difference could result from a number of factors. Pharmacy owners and/or managers who are interested in nursing home prescription patronage generally are associated with pharmacies providing a full range of pharmaceutical

services. These services normally include prescription delivery, patient medication records, and patient consultation services. The cost of these services contribute to a higher COD(WIS). Also, many nursing home patients receive Title XIX benefits. It was shown that increased Title XIX prescription volume is associated with an increased COD(WIS). Pharmacists servicing nursing homes also may allocate more professional employment expense to the prescription department because of the pharmacist time required for consultation in nursing homes.

#### Continuing Education Expenses

Respondents were asked to report the total dollars expended in a 12 month period for continuing education for pharmacists associated with the pharmacy. There were 104 responses to the question on continuing education expenses. The reported continuing education expenditures ranged from \$0.00 to \$3,240.00. The mean expense was \$405.84. Pharmacy operations that expended less than \$500.00 on continuing education were compared to pharmacy operations that spent \$500.00 or more. The results are shown in Table 10 (page 69).

The F-ratio for these data was  $F_{(1,102)} = 4.38$  which was significant at a 95 percent level of confidence. Therefore, it may be concluded that the unweighted mean COD(WIS)s for these two categories were not equal. Pharmacy

TABLE 10

PHARMACY CONTINUING EDUCATION EXPENSE

<u>Continuing Education Expense of the Pharmacy</u>	<u>n</u>	<u>COD(WIS) Standard Deviation</u>	<u>Unweighted Mean COD(WIS)</u>
Less than \$500	77	0.4821	\$2.04
<u>\$500 or more</u>	<u>27</u>	<u>0.4927</u>	<u>\$2.27</u>
Total	104	0.4927	\$2.10

TABLE 11

PERCENT OF PRESCRIPTION SALES ON PERSONAL CHARGE ACCOUNTS

<u>Percent of RXS Personal Charge</u>	<u>n</u>	<u>Unweighted Means</u>	
		<u>Total Sales</u>	<u>RXS</u>
Less than 35%	86	\$304,600	\$125,300
35% - 49%	15	\$319,400	\$150,700
<u>50% or more</u>	<u>7</u>	<u>\$361,400</u>	<u>\$167,600</u>
Total	108	\$310,300	\$131,400

operations with a \$500.00 or more continuing education expense had a significantly higher unweighted mean COD(WIS).

Look found the mean continuing education expense to be \$450.00 in 1968. Also, the weighted mean continuing education cost per prescription was 1.8 cents.<sup>26</sup>

### Prescription Sales on Credit

Respondents were asked to estimate the percent of total prescription sales volume that was charged on personal charge accounts. For this sample, the results are shown in Table 11 (page 69).

For the 108 respondents, the mean percent of prescription sales on credit via personal charge accounts was 23.13 percent. There was not a statistically significant difference among the unweighted mean COD(WIS)s for three categories of respondents based on the percent of personal charge prescription sales. However, Look found the unweighted mean prescription charge account cost per charged prescription was \$0.36 in 1968.<sup>27</sup>

The prescription personal charge account data indicate a positive relationship between total net sales and prescription sales volume, and the percent of prescription sales charged to personal charge accounts.

---

26. Kenneth William Look, op. cit., p. 208.

27. Ibid., p. 187.

The percent of total prescription sales accounted for by credit cards also was estimated for 108 of the sample pharmacies. The pharmacies for which a percentage estimate was provided were categorized as shown in Table 12 (page 72).

The F-ratio for the unweighted mean COD(WIS)s was  $F_{(1,106)} = 4.47$ . This ratio was significant at a 95 percent level of confidence which indicates the unweighted means were not equal, with the COD(WIS) higher for pharmacies where five percent or more of the total prescription sales are charged on credit cards. A portion of the increased cost of dispensing could result from the service fee charged by the credit card plans. With bank credit card plans, the bank normally factors the seller's accounts receivable. The bank purchases the accounts receivable at a discount and credits the seller's account with the net amount. The usual discount is 4.5 percent for monthly volume up to \$750.00 and 3.5 percent when the monthly volume exceeds \$750.00.<sup>28</sup> There are additional costs incurred by the pharmacy as a result of increased time in completing the necessary paper work.

Apparently, credit card sales were not an important factor in prescription sales for the majority of the sample

---

28. Arthur W. Weil, "Pick a Card? Why You Should...Why You Shouldn't," Drug Topics (118:22), November 18, 1974, p. 22.

TABLE 12

PERCENT OF PRESCRIPTION SALES ACCOUNTED FOR BY CREDIT CARDS

<u>Percent of RXS Credit Card</u>	<u>n</u>	<u>Unweighted Means</u>		
		<u>Total Sales</u>	<u>RXS</u>	<u>COD(WIS)</u>
Less than 5%	94	\$298,100	\$128,200	\$2.06
<u>5% or more</u>	<u>14</u>	<u>\$392,100</u>	<u>\$154,500</u>	<u>\$2.35</u>
Total	108	\$310,300	\$131,600	\$2.10

pharmacies. Only 14 sample pharmacies (12.96%, n=108) had five percent or more of total prescription sales resulting from credit card transactions.

### Prescription Delivery

Respondents were asked how many prescriptions were delivered from the pharmacy on a typical or average day. The reported average number of prescriptions delivered per day was multiplied by the number of days the pharmacy was open per week. To determine the approximate number of prescriptions delivered annually, the weekly prescription deliveries were multiplied by 52 weeks per year. The percent of prescriptions that were delivered for each pharmacy was determined by dividing the calculated approximate number of prescriptions delivered per year by the total of original and renewed prescriptions dispensed in a 12 month period.

Look did a prescription delivery cost analysis for the 1968 data he collected through personal interviews. The unweighted mean cost of delivery per delivered prescription was \$0.68 for pharmacies that delivered five percent or more of their prescriptions (n=27).<sup>29</sup>

Sample pharmacies were classified similarly for this current study. The results are shown as follows:

---

29. Kenneth William Look, op. cit., p. 149.

<u>Percent of Rxs Delivered</u>	<u>n</u>	<u>Percent of Respondents</u>	<u>COD(WIS)</u>	
			<u>Standard Deviation</u>	<u>Unweighted Mean</u>
Less than 5%	33	32.7%	0.4482	\$1.91
<u>5% or more</u>	<u>68</u>	<u>67.3%</u>	<u>0.4770</u>	<u>\$2.20</u>
Total	101	100%	0.4843	\$2.10

Approximately two-thirds of the pharmacies in Wisconsin were delivering five percent or more of the prescriptions dispensed in a 12 month period. The unweighted mean percent of prescriptions delivered for the 101 pharmacies for which delivery data were supplied was 25.86 percent.

The F-ratio for these delivery data was  $F(1,99) = 8.13$  which was significant at a 99 percent level of confidence.

These findings are about what was expected. A pharmacy that has five percent or more of the total prescriptions dispensed in a 12 month period delivered incurs additional expenses. That delivery volume may make a special delivery vehicle a necessity. The time spent by pharmacy personnel in providing delivery services also would add to prescription department expense.

Since 1973, delivery expenses can be expected to have increased substantially. The cost of operating and maintaining a delivery vehicle has increased rapidly. The increased cost of gas and oil may cause pharmacists to reevaluate their delivery services. Pharmacists may start

adding a delivery charge to cover increased expenses. However, delivery services at no additional charge to WMAP recipients is a requirement for "special service" pharmacies in Wisconsin and must be provided before a pharmacy can receive the \$2.20 dispensing fee.

### Full Service Pharmacies

For the purpose of the following analysis, four criteria were established for full service pharmacies. These criteria were (1) maintenance of patient profiles, (2) provision of 24 hour emergency prescription service, (3) pharmacy expenditures of \$500 or more on continuing education, and (4) 20 or more prescriptions delivered on a typical working day. Eight pharmacies from the sample satisfied all four criteria. The results of this analysis are shown in Table 13 (page 76).

These data indicate the unweighted mean COD(WIS) is higher for the full service pharmacies as specified by this study. However, only eight pharmacies met the criteria established for full service pharmacies. The qualifying full service pharmacies had higher mean total net sales and total prescription sales. The full service pharmacies also had a substantially higher ratio of prescription sales to total net sales. In fact, the full service pharmacies had mean prescription sales which exceeded the mean total net sales for all other pharmacies.

TABLE 13  
 FULL SERVICE PHARMACIES COMPARED WITH ALL OTHER SAMPLE PHARMACIES

<u>Type of Pharmacy</u>	<u>n</u>	Unweighted Means				
		<u>Total Sales</u>	<u>RXS</u>	<u>RXS/TS</u>	<u>Rx Price</u>	<u>COD(WIS)</u>
Full Service	8	\$701,600	\$313,130	0.532	\$4.97	\$2.28
All Other Pharmacies	<u>104</u>	<u>\$299,000</u>	<u>\$117,130</u>	<u>0.469</u>	<u>\$4.56</u>	<u>\$2.08</u>
Total	112	\$329,200	\$131,060	0.4698	\$4.58	\$2.10

## Professional Employment Expense

Personnel employment costs account for a large portion of the total cost of dispensing per prescription. Look found the unweighted mean employment costs as follows: (1) 75 cents for proprietor's salaries allocated by the percent time spent performing prescription department duties,<sup>30</sup> and (2) 54 cents for employee pharmacist's salaries allocated by percent time.<sup>31</sup> These employment costs, when totaled (\$1.29), accounted for 72.9 percent of the unweighted mean COD(WIS) in 1968. In the recent Texas cost of dispensing study, direct personnel costs equaled \$1.28 per prescription.<sup>32</sup> This was 66 percent of the total cost of dispensing (\$1.94) per prescription. The reader should note that the Texas study personnel costs included nonprofessional as well as professional employment costs.

For this study, nonpharmacist employment costs were included in the reported total operating expenses and not reported separately. Therefore, this author could not determine how nonpharmacist employment costs contributed to the total COD(WIS). The contribution of professional employment costs to the cost of dispensing per prescription

---

30. Ibid., p. 131.

31. Ibid., p. 121.

32. Bryan Adair, op. cit., p. 15.

was calculated using the following formula:

$$\text{Professional Employment Expense} = \frac{\text{PS}(\% \text{ TIME}) + \text{RPh}(\% \text{ TIME})}{\text{Rxs}}$$

The unweighted mean professional employment expense was \$1.29 for the 112 sample pharmacies. This figure was 61.4 percent of the unweighted mean COD(WIS) of \$2.10. The reader should note that the professional employment expense figure does not include nonpharmacist employment costs allocated to the prescription department.

These findings indicate professional employment expenses have remained the same in absolute dollar value, but have decreased when expressed as a percent of the COD(WIS). One possible reason for this finding could be proprietor's and employee pharmacist's salaries have increased proportionately with increases in prescription volume. This could cause the professional employment expense per prescription to remain the same. Another reason for the constant professional employment expense per prescription could be the increased utilization of non-pharmacists in the performance of prescription department duties. The combined effect of these factors probably explain the finding.

Most Likely COD(WIS)

As reported earlier, the COD(WIS)s for this study ranged from \$0.97 to \$3.66. To determine the most likely unweighted mean COD(WIS), the approximate upper and lower five and ten percent COD(WIS) values were eliminated and new unweighted means for COD(WIS) calculated. First, the pharmacies with the six highest and six lowest COD(WIS)s were eliminated and a new unweighted mean COD(WIS) calculated. These data, shown in Table 14 (page 80), are for the 100 pharmacies in the approximate middle 90 percent of the sample with respect to the COD(WIS) for each pharmacy. Second, an unweighted mean COD(WIS) was calculated after eliminating the pharmacies with the 12 highest and 12 lowest COD(WIS)s. Table 14 also includes these data representing the approximate middle 80 percent (88 pharmacies) of the sample pharmacies with respect to their COD(WIS)s.

This analysis eliminated any biasing tendencies of extreme COD(WIS) values at either end of the spectrum. The variance for COD(WIS) from the approximate middle 90 and 80 percent samples was 0.3374 and 0.2745, respectively. The 95 percent confidence intervals were calculated as follows:

TABLE 14

MOST LIKELY COD(WIS) - APPROXIMATE MIDDLE 90 AND 80 PERCENT  
OF SAMPLE PHARMACIES

Sample	n	Unweighted Means							COD(WIS) Range
		Total Sales	RXS	RXS/TS	Rx Price	Rxs Per Day	Prof. Emp. Expense/Rx	COD(WIS)	
Middle 90%	100	\$332,700	\$133,100	0.472	\$4.58	82.4	\$1.28	\$2.08	\$1.37- \$2.84
Middle 80%	88	\$348,600	\$135,820	0.464	\$4.58	83.8	\$1.27	\$2.08	\$1.56- \$2.63
Entire Sample 100%	112	\$329,200	\$131,060	0.4698	\$4.58	81.68	\$1.29	\$2.10	\$0.97- \$3.66

<u>Sample</u>	<u>95 Percent Confidence Interval for COD(WIS)</u>
entire sample (100%)	$\$2.10 \pm 1.96(0.4830/\sqrt{112}) = \$2.10 \pm .09$
approximate middle 90%	$\$2.08 \pm 1.96(0.3374/\sqrt{100}) = \$2.08 \pm .07$
approximate middle 80%	$\$2.08 \pm 1.96(0.2745/\sqrt{88}) = \$2.08 \pm .06$

By eliminating the pharmacies with the approximate upper and lower ten percent COD(WIS) values, the 95 percent confidence interval for the unweighted mean COD(WIS) was \$2.02 - \$2.14. By this analysis, the most likely COD(WIS) was \$2.08.

A similar analysis was done in the recent Texas cost of dispensing study. In that study, data for the pharmacies with the highest and lowest five and ten cost estimates were eliminated. The original sample represented 75 pharmacies. The two modified samples had data from the middle 65 and 55 pharmacies. The cost of dispensing for the entire sample (n=75) was \$1.94. The middle 65 and 55 pharmacies had mean costs of dispensing of \$1.85 and \$1.84, respectively. The overall average cost of dispensing estimate in Texas was reduced by approximately five percent by modifying the sample.<sup>33</sup>

Apparently, the Texas study was subject to the biasing effects from high cost of dispensing estimates to a greater degree than in this study. Eliminating the approximate

---

33. Ibid., p. 15.

highest and lowest ten percent COD(WIS)s resulted in the overall unweighted mean COD(WIS) being reduced by less than one percent.

#### Dispensing Fee Projected to 1975

The determination of an equitable dispensing fee was explained in the discussion following Hypothesis III in Chapter Four. The unweighted mean DF(WIS-P) for the entire sample was \$2.55. When only data for the pharmacies with COD(WIS)s within the approximate middle 80 percent of the COD(WIS) range were considered, the unweighted mean DF(WIS-P) was \$2.53. This figure represents the most likely equitable dispensing fee for 1973.

The inflation rate, equal to the increase in the Consumer Price Index for all items, was 12.2 percent in 1974.<sup>34</sup> Applying this rate to the 1973 most likely DF(WIS-P) resulted in an increase in DF(WIS-P) of 31 cents. Therefore, the DF(WIS-P) for 1974 would have been \$2.84.

Assuming a marked decrease in the inflation rate, the rate probably will be at least eight percent in 1975. Inflating the 1974 recommended DF(WIS-P) by eight percent would increase the DF(WIS-P) by 23 cents. Therefore, the recommended most likely equitable DF(WIS-P) for 1975 is

---

34. "Consumer Prices Had Slower Gain for December," Wall Street Journal (185:15), January 22, 1975, p. 3.

\$3.07.

The most likely DF(WIS-F) was determined in a similar manner. The most likely COD(WIS) of \$2.08 in 1973 was inflated by 12.2 percent and 8.0 percent for 1974 and 1975 respectively. The result was a most likely COD(WIS) of \$2.52 for 1975. After adding the fixed 30 cent allowance for business risk and growth, the most likely DF(WIS-F) for 1975 is \$2.82.

CHAPTER FIVE  
SUMMARY AND CONCLUSIONS

The study had four main objectives. These were:

(1) to determine the mean cost of dispensing a prescription for a sample of community pharmacies in Wisconsin and test the relationships between various individual service and operational characteristics and the COD for these same pharmacies, (2) to determine a potentially adequate dispensing fee which would allow for business risk and growth, (3) to provide financial and cost data that would be useful in consultations between representatives of third party payment programs and those of pharmacy, such as the Wisconsin Pharmaceutical Association, and (4) to establish a format and collect data that can serve as a "benchmark" for future periodic COD studies in Wisconsin conducted for the purpose of trend analysis.

The COD(WIS) formula was used to compute the cost of dispensing.

$$\text{COD(WIS)} = \frac{\text{PS}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{RPh}(\% \text{ TIME})}{\text{Rxs}} + \frac{\text{nonRPh}(\text{RXS}/\text{TS})}{\text{Rxs}} + \frac{\text{nonlabor}(\text{RXS}/\text{TS})}{\text{Rxs}}$$

The unweighted mean COD(WIS) for the 112 pharmacies for

which useable, completed questionnaires were supplied was \$2.10. The 95 percent confidence interval for the unweighted mean COD(WIS) was  $\$2.10 \pm 0.09$  for these 112 pharmacies.

The unweighted mean COD(WIS) has increased by approximately four percent per year for the period between 1968 and 1973, about equal to the yearly increase in the consumer price index in this period.

Dispensing fees were calculated which would provide an allowance for business risk and growth as well as cover the cost of dispensing. The first method, DF(WIS-P), arrives at a dispensing fee based on a 10.5 percent return on the sum of COD(WIS) and the approximate drug acquisition cost per prescription. The second method, DF(WIS-F), allows an absolute amount (30 cents) for business risk and growth per prescription.

$$DF(WIS-P) = \frac{PS(\% \text{ TIME})}{Rxs} + \frac{RPh(\% \text{ TIME})}{Rxs} + \frac{\text{nonRPh}(RXS/TS)}{Rxs} + \frac{\text{nonlabor}(RXS/TS)}{Rxs} + \frac{[10.5\%][\overline{COD(WIS)} + (0.48)(\overline{RX})]}{Rxs}$$

$$DF(WIS-F) = \frac{PS(\% \text{ TIME})}{Rxs} + \frac{RPh(\% \text{ TIME})}{Rxs} + \frac{\text{nonRPh}(RXS/TS)}{Rxs} + \frac{\text{nonlabor}(RXS/TS)}{Rxs} + \$0.30$$

The unweighted mean DF(WIS-P) and DF(WIS-F) were \$2.55 and \$2.40 respectively based on 1973 operating data. These dispensing fees were significantly greater than the \$2.20

paid to "special service" pharmacies by the Title XIX program in Wisconsin.

Pharmacies for which 10 percent or more of the total prescriptions were dispensed to third party payment program participants had a significantly higher unweighted mean COD(WIS) than did pharmacies in the less than 10 percent category. This finding indicates additional costs are incurred by pharmacists participating in third party payment programs. Because of the additional administrative expense associated with third party payment programs, it is recommended DF(WIS-P) be used to determine how much pharmacists will be reimbursed by these same programs.

Although the analysis of variance for the unweighted mean COD(WIS)s for pharmacies categorized by the number of prescriptions dispensed per day indicated the unweighted means were not equal for all categories, there was no clear relationship between the COD(WIS)s and prescriptions dispensed per day. The unweighted mean COD(WIS) decreased as the prescriptions dispensed per day increased until points were reached where the productive capacity of prescription department personnel apparently was exceeded. At these points, additional personnel costs may have been necessary in which case the unweighted mean COD(WIS) may rise and subsequently decrease again as prescription volume continued to increase. In brief, the economy of scale concept has only limited applicability to the COD.

The findings also indicated the unweighted mean COD(WIS) was higher in Madison and Milwaukee than in smaller communities in Wisconsin, although the difference between the mean COD(WIS)s was not statistically significant. Also, costs per prescription generally were higher in pharmacies (1) where the ratio of prescription sales to total sales was less than 30 percent, and (2) where less than 40 prescriptions were dispensed per day.

Generally, the COD(WIS) showed a positive linear relationship with the mean prescription price. Knowingly or not, owners and managers of pharmacies with higher COD(WIS)s attempted to recover these costs through higher mean prescription prices.

The cost of dispensing per prescription generally was higher in pharmacies (1) where 10 percent or more of the prescription sales were to Title XIX recipients, (2) where five percent or more of the total prescription sales were for nursing home patients, (3) where \$500.00 or more was expended on continuing education expenses, (4) where five percent or more of the prescription volume was charged on credit cards, (5) where five percent or more of the prescriptions were delivered, and (6) which were full service pharmacies as defined in this paper.

Professional employment expenses accounted for 61.4 percent of the unweighted mean COD(WIS).

The most likely unweighted mean COD(WIS) was

determined by eliminating the possible biasing effects of extreme COD(WIS) values on either end of the COD(WIS) range. When only pharmacies in the approximate middle 80 percent of the COD(WIS) range were considered, the 95 percent confidence interval for the unweighted mean COD(WIS) was  $\$2.08 \pm \$0.06$ . The corresponding unweighted mean DF(WIS-P) and DF(WIS-F) were  $\$2.53$  and  $\$2.38$  respectively. The 12.2 percent annual inflation rate for 1974 and an estimated eight percent inflation rate for 1975 were applied and the projected DF(WIS-P) and DF(WIS-F) were  $\$3.07$  and  $\$2.82$  respectively for 1975.

The projected dispensing fees are considered conservative. In determining COD(WIS), only explicit costs - those which appear in a pharmacy's profit and loss statement - were considered. Excluded were implicit costs such as the cost of invested capital. Most germane here would be an addition for the pharmacist's capital invested in prescription department inventory and in the market value of prescription department fixtures and equipment. Also, in projecting the DF(WIS-F) to 1975, the inflation factor was considered only for the COD.

Pharmacists in the state of Wisconsin are reimbursed inadequately for the pharmaceutical service they provide to recipients of third party payment program benefits. The findings of this study should be considered by third party administrators and adjustments of dispensing fees initiated.

Similar studies should be completed at least bi-annually to measure changes in COD(WIS). In this manner, third party administrators would have valid cost data on which to base dispensing fee adjustments. This recommendation will become even more important as the number of citizens participating in third party payment programs increases.

## BIBLIOGRAPHY

### Books

- Boyd, Harper W., Jr., and Ralph Westfall, Marketing Research Text and Cases, Richard C. Irwin, Inc.: Homewood, Ill., 1972.
- Hays, William L., and Robert L. Winkler, Statistics: Probability, Inference, and Decision, Holt, Rinehart, and Winston, Inc.: New York, 1971.
- The State of Wisconsin 1973 Blue Book, Distributed by Department of Administration, Document Sales and Distribution, 202 S. Thornton Avenue, Madison, Wisconsin, 1974.
- U. S. Bureau of the Census, Statistical Abstract of the United States: 1974 (95th edition), Washington, D.C., 1974.
- Wonnacott, Thomas H., and Ronald J. Wonnacott, Introductory Statistics for Business and Economics, John Wiley and Sons, Inc.: New York, 1972.

### Periodicals

- Abrams, Robert E., "The Professional Fee Concept," Bulletin of the Ontario College of Pharmacy (11:3), May 1962, p. 43.
- "A Look at 3rd-Party Prepaid Rx Plans," Journal of the American Pharmaceutical Association (NS10:1), January 1970, p. 52.
- "APhA, NARD Join Forces to Boost Rx Men's Economic Security," American Druggist Merchandising (168:1), July 1, 1973, p. 16.
- "APhA Push for Individualized Fees," Weekly Pharmacy Reports (23:48), December 2, 1974 (p. 1).

- Billups, Norman F., "The 1973 Kentucky Prescription Survey," The Kentucky Pharmacist (XXXVII:6), June 1974, p. 20.
- Billups, Norman F., "The Relative Stability of Drug Prices and Pharmacists Fees," Journal of the American Pharmaceutical Association (NS11:1), January 1971, p. 22.
- Billups, Norman F., and Donald D. Vogt, "Prescription Prices are Still the Best Buy When Compared with Other Goods and Services," Texas Pharmacy (91:11), November 1972, p. 16.
- Billups, Norman F., L. Randolph McGee, and Donald D. Vogt, "A Comparison of Prescription Charges and Pharmacists' Fees with Other Medical Charges," Texas Pharmacy (91:2), February 1972, p. 20.
- "Consumer Prices Had Slower Gain for December," Wall Street Journal (185:15), January 22, 1975, p. 3.
- "Cost Survey Wins Boost in Rx Fees," Drug Topics (118:22), November 18, 1974, p. 10.
- Cotton, Hugh A., "Kansas Experience with the Variable Professional Fee for Title XIX Prescriptions," The Wisconsin Pharmacist (42:9), September 1973, p. 322.
- Cotton, Hugh A., and T. Donald Rucker, "Prescription Cost Determination in Kansas," Journal of the American Pharmaceutical Association (NS12:8), August 1972, p. 412.
- Dee, Donald A., "Welfare Program Outlined...Additional Info Needed," Minnesota Pharmacist (29:1), October 1974, p. 42.
- "Drug Price Info for Doctors," American Druggist (169:12), June 15, 1974, p. 25.
- Fuller, H. J., "Canadian Community Pharmacy in 1972," The Canadian Pharmaceutical Journal (106:8), August 1973, p. 1.
- Fuller, H. J., "What Does it Cost to Dispense a Prescription?" Bulletin of the Ontario College of Pharmacy (18:1), January 1969, p. 22.
- Gagnon, Jean P., and G. Joseph Norwood, "Should You Accept the Fee on Prepaid Rx Insurance Contract?" Iowa Pharmacist (29:2), February 1974, p. 22.

- Granberg, C. Boyd, and James E. DeMuth, "Summary Report on a Prescription Survey," Iowa Pharmacist (24:11), November 1969, p. 19.
- "HEW Eyes Kansas Variable Fee as Answer to MAC-AAC Protests," American Druggist (171:5), March 1, 1975, p. 14.
- "How to Figure Cost of Filling Rx," American Druggist (161:12), June 15, 1970, p. 16.
- "How Inflation Can Strip You and What You Can Do About It," Drug Topics (118:20), October 21, 1974, p. 25.
- "Immediate Upward Adjustment of Rx Dispensing Fees Paid by the States," Weekly Pharmacy Reports (24:7), February 17, 1975 (p. 3).
- Jones, C. R., "What Pharmacists Think About Prepaid Rx Plans," Pharmacy Times (38:3), March 1972, p. 30.
- Kirk, Kenneth W., "A Review of Procedures for Pharmacists Who Participate in Wisconsin's Medicaid Program," The Wisconsin Pharmacist (42:10), October 1973, p. 356.
- "MBS Fee Hike," Michigan Pharmacist (72:4), April 1974, p. 19.
- "Medicaid Dispensing Fee Raised," Drug Topics (118:18), September 16, 1974, p. 8.
- Miller, Jacob W., "The Variable Fee," Minnesota Pharmacist (25:10), July 1971, p. 14.
- "N. S. Ph.S. Annual Meeting," The Canadian Pharmaceutical Journal (106:8), August 1973, p. 16.
- "Opposition Views on MAC Swamp HEW," Drug Topics (119:5), March 3, 1975, p. 5.
- "Pharmacy's Share of Prescription Dollar Continues to Rise," P. M. A. Bulletin (74:6), August 1974, p. 3.
- Polinsky, Max, "The Professional Fee: Another Look," California Pharmacist (18:5), November 1970, p. 8.
- Polinsky, Max, and Franklin S. Rice, Jr., "California Pharmacy Expense Study Operational Factors," California Pharmacy (15:8), February 1969, p. 11.
- Rucker, T. Donald, "Drug Insurance and Vendor Compensation," California Pharmacist (18:4), October 1970, p. 20.

- Siegelman, Stanley, "Medicaid is Exploiting You," American Druggist (170:1), July 1, 1974, p. 58.
- Siegelman, Stanley, "The State of Pharmacy Today," American Druggist (170:7), October 1, 1974, p. 17.
- Slavin, George F. Jr., "Financial Management," The Minnesota Pharmacist (25:2), November 1970, p. 8.
- "Stores Balk at Low Fees, Heavy Paper Work," Drug Topics (119:2), January 20, 1975, p. 10.
- "Third-Party Prescription Ratio Increases to Record 21.4%," American Druggist (169:8), April 15, 1974, p. 14.
- "Third-Party Rx Paper Work Will Cost \$1.5 Billion," Drug Topics (119:1), January 6, 1975, p. 6.
- "Third-Party Rx's Up 13%," American Druggist Merchandising (168:1), July 1, 1973, p. 24.
- Tice, Linwood F. (ed.), "The Fixed Professional Fee," American Journal of Pharmacy and the Sciences Supporting Public Health (143:3), May-June 1971, p. 75.
- "Variable Fee Study Part II: Prescription Dispensing Cost Survey," Michigan Pharmacist (10:1), January 1972, p. 6.
- "View in Washington: Demo Landslide in 1974 Means Enactment of National Health Insurance," Weekly Pharmacy Reports (23:45), November 11, 1974 (p. 2).
- Weil, Arthur W., "Pick a Card? Why You Should...Why You Shouldn't," Drug Topics (118:22), November 18, 1974, p. 22.
- Wertheimer, Albert, "Pharmaceutical Services - Some Necessary Distinctions," Journal of the American Pharmaceutical Association (NS13:5), May 1973, p. 260.
- Wertheimer, Albert, "Pricing Pharmaceutical Service - Art, Science, or Whim," Journal of the American Pharmaceutical Association (NS13:1), January 1973, p. 11.
- Wertheimer, Albert, "The Pricing of Professional Services," Journal of the American Pharmaceutical Association (NS11:1), January 1971, p. 26.

Miscellaneous Publications

The Lilly Digest 1974, Eli Lilly and Co.: Indianapolis, Indiana, 1974.

"Summary By State, East North Central, Wisconsin, 71 Stores," computer output, June 12, 1974 (Eli Lilly and Co.: Indianapolis, Indiana).

Uniform Accounting Manual for Pharmacies, National Pharmacy Insurance Council: Washington, D.C., 1975.

Correspondence

Personal communication with Kenneth William Look, August 1974.

Unpublished Materials

Adair, Bryan, "Prescription-Filling Costs of Community Pharmacies in Texas," unpublished report by the Bureau of Business Research, The University of Texas at Austin, November 1974.

Berki, Sylvester E., James W. Richards, and H. Ashley Weeks, "Prescription Dispensing in Twenty Pharmacies: Characteristics, Utilizers, Services, and Costs," unpublished paper presented at the American Pharmaceutical Association meeting, San Francisco, California, April 1971.

Dickson, W. Michael, and Christopher A. Rodowskas, Jr., "Third-Party Prescription Plans: An Exploratory Study of Community Pharmacist Time Allocation," Inquiry, in press.


Eddis and Associates, "Dispensary Fee Review: February 1974," unpublished report submitted to the Pharmaceutical Services Committee, Ontario Pharmacists' Association, 99 Avenue Road, Toronto, Ontario, February 1974.

Johnson, Robert C., "Era of Accountability," address presented to the National Association of Retail Druggists, Las Vegas, Nevada, October 1, 1974.

Look, Kenneth William, "An Analysis of the Cost of Dispensing Prescriptions in a Sample of Community Pharmacies," unpublished doctoral dissertation, University of Wisconsin, Madison, Wisconsin, 1974.

Ryan, Michael Richard, "An Analysis of the Work of Fifty Community Pharmacists in Northern Mississippi," unpublished doctoral dissertation, Department of Health Care Administration, University of Mississippi, May 1973.

Walker, Charles Alborn, "The Cost of Filling a Prescription in Texas," unpublished master's thesis, University of Texas, Austin, Texas, 1968.



APPENDICES

APPENDIX A

COVER LETTER AND QUESTIONNAIRE USED IN THE STUDY TO  
DEVELOP THE COD(WIS) FORMULA

THE UNIVERSITY OF WISCONSIN  
Madison 53706

School of Pharmacy  
425 N. Charter Street

4 March 1969

Dear Colleague,

What does it cost to dispense a prescription in your pharmacy? At the present time the Wisconsin Medical Assistance Program (Title XIX) generally pays the Blue Book price plus a \$2.00 fee for each Medicaid prescription you dispense. Is this fee "reasonable", inadequate, or may it be deemed 'too high'?

A new Federal regulation states, "The dispensing fee should be ascertained by analysis of pharmacy operational data which includes components of overhead, professional services, and profit."<sup>1</sup> This regulation plus the State's current budget deficit convince the Board of Directors of your Wisconsin Pharmaceutical Association that pharmacy soon will have to provide objective cost data. They strongly believe this type of analysis and its interpretation should be performed by the profession rather than by an outside agency.

Your cooperation in supplying requested data is vital to provide meaningful and representative figures without recourse to full-scale audits. WPhA's Board of Directors needs these data to deal intelligently in consultation with State and Federal government agencies.

The operational data requested, which only you can provide, will be kept confidential. Your pharmacy was one of 300 selected randomly from a list of all pharmacies in Wisconsin. Data from your pharmacy will be combined with that from other pharmacies to insure confidentiality.

Please complete the following questionnaire and return it in the enclosed envelope by 12 March 1969. Thank you.

Sincerely,

R. W. Hammel, Professor  
Pharmacy Administration

P.S. Please check here \_\_\_\_\_ if you want a confidential report of the computed dispensing costs for your pharmacy only.

<sup>1</sup>Federal Register (34:17) 25 Jan 69, p. 1244.

SURVEY ON THE COST OF DISPENSING  
PRESCRIPTIONS IN WISCONSIN

I. GENERAL INFORMATION

- A. Number of days pharmacy open per week \_\_\_\_\_ (number of days)
- B. Number of hours open per week \_\_\_\_\_ (number of hours)
- C. Do you routinely provide 24-hour emergency service?    yes \_\_\_\_\_    no \_\_\_\_\_
- D. Do you routinely deliver prescriptions?    yes \_\_\_\_\_    no \_\_\_\_\_
- Approximately what % of all prescriptions are delivered? \_\_\_\_\_ % of Rx's
- E. Do you routinely offer a charge account service?    yes \_\_\_\_\_    no \_\_\_\_\_
- Approximately what % of all prescriptions are charged? \_\_\_\_\_ % of Rx's
- F. Do you routinely maintain a patient record system?  
(i.e. individual records, by patient name, of all Rx's dispensed)    yes \_\_\_\_\_    no \_\_\_\_\_
- G. Do you own or rent your pharmacy building?    own \_\_\_\_\_    rent \_\_\_\_\_

II. PHARMACY OPERATIONAL DATA

NOTE: Accounting data should be used from the most recent twelve month period for which you have records, or from your latest fiscal year. These itemized data are necessary to compute dispensing costs using different recommended cost accounting techniques.

For your pharmacy, this twelve month period ended on \_\_\_\_\_, 19\_\_\_\_.
month day

(If exact figures are unavailable, please write "estimate" where necessary. If more convenient, enclose your income and expense statement and please go on to II. C.)

II. A. TOTAL NET SALES OF PHARMACY \$ \_\_\_\_\_

II. B. OPERATING EXPENSES

- Owner's or manager's withdrawal or salary (do not include net operating profit) \$ \_\_\_\_\_
Employees' wages, including part-time personnel. \$ \_\_\_\_\_
Other employee benefits (bonuses, pension, funds, etc.). \$ \_\_\_\_\_
Rent (if you own your building, estimate the rent for comparable quarters). \$ \_\_\_\_\_
Taxes (except on buildings, income, & profit, but include Social Security payments) \$ \_\_\_\_\_
Insurance (except on buildings) \$ \_\_\_\_\_
Advertising \$ \_\_\_\_\_
Depreciation (except on buildings) \$ \_\_\_\_\_
Heat, light, and power \$ \_\_\_\_\_
Delivery, including auto expense for business purposes \$ \_\_\_\_\_
Telephone \$ \_\_\_\_\_
Licenses, dues, and subscriptions \$ \_\_\_\_\_
Accounting, legal, & other professional fees \$ \_\_\_\_\_
Miscellaneous expenses \$ \_\_\_\_\_
TOTAL OPERATING EXPENSES (do not include cost of goods sold) \$ \_\_\_\_\_

II. C. FROM YOUR BALANCE SHEET

Total assets of your pharmacy \$ \_\_\_\_\_
Total liabilities of your pharmacy \$ \_\_\_\_\_

III. PRESCRIPTION DEPARTMENT SUMMARY

- A. 1. Total original and renewal prescriptions dispensed in the same 12 month period (number of Rxs)
2. Total prescription volume \$ \_\_\_\_\_
3. Approximate % of all Rxs dispensed that are for Wis. Medical Assis. Program (Title XIX) beneficiaries % of Rxs
B. Total floor area of your pharmacy sq. ft.
Total floor area of the Rx Dept. sq. ft.

C. PERSONNEL EXPENSES

NOTE: To allocate the pharmacy's personnel expenses to your Rx Dept., please give the salaries and the estimated % of time spent by all personnel in Rx Dept. duties. The % of time spent in Rx Dept. duties should include dispensing time, plus time for related ordering, record keeping, delivery, etc.

<u>Personnel</u>	<u>Number</u>	<u>Total wages &amp; salaries</u>	<u>% of time spent in Rx Dept. duties</u>
Owner or manager	_____	\$ _____	_____ %
Full-time RPhs	_____	\$ _____	_____ %
Part-time RPhs	_____	\$ _____	_____ %
Interns	_____	\$ _____	_____ %
Sales clerks	_____	\$ _____	_____ %
All other personnel	_____	\$ _____	_____ %

D. What do you believe to be the annual "going wage" for salaried pharmacists in your area of the state?

\$ \_\_\_\_\_ per year

E. Do any factors increase or decrease your total dispensing costs for Rxs dispensed under Title XIX?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

F. If you keep records of the cost of the drugs you dispense, please submit the following information for the same 12 month period. If unavailable, please provide data for the most recent month.

These records cover the period \_\_\_\_\_ through \_\_\_\_\_, 19\_\_\_\_\_.

Total number of prescriptions dispensed \_\_\_\_\_

Total prescription volume \$ \_\_\_\_\_

Total prescription cost (your acquisition cost) \$ \_\_\_\_\_

\_\_\_\_\_  
Name of pharmacy

Thank you for your cooperation!

APPENDIX B  
PRETEST COVER LETTER AND QUESTIONNAIRE

The University of Wisconsin  
School of Pharmacy

14 Oct 74

Dear Colleague,

Has your cost of operating the prescription department increased in the past five years? A study of 1968 data provided our last reliable estimate of the average cost of dispensing prescriptions in Wisconsin. It is important to update that study because of the changing economic conditions in recent years.

A \$2.00 dispensing fee was paid under the Kerr-Mills program in the mid-1960's. On 1 July 66, the same fee was incorporated into Title XIX coverage in Wisconsin's Medical Assistance Program(WMAP). On 1 May 71, the \$2.00 dispensing fee was increased under WMAP to \$2.20 for those meeting four requirements for "special service" pharmacies. The 20 cent increase recognized the added costs of providing these services, but did not consider any overall change in the cost of dispensing inherent in an inflationary period.

The Board of Directors of your Wisconsin Pharmaceutical Association needs cost of dispensing data to consult with State and Federal government agencies and other third-party payment organizations. WPhA's Board of Directors believe this type analysis should be done within the profession.

Your pharmacy was one of 600 selected randomly from a list of all community pharmacies in Wisconsin. Please complete this form and mail it in the enclosed envelope by 21 Oct 74. Your help in completing this anonymous questionnaire is needed to insure the validity of the study.

The collective findings of the survey will be used to prepare a more current estimate of the average cost of dispensing a prescription, and the results will be reported in The Wisconsin Pharmacist.

If you have any questions about the study, please call either W. Allen Daniels-(608)238-5515 or R. W. Hammel-(608)262-2890.

Your help would be greatly appreciated.

Sincerely,

Pharmacist R.W. Hammel  
Professor  
Pharmacy Administration

Pharmacist Paul A. Holberg  
A.F.P.E. Fellow  
Pharmacy Administration

Confidential Survey of the Cost of Dispensing  
a Prescription in Wisconsin

PART I GENERAL INFORMATION

NOTE: Replies to all questions should refer to the most recent twelve month period for which you have records, or from your latest fiscal year. For your pharmacy, this twelve month period ended on:

\_\_\_\_\_, 197\_\_  
(month) (day)

- A. Number of days pharmacy was open per week (Check one) 5 6 7
- B. Number of hours pharmacy was open per week . . . . . (number of hours) \_\_\_\_\_
- C. Did you provide 24-hour emergency service? ( ) yes ( ) no
- (1) If yes, how was this service publicized?
- Emergency number given to local physicians ( )
  - Emergency number listed in telephone directory ( )
  - Emergency number posted in pharmacy entrance ( )
  - Other (please specify) . . . . . ( )
- D. How many prescriptions did you deliver on a typical or average day? (Excluding hospital and nursing home deliveries). . . ( ) \_\_\_\_\_
- E. Did you routinely maintain a patient record system? (i.e., individual records, by patient or family name, for all patients) ( ) yes ( ) no
- F. Population of the community where your pharmacy is located:
- (1) under 2,500 . . . . . ( )
  - (2) 2,500 to 4,999. . . . . ( )
  - (3) 5,000 to 49,999 . . . . . ( )
  - (4) 50,000 to 99,999. . . . . ( )
  - (5) 100,000 to 500,000. . . . . ( )
  - (6) over 500,000. . . . . ( )

G. Please estimate the continuing education costs for prescription department personnel (pharmacists and interns) paid for by the pharmacy, including:

- Professional association meetings\*
- Professional publications
- Seminars\*
- Courses\*
- Other professional programs\*

\$ \_\_\_\_\_  
(continuing education costs)

\*Continuing education costs should include wages paid to relief pharmacists while regular pharmacists are attending these meetings, seminars, courses, or programs.

**PART II PHARMACY OPERATIONAL DATA**

- A. TOTAL NET SALES OF THE PHARMACY (same 12 month period) \$ \_\_\_\_\_
- B. TOTAL OPERATION EXPENSES (do NOT include cost of goods sold) . . . . . \$ \_\_\_\_\_

**PART III PRESCRIPTION DEPARTMENT SUMMARY**

- A. Total number of prescriptions (ORIGINAL AND RENEWAL) dispensed in the same 12 month period . . . . . \_\_\_\_\_  
(Number of Rx's)
- B. Total (ORIGINAL AND RENEWAL) prescription sales . . . . . \$ \_\_\_\_\_  
(dollars)
- C. Prescription sales allocated by type of reimbursement (percentage estimate) . . . . .
 

(1) cash . . . . .		%
(2) personal charge . . . . .		%
(3) credit card . . . . .		%
(4) Title XIX . . . . .		%
(5) other third-party . . . . .		%
TOTAL . . . . .	100	%
- D. What was the approximate total dollar volume for prescriptions which were dispensed for all nursing home patients (private and third-party pay)? . . . . . \$ \_\_\_\_\_  
(dollars)

**PART IV PROFESSIONAL PERSONNEL EXPENSES**

NOTE: To allocate the pharmacy's professional personnel expenses to your prescription department, please list the salaries including employment costs and the estimated % time spent by these personnel in all prescription department duties, including record keeping, ordering, billing and related activities.

PHARMACY PERSONNEL	NUMBER	TOTAL WAGES & SALARIES**	% OF TIME SPENT IN RX DEPT. DUTIES
Pharmacist owner(s) or manager		\$ _____	%
Full-time pharmacists (Not included above)		\$ _____	%
Part-time pharmacists		\$ _____	%
Interns		\$ _____	%

\*\*Wages and salaries should include the employer's contribution to Social Security, Unemployment Compensation Insurance, plus any pension, retirement, profit sharing or insurance provided as a fringe benefit.

Please review the questionnaire before mailing to assure all questions have been answered accurately.

APPENDIX C

MAIN COVER LETTER AND MAIL QUESTIONNAIRE

CENTER FOR HEALTH SCIENCES  
THE UNIVERSITY OF WISCONSIN-MADISON  
MADISON, WISCONSIN 53706

SCHOOL OF PHARMACY  
Pharmacy Building  
425 North Charter Street

14 Oct 74

Dear Colleague,

Has your cost of operating the prescription department increased in the past five years? A study of 1968 data provided our last reliable estimate of the average cost of dispensing prescriptions in Wisconsin. It is important to update that study because of the changing economic conditions in recent years.

A \$2.00 dispensing fee was paid under the Kerr-Mills program in the mid-1960's. On 1 July 66, the same fee was incorporated into Title XIX coverage in Wisconsin's Medical Assistance Program (WMA). On 1 May 71, the \$2.00 dispensing fee was increased under WMA to \$2.20 for those meeting four requirements for "special service" pharmacies. The 20 cent increase recognized the added costs of providing these services, but did not consider any overall change in the cost of dispensing inherent in an inflationary period.

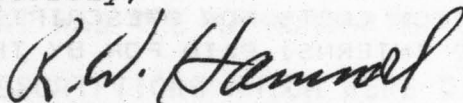
The Board of Directors of your Wisconsin Pharmaceutical Association needs cost of dispensing data to consult with State and Federal government agencies and other third-party payment organizations. WPhA's Board of Directors believe this type analysis should be done within the profession.

Your pharmacy was selected randomly from a list of all community pharmacies in Wisconsin. Please complete this form and mail it in the enclosed envelope at your earliest convenience, if at all possible, before 21 Oct 74. Your help in completing this anonymous questionnaire is needed to insure the validity of the study.


The collective findings of the survey will be used to prepare a more current estimate of the average cost of dispensing a prescription, and the results will be reported in The Wisconsin Pharmacist.

If you have any questions about the study, please call either W. Allen Daniels-(608)238-5515 or R.W. Hammel-(608)262-2890.

Sincerely,



Pharmacist R.W. Hammel  
Professor  
Pharmacy Administration



Pharmacist Paul A. Kolberg  
A.F.P.E. Fellow  
Pharmacy Administration

*Your help will be greatly appreciated*

PART II PHARMACY OPERATIONAL DATA

- A. TOTAL NET SALES OF THE PHARMACY(SAME 12 MONTH PERIOD) \$ \_\_\_\_\_
- B. TOTAL OPERATING EXPENSES(DO NOT INCLUDE COST OF GOODS SOLD) . . . . . \$ \_\_\_\_\_

PART III PRESCRIPTION DEPARTMENT SUMMARY

A. TOTAL NUMBER OF PRESCRIPTIONS(ORIGINAL AND RENEWAL) DISPENSED IN THE SAME 12 MONTH PERIOD . . . . . \_\_\_\_\_ (NUMBER OF RX'S)

B. TOTAL (ORIGINAL AND RENEWAL) PRESCRIPTION SALES . . . . . \$ \_\_\_\_\_ (DOLLARS)

C. PRESCRIPTION SALES ALLOCATED BY TYPE OF REIMBURSEMENT (PERCENTAGE ESTIMATE) . . . . .

(1) CASH . . . . .	_____ %
(2) PERSONAL CHARGE . . . . .	_____ %
(3) CREDIT CARD . . . . .	_____ %
(4) TITLE XIX . . . . .	_____ %
(5) OTHER THIRD-PARTY . . . . .	_____ %
TOTAL . . . . .	<u>100</u> %

D. WHAT WAS THE APPROXIMATE TOTAL DOLLAR VOLUME FOR PRESCRIPTIONS WHICH WERE DISPENSED FOR ALL NURSING HOME PATIENTS(PRIVATE AND THIRD-PARTY PAY)? . . . . . \$ \_\_\_\_\_ (DOLLARS)

APPENDIX D  
PROJECTED SAMPLE SIZE REQUIRED

The formula used to estimate the sample size was:<sup>1</sup>

$$n = \frac{k^2 c^2}{r^2}$$

n = necessary sample size, assuming simple random sampling

k = 2 when one wishes to take only a five percent chance of not having an adequate sample size

c = coefficient of variation =  $\sigma/M$  (100%)

$\sigma$  = expected standard deviation

M = expected mean value

r = percentage within which universe mean is to be estimated (assume 5%)

The following assumptions were made:

- (1) The expected standard deviation would equal the standard deviation of the mail sample (0.4665) in the Wisconsin study of 1968.<sup>2</sup>
- (2) The expected mean will equal \$2.00.
- (3) The expected usable response rate would be at least 15 percent.

- 
1. Harper W. Boyd, Jr., and Ralph Westfall, Marketing Research Text and Cases, Richard D. Irwin, Inc.: Homewood, Ill., 1972, pp. 372-373.
  2. Kenneth William Look, "An Analysis of the Cost of Dispensing Prescriptions in a Sample of Community Pharmacies," unpublished doctoral dissertation, University of Wisconsin, Madison, Wisconsin, 1974, p. 90.

Using the formula:

$$c = \frac{0.4665}{2.00} (100\%) = 23.325$$

$$n = \frac{(2)^2 (23.325)^2}{(5)^2} = 87.05$$

Therefore, the required number of usable responses is approximately 87. Assuming a usable response rate of approximately 15 percent, the total sample size should be at least 580 ( $87 = 15\% \times 580$ ).

APPENDIX E

COPY OF PUBLISHED APPEAL TO PROSPECTIVE RESPONDENTS

# COMMUNITY PHARMACIES ASKED TO PARTICIPATE IN IMPORTANT RESEARCH PROJECT

Dear Allen:

In accordance with our discussions with you this summer, Paul Holberg and I have developed a simplified format to up-date our estimate of the average cost of dispensing a prescription in Wisconsin. The short, anonymous questionnaire will be sent to a sample of about one-half of all community pharmacies in the state during the middle of October.

Since a high rate of response is important to assure validity of the study, we will appreciate your notifying

WPhA members of our cooperative effort in an appropriate issue of *The Wisconsin Pharmacist* as well as urge questionnaire recipients to participate in the research project.

Sincerely,

R. W. Hammel, Professor  
of Pharmacy Administration  
School of Pharmacy  
University of Wisconsin

---

## MEMO

**TO: All Wisconsin Pharmacists**

**RE: PARTICIPATION IN IMPORTANT ECONOMIC RESEARCH PROJECT**

As a valuable service to its members, The Wisconsin Pharmaceutical Association is cooperating with Professor Robert W. Hammel and Mr. Paul Holberg, R.Ph., in a research project to develop information relating to the average cost of dispensing a prescription in Wisconsin.

During the middle of October about one-half of all community pharmacies in Wisconsin will receive a short questionnaire requesting certain economic data.

A high rate of response is essential to assure the

validity of this study. The Wisconsin Pharmaceutical Association urges all recipients of the questionnaires to complete the form accurately and return it to Dr. Hammel as soon as possible.

Competent research involving the economics of pharmacy will be of genuine value to the profession. Your cooperation with this project will be most helpful.

Allen Daniels, R.Ph.

Executive Director

Wisconsin Pharmaceutical Association

200

APPENDIX F  
ONE-WAY ANALYSIS OF VARIANCE

The usual hypothesis tested using analysis of variance is:

$$H_0 : \bar{x}_1 = \bar{x}_2 = \bar{x}_3 = \dots = \bar{x}_j, \text{ where}$$

$\bar{x}_{1,2,\dots,j}$  = the mean value of the variable in question  $\overline{\text{COD(WIS)}}$  for each subgroup. There are  $j$  subgroups.

The alternative hypothesis is just:

$$H_1 : H_0 \text{ is false}$$

Before  $H_0$  can be tested, the sum of the squares within  $\overline{\text{SS(within)}}$  and the sum of the squares between  $\overline{\text{SS(between)}}$  must be calculated.<sup>1</sup> Let  $x_{ij}$  represent each individual observation where,

$i$  = the  $i^{\text{th}}$  observation within each subgroup

$j$  = the  $j^{\text{th}}$  subgroup.

For example, in a sample with a total of 60 observations ( $N$ ) divided into three subgroups of 20 observations ( $n_j$ ) each,  $i$  would range from one to 20 and  $j$  would equal one, two, or three. The fourth observation in subgroup two would be represented as  $x_{4,2}$ .

$$\text{The SS(within)} = \sum_{j=1}^j \sum_{i=1}^i (x_{ij} - \bar{x}_j)^2 \text{ and}$$

---

1. William L. Hays and Robert L. Winkler, Statistics: Probability, Inference, and Decision, Holt, Rinehart and Winston, Inc.: New York, 1971, pp. 706-726.

$$SS(\text{between}) = \sum_1^j n_j (\bar{x}_j - M)^2 \text{ where,}$$

- $n_j$  = the number of observations in subgroup  $j$  and,  
 $M$  = the overall mean for the entire sample and,  
 $N$  = the total number of sample observations.

Individual observations in any sample will differ from each other, or show variability. When the observations are classified by some characteristics, the  $SS(\text{within})$  reflects chance or unexplained variation. The  $SS(\text{between})$  reflects chance variation, as well as explained variation due to the classification of the subgroups.

The mean square between groups  $[\overline{MS}(\text{between})]$  is equal to  $SS(\text{between})$  divided by the degrees of freedom. There are  $J-1$  degrees of freedom for  $MS(\text{between})$ . The mean square within groups  $[\overline{MS}(\text{within})]$  is equal to  $SS(\text{within})$  divided by the degrees of freedom. There are  $N - J$  degrees of freedom for  $MS(\text{within})$ .  $MS(\text{within})$  and  $MS(\text{between})$  are two variance estimates which should be the same, given that  $H_0$  is true. In other words, the ratio  $\frac{MS(\text{between})}{MS(\text{within})}$  should equal one if  $H_0$  is true. The F-ratio, with  $J-1$  and  $N-J$  degrees of freedom, is used to test if the two variance estimates are equal and, thus, if  $H_0$  is true.

#### Hypothetical Example

Assume a sample contains 15 pharmacies ( $N=15$ ). The pharmacies are classified into three groups ( $J=3$ ) based on

their percentage of prescription volume paid for by Title XIX. The three groups are as follows: (1) less than five percent, (2) five to ten percent, and (3) greater than ten percent. There are four pharmacies in group one ( $n_1=4$ ), five pharmacies in group two ( $n_2=5$ ), and six pharmacies in group three ( $n_3=6$ ).

The COD(WIS)s for the pharmacies can be tabulated as follows:

<u>Observation</u>	<u>Group</u>		
	<u>1</u>	<u>2</u>	<u>3</u>
1	\$1.90	\$2.05	\$2.15
2	1.95	2.06	2.15
3	2.00	2.10	2.20
4	1.98	2.15	2.30
5	--	2.10	2.25
6	--	--	2.25
Means	$\bar{x}_1 = \$1.96$	$\bar{x}_2 = \$2.09$	$\bar{x}_3 = \$2.22$

The SS(within) for each group is:

$$\begin{aligned} \text{Group 1: } & (1.90-1.96)^2 + (1.95-1.96)^2 + (2.00-1.96)^2 + \\ & (1.98-1.96)^2 = (-0.06)^2 + (-0.01)^2 + (0.04)^2 + \\ & (0.02)^2 = 0.0036 + 0.0001 + 0.0016 + 0.0004 \\ & = \underline{0.0057} \end{aligned}$$

$$\begin{aligned} \text{Group 2: } & (2.05-2.09)^2 + (2.06-2.09)^2 + (2.10-2.09)^2 + \\ & (2.15-2.09)^2 + (2.10-2.09)^2 = (-0.04)^2 + \\ & (-0.03)^2 + (0.01)^2 + (0.06)^2 + (0.01)^2 = \\ & 0.0016 + 0.0009 + 0.0001 + 0.0036 + 0.001 = \\ & \underline{0.0063} \end{aligned}$$

$$\begin{aligned}
 \text{Group 3: } & (2.15-2.22)^2 + (2.15-2.22)^2 + (2.20-2.22)^2 + \\
 & (2.30-2.22)^2 + (2.25-2.22)^2 + (2.25-2.22)^2 = \\
 & (-0.07)^2 + (-0.07)^2 + (-0.02)^2 + (0.08)^2 + \\
 & (0.03)^2 + (0.03)^2 = 0.0049 + 0.0049 + 0.0004 + \\
 & 0.0064 + 0.0009 + 0.0009 = \underline{0.0185}
 \end{aligned}$$

The total SS(within) is equal to 0.0305 (0.0057 + 0.0063 + 0.0185). The degrees of freedom for MS(within) is equal to N-J (15-3) or 12. Thus,  $MS(\text{within}) = \frac{0.0305}{12} = \underline{0.00254}$ .

The sample mean (M) equals \$2.11. The SS(between) for each group is:

$$\text{Group 1: } 4(1.96-2.11)^2 = 4(-0.15)^2 = 0.09$$

$$\text{Group 2: } 5(2.09-2.11)^2 = 5(-0.02)^2 = 0.002$$

$$\text{Group 3: } 6(2.22-2.11)^2 = 6(0.11)^2 = 0.0726$$

The total SS(between) equals 0.1646 (0.09 + 0.002 + 0.0726). The degrees of freedom for MS(between) equals J-1 (3-1) or 2. Thus,  $MS(\text{between}) = \frac{0.1646}{2} = \underline{0.0823}$ .

The F-ratio is  $\frac{MS(\text{between})}{MS(\text{within})} = \frac{0.0823}{0.00254} = 32.40$ . The critical F-ratio value with 2 and 12 degrees of freedom at a 99 percent confidence level is 6.93. Since the calculated F-ratio (32.40) exceeds the critical F-ratio (6.93), we can reject  $H_0$  at a 99 percent level of confidence. Note that the alternative hypothesis ( $H_1$ ) does not say that all the subgroup sample means are unequal, nor does it tell where

any inequality exists. Other types of analysis are necessary to determine where inequalities exist.