A comparison of alternative pharmacy fee systems in a community hospital was studied.

A retrospective analysis of FY 80 financial reports for an 83 bed community hospital was used. This data base was used to determine the economic impact of various pharmacy charging systems in a typical community hospital and to ascertain if any relationship exists between charges and work standards at the study hospital.

Pharmacy revenue under the traditional and flat per diem fee system generated considerable revenue, but the revenue did not reflect a relationship to the work standards used in the study hospital. Pharmacy in-patient service units (primarily products) were underpriced while I.V. piggyback service units were overpriced in relationship to suggested revenue by work standards. This analysis reaffirms the criticism that pharmacy fees do not reflect work standards and are in need of change.
This study suggests that some simple applications of specific work standards or those in the current pharmacy literature can aid the pharmacy director in justification of pharmacy fees.
A Comparison of Alternative Pharmacy Fee Systems in a Community Hospital

by

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I would like to thank Doug Stennett and Dean Ohvall for their support during my off-campus graduate work endeavor. Dean Ohvall's encouragement to finish this endeavor is greatly appreciated.

Finally, a great deal of my gratitude for the completion of this degree goes to my family. My wife, Ruth Ann, sons Kevin and Kurt, endured with me to see this project completed. At times it was difficult to share time between a full time job, family, and further educational endeavors. As the end arrives, a feeling of victory overcomes one, making it all worth the effort.
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A COMPARISON OF ALTERNATIVE PHARMACY FEE SYSTEMS
IN A COMMUNITY HOSPITAL

I. INTRODUCTION

Hospital pharmacy operations in the United States have grown rapidly over the years, both in scope of services offered and in the number of employees that are providing these pharmaceutical services. The growth of comprehensive pharmacy services throughout the nation's hospitals is centered around (1) the advent of more specially trained pharmacists from the colleges of pharmacy, (2) from a strong push by the accreditation bodies, more specifically, the Joint Commission on Accreditation of Hospitals (JCAH), to adhere to standards of practice, and finally, (3) through the efforts of the professional associations itself, like the American Society of Hospital Pharmacists through its "Minimum Standards for Pharmacies in Institutions" (1, 5, 14).

With the expansion of hospital based pharmaceutical services, it was inevitable that the increased costs would be part of an overall concern by outside forces, mainly various third-party payers and governmental agencies (2). An editorial appearing in the February 1979 issue of American Journal of Hospital Pharmacy on "Economics of Hospital Pharmacy Practice" (3) pointed out that while most services are paid for on a cost accrual basis by third-party reimbursement system, skyrocketing costs have necessitated a much closer review by the many third-party payers. Their objectives have been to halt the sentiment
of many politicians that only legislation can control the future of inflationary health care costs. Still others raised the questions that all citizens really wanted to know, "How or why did it cost so much to deliver the health care services, and are the prices charged appropriate?" Certainly, this question is frequently raised in hospital pharmacy operations. In March 1979, a series of articles appeared in the *American Journal of Hospital Pharmacy* (4, 6, 7, 8, 9, 10) dealing with "Economics of Hospital Pharmacy Practice--Charging for Services" in which the diversity was reaffirmed. Cohn and Milius (10), writing for *The Washington Post* on "The Business of Health," pointed out that most hospital bills are works of fiction and that charges for services of certain departments, such as pharmacy, lab, and other ancillary services, are inflated far above actual cost, frequently to help keep room rates down in the eyes of the public.

An editorial in the same issue cited at least four reasons why hospital pharmacists should want to change systems of charging (4). The editor's comments were (1) charges are irrational, bearing little relationship to the cost of providing these services and varying widely from one provider to another; (2) the charging methods may make it difficult to obtain approval of new pharmaceutical services, since this would mean raising drug costs more in the face of cost containment efforts, (3) the charging methods are a disincentive for clinical services, since good clinical services reduce drug use, thus reducing income from drug charges, and (4) the charges harm the image of pharmacy,
because no relationship exists between the costs of the drugs in the community and in the hospital.

Indeed, this series of articles and others (11, 12) continue to suggest that, while pharmacy is part of the big picture in hospital bills, it may be time to move ahead with a more aggressive evaluation of pharmacy charging systems. To determine the validity of these editorial charges, a study of an 83 bed Oregon hospital was undertaken.

**Objectives**

The objectives of this study were to:

1. Determine if the (per dose) income units generated by the dose fee and per diem pharmacy charging systems are related economically to the pharmacy work standards.

2. Develop, if needed, a modified pharmacy charging system, based on established industrial engineering work standards for an 83 bed hospital.

**Review of the Literature**

A variety of charging systems are used by hospitals to capture revenue from pharmacy services. These generally reflect approaches outlined in the literature as:

1. **DOSE FEE SYSTEM** (7) Historically, this has been the most popular system used for hospitals and is sometimes given the label "traditional." Working on the principle that the patient
should only be charged for medication administered, the system utilizes either manual accounting records in pharmacy or medication administration records from the nursing service to generate a final pharmacy bill for the patient. The pricing program contains a formula created by the pharmacy service and hospital financial officer. A basic formula would be:

\[
(Cost \ of \ Medication)(Mark-up) + (Dose \ Fee)(Doses \ Given) = Patient \ Charge \quad [Eq. \ 1]
\]

The basic dose fee frequently varies among different products as an attempt is made to seek an equitable distribution of costs based on time involved, as well as direct and indirect costs to operate the department. A typical list of dose fee categories might include:

a. Oral, unit dose (solids and liquids)
b. Injections, unit dose
c. Injections, multiple dose vials
d. Non-prescription drugs (i.e. aspirin, etc.)
e. Intravenous therapy (large volume)
f. Intravenous therapy (small volume)
g. Prescription drugs in multiple use containers
   (i.e. ointments, creams, etc.)

The dose fee system offers a number of advantages in that:
(1) the patient or third-party payer is given an itemized bill for all pharmaceutical charges by most hospital operations;
(2) the system covers medication costs in the fee; (3) the revenue from the department can be both projected and adjusted;
(4) the patient pays for products received; and (5) the dose fee system generates good statistical reports on drug usage.

An alternative dose fee system, called the flat-fee MAR (Medication Administration Record) system has been outlined by Wyatt (9) to overcome much of the third-party payer opposition to per diem concepts. The flat fee system merely charges a flat fee for each oral, injection, or suppository dose, regardless of the acquisition cost of the drug. Exceptions to the flat-fee MAR concept include: charging of intravenous therapy drugs, topicals, injectables costing more than specified dollars per dose, and various miscellaneous items, both prescription and non-prescription items. The advantages of the flat-fee MAR approach over the standard dose fee system are: (1) reduction in hours devoted to the pricing function and maintenance of accurate price lists; and (2) reduction of hours needed in the business office and nursing units to properly account for drug charges.

According to the literature, all dose fee systems have substantial disadvantages and are in need of change (4, 6, 7, 8, 9). Without the assistance of a computer, the pricing functions require many laborious hours, except as outlined in the modified flat fee system, result in late charges and variable charges for the same drug, and lost revenue due to oversight. However, in addition to these problems, various authors (4, 6, 7, 8) consider the major disadvantage is the lack of a sound mechanism for payment of clinical services.
provided to patients, resulting in a product only fee system. This is somewhat offset by study completed by Strandberg et al. (19) in a number of West Coast hospitals, whereby these hospitals developed fee structures for clinical services similar to product fees as part of a total patient pharmacy bill.

In general, the literature would support that the dose fee system orientation to products could easily over-shadow newer clinical service charges and potentially not accurately reflect work standard times needed to deliver the products and clinical services.

2. PER DIEM FEE. The concept of some type of daily pharmacy charge has appeared in the pharmacy literature for over a decade (15, 16), yet the practice neither has been widely used nor accepted. Part of the reluctance of this approach can certainly be found in the attitude of the third-party payers who have been comfortable for so long with the dose fee system. However, as pharmacy productivity has been associated with cost containment, newer and more effective ways were sought to utilize available staffing in the pharmacy department. One of the areas identified as very labor intense was the pricing job associated with dose fee systems (6, 7, 8, 9). Because of the desire to continue many innovative pharmacy programs or expand others, pharmacy managers began to look for a system that would both save labor and provide a basis for pharmacy charges that would reflect the services offered, especially those that fall into the clinical services area.
The per diem approach was one answer (6, 8).

As in the dose fee system, several different approaches are offered in the literature for the development of per diem fees. A simple flat fee concept would merely use the projected pharmacy revenue divided by the projected patient days, to arrive at a basic daily per diem fee. Obviously, because of the public relations problems with this concept, it is not utilized today. The approach most often suggested utilizes a sample review of different types of patients over a period of time to determine an average range for activities associated in treating different patient types.

Dirks and Pang (8) outlined a product-service per diem fee in which an evaluation of six categories of patients was completed to determine the average daily charges for pharmaceutical services and drugs. The study excluded intravenous solutions, serum albumin, drugs given in the intensive and cardiac care units, and drugs costing more than $10.00. All of these were billed separately. The advantage of this approach is a reduction in hours devoted towards pricing functions and emphasis upon reimbursement of the pharmacists' professional time, regardless of the doses the patient received.

Smith and Weiblen (6) defined yet a different approach to rational pharmacy fees, utilizing product cost, per diem fees, and fees for special clinical services. Under this approach, drug products are charged separately and appear on the patient's bill as a separate charge per drug item based on the hospital
The per diem charge represents many basic pharmaceutical services each hospitalized patient receives, among which are drug purchasing and inventory control, department management, drug information services, dose preparation, order interpretation, therapy monitoring, and pharmacists' availability to physicians and nurses. The per diem rates represented an evaluation of pharmacy personnel time per patient in different patient groupings: critical care patients, general care patients, and minimal care patients. The final fee area covered special clinical services which are unique to selected patients and are based on average professional time needed by the pharmacist to complete the specialized task.

The proponents of the modified per diem approach cite as advantages: (1) establishment of a basic fee for professional services; (2) special fees for specific unique services; (3) comparison of hospitals on the per diem fee; and (4) revenue that is not subject to drug products only.

The disadvantages identified in the literature are limited primarily to its sparse use by hospitals. The major objection was identified as the reluctance of third-party payers to accept this approach, generally due to a lack of clear understanding of the objectives of the per diem concept (6). A secondary concern was the exclusion of intravenous drug admixtures, expensive drugs, and some patient care areas (6, 8).

3. MODIFIED CHARGING SYSTEM APPROACH. A review of the literature would suggest that the search for pharmacy charging
fee systems was not over, and the profession has not yet found the ultimate system in the part of pharmacy operations. During 1980, some references (17, 20) have suggested that the growing trend towards utilization of work standards in pharmacy departments must somehow be tied into the charging system. Such an approach would certainly begin to answer the editorial (4) charges outlined in the American Journal of Hospital Pharmacy in March 1979.

Various other sources, most frequently those associated with government health care programs, have promulgated rules that affect reimbursement to the hospital, including the pharmacy. Because of these regulations and the growing constraint on federal dollars associated with health care programs (22), any modified charging systems would have to meet the government regulations as they affect the overall hospital rates. Through work standards, as a component of pharmacy charges, the hospital cost-based reimbursement agreement for federal and state programs could be more easily justified.
II METHODOLOGY

Institutional Background

Dwyer Community Hospital (DCH) is an 83 bed, acute care, non-profit hospital. The pharmacy department is staffed by licensed pharmacists and supportive staff from 6:30 A.M. to 11:00 P.M., seven days a week. Pharmacy services include a centralized unit drug dose distribution system, intravenous admixture service for both large and small volume parenterals, out-patient services, and clinical services. Among the clinical services are cardio-pulmonary response (CPR), discharge consultation, pharmacokinetic consultation, oncology consultations, drug information services, patient education on special drugs, and TPN services. In addition, the department operates cart exchange systems for drugs in ancillary departments and has assigned hours for administrative and clerical work such as patient billings and inventory control. The department utilizes a pharmacy computer system in its operation.

In recent years, the pharmacy department was the only ancillary service department in the hospital which had not raised its rates on an annual basis. The general reason cited was that rates currently charged under the dose fee system were generally higher than similar hospitals in the market area, according to various hospital monitoring reports (18).
It was the feeling of the director and other hospital officials that, indeed, some review of the dose fee charging system must be undertaken.

The premise for this assumption was that, while the system generated the necessary revenue, the charges might not be appropriate. A review of Table I indicates that the current charging system generated 12.6% of the hospital revenue, a substantial amount for this ancillary service, while similar hospitals generated 8-10% of the hospital revenue (18).

Methods

The comparison of alternative fee systems was based on the financial reports utilized by the hospital during the 1980 fiscal year. Among the reports (21) used were:

1. Accounts Receivable Procedure Analysis
2. Statement of Revenue and Expenses
3. Statement of Gross Profit--Pharmacy
4. Statement of Gross Profit--I.V.
5. Statistics Based on Admissions
6. Statistics Based on Discharges
7. Hospital Work Standards for Pharmacy Service

The literature review was used to develop a list of criteria which would allow the identification of an acceptable pharmacy charge system. The following criteria were chosen:

1. The methodology used to determine the service fees of the pharmacy should take into account all activities performed by the pharmacy staff.
## TABLE I  FY 80 STATISTICS

<table>
<thead>
<tr>
<th>ACTUAL</th>
</tr>
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<tbody>
<tr>
<td><strong>1. Gross Hospital Revenue</strong></td>
</tr>
<tr>
<td><strong>2. Gross Pharmacy/I.V. Revenue</strong></td>
</tr>
<tr>
<td>a. Pharmacy</td>
</tr>
<tr>
<td>1) In-patient</td>
</tr>
<tr>
<td>2) Out-patient</td>
</tr>
<tr>
<td>3) Other</td>
</tr>
<tr>
<td>b. I.V. Therapy</td>
</tr>
<tr>
<td><strong>3. Service Units (Individual Doses)</strong></td>
</tr>
<tr>
<td>a. Pharmacy</td>
</tr>
<tr>
<td>1) In-patient</td>
</tr>
<tr>
<td>2) Out-patient</td>
</tr>
<tr>
<td>b. I.V. Therapy</td>
</tr>
<tr>
<td><strong>4. Total Worked Hours</strong></td>
</tr>
<tr>
<td>a. Pharmacy</td>
</tr>
<tr>
<td>1) Hours per day</td>
</tr>
<tr>
<td>b. I.V. Therapy</td>
</tr>
<tr>
<td>1) Hours per day</td>
</tr>
<tr>
<td><strong>5. Revenue Per Service Unit</strong></td>
</tr>
<tr>
<td>a. Pharmacy</td>
</tr>
<tr>
<td><strong>6. Patient Activities</strong></td>
</tr>
<tr>
<td>a. Total Admissions</td>
</tr>
<tr>
<td>1) Medical Unit</td>
</tr>
<tr>
<td>2) Surgical Unit</td>
</tr>
<tr>
<td>3) ICU/CCU Unit</td>
</tr>
<tr>
<td>b. Patient Days</td>
</tr>
</tbody>
</table>
2. The methodology used should be easy to implement and require a minimum amount of time and monetary commitment.

3. The methodology used should utilize data already available at the hospital with a minimum of new data collection needed in any alteration of the fee system.

4. The data and fees generated from the methodology should be acceptable to third-party payers under reimbursement agreements.

5. The fees should reflect charges that can be justified by the pharmacy work standards (time) per activity.

6. The methodology should be fair and equitable to each patient receiving services, assuring appropriate fees for services provided.

The criteria developed were used to evaluate the systems identified in the literature search. Evaluation was done by reviewing the results of different systems against the criteria, thereby arriving at a management decision.
III RESULTS

Hospital Dose Fee System

The current hospital dose fee system employs a price formula as suggested in the literature (7). A number of different dose fees were employed to represent the anticipated variables associated with different types of medications and routes of administration of the medications. Table II outlines the current dose fee system utilized.

As indicated in Table II, the dispensing fees were designed to cover most situations that can arise. The fees were based in part on the trends in the community as well as in similar hospitals, according to the hospital reporting systems (18). The economic impact of this dose fee charging system for pharmacy services during the FY 80 year was $1,020,897, or 97% of the total pharmacy revenue generated. The balance was generated in the non-exempt out-patient area of the pharmacy service.

This can further be broken down into $595,807 from pharmacy in-patient services and $325,121 from I.V. services, specifically large volume parenterals and related equipment. The pharmacy in-patient revenue represented a total of 190,273 service units (primarily made up of chargeable items, i.e. one tablet = one service unit) during FY 80, or 521 units/day. The hospital had 18,981 patient days in FY 80, which meant that each patient
TABLE II  DWYER COMMUNITY HOSPITAL PHARMACY DOSE FEE SYSTEM

1. Orals (solids, tablets and capsules):

   $ 0.00----5.00/C cost  $0.05 + 0.55 = 0.60 minimum charge
   5.01----10.00/C cost  0.10 + 0.55 = 0.65 patient charge
   10.01----15.00/C cost  0.15 + 0.55 = 0.70 patient charge
   15.01----20.00/C cost  0.20 + 0.55 = 0.75 patient charge
   20.01----25.00/C cost  0.25 + 0.55 = 0.80 patient charge
   25.01----30.00/C cost  0.30 + 0.55 = 0.85 patient charge

   This could continue at $5.00 increments to find patient charge.

2. Liquids:  

   cost of drug + 0.80 dispensing fee = patient charge

3. Injectables:

   cost of drug + 15% mark-up + $3.25 dispensing fee = patient charge

4. Injectables (small volume parenterals):

   cost of drug + 15% + $5.00 dispensing fee = patient charge

5. Injectables (large volume parenterals):

   cost of solution + 15% + $10.00 dispensing fee = patient charge

6. Non-prescription items:

   cost of product + $2.00 dispensing fee = patient charge

7. Out-patient drugs:

   cost of product + 15% + $3.25 dispensing fee = patient charge
received an average of 10 in-patient service units per day.

**Alternative Pharmacy Fee Systems**

**Per Diem System**

The hospital had conducted only a preliminary review of the per diem approach for pharmacy service fees. As outlined in the literature, the simplest approach to per diem is an unsophisticated projection at the beginning of each fiscal year on a flat fee basis. The advantage of this system lies in its simplicity of operation. The disadvantage is primarily the risk involved in projecting the wrong figure, the question of inappropriate charges for some patients, and the exclusions that must be made to make the concept acceptable to third-party payers and patients. A review of this approach from an economic impact position for the study hospital indicates the following results in Table III.

As shown in Table III, the daily charge under this system would be rather substantial to each patient. The flat fee per diem system, while a basic starting point, would require considerable adjustment to properly reflect the correct per diem charges for different patient service areas and would require elimination of high priced medications to gain acceptance by the patients in low use medication areas such as obstetrics. A basic formula used to arrive at a flat per diem fee would be as follows:
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacy Service Units Forecast</td>
<td>211,130</td>
</tr>
<tr>
<td>Pharmacy In-patient Revenue Forecast</td>
<td>$549,556</td>
</tr>
<tr>
<td>Patient Days Forecast</td>
<td>19,440</td>
</tr>
<tr>
<td>Service Units/Patient Day</td>
<td>10.86</td>
</tr>
<tr>
<td>Daily Per Diem for Pharmacy Services</td>
<td>$28.27</td>
</tr>
</tbody>
</table>
Projected Revenue/Projected Patient Days = Per Diem Fee for Pharmacy \[\text{Eq. 2}\]

Projected Revenue/Projected Patient Days = Per Diem Fee for I.V. \[\text{Eq. 3}\]

As pointed out in the literature, the arguments against the flat fee per diem are fairly easy to understand. First, the fees are arbitrarily established without any evaluation of the number of doses used by patients under different levels of patient care, and secondly, patients are known to receive a wide variety of different medications with variable costs. These concerns generally require any hospital reviewing its pharmacy charging formulas to determine whether a modified alternative fee system or the dose fee system fulfills more of the hospital's criteria than the flat fee concept.

Alternative Per Diem Systems

Modified per diem charge systems (6, 8) have been suggested as a more rational approach towards pharmacy service fees. Based on the FY 80 hospital forecast of 10.0 medications per patient day, an additional analysis of medications used by different patient service areas was completed (Appendix I).

Service areas reviewed were (1) medical unit, (2) surgical unit, (3) intensive-coronary care unit, and (4) obstetrical unit. Based on the FY 80 pharmacy in-patient revenue ($595,807), each one of the 190,273 service units had an average monetary value of $3.13. Table IV shows the economic impact of a modified per diem
<table>
<thead>
<tr>
<th>Hospital Service Area</th>
<th>Average Doses/Patient</th>
<th>Per Diem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Medical</td>
<td>8.97</td>
<td>$28.08</td>
</tr>
<tr>
<td>2. Surgical</td>
<td>7.78</td>
<td>$24.35</td>
</tr>
<tr>
<td>3. ICU/CCU</td>
<td>11.55</td>
<td>$36.15</td>
</tr>
<tr>
<td>4. OB</td>
<td>5.90</td>
<td>$18.47</td>
</tr>
</tbody>
</table>

Mean Value------$26.76
fee based on average medications used by patients in four different service areas.

Figures in Table IV were calculated using the following formula:

\[
\frac{\text{Pharmacy Revenue}}{\text{Pharmacy Service Units}} \times \text{Average Doses} = \text{Projected Per Diem/Service Area} \quad \text{[Eq. 4]}
\]

Data shown in Table IV reflects the economic impact of the per diem system outlined by Dirks and Pang (8). Utilization of this approach would satisfy established criteria #1, 2, 3, 4, and 6; but fail to meet Criterion #5. This approach is not an ideal concept from the work standard prospective required in criterion #5.

A second approach based on the Smith (6) concept would remove the cost of drugs and charge at hospital acquisition cost to the patient. Table V shows the impact of these adjustments.

Use of this approach would reduce the daily per diem charge to a more acceptable figure from a consumer's viewpoint while charging each patient acquisition costs for actual drugs used. Criteria #1, 2, 3, 4 and 6 would be met, but #5, work standards, would not be covered. Assuming that a relationship exists between the pharmacy personnel time to provide service to various patient areas and the average doses per patient day, an extrapolation of this can be used to project an adjusted per diem fee based on personnel time. The calculations can be done from available data bases, either actual or forecast from the following equations:
TABLE V  ECONOMIC IMPACT BASED ON FY 80 PHARMACY SERVICE
COSTS EXCLUDING DRUGS FOR IN-PATIENTS

1. In-patient Pharmacy Revenue $595,807
   Less Drug Costs for In-patients $192,858
   In-patient Pharmacy Revenue $402,949
   Average Service Unit Drug Cost = $1.01
   Average Service Unit Gross Revenue = $2.12

<table>
<thead>
<tr>
<th>Hospital Service Area</th>
<th>Average Doses/Patient</th>
<th>Per Diem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Medical</td>
<td>8.97</td>
<td>$19.01</td>
</tr>
<tr>
<td>2. Surgical</td>
<td>7.78</td>
<td>$16.49</td>
</tr>
<tr>
<td>3. ICU/CCU</td>
<td>11.55</td>
<td>$24.49</td>
</tr>
<tr>
<td>4. OB</td>
<td>5.90</td>
<td>$12.51</td>
</tr>
</tbody>
</table>

Mean Value----$18.13
\[
\text{Service Area (Average Doses/Day)} = \frac{\text{Sum of all Averages}}{} \quad [\text{Eq. 5}]
\]

\[\text{i.e.} \quad \frac{\text{Medical (8.97)}}{\text{Sum 34.2}} = 0.26 \text{ SAF}\]

\[
\frac{\text{Gross Pharmacy Revenue}}{\text{Hours Paid}} = \frac{\text{Revenue/Hour}}{} \quad [\text{Eq. 6}]
\]

\[\text{i.e.} \quad \frac{\$716,043}{7,785} = \$91.98 \text{ Revenue/Hour}\]

By multiplication of the service area factor times the revenue per hour, we can show a modified per diem fee based on projected personnel time to service patients in that hospital area.

Table VI reflects the economic impact using actual gross pharmacy revenue and hours worked during FY 80. Gross pharmacy revenue was $716,043 while hours paid were 7,785, equating to a revenue need of $91.98 for each hour paid for all pharmacy services provided.

This approach to establishment of per diem fees closely resembles the criteria used by Smith et al. (6) and adjusts the personnel time according to the service areas requiring the most doses. As shown in Tables V and VI, the per diem fees calculated from this approach reflect appropriate charges based on known or forecast activity in a given area. However, without a good work sampling as suggested by Smith et al. (6), the average doses may not accurately reflect the time needed in any given service.
<table>
<thead>
<tr>
<th>Service Area</th>
<th>Service Area Factor (SAF)</th>
<th>Per Diem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Medical</td>
<td>0.26</td>
<td>$23.91</td>
</tr>
<tr>
<td>2. Surgical</td>
<td>0.23</td>
<td>$21.16</td>
</tr>
<tr>
<td>3. ICU/CCU</td>
<td>0.34</td>
<td>$31.27</td>
</tr>
<tr>
<td>4. OB</td>
<td>0.17</td>
<td>$15.64</td>
</tr>
</tbody>
</table>

Mean Value----$23.00
area. While better than a flat fee per diem system from an appropriate patient charge viewpoint, the variable per diem fee concept has an equally high probability for error.

Fee System Based on Work Standards

In July 1979 the hospital administration began a study of the pharmacy service by an outside consulting firm to establish work standards to assist in the cost containment through better staff utilization and productivity. Prior to completing the pharmacy service, the firm had completed a nursing service study and projections called for the other areas of the hospital to be part of this hospital-wide program. The standards established along with those in the literature have been suggested as a new way to look at pharmacy service charges to establish which system best relates to fees charged and services offered (17, 20).

Shown in Table VII is the industrial engineering standard for the study hospital. In addition to the hours shown, a constant factor of 28.5 hours per week was allocated for clerical tasks such as pricing, inventory, and stocking. A factor of 16 hours per week was allowed for administrative tasks for the department. Other unscheduled tasks were referred to as special activities, but this area was limited to a maximum of 6 hours per week, or approximately 3% of paid hours. Emergencies, where the pharmacist participates on the cardiac arrest team, were classified as special activities.
## TABLE VII  DWYER COMMUNITY HOSPITAL PHARMACY WORK STANDARDS

<table>
<thead>
<tr>
<th>Standard Hours&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Minutes/Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In-patient services</td>
<td>0.218 hrs</td>
</tr>
<tr>
<td>2. I.V. services (LVP &amp; SVP)</td>
<td>0.147 hrs</td>
</tr>
<tr>
<td>3. Chemotherapy</td>
<td>0.479 hrs</td>
</tr>
<tr>
<td>4. TPN Starts</td>
<td>0.638 hrs</td>
</tr>
<tr>
<td>5. TPN Maintenance</td>
<td>0.205 hrs</td>
</tr>
<tr>
<td>6. Special I.V. solutions</td>
<td>0.301 hrs</td>
</tr>
<tr>
<td>7. Out-patients</td>
<td>0.160 hrs</td>
</tr>
<tr>
<td>8. Clerical hours per week</td>
<td></td>
</tr>
<tr>
<td>9. Administrative hours per week</td>
<td></td>
</tr>
</tbody>
</table>

A complete description of what each work standard includes is found in the Appendix II.

<sup>a</sup>Standard hours for each category were developed by work sampling. Additionally, a 90% overall staff utilization goal was established by the study firm. Therefore, forecasted hours will reflect a 10% increase to account for the 90% utilization goal.
From the FY 80 hospital procedure analysis report, adjustments were made to relate the service units to the industrial engineering units. This was accomplished by removing the in-patient I.V. piggyback units and discharge drug units. The resulting 14,976 I.V. piggyback units and 4,013 discharge drug units resulted in net service units of 171,284 during FY 80, which were directly related to the work standard of 0.218 standard hours for each patient day. Likewise, the I.V. piggybacks were related to the 0.147 standard hours for each patient drug order to be given by I.V. piggyback, regardless of the number of doses of the drug the patient might receive in a day.

The use of standard units by the industrial engineering firm is symbolic of many pharmacy standards because these data points are readily available each day. However, to accurately reflect constant hours as a part of the standards for evaluating an alternative charging system, the following equation was used:

$$\frac{\text{Average Constant Hours/Day}}{\text{Average Daily Hours/Revenue Area}} = \frac{\text{Percentage}}{\text{Standard Increase}}$$  [Eq. 7]

During FY 80, 2,314 constant hours were used, equating to 6.34 hours per day. From Table I, we noted that 69% of revenue is related to the pharmacy area; therefore, 4.37 hours can be added to the standards in the areas (in-patient and out-patient pharmacy). Standards for I.V. work are adjusted by 1.97 hours per day. The

1A computer printout of service unit activities reported by the pharmacy.
application of Equation No. 7 resulted in the revised work standards shown in Table VIII. Pharmacy areas were increased by 20% and I.V. areas by 16% to reflect constant hour allocation according to work standards.

As outlined previously, the actual pharmacy revenue was $716,043 and required 21.33 hours of staff time as shown in Table I. During FY 80 this was equated to a need of $91.98 of revenue per operational hour. A further breakdown of the FY 80 procedure analysis report showed that $595,807 of the pharmacy revenue was associated with the 18,981 patient day service units and the 3,993 intravenous piggyback service units. After the work standard study was completed the patient day service units were assigned 0.262 hour per unit while the intravenous piggyback units were assigned a work standard of 0.171 hours per unit. Table IX illustrates the staffing needs and forecast revenue when work standards were applied to the FY 80 data base.

Multihospital Work Standard Review

During 1979, Strandberg et al. studied four hospitals to determine pharmacy staffing patterns and percentage of time utilized each day on various functions. Table X outlines the study results (20).

The study hospital in this paper was part of this four hospital statistical base. During FY 80, average census was 52 patients requiring, according to Table VIII, 0.264 standard hours per patient for in-patient pharmacy services. Based on a 90% utilization
<table>
<thead>
<tr>
<th>Task</th>
<th>Standard Hours</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In-patient</td>
<td>0.262</td>
<td>15.72</td>
</tr>
<tr>
<td>2. I.V. Services (LVP &amp; SVP)</td>
<td>0.171</td>
<td>10.26</td>
</tr>
<tr>
<td>3. Chemotherapy</td>
<td>0.556</td>
<td>33.34</td>
</tr>
<tr>
<td>4. TPN Starts</td>
<td>0.740</td>
<td>44.40</td>
</tr>
<tr>
<td>5. TPN Maintenance</td>
<td>0.238</td>
<td>14.28</td>
</tr>
<tr>
<td>6. Special I.V. Solutions</td>
<td>0.350</td>
<td>21.00</td>
</tr>
<tr>
<td>7. Out-patients</td>
<td>0.192</td>
<td>11.52</td>
</tr>
<tr>
<td>Data Unit</td>
<td>Standard</td>
<td>Hours Needed</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>18,981 patient day service units</td>
<td>0.262</td>
<td>4973</td>
</tr>
<tr>
<td>3,993 intravenous piggyback service units</td>
<td>0.171</td>
<td>683</td>
</tr>
</tbody>
</table>

<sup>a</sup>Hours budgeted reflect a 90% utilization of staff, therefore represent 110% of hours needed.
**TABLE X  TIME ALLOCATIONS BASED ON FOUR HOSPITALS**

1. In-patient Activities--------------------------------- 25.6%
2. In-patient I.V.s---------------------------------- 10.3%
3. Clinical Pharmacy---------------------------------- 6.8%
4. Administrative------------------------------------- 11.7%
5. Non-productive Time------------------------------- 12.0%
6. Inventory Functions------------------------------- 14.0%
7. Out-patient-------------------------------------- 10.0%
8. Breaks/Lunch-------------------------------------- 10.0%
factor, the average census during FY 80 required 15.1 hours per
day for in-patient pharmacy services. As outlined earlier, the
hourly revenue ($91.98) generated a total of $1,388.90 during
each operational day. From Table X, time allocations for items
#1, 3, 4, 5, 6, and 8 (80.1%) most closely related to the study
hospital work standard of 0.264 hours. By multiplying the time
percentage against 21.33 average hours per day of pharmacy service
in the study hospital, the resultant value of 17.1 hours represented
a projected revenue of $1,572.86. The difference of $183.96 (11.7%)
suggests that the known diversities among this four hospital
research group produced results favorably close to a very specific
set of work standards at the study hospital. It further suggests
that directors can use single and multiple hospital work standards
or time allocations as a basis for effective review of appropriate
pharmacy service charges for products and clinical services.
The ability to use such literature standards is a major answer
to the editorial charges (4, 10).
IV DISCUSSIONS AND CONCLUSIONS

The comparison of alternative pharmacy fee systems evaluated in this study confirm many of the concerns expressed in the literature about pharmacy charging systems (4-10). The application of the alternative fee systems to data from the study hospital revealed some basic points that most hospitals planning a change must evaluate.

Among these are:

1. The traditional dose fee system is the currently accepted standard, and median groupings are readily available to most hospitals through the hospital financial reporting systems (18).

   Providing regular reports on revenue per patient day, expenses per patient day, hours worked per patient day, and others, the hospital can easily adjust its fees to be part of the norm. This philosophy is simple and easy to administer since it is product based. Additionally, it follows the basic business concept of profit on products sold. Unfortunately, to the professional pharmacist, the product has overshadowed the professional decision involved in the product and, in most cases, probably would not equate well with work standards as shown in Table IX.

2. The various per diem fee systems will only be effective with supportive data bases and appropriate work samples
to determine patient charges that become acceptable to the patient and the hospital's public relations goals.

The advent of more work standards for pharmacy services has greatly enhanced the ability to establish the number of pharmacy personnel needed in various pharmacy related activities. The greatest need will be specific time allocations for various service areas within the hospital as outlined by Smith et al. (6). Without such service area time assessments by sound work samplings, the pharmacy must revert to the more general standards in the literature, either per patient day as used in this study, or per task as identified in literature reference (17). The other problem faced in per diem fees relates to the difficulty of data bases that reflect drugs used in various service areas.

Finally, the per diem system must be approached as part of hospital public relations effort. The concept of charging for pharmacy services, even when no product is involved, is a major departure from what the patient has been accustomed. While easy for the pharmacist to understand, it is a major public relations challenge for the hospital and its employees.

3. The application of work standards to pharmacy service fees can assist in development of appropriate pharmacy charges for any system used: traditional dose fee, per diem, or variations of fee systems.
As the health care industry continues its efforts of cost containment, pharmacy service fees must be changed to at least reflect acceptable work standards. Traditionally, intravenous piggybacks, like other parenteral intravenous products were labor intense and the fees, in part, reflect the market rather than solely the pharmacy time. Smith et al. (6) excluded such parenteral products since these are patient specific rather than common to all patients. Likewise, making adjustments on intravenous piggyback fees from these data would be inappropriate.

The use of work standards can, however, be easily applied to many pharmacy fees through a simple formula:

\[
\text{Work Standard Forecast Revenue}
\]

\[
\text{8a - } \frac{\text{Forecast Revenue}}{\text{Forecast Paid Hours}} = \text{Revenue/Hour}
\]

\[
\text{8b - } \text{Revenue/Hour} \times \text{Work Standard} = \frac{\text{Forecast Revenue}}{\text{Per Unit}}
\]

\[
\text{8c - } \text{Revenue/Unit} \times \text{Projected Service Units} = \text{Forecast Revenue}
\]

The application of this formula to patient day service units and intravenous piggyback service units is shown in Table XII.

The results of Tables XI and XII clearly point out that the pharmacy charges shown were not tied to appropriate work standards. A review of the data points out that the actual patient day service fee was $22.91 (work standard based = $26.51) or $3.60 less than that needed by the hospital had the fees been based on work standards for this service area. Likewise, the intravenous
### TABLE XI  ECONOMIC IMPACT FROM ACTUAL FY 80 FINANCIAL REPORT

<table>
<thead>
<tr>
<th>Data Unit</th>
<th>Actual Revenue per unit</th>
<th>Actual Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>18,981 patient day service units</td>
<td>$22.91</td>
<td>$434,821</td>
</tr>
<tr>
<td>3,993 intravenous piggyback service units</td>
<td>$40.32</td>
<td>$160,986</td>
</tr>
</tbody>
</table>

FY 80 revenue for these service areas = $595,807
<table>
<thead>
<tr>
<th>Data Unit</th>
<th>Standard</th>
<th>Forecast Hours</th>
<th>Forecast Revenue/Unit</th>
<th>Forecast Revenue/Hour</th>
<th>Forecast Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>18,981 patient day service units</td>
<td>0.262</td>
<td>5470</td>
<td>$26.51</td>
<td>$91.98</td>
<td>$503,160</td>
</tr>
<tr>
<td>3,993 intravenous piggyback service units</td>
<td>0.171</td>
<td>751</td>
<td>$17.30</td>
<td>$91.98</td>
<td>$69,083</td>
</tr>
</tbody>
</table>

FY 80 forecast revenue for these service areas $572,243
piggyback service units generated $40.32 revenue for each service unit (work standard based = $17.30) or $23.02 more than that needed by the hospital if work standards had been used to determine intravenous piggyback fees. The resultant charges in these two areas of overall pharmacy service were $23,000 more than suggested by the work standards.

These results emphasize the criticism that can be anticipated by a hospital and its pharmacy manager when pharmacy charges are not tied to justifiable work standards. Of notable concern is the difference between actual revenue and forecast revenue using work standards in selected activities like intravenous piggyback service units. Appropriately, these charges could have been adjusted at the beginning of the fiscal year by the pharmacy manager and hospital financial officer through the use of Equation No. 8. Some variations from work standard forecast may still occur due to market place adjustments for different areas of the country or other factors associated with the health care industry over which little internal control exists. However, the key point for any pharmacy manager to understand is that through work standards, the beginning basis for a pharmacy service fee can be an acceptable work standard specifically designed for a hospital or extracted from the literature.

Finally, as pointed out in the literature, the "works of fiction" often associated with hospital bills could be clarified, rational charges developed, and a step towards fees for professional services other than products expanded through
improved and better pharmacy management as it relates to pharmacy service fees. Regardless of the pharmacy charging system, adjustments to pharmacy fees must be work standard based if the profession is to discard the yoke suggested in the literature. As the era of cost containment continues, the consumer will demand and deserves the profession's highest degree of integrity. One component of that integrity can be pharmacy service fees based on justifiable work standards.
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APPENDIX I

A random review of patients admitted to four different hospital service units was conducted for FY 80. Patients selected represent a twelve months time frame covering doses of medications defined as orals, injections, I.V. piggybacks and the length of stay.

<table>
<thead>
<tr>
<th>Unit</th>
<th>n</th>
<th>ORALS</th>
<th>INJ.</th>
<th>IVPGB</th>
<th>TOTAL</th>
<th>LOSa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Unit</td>
<td>28</td>
<td>1031</td>
<td>210</td>
<td>257</td>
<td>1498</td>
<td>167</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>36.8</td>
<td>7.5</td>
<td>9.18</td>
<td>53.5</td>
<td>5.96</td>
</tr>
<tr>
<td>Average Medications/patient/day = 8.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstetrics</td>
<td>18</td>
<td>217</td>
<td>68</td>
<td>22</td>
<td>307</td>
<td>52</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>12.1</td>
<td>3.8</td>
<td>1.2</td>
<td>17.1</td>
<td>2.88</td>
</tr>
<tr>
<td>Average Medications/patient/day = 5.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical Unit</td>
<td>41</td>
<td>616</td>
<td>233</td>
<td>37</td>
<td>879</td>
<td>113</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>15.0</td>
<td>5.7</td>
<td>0.9</td>
<td>21.4</td>
<td>2.76</td>
</tr>
<tr>
<td>Average Medications/patient/day = 7.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU/CCU Unit</td>
<td>15</td>
<td>475</td>
<td>178</td>
<td>112</td>
<td>774</td>
<td>67</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>31.7</td>
<td>11.9</td>
<td>7.5</td>
<td>51.6</td>
<td>4.46</td>
</tr>
<tr>
<td>Average Medications/patient/day = 11.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) LOS = Length of Stay
APPENDIX II
DEFINITION OF PATIENT CARE UNITS (PCU)

Dwyer Community Hospital

All pharmacy associated work falling in the definitions listed should be counted to establish a labor utilization report and staffing guide for the pharmacy service.

I. In-patient Medication Distribution: Includes all routine services provided for patients hospitalized. The unit of measure is the patient census at midnight with an allocation of 0.218 hrs/patient. Among the activities included are:
   a. Unit Dose Distribution
   b. Routine Order Clarification
   c. Clinical monitoring of patient profiles on routine basis.

II. Out-patient Medication Dispensing: Included in this standard of 0.160 hrs per medication is:
   a. Routine dispensing and consultation with patient
   b. Non-legend drug dispensing and consultation

III. I.V. Solutions: Included in this standard of 0.147 hrs I.V. order per day (i.e. one antibiotic order of six doses = one unit) are the following:
   a. L.V.P. fluids--one unit per each I.V. site
APPENDIX II (Continued)

b. I.V. piggybacks--one unit per each antibiotic or drug regimen via this route.

IV. Chemotherapy Starts: Included in this standard of 0.479 hrs is the basic analysis and preparation of chemotherapy drugs for a specific patient.

V. TPN Starts: Included in this standard of 0.638 hrs is the basic assessment and preparation of the initial TPN dose.

VI. TPN Maintenance: Included in this standard of 0.205 hrs is the preparation and assessment of each subsequent bottle of TPN solution, the daily follow-up of the patient.

VII. Special I.V. Medications: Included in this standard of 0.301 hrs is a variety of special I.V. medications and clinical protocols for such items as aminoglycoside dosing regimens, aminophylline infusion monitoring, continuous heparin infusion monitoring and preparations, total iron preparation, monitoring, and other unique solutions requiring clinical assessment and monitoring during therapy. Each bottle is counted as one unit.

Budgeted Allowance: A constant of 28.5 hours to be used for technician support in patient profile pricing, stocking, unit dose cart filling, and other associated functions.
APPENDIX II (Continued)

Administrative: A constant of 16 hours per week for an 83 bed hospital.

Special Activities: One time occurring functions, or special situations such as Codes, Extensive Drug Information Request, Meetings outside of hospital, Inervices, Interviews, Evaluations, JCAH obligations each month.