

AN ABSTRACT OF THE THESIS OF

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SERVICES IN A SMALL HOSPITAL

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A 24 bed community hospital was the setting where a comparison of shared and traditional pharmacy services took place. This study also provides a model for implementation of shared pharmacy services for health care professionals faced with improving the quality of patient care and controlling costs.

Curry General Hospital and Medical Services, consisting of a 24 acute care bed, non-profit community hospital in Gold Beach and a clinic in Port Orford and Brookings, was chosen as the site of the pilot Shared Pharmacy Services project. It is representative of the small hospitals of the southern Oregon coast and is geographically further removed from the referral center, Bay Area Hospital in Coos Bay. The Shared Pharmacy Services program decreased capital investments, decreased operating expenses and increased revenue totaling approximately \$22,650. This savings can be broken

down as follows: (1) group purchasing, \$3750; (2) decreased inventory, \$10,000; and (3) increased revenue, \$8900.

Other areas of decreased operating expenses were also found but specific measurements could not be determined within the time frame of this study. These include: (1) drug and poison information and (2) pharmacy and therapeutic project, formulary development.

The third area of financial concern was finding ways to better utilize existing monies in the hospital budget. The Pharmacy Inservice Education project produced an 8.5-fold increase in the hospital's inservice dollar purchasing power.

The cost of a shared regional pharmacist would be approximately \$20,000 including the benefit package available at Bay Area Hospital. The personnel costs of one pharmacy technician including the benefit package would be approximately \$10,000. It is anticipated that one pharmacist and one pharmacy technician would be needed to begin implementation of the Shared Pharmacy Services program to the other three hospitals. At a later date the services of another pharmacist may be needed. The maximum personnel cost of two pharmacists and one technician would be approximately \$50,000.

Similar financial benefits can be obtained by the other small hospitals in Bandon, Coquille and Reedsport through implementation of the Shared Pharmacy Services program. Decreased operating expenses and increased revenue amounting to \$50,600 could be

expected if the program were to be implemented by all four hospitals in the South Coast Area. Additionally, a reduction in capital investment of approximately \$40,000 could be realized which would increase the hospital's return on investment.

Each hospital will present some different problems, but they all are operated in the same basic manner as Curry General Hospital. The hospital personnel have similar backgrounds and educational experience. It is important to provide latest technology and knowledge available which can best be done by sharing the expense when resources are limited.

Shared Pharmacy Services program utilizing a shared regional pharmacist for Curry General Hospital and Medical Services has been shown to be both financially and clinically beneficial.

Comparison of Shared and Traditional Pharmacy
Services in a Small Hospital

by

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COMPARISON OF SHARED AND TRADITIONAL PHARMACY SERVICES IN A SMALL HOSPITAL

INTRODUCTION

The primary role of the institutional pharmacist has been to upgrade the level of pharmaceutical care in the nation's hospitals. There have been many accomplishments in this area across the country, but many smaller hospitals' services have not progressed due to economic constraints, lack of qualified personnel, and proper facilities and equipment. It is extremely difficult and costly for them to provide these services individually. This problem is compounded by requirements from the Joint Commission on Accreditation of Hospitals, Federal Medicare and State Medicaid programs. Hospitals have been organizing shared services programs to meet these requirements for improved health care with the existing economic, personnel and equipment constraints. Many successful programs have been developed elsewhere which encompass personnel, equipment and services between hospitals.

Goals of the Study

This study was developed to compare and evaluate a shared regional pharmacist and pharmacy services with the existing system of pharmacy services in a small rural hospital. In addition, this

study provides a model for implementation of shared pharmacy services for health care professionals faced with improving the quality of patient care and controlling costs.

Statement of Problem

Those hospitals under 100 beds have had many difficulties providing quality medical care within their budget limitations. The hospitals encompassed by Coos, Curry and southern Douglas counties on the southwest Oregon coast are no exception.

The largest population center in the two county area is composed of the two adjoining towns of North Bend and Coos Bay. The total population of this area is 22,000. Bay Area Hospital, located in Coos Bay, is a 140 bed, medical-surgical hospital accredited by the Joint Commission on Accreditation of Hospitals and serves as the first level of referral for the smaller hospitals in Coos, Curry and southern Douglas counties. This medical service area has four other hospitals in addition to Bay Area Hospital in Coos Bay, which include the following non-profit community hospitals: Coquille--30 acute care beds; Gold Beach--24 acute care beds; Bandon--30 acute care beds; and Reedsport--22 acute care beds and 20 long term care beds. Bandon, Reedsport, and Coquille are located 20 miles from Bay Area Hospital while Gold Beach is 80 miles away.

The total population for the service area is 75,700 as follows: Coos county, 58,100; Curry county, 13,200; and Reedsport (southern Douglas county), 4,400.²⁷ The cities of Coos Bay, North Bend, Bandon and Reedsport have experienced population growth over the past five years. The other cities and Curry county have declined in population for the same time period. During the 20 year period, 1970-1990, a 2.2 percent population decline is forecast.²⁰

Bay Area Hospital, which opened in May of 1974, has a comprehensive pharmacy service. The pharmacy provides services 24 hours a day and operates a hospital-wide unit dose and intravenous additive system. Outpatient service is provided to employees and Emergency Room patients. The pharmacy also operates an American Society of Hospital Pharmacists accredited residency program with two positions filled by Oregon State University graduate students and is developing an active clinical program. The four other hospitals in the service area are faced with budget constraints coupled with demands by accrediting agencies for improved medical and pharmaceutical services. All hospitals have a drug room supervised by the Director of Nursing. Three out of four hospitals have local community pharmacists acting as consultants but providing nothing more than short term drug supply needs. The fourth hospital has no acting pharmacy consultant and is in violation of the existing accreditation requirements.

Four of the five existing hospitals on the southern Oregon coast do not possess the financial and personnel resources to provide acceptable institutional pharmacy services.

REVIEW OF LITERATURE

In the early 1960's, the American Hospital Association approved a "Statement on the Changing Hospital."⁹ In that statement, hospitals were designated as the repository and custodian of a community's health resources. Brodie and Graber⁶ state that,

Numerous factors are contributing to this development. For example, the hospital is growing 'centrally' because of increased demands for its services, continual scientific specialization, and centralization of health resources. On the other hand, it is growing 'peripherally' since it is being required to extend its services into the community because of the forces created by the physician shortage in selected areas and the need for lessening the high density of patients at the hospital. Thus, the community hospital is growing 'inwardly' and 'outwardly' simultaneously.

Not only is there growth within the hospital but there is also growth between hospitals. Acute care hospitals have been organized in different levels of care, or a system of triage. Hospitals in the Portland, Oregon, area, for instance, have created "specialty" services that are not duplicated by their neighbors. Good Samaritan Hospital offers extensive neurological and ophthalmological specialties while the University of Oregon Health Science Center and Emanuel Hospital provide pediatric care.

According to Stull²⁵

Within a relatively short period, the development of interinstitutional relationships has become the most compelling challenge confronting organizational management and public policy. The underlying consensus is clear: The technological, financial and managerial requirements

of health services delivery no longer can be accommodated within traditional organizational boundaries.

Competition between institutions and regional jealousies must be minimized to ensure adequate facilities and personnel expertise in the hospitals of the future. Large, medium and small hospitals must coordinate their efforts both in systems and equipment as well as personnel.

Jaeger¹⁴ notes the dilemma concerning resources available to hospitals for the delivery of care to populations that are fixed in size and economical potential. When services are expanded by individual institutions to meet community needs, costs per unit of service increase; when services are not improved as needed, quality declines. "The support base required for the average hospital," he says, "already is beginning to exceed the resources and capacity available in many communities."

For more than one-half of United States hospitals, survival strategy includes investment in multiinstitutional arrangements and shared services in order to participate in the benefits of increased scale and volume.¹⁶ Latimer¹⁶ states that

Scale or volume has increased the availability of resources by 1) making resources affordable and, therefore attainable by spreading the costs of overhead, personnel, and equipment (cost motivation), and 2) providing access to resources that are scarce or that are not offered in appropriate packages (quality motivation).

Each year brings improvements in medical equipment that require large capital investments and more specialized personnel. Every hospital cannot afford many of the latest medical advancements or the required highly trained personnel. There are many examples each year of cooperative ventures in capital equipment, as well as administrative, professional and technical services.

Price²¹ cites the formation of Hospital Central Services, Inc. in Allentown, Pennsylvania, in 1967. The group started with seven hospitals and boasts a membership of 60 hospitals in 1977. Services began with a central laundry plant in 1968, and a blood bank was established in 1970. Since then, programs in group purchasing, credit and collections, microfilming and biomedical services have been started. Price concludes, "For the present, shared services continue to be an outstanding example of greater productivity and cost containment of hospitals."

Gilbertson¹² discusses the shared services potential in the professional and clinical areas. Two hospitals in Boise, Idaho, formalized a cooperative process of clinical services. St. Alphonsus and St. Luke Hospitals, which are six miles apart, engaged a consultant who recommended exclusive and concentrated clinical services for each. Two years after the institution of the program, a review showed that each hospital was able to provide better services in its specialty than either had been able to provide before the arrangement.

The two hospitals found that compromise was a mandatory element of the cooperative relationship, whether it be participating in a joint laundry or an extensive sharing of clinical services. In the final analysis each benefitted by sharing services.

A number of hospitals in the Minneapolis-St. Paul area have joined to implement shared services in laundry, printing, credit and collections, purchasing, warehousing and data processing.²⁴ In 1966 the desire to formulate a shared services group became evident and in 1969 the Affiliated Hospital Services (AHS), Incorporated was formed. By 1975, 33 hospitals representing 7,000 beds were participating in all or part of the shared services offered. To serve their needs, the association had 36 full-time, four part-time and several on-call employees as well as a fiscal year 1974-75 budget of one million dollars.

In 1972, Virginia Mason Hospital in Seattle, Washington, organized a cooperative effort in education.¹⁰ Nine other hospitals totaling 533 beds in rural western Washington joined Virginia Mason Hospital (292 beds) to improve the continuing education demands for nursing, pharmacy, respiratory therapy, housekeeping and dietary services. Many of these hospitals were over 100 miles away with the farthest being 170 miles.

Brodie and Graber⁶ discuss the arrangements that may be found in small hospitals where the pharmacy services are provided

from a local community pharmacy. Others feel that these relationships will continue but believe that some health care institutions, including small hospitals, will purchase drug related services from some form of group pharmacy practice.⁸ Numerous examples by which hospitals are sharing services are found in a study conducted by Blumberg.⁵

The Joint Commission on Accreditation of Hospitals (JCAH) has identified numerous criteria that must be met by pharmacy departments. Besides JCAH, state agencies have required many of the same criteria for accreditation of the pharmacy department. Meeting these requirements while keeping costs at a minimum has become a great challenge. Shared services have presented many viable alternatives in meeting cost and accreditation goals.

The group purchasing of drugs is usually the first shared pharmacy service attempted. Levinson¹⁷ writes

Unlike other industries where the expense dollar splits about 60% for supplies and 40% for payroll, the hospital spends some 70% for payroll and 30% for supplies and services. This disparity has long tended to divert hospital administrators' attention from the purchasing function because of its relative 'insignificance.' The 30%, however, represents billions of dollars each year and has become recognized as tremendously significant when viewed as a total hospital industry expenditure.

Because of the realization of potential savings and government pressure to reduce hospital costs, many cooperative programs have been developed in the purchase of drugs and intravenous solutions.

One of the first successful programs to reach the West Coast was the Commodities Purchasing Association (COMPASS)¹⁷ launched by four San Francisco Bay Area Hospitals in January 1962. By 1971 the membership had increased to 17. Within COMPASS there is a pharmacy committee consisting of the chief pharmacists from the five COMPASS hospitals in the San Francisco Bay area. This committee determines the feasibility of shared drug purchasing for individual drugs and negotiates contracts at considerable savings to the member hospitals. Although no specific percent savings was mentioned for the COMPASS pharmacies, the article stated "each hospital gained a better price, and, as expected, the smaller hospitals really hit the jackpot."¹⁷ This relationship holds true for all shared purchasing programs with the small hospital benefiting more because of increased purchasing power through increased volume from the group.

J.A. Bachynsky³ reported that group purchasing resulted in a reduction of the drug budget at participating hospitals in Ottawa, Ontario, by five percent. In addition, a large number of products not packaged in a suitable manner for the hospitals were repackaged by the manufacturers because the group volume made it economically feasible.

Garvin¹¹ states that a rural hospital using 5,000 doses of a drug annually may cut their costs for that product in half through group purchasing. He also found that through shared purchasing

programs large urban hospitals may reduce their costs by 10 to 15 percent.

McNab¹⁸ reported that, depending on the volume of certain drugs purchased, savings of up to 27.5 percent (\$72,585 savings on total purchases of \$264,000) could be realized. Another group of drugs represented a savings of 18.75 percent (\$75,000 savings on total purchases of \$400,000). One hospital reported its total drug purchases as \$197,775 with a savings of \$4,249 from drugs obtained through the shared purchasing program. The saving realized on total pharmacy purchases was 2.14 percent.

In an editorial by Summers,²⁶ small hospitals were identified as the beneficiary of the most dramatic savings, in terms of percentages, from group purchasing programs. The larger hospitals, because of volume, will end up with greater dollar savings. If group purchasing is used wisely with concern for all members it can be used as a means for both cost containment and financing improved clinical and administrative pharmacy services.

One of the first and most widely publicized shared service programs in pharmacy has grown out of the United Mine Workers of America Welfare and Retirement Fund.⁴ In 1955-56 the Miners Memorial Hospital Association was brought into being as a modern system of hospitals. During 1963-64, the hospitals were purchased by Appalachian Regional Hospitals (ARH), a non-profit corporation.

In 1971, ARH owned and operated a modern system of nine hospitals in the soft coal producing region of West Virginia, Kentucky, and Virginia. Five of the hospitals range in size from 50-99 beds, three range from 100-199 beds and the largest hospital has 215 beds. All hospitals take part in the central pharmacy purchasing program along with other shared administrative pharmacy services. These shared administrative pharmacy services include central printing of pharmacy forms and labels, equipment procurement, systems evaluation, personnel recruiting, management and warehousing. Some of the shared professional pharmacy programs reported were a central drug information center, coordination between inpatient and outpatient medication profiles and a centralized drug formulary.

Bachynsky² writes,

To date hospital pharmacists have cooperated with one another on a formal basis primarily in the area of group purchasing. This voluntary association has been useful and has led to other forms of mutual assistance on a sporadic basis.

Some of the areas that he has proposed for cooperative or shared service areas are:

1. Common drug policies and a shared formulary.
2. Central packaging and labelling.
3. Common forms and paper handling procedures.
4. Centralized drug information center and drug bulletin to support the day-to-day information function.

5. Central facilities for bulk compounding and the preparation of sterile products.
6. Centralized radiopharmacy unit.
7. Central education unit for continuing education of pharmacists and nurses and the training of health profession students as well as technicians and other paramedical staff.
8. Shared computer time for drug management and control.
9. Central research and analytical chemistry unit.

Bachynsky concludes that

Pharmacists should be the scientific advisors in the hospitals and provide a constant flow of informed opinion to the administrator. To do this he (sic) must be management oriented and be able to organize resources for their most efficient use. To the extent that this occurs, I am sure that the logic and benefits of inter-hospital cooperation will be apparent and be implemented.

West²⁸ reports of two hospitals, Holland City Hospital and North Ottawa Community Hospital in Michigan, who joined forces for packaging, purchasing and implementing of a shared unit dose service. The two hospitals, while 25 miles apart, were able to reduce their implementation costs on equipment, supplies and personnel without adversely affecting the unit dose program.

The demand for drug information and education is increasing dramatically and the pharmacy department of a hospital is becoming a major source. It takes considerable time and money to develop an

adequate library and provide the personnel for literature searches. Rosenberg and Paritore²³ reported on a drug information service developed at Valley Hospital in Ridgewood, New Jersey. Services are provided seven days a week to all interested professionals in northern Bergen County, which consists of 16 communities. They conclude that a similar drug information service can be created in other community hospitals. "The physicians and other health professionals have a need for rapid, comprehensive information, and providing this service through a community hospital is a logical way to fulfill this need." The cost to establish this specialized library was approximately \$6,000 while the maintenance cost is approximately \$2,000 to \$2,500 a year.

The idea of shared drug information services has been expanded and is best illustrated by the statewide service provided from the University of Kentucky Medical Center described by Amerson and Walton.¹ Utilizing Wide Area Telephone Service (WATS), service is provided to all areas of Kentucky.

Many other examples of drug information services are available from hospital-based to statewide facilities. There has developed a triaging of drug information with the simpler and less time consuming questions answered in the primary care areas to full scale literature search facilities at the state level for more time consuming requests.

Provost²² writes in an editorial "the record of accomplishments in voluntary regional planning has not been impressive." There are many duplications of services in large metropolitan areas and a gross lack of pharmaceutical services in rural areas. "Some studies of the feasibility of developing shared pharmaceutical services among independent hospitals have been conducted but much more work needs to be done."

METHODOLOGY

Description of the Study

Hospitals included in the study were those located at Coos Bay, Bandon, Coquille, Reedsport and Gold Beach. Curry General Hospital and Medical Services (CGH & MS), consisting of a 24 acute care bed, non-profit community hospital in Gold Beach and a clinic in Port Orford and Brookings, was chosen as the site of the pilot Shared Pharmacy Services project. It is representative of the small hospitals of the southern Oregon coast and is geographically farther removed from the referral center, Bay Area Hospital in Coos Bay. Previous pharmacy services consisted solely of a drug room. A local pharmacist was retained to supervise narcotic distribution and ensure that the hospital complied with Medicare and Medicaid pharmacy regulations. The ultimate responsibility in pharmacy services rested entirely with the Director of Nursing.

The administrators from the four small hospitals and the assistant administrators from Bay Area Hospital had formed a group to investigate shared services in other areas besides pharmacy at the time of implementation of the Shared Pharmacy Services study. These included services from accounting, nursing education, biomedical engineering, purchasing and laboratory.

Interviews with the administrators of the participating hospitals were conducted to develop the shared regional pharmacy services concept. The purpose of the interviews was to:

1. Familiarize the administrators with the national and international situation concerning shared pharmacy services.
2. Discuss the possible pharmacy services and the needs of the hospital at the local level and compare these needs to what is presently being provided.
3. Discuss present pharmacy expenditures.
4. Discuss a pilot test and implementation of the shared regional pharmacist and his services.
5. Discuss the analysis of the pre and post era of the shared regional pharmacy services project in one of the participating hospitals.
6. Discuss the determination of the economic feasibility of implementation.

A general session was held after the individual interviews with the participating administrators. Nine pharmacy services were defined which would provide the most economical and clinical benefit to the hospital while being practical.

Five areas classified as administrative pharmaceutical services were studied:

1. Group Purchasing.

2. Financial Data Review.
3. Staffing and Equipment Review for the Drug Distribution System.
4. Centralized Prepackaging.
5. Policy and Procedure Manual.

Four other areas classified as clinical pharmacy services were also studied:

1. Pharmacy Inservice Education.
2. Drug and Poison Information Services.
3. Pharmacy and Therapeutics Committee.
4. Intravenous Admixture System.

Implementation of the Study

Group Purchasing

Description of Old System. The Director of Nursing of Curry General Hospital had been given the responsibility for purchasing all pharmaceutical products. The primary source of supply was AMFAC, a wholesaler located in Eugene, which was five hours driving time from Gold Beach. Manufacturers' representatives who had direct purchasing accounts with CGH & MS also visited approximately every six weeks. When these two sources of supply were unable to

meet the hospital's needs, the local community pharmacy or the other area hospitals were called.

CGH & MS was not afforded the customary ten percent volume discount from AMFAC. Selected items did have a rebate from the manufacturer, but the rebate depended on the quantity purchased. When direct purchases were made, savings to the hospital were realized, but many manufacturers had a minimum quantity or dollar amount. This led to overstocking in many areas in order to take advantage of reduced prices.

The Manufacturers' representatives wrote drug orders for CGH & MS because the Director of Nursing would sometimes not be available for consultation. The representatives reviewed their stocks of medications in the drug room and ordered accordingly. This did not take into account medications stored at the nursing station or elsewhere in the hospital. There was little or no effort by the representatives to review their products for dating, which resulted in an overstock of supplies with many being outdated.

The wholesaler's representative would visit the hospital on a weekly basis to take orders composed of those items available only from the wholesaler and limited direct items. Again, the wholesaler's representative made no effort to review the hospital's medication supplies for outdated items.

Items that were needed from the wholesaler in between the representative's visits were telephoned to them and drugs were delivered via special carrier. Other forms of transportation used included personal auto from local pharmacy or neighboring hospitals. Occasionally state, county or local police assisted in delivering emergency medications.

A local community pharmacist had been retained as a consultant for the previous nine months. His sole function was to transfer narcotics from the drug room to the nursing station. He spent approximately one hour on Monday, Wednesday and Friday to carry out the narcotic transfer and maintain the narcotic records while being paid \$6.00 per hour for this function.

The hospital had a licensed drug room adjacent to the Director of Nursing office. The Director of Nursing was the only person who had a key to the room during the day shift. The evening and night charge nurse had emergency access only. A separate narcotic closet was in the drug room and only the Director of Nursing and the consulting pharmacist had access. All refrigerated items were kept on the nursing station.

When pharmaceuticals were ordered from the drug room, they were to be deducted from an inventory control card. This inventory control system had been developed by the Director of Nursing to keep a running account of medications received and issued.

Open access to the drug room was a continuing problem. The room was seldom secured during the day when the Director of Nursing was in the hospital. During the evening and night shifts the door was found open on many occasions in spite of an increased security effort. Staff nurses would obtain required medication themselves without deducting the amount from the inventory control cards. Medications were obtained in the same manner for emergency room patients by nurses or physicians. Other employees and physicians had relatively easy access to the drug room. This inappropriate procurement of medication led to the records not being an accurate reflection of the drug room inventory.

Description of New System. The Shared Pharmacy Services Group Purchasing program was designed to meet the following goals:

1. To maintain a small, well controlled inventory that is able to meet the medical needs of the institution.
2. To maintain an annual inventory turnover of four to six.
3. To implement an inventory control system to reduce financial loss from expired drugs.
4. To purchase medications at the lowest possible cost without sacrificing quality.
5. To have ready availability to all necessary therapeutic agents.

The group purchasing study covered a two month period, 5 March to 8 May, 1975. All pharmaceuticals were purchased through Bay Area Hospital except Schedule II drugs as defined by the Drug Enforcement Agency. Schedule II drugs were purchased through the wholesaler, as before, by the Director of Nursing. The Shared Pharmacy Services project investigator ordered supplies during the weekly visitation. A list of needed medications was reviewed and updated by the pharmacist prior to ordering. Items needed between visits were ordered by telephone from Bay Area Hospital.

Drug items were obtained from the existing stock at Bay Area Hospital Pharmacy and sent to CGH & MS by the mode of transportation required to meet the need. Items not available at Bay Area Hospital Pharmacy were obtained as soon as possible by ordering directly from the manufacturer, wholesaler or borrowing from another medical facility. Bay Area Hospital was responsible for arranging the appropriate transportation which included using:

1. Shared Regional Pharmacist rounds.
2. United Parcel Service.
3. Greyhound Bus Service.
4. State and County police.
5. Coast Guard helicopter.
6. United States mail.
7. Employees of requesting or issuing facility living near or

driving to the requesting area.

8. Special courier dispatched from Bay Area Hospital.

Collection of Data. Invoices were used to record the transactions between Bay Area Hospital and CGH & MS. The invoice supplied billing and credit information to the accountant and Director of Pharmacy at Bay Area Hospital and to the accountant for CGH & MS. In addition, the billing and credit information was also sent to the supervisors of the clinics when their services were involved in the group purchasing study. A copy of each transaction was also kept by the observer of the study.

Final billing for all merchandise was not done until after the study was completed to ensure that all receipts and credits were made. The price charged to CGH & MS was Bay Area Hospital's acquisition cost plus a transportation charge if an item was sent by common carrier.

Pre-project costs to CGH & MS were determined by:

1. Reviewing past purchasing methods with the Director of Nursing, the Clinic Supervisors and the accountant at CGH & MS.
2. Surveying pre-project invoices from manufacturers and wholesalers.
3. Surveying the cost of items purchased from the local community pharmacies.

A random sample was taken of 20 items, purchased by CGH & MS from the local community pharmacies, to determine the actual acquisition costs under the old purchasing system (Appendix A). Pre-project costs for these drugs were calculated at Bay Area Hospital costs plus 30 percent, a figure documented by a local community pharmacist.

Evaluation. The objective evaluation was conducted by comparing the prices for drugs charged by Bay Area Hospital, during the two month study period, with the calculated cost for these drugs using pre-project purchasing methods by CGH & MS.

The subjective evaluation was obtained by post-project interviews with the participants of the group purchasing project.

Financial Data Review

Description of Old System. During the pre-project interviews it was determined that the CGH & MS pharmacy pricing policy had no organization. The patient charge for drugs was calculated by doubling the acquisition cost and there was no attempt to maintain a current price list.

Upon discharge under the old pricing system the business office would receive the patient's medication administration record. The price was calculated directly from the record and written on the form. The prices were obtained from a list that had not been updated for

three years. Frequent errors in calculating what constituted a dose occurred. There was a general lack of knowledge in nursing and pharmacy terminology that was attributed to poor communications between the nursing staff and the business office.

Description of New System. In an attempt to make pharmacy charges more equitable by separating the drug costs from drug distribution costs, the "cost plus fee" system was tested.

An inservice education program was given to the business office by the Shared Regional Pharmacist and procedures were written for pricing of patient medication records.

The following patient pricing procedure for medications and pharmaceutical services delivered at Curry General Hospital was implemented to test the cost plus fee system:

1. A medication price list was maintained to reflect current acquisition cost. When price changes were noted on invoices or contracts, that information was used to update the drug pricing list.
2. The pricing of drug charges was completed not later than three working days after discharge of the patient.
3. Calculation of doses and fees.

Oral Dose - Any medication taken via the oral route.

The dose was calculated as the total quantity consumed at one given time. If two tablets were administered then the

total acquisition cost of the two tablets was added to one oral dose fee (\$0.35). In the case of liquid doses, the cost of the single dose at one given time was added to the oral dose fee.

Multiple Dose - Those medications which are packaged to provide more than one dose per container. The acquisition cost was added to the multiple dose fee (\$2.00).

Injectable Dose - Those medications requiring the intramuscular, intravenous or subcutaneous route of administration. The acquisition cost per dose was added to the injectable dose fee (\$2.50).

Large Volume Intravenous Dose - Fluids that are administered intravenously. When medications are added to the solution an additional fee was added to the large volume IV charge (\$7.70).

Piggyback Dose - Small volumes of IV fluids that are used to dilute medications prior to administration. The acquisition cost of the drug was added to the Piggyback fee (\$4.70).

4. In all cases, the dose was calculated as the total amount of medication administered at a specific time. The acquisition cost of that dose was then added to the specific fee determined by the route of administration. In the case of a dose

that consisted of two drugs given simultaneously, the acquisition of the two were totaled and added to a single fee.

Collection of Data. Eleven discharged patient drug charts were randomly selected and priced both by the Curry General Hospital system (drug cost times two) and a drug cost plus fee system used by Bay Area Hospital. The cost plus fee structure was as follows: oral unit dose fee, 35 cents; injection fee, \$2.50; multiple dose fee, \$2.00; large volume IV without additives, \$4.00; large volume IV with additives, \$7.70 plus ingredients; and Piggybacks, \$4.70 plus ingredients. The patient charges of the two methods were totaled.

Evaluation. The totals of the two drug pricing methods were compared to determine if there would be a change in pharmacy revenue.

Centralized Prepackaging

Description of Old System. Curry General Hospital and Medical Services did not have a way of obtaining drugs packaged in smaller quantities than those available from the manufacturers.

Description of New System. A centralized prepackaging operation, utilizing the facilities at the Bay Area Hospital pharmacy, was implemented. A preproject drug inventory was conducted at CGH & MS during which many expired medications were found. After completion of the inventory, those items that had expired or were in

excess of anticipated usage, as determined by the Director of Nursing, were recorded. During the Group Purchasing project, any items ordered in a quantity less than a manufacturer's unit of issue was made available by Bay Area Hospital. The availability of unit dose packaging permitted CGH & MS to obtain quantities of medications more suited to their usage. An inventory level of two months was considered desirable in determining the quantities distributed to CGH & MS, as outlined in the group purchasing objectives. This level would then result in an annual turnover of six. When items were packaged by Bay Area Hospital, both the labor and material costs were included in the total cost of the drug. Parke, Davis packaging equipment was used for both oral solid and liquid medications.

Collection of Data. During the study period, all group purchasing invoices were retained and those items prepackaged in less than the manufacturer's issue were listed separately. All discounts received by Bay Area Hospital were passed on to the CGH & MS.

Evaluation. The price CGH & MS was charged for prepackaged items was then compared to the price CGH & MS would have had to pay to receive the manufacturer's unit of issue.

Staffing, Workload and Equipment Review for the Drug Distribution System

Description of Old System. Medications were received by the Director of Nursing and stored in the drug room. When drugs were needed for the nurses station, they were transferred to floor stock. Physicians' orders were then filled from these supplies (Figure 1).

Development of New System. A complete drug inventory and system analysis was done before any drug distribution system could be recommended. First, a complete hospital-wide drug inventory was taken and the total drug purchases for the previous 12 months were determined. Annual inventory turnover was calculated and the quantity of expired and excess drug items were determined as previously outlined.

The Parke, Davis Medication Control Module System (MCM) was chosen for study after an extensive review of drug distribution systems was completed. Mr. Richard P. Pfeifer, Systems Consultant from Parke, Davis, provided his assistance for a system analysis of Curry General Hospital's drug distribution system.

Time and motion studies were conducted measuring the tasks performed in the present drug distribution system. A comparison of each system's advantages and disadvantages was made along with cost analysis of both drug distribution systems. Both leasing and purchasing of equipment was investigated.

Finally, recommendations were made to the administrator of CGH & MS and the South Coast Shared Services Committee.

Evaluation. Evaluation was based upon time and motion studies, cost recovery analysis and subjective results from the post-project interviews.

Policies and Procedures

Description of Old System. One of the requirements of the surveying agencies, such as Medicare and JCAH, is that comprehensive policies and procedures be maintained. The policies and procedures must reflect present methods and if changes occur, the procedures must be updated. Curry General Hospital did have a procedure manual, but many sections did not reflect the current pharmacy practices or they described required procedures that were non-existent.

The Curry General Hospital Pharmacy Procedure Manual⁷ described a functioning Pharmacy and Therapeutics Committee that was nonexistent. The procedure for Drug Storage stated "The Drug Room shall be accessible only to the Consultant Pharmacist, the Director of Nursing or her designated assistant." Many times during the day and evening shifts "non-authorized" personnel were observed in the drug room. There were numerous violations of the Procedure Manual in drug storage, labeling and required monthly

inspections. Teaching activities and drug information duties of the consultant pharmacist were also not being fulfilled.

Description of New System. Policies and procedures were written for each of the administrative and clinical services that were tested or implemented during the Shared Pharmacy Services project. In addition, procedures were written for Stop Orders, Generic Equivalent Medications and Unit Dose Prepackaging.

Evaluation. The policies and procedures were included in the hospital's manual and evaluated subjectively by the hospital personnel in the post study questionnaire.

Pharmacy Inservice Education

Description of Old System. Curry General Hospital and Medical Services' continuing education goals were to maintain its staff at a high professional level. However, due to budget (\$1500.00 per year for nursing and administrative staff) and geographical constraints, the education goals were extremely difficult to meet. Personnel often had to pay for their own continuing education or forego the opportunity.

Description of New System. Three presentations were conducted by the shared regional pharmacists: "Available Drug Information Sources and How to Use Them;" The Abbott Piggyback System;" and "Improving the Hospital's Drug Pricing System."

The following procedure was developed from the implementation of the Pharmacy Inservice Education project.

Purpose: To provide the employees, both professional and administrative, the pharmaceutical knowledge needed for them to perform their functions.

Policy: The shared regional pharmacist will conduct, on a quarterly basis, inservice education for the hospital staff. Topics will be timely and of mutual interest.

The programs will be presented at a time most convenient for the employees of Curry General Hospital. Expenses for the program will be paid to the shared regional pharmacist by Curry General Hospital and Medical Services. No monies will be collected by the shared regional pharmacist from participants of the inservice programs. The shared regional pharmacist will make available any handouts or other educational aides that may be needed to benefit the participants of the inservice programs. A copy of the program and attendance figures will be maintained by the hospital administrator for accreditation records.

Collection of Data. The cost to Curry General Hospital was determined for each program, which included travel, meals, personnel expenses and lodging. The cost to Curry General Hospital was then compared to the cost the hospital would have incurred if the people who attended would have traveled to Coos Bay to receive

the instruction. This cost included travel, meals and personnel expenses.

Evaluation. The difference, between the incurred costs of bringing an educational program to Curry General Hospital from that of sending the employees to Coos Bay, became the amount saved. The dollar savings of each of the three Pharmacy Education Programs were calculated and totaled for the study period. Subjective analysis was obtained during the post-project interviews.

Drug and Poison Information Service

Description of Old System. The drug information sources utilized by Curry General Hospital nurses consisted of a 1973 Physicians' Desk Reference, a 1969 American Hospital Formulary Service, a 1970 Merck Manual and a 1972 Manual of Toxicology. Product information inserts provided nurses with most of their information needs. Nurses could not clearly identify an individual from whom they could obtain needed drug information in a short time.

It was determined through interviews with staff nurses, physicians and the Director of Nursing that the overall drug information system for Curry General Hospital and Medical Services needed improvement.

Description of New System. An inventory of current literature sources available to the hospital personnel was conducted.

Permission was obtained from the hospital administrator for purchase of drug reference material. These references (Table 9) were selected from a list recommended by the Oregon State University School of Pharmacy Drug Information Service for a primary care area.

Bay Area Hospital Pharmacy Service provided its monthly drug information newsletter to CGH & MS. This newsletter highlighted new drugs and drug therapy of interest to physicians and nurses. In addition, Bay Area Hospital operated a 24 hour pharmacy and emergency room. Drug and poison information from the pharmacists or emergency room physician was made available to CGH & MS. Routine drug information for physicians and nurses was made available through the regional shared pharmacist. Literature searches were conducted using both Bay Area Hospital facilities and the Oregon State University Drug Information Service.

Collection of Data. Expenses incurred by CGH & MS for development of an improved pharmacy library were tabulated. In addition, the time the shared regional pharmacist spent researching drug information requests was recorded and analyzed.

Evaluation. Subjective evaluation of the data compiled was obtained from the post-project interviews.

Pharmacy and Therapeutics Committee

Description of Old System. The Curry General Hospital Procedure Manual⁷ outlines a functional Pharmacy and Therapeutics Committee, but none was in existence.

Description of New System. The Pharmacy and Therapeutics Committee was combined with the monthly medical staff meeting after discussing the JCAH requirements with the hospital administrator.

Evaluation. Evaluation of the Pharmacy and Therapeutics section of the medical staff meeting was obtained through the post-project interview with the medical staff and hospital administrator.

Intravenous Admixture System

Description of Old System. The Joint Commission on Accreditation of Hospitals states, in the Standards for Pharmaceutical Services,¹⁵ that "the director of the pharmaceutical service should be responsible for an associated quality control program to monitor personnel qualifications, training and performances and equipment and facilities." A review of the large volume parenteral system was conducted at Curry General Hospital following the recommendations of the National Coordinating Committee on Large Volume Parenterals.¹⁹

The staff nurses of Curry General Hospital were responsible for the preparation and maintenance of the intravenous solution

system. Intermittent administration of intravenous medications requiring dilution was accomplished utilizing the Abbott Soluset^R system. This procedure was in conflict with the recommendations of the National Coordinating Committee on Large Volume Parenterals.

Description of New System. Following the guidelines of the National Coordinating Committee on Large Volume Parenterals,¹⁹ a procedure was developed for a comprehensive intravenous admixture system.

Evaluation. Subjective evaluation was obtained from the post-project interviews.

RESULTS

Group Purchasing

The objective results of the group purchasing study are divided into two categories to give a more definitive picture of the purchasing requirements of CGH & MS. Regular items (those items that come in the unit of issue from the manufacturer or wholesaler) and partial packages (those items not available to CGH & MS from their previous suppliers) are separated. An average of two hours was spent in filling and arranging for transportation of the weekly CGH & MS order. Orders for items needed to supplement the weekly routine order would take an average of one-half hour. The pharmacist interpreted the request and checked the final order which consumed an average of 20 minutes for the weekly order and five minutes for the supplemental order. A pharmacy technician spent 100 minutes filling the weekly order and arranging for transportation while 25 minutes was spent processing the supplemental order.

The pharmacist's time represents 17 percent of the process while the technician's time consists of 83 percent of the total time. Costs incurred by CGH & MS did not reflect these labor charges.

The figures in Table 1 represent the percent savings by group purchasing through Bay Area Hospital.

Table 1. Group Purchasing Results.

| | BAH Charge (\$) | CGH&MS Pre-study Cost (\$) | Money Difference (\$) | Savings (%) |
|---|-----------------------|----------------------------------|-----------------------------|----------------|
| <u>Regular Items (whole containers)</u> | | | | |
| Curry General Hospital | 5316.75 | 5849.13 | 532.38 | 9.1 |
| Curry Medical Services Clinics | <u>546.72</u> | <u>788.66</u> | <u>241.94</u> | <u>30.7</u> |
| Total | 5863.47 | 6637.79 | 774.32 | 11.7 |
| <u>Partial Packages (not available to Curry Medical Services)</u> | | | | |
| Curry General Hospital | 221.69 | 699.08 | 477.39 | 68.3 |
| Curry Medical Services Clinics | <u>41.59</u> | <u>175.27</u> | <u>133.68</u> | <u>76.3</u> |
| Total | 263.28 | 874.35 | 611.07 | 69.9 |
| <u>Total Cost Advantage</u> | | | | |
| Curry General Hospital | 5538.44 | 6548.21 | 1009.77 | 15.4 |
| Curry Medical Services | <u>588.31</u> | <u>963.93</u> | <u>375.62</u> | <u>39.0</u> |
| Total | 6126.75 | 7512.14 | 1385.39 | 18.4 |
| <u>Items Purchased Not Available to Curry General Hospital</u> | | | | |
| Items unit dose packaged by BAH | | | 38.19 | |
| Items manufactured by BAH | | | <u>4.50</u> | |
| Total | | | 42.69 | |

(Continued on next page)

Table 1. (Continued)

| | | |
|--|---|--------------|
| | <u>Transportation Charges</u> | (\$) |
| To Curry General Hospital | | |
| Drop shipments | | 1.00 |
| Greyhound | | 14.65 |
| United Parcel Service | | <u>4.08</u> |
| Total | | 19.73 |
| To Curry Medical Services Clinics | | |
| Greyhound | | 0 |
| United Parcel Service | | <u>4.81</u> |
| Total | | 4.81 |
| Total Transportation Charges | | |
| Transportation charges | | 24.54 |
| Total purchase by CGH & MS | | 6161.36 |
| Transportation as % of total purchases | | 0.4% |
| | <u>Credits on Returned Items</u> | |
| Curry General Hospital | | 1032.02 |
| Curry Medical Services Clinics | | <u>40.28</u> |
| Total | | 1072.30 |
| | <u>Community Pharmacy Cost Comparison</u> | |
| Bay Area Hospital charges | | 50.64 |
| Curry Medical Services costs | | 72.11 |
| Difference | | 21.47 |
| Percent savings | | 29.8% |

The following are the subjective results obtained from the post-project interviews.

Curry General Hospital Administrator's Responses:

There has been a time savings for the Director of Nursing who had been in charge of drug purchasing. However, the medicine nurse has had an increase in responsibilities and time to coordinate the orders from the clinics and hospital. There has been an overall time savings to our hospital personnel because of group purchasing. They no longer need to spend time with the manufacturers' representatives and there is only one order to handle.

The order response time during the study period was better than our old system. However, after the study period, some problems in ordering supplies developed. These problems have been overcome by identifying the medication nurse as being responsible to coordinate orders to Bay Area Hospital.

Drug cost savings have been significant. At first we expected a 5 percent savings, however our savings has approached 15 percent. We have embarked on a courier system for deliveries of supplies between Curry General Hospital and Bay Area Hospital. The deliveries include items from lab, xray, and dietary besides pharmacy. This has been expanded from the consultant pharmacist's visit when pharmacy supplies were delivered.

We feel that additional personnel may be needed at Bay Area Hospital if all the hospitals in the shared services group participated in the group purchasing program. Even with additional personnel costs, the group purchasing program

would save us considerable time and money. The additional costs should be shared by all the participating hospitals.

Billing Clerks (3), Curry General Hospital Responses:

It has saved at least ten hours per week in billing time since we only have one invoice with which to be concerned. There was not the problem of looking up prices or hunting down all the different invoices. Everything we needed was on one document.

However, during the post study period the invoices are not as prompt as when we had a full time consultant pharmacist.

This program should be continued and expanded.

Director of Pharmacy at Bay Area Hospital's Response:

The Group Purchasing Program has saved Curry General Hospital time since there is only one order and one bill. There has also been a significant (15 percent) cost reduction in drug purchases. During the post study period, the time required to meet Curry General Hospital's purchasing requirements has increased since no one person has been responsible. We need to train a pharmacy technician to handle this area. Our order response time has been adequate except for a few instances when there were breakdowns in communications. Now that we have a courier system established, our order response time has improved.

I would like to see the shared pharmacy service expanded beyond the supply system to other hospitals besides Curry General Hospital. The whole program has a lot of merit and should be expanded with the use of pharmacy technicians.

We would be able to service the closer hospitals to a much greater degree than Curry General Hospital.

Director of Nursing at Curry General Hospital's Response:

The program has saved approximately 20 percent of my time since I had to deal with all the manufacturers' representatives. Inventory control benefits have been tremendous. Expired drug problems have been non-existent since the beginning of the pilot study. Returns have been handled without any problems at Bay Area Hospital. We need the consultant pharmacist to visit Curry General Hospital at least twice a month to coordinate all the pharmacy programs. Single billing has been a benefit since there are not so many invoices to handle.

Curry General Hospital and Clinics, Nurses' (3) Responses:

The order response time has been good considering the time and distance. It has been much better than before the project.

We have all been made more aware of the expired drug problems and are constantly on watch for them.

We have less junk on the shelf. In the clinics we have been able to get many hospital type items that the community pharmacies could not, or would not, obtain for us.

There has been a decrease in inventory. One problem was that the physicians may want a drug that had not been used in a long time and it had been sent back to Bay Area Hospital. They were not real happy with having to wait for a day to get it. However, for the most part they were satisfied.

Physicians' (3), Curry Medical Service Responses:

We physicians were particularly impressed by the dollar savings accomplished by the group purchasing program both for the hospital and our clinics. We noticed a decrease in problems with expired items. We did object to the reduction of inventory since we felt that might reduce the availability of drugs. This may be one of the prices we pay in reducing operating expenses. The group purchasing program should be continued and be monitored by a full time consultant pharmacist as in the study period.

Financial Data Review

The results of the comparison of the Curry General Hospital system of pharmacy pricing with the proposed "cost plus fee system" are shown in Table 2. The total cost for the 11 patients using the previous percent markup system (100 percent of acquisition) was \$1,289.36. The proposed "cost plus fee" system using the same charges used by Bay Area Hospital produced a total cost to the patient of \$1,361.11. The difference between the two systems was \$71.75 or 5.6 percent increase.

The following are the subjective results obtained from the post-project interviews.

Curry General Hospital Administrator's Response:

I was concerned at first that drug revenue would go down, however I felt the smartest thing I did was to accept the

Table 2. Financial Data Review.

| Number | Patient | Cost Plus Fee System (\$) | Curry General Hospital System (\$) | Difference (\$) |
|--------|---------|---------------------------------|---|--------------------|
| 1 | W.K. | 20.24 | 9.35 | +10.89 |
| 2 | V.B. | 85.18 | 33.35 | +51.83 |
| 3 | J.B. | 128.37 | 106.45 | +21.92 |
| 4 | E.C. | 75.31 | 96.29 | -20.98 |
| 5 | J.P. | 61.39 | 56.05 | + 5.34 |
| 6 | V.R. | 85.06 | 44.25 | +40.81 |
| 7 | F.M. | 563.15 | 645.07 | -81.92 |
| 8 | J.N. | 129.90 | 101.05 | +28.85 |
| 9 | L.M. | 124.08 | 111.50 | +12.58 |
| 10 | N.A. | 20.58 | 18.00 | + 2.58 |
| 11 | R.G. | <u>67.85</u> | <u>68.00</u> | <u>- 0.15</u> |
| Total | | 1361.11 | 1289.36 | 71.75 |

pricing system (cost plus fee) change because 1. It made for a more reasonable charge overall to the patient and 2. It was a system that was uniform. The system we used before (percent markup) varied depending on who ever was pricing, plus the variance of the cost of the drug.

The gain in pharmacy revenue was substantial. The period between April of 1975 to Sept 1975 produced a 25 percent increase in revenue. We are also picking up more charges due to inservice education. In addition, we have found areas that we have lost charges. For example, we have no more "give-away" medications in the emergency room. It is far easier to keep up with price changes which saves us considerable time.

The separation of the cost of the drug from the fee for service has made it very easy to explain costs to patients and third party providers.

I have been so enthusiastic with the new pricing system that I have recommended the change to the three other hospitals who are planning to participate in the Shared Services Program.

Billing Clerks' (3), Curry General Hospital Responses:

With the new pricing structure, we are not losing as many charges as we did before. It is also easier for us to calculate the price of various items. We have had absolutely no problem in keeping up with the price changes. If the fee should change, we do not have to recalculate the whole price list of drugs. All we need to do is keep up with the acquisition costs of the drugs and they do not change that often. It is not nearly as time consuming as before.

It is also easier for us to justify drug charges to the patient. It can be broken down into drug costs and drug distribution costs. The patients appreciate now that the expensive drugs are not marked up as high as before. They do realize that the cheaper drugs are more expensive than before because of this but accept the new pricing system as being more fair.

Bay Area Hospital Pharmacy has been helpful to us in our day to day questions. We would like to have more inservice education for administrative personnel.

Centralized Prepackaging

Table 3 represents the dollar volume involved in the centralized unit dose packaging operation. The percent savings was considerable even though the dollar volume was not large.

When a complete drug inventory of the hospital was taken, it was found that there was a considerable quantity of expired and overstocked pharmaceuticals. Expired drugs totaled \$1,629.45 and overstocked drugs totaled \$2,343.60 (Table 4).

Table 3. Centralized Prepackaging Results.

| | BAH charges (\$) | CGH&MS prestudy costs (\$) | Differences (\$) | Savings (%) |
|--|------------------------|-------------------------------------|---------------------|----------------|
| Unit does packages from manufacturers | 121.64 | 368.42 | 246.78 | 67.0 |
| Bay Area Hospital packaged items | 38.19 | 120.37 | 82.18 | 68.3 |
| Total | 159.83 | 488.79 | 328.96 | 67.3 |

The following are the subjective results obtained from the post-project interview.

Curry General Hospital Administrator's Response:

Even though the individual dose is more expensive, by providing us with a small quantity that was not available from the manufacturer, it has saved us money. From an inventory control standpoint, it has helped us decrease our expenditures and has reduced our losses from expired drugs. There have been no complaints from the physicians. We all would like to see this portion of the shared pharmacy services continued.

Bay Area Hospital Director of Pharmacy's Response:

This area has become a problem in the post study era. We have managed to continue to supply the items already packaged by the manufacturer but have had to cut down on our in-house packaging. This is because of the extra time commitment the packaging program requires. If we had a trained technician to support this it could be increased. We need a greater financial commitment from Curry General Hospital for this to happen.

Curry General Hospital Director of Nursing's Response:

I would like to have more unit dose packaging, everything if possible. It has saved money by not having inflated inventories, has reduced errors and has been more sanitary. The packaging has been easy to use and has been well accepted by the staff nurses.

Curry General Hospital Nursing Staff's (3) Responses:

We liked the unit dose packaging. We are not aware of any decreased inventory benefits. We do not have any complaints of shortages due to the inventory reduction and feel the unit does packaging cut down on medication errors.

Staffing, Workload and Equipment Review for the Drug Distribution System

Table 4 provides a breakdown in the location of pharmaceuticals at Curry General Hospital. The expired and overstocked drugs were found throughout the hospital. The total inventory was \$17,385.80 and when compared to the annual purchases (\$21,385.80) for the year February 1974 through January 1975 produced an annual turnover of 1.2. This fell far short of the Curry General Hospital administrator's objective of six turns of inventory per turn.

When the expired and overstocked drugs (\$3,973.05) were returned to the manufacturer or destroyed, the annual turnover rose to 1.6. The further reductions in the inventory (\$8,769.32) caused by group purchasing and inventory control increased the annual turnover to 2.9. This amounted to a 2.4-fold increase in annual turnover during the study period. The inventory was reduced by 49.6 percent during the study period.

Schedule II controlled drugs were not included in the group purchasing and inventory control phase. Mr. A.G. Mike McClain,

Table 4. Pre-project Hospital Drug Inventory.

| | (\$) |
|--|-----------------|
| Labor and delivery | 115.88 |
| Surgery | 96.81 |
| IV storage room (drugs only) | 2,402.48 |
| Emergency room drugs | 901.32 |
| Nursing station | 1,112.28 |
| Drug room | |
| Oral solids | 2,422.02 |
| Oral liquids and ointments | 1,297.98 |
| Injectables | 3,931.32 |
| Narcotic closet (controlled drugs) | <u>1,132.66</u> |
| | 13,412.75 |
| Expired drugs (returned or destroyed) | 1,629.45 |
| Overstocked drugs (returned to manufacturer) | <u>2,343.60</u> |
| | 3,973.05 |
| Total | 17,385.80 |
| Purchases for February 1974 to January 1975 | 21,290.35 |
| Turnover (annual) (annual purchases divided by total inventory) | 1.22 |
| Turnover after disposal of outdated and overstocked drugs | 1.59 |
| Inventory at the end of study period | 8,769.32 |
| Amount inventory reduced during study period | 8,616.48 |
| Percent reduction | 49.6% |
| Purchases for June 1974 to May 1975 | 25,771.15 |
| Turnover (annual) post study | 2.9 |

Secretary of State Board of Pharmacy, assisted in disposal of \$437.20 in overstocked and out-dated narcotics. The study was unable to effect a great deal of change in the area of Schedule II drugs due to Drug Enforcement Agency license restrictions.

Figure 1 is a graphic display comparing the old drug distribution system employed by Curry General Hospital to that of the proposed Parke, Davis Medication Control Modules. The time and motion study data provided by the Director of Nursing at Curry General Hospital show a potential saving of five hours per day in the medication nurses' time. The Director of Nursing has since increased the medications nurses' responsibility to include coordination of the hospital and clinic's group purchasing order with Bay Area Hospital. This has given the Director of Nursing an additional ten hours per week in her own schedule that had been previously devoted to pharmacy related tasks. Table 5 outlines the time savings identified for the staff nurses.

Table 6 outlines price information from Parke, Davis for its Medication Control Module System. Table 7 provides an analysis between leasing and outright purchasing of Parke, Davis system.

The following are the subjective results obtained from the post-project interview.

Figure 1. System Comparison. This outline compares the present system at Curry General Hospital (left hand column) with UNI/USE System's recommendations (right hand column). The center column lists those procedures that are essentially common to both.

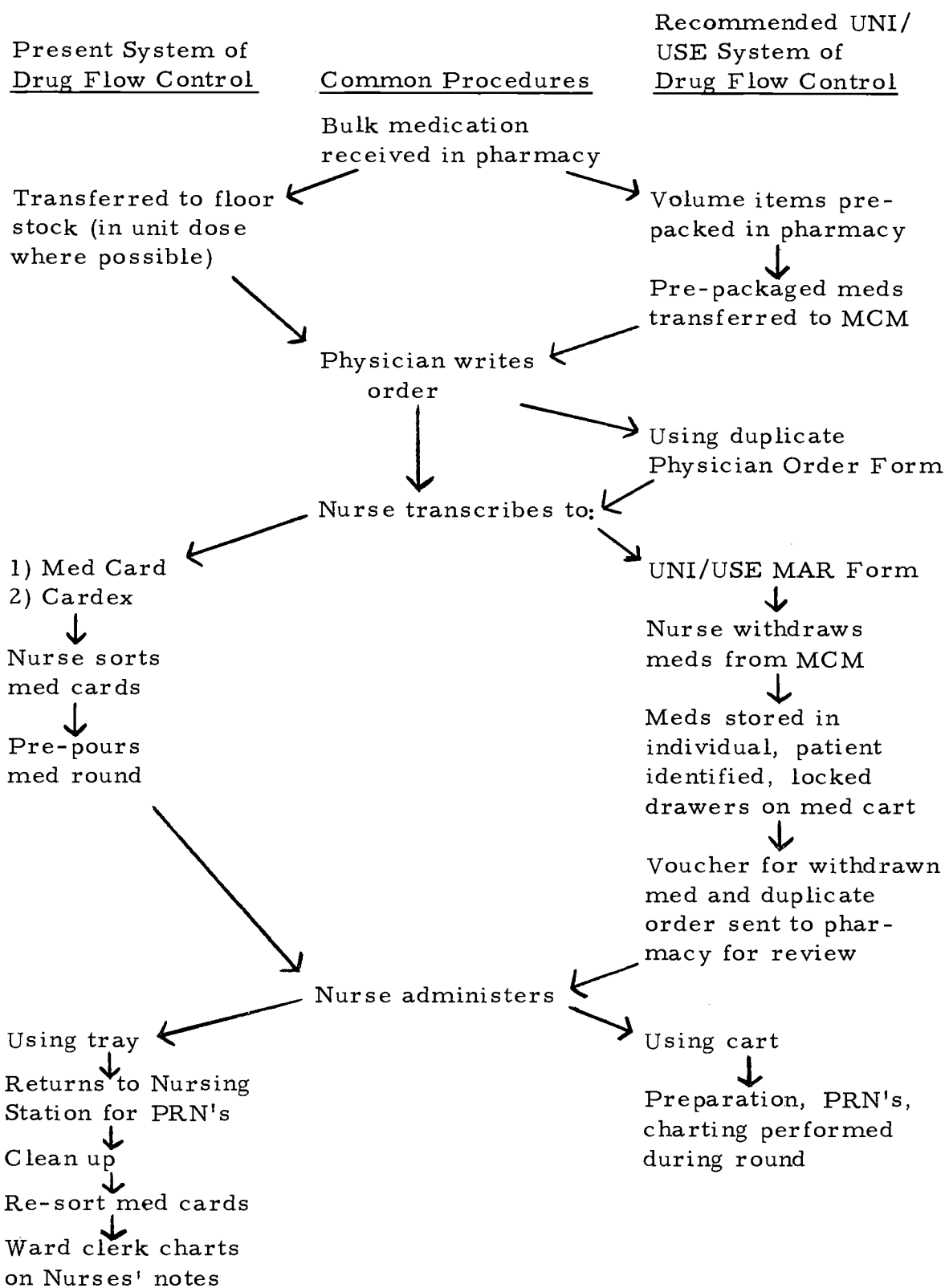


Figure 1.

Table 5. Potential Time Transposition.

| | Hours daily | Ref. |
|--------------------------------|-------------|------|
| Pharmacy | None | A |
| Nursing | | |
| Medication administration time | 4.00 | B |
| Trips to drug room | <u>1.25</u> | C |
| Total | 5.25 | |

Reference notes to potential time transposition

Note: We recognize the fact that time saved in one specific area cannot be projected with validity to dollar savings on personnel. The additional professional capacity made available by UNI/USE equipment and system will generally be transposed into the areas of enhanced patient care and we have not considered it as a potential dollar economy.

- A. We cannot objectively forecast any time saving in pharmacy. We do, however, feel that your current staff will be able to operate the system effectively.
- B. We have been told that approximately 12 hours per day, per nursing station, are spent in administering medications. This means that a total of at least 12 hours are used to administer medications at the one major station in the hospital. This is conservative, as it includes two transcriptions of the physician order, preparation, administration, PRN's, trips, charting, clean up, etc. Our experience allows us to forecast a time saving of one-third or four hours if our system were to be installed.
- C. Nursing has told us that at least 15 trips per day and evening shifts are required to the drug room. Each of these trips takes approximately five minutes or 1.25 hours of valuable nursing time that is lost. The MCM will make medications available to authorized personnel at the Nursing Station 24 hours a day, seven days a week and should, for all practical purposes, eliminate this chore.

Table 6. Pricing Information.

| Number | Item | Price (\$) |
|---------------------------|---|------------------|
| 1 | #800 Medication Control Module | 6, 575.00 |
| 1 | #851 Recordatrol Base | 1, 625.00 |
| 1 | Set of Service Components | 1, 350.00 |
| 1 | #228 Medication Cart with Accessory Kit | <u>1, 065.00</u> |
| Total cash purchase price | | 10, 615.00 |

Table 7. Cost Recovery.

| | Monthly cost (\$) | PPD | Ref. |
|---|-------------------------|--------------|------|
| <u>Summary Analysis--Lease</u> | | | |
| Total cost = \$281.30 | | | |
| Recommended UNI/USE | | | |
| Standard Equipment | 281.30 | 55.1 | 1 |
| On payroll expense | <u>-</u> | <u>-</u> | 2 |
| Total cost | 281.30 | 55.1 | |
| <u>Potential \$ Recovery Areas</u> | | | |
| Total recovery = \$670.21 | | | |
| Third party reimbursement | 239.11 | 46.9 | 3 |
| Inventory control | 303.60 | 59.5 | 4 |
| Lost, forgotten, incorrect charges | <u>127.50</u> | <u>25.0</u> | 5 |
| Total recovery | 670.21 | 131.4 | |
| Differential = \$388.91 | | | |
| Total cost | 281.30 | 55.1 | |
| Total recovery | <u>670.21</u> | <u>131.4</u> | |
| Differential | 388.91 | 76.3 | |
| <u>Summary Analysis - Cash Purchase</u> | | | |
| Total cost = \$53.07 | | | |
| Recommended UNI/USE | | | |
| Standard Equipment | 53.07 | 10.4 | 1 |
| On payroll expense | <u>-</u> | <u>-</u> | 2 |
| Total cost | 53.07 | 10.4 | |
| <u>Potential and Recovery Areas</u> | | | |
| Total recovery = \$476.21 | | | |
| Third party reimbursement | 45.11 | 8.8 | 3 |
| Inventory control | 303.50 | 59.5 | 4 |
| Lost, forgotten, incorrect charges | <u>127.50</u> | <u>25.0</u> | 5 |
| Total recovery | 476.21 | 93.3 | |

(Continued on next page)

Table 7. (Continued)

| | Monthly cost (\$) | PPD | Ref. |
|-------------------------|-------------------------|-------------|------|
| Differential = \$423.14 | | | |
| Total cost | 53.07 | 10.4 | |
| Total recovery | <u>476.21</u> | <u>93.3</u> | |
| Differential | 432.14 | 82.9 | |

Reference notes to summary analysis page

Note: All per patient day figures (PPD) that appear beside the cash figures are derived by dividing monthly cost and recovery potentials by 510 monthly patient days. This 510 figure was arrived at as follows: 17 beds x 30 days.

1. We have proposed the acquisition of our recommended UNI/USE System under two options: cash purchase and a five-year lease through our subsidiary company, Unilease, Inc. The figures under the lease option (\$281.30) represent the monthly payment due to Unilease, Inc. The figures listed under the Cash Purchase option (53.07) represent the monthly depreciation allowance figures on a 15-year 90 percent depreciation schedule as supplied to us by the business office.
2. We have not forecast an "On payroll" expense for pharmacy. It is our feeling that the present staff can successfully implement our recommended system.
3. Third party reimbursement is, at best, difficult to forecast. Regulations vary widely from area to area. In most sections of the country, our equipment is considered as part of pharmacy operation, and as such is eligible to participate in third party reimbursement to the same extent as other pharmacy operations. In the case of Curry General Hospital, we were supplied with an 85 percent figure of reimbursement. The figures listed under the lease option represent 85 percent of the monthly payment; under the case purchase option, 85 percent of the monthly depreciation allowance.

(Continued on next page)

Table 7. (Continued)

-
4. We have been supplied with an annual cost of drugs sold figure of \$20,240.00. UNI/USE control among our systems hospitals generally reduces overall shrinkage by 10 to 12 percent per year, depending on the amount of floor stock. In the case of Curry General Hospital, we were supplied with an estimate of 18 percent loss. When this is applied to the annual cost of drugs sold figure (\$20,240) it produces a potential recovery of \$303.60 per month.
 5. The recommended UNI/USE System will inevitably produce an enhancement of pharmacy revenues due to charges formerly lost, priced incorrectly, illegibly made, or not made due to a nurse's sympathetic decision to create no charge. The average such increase reported to UNI/USE has ranged from \$0.20 to \$1.36 per patient day. In the case of Curry General Hospital, we were supplied with a loss estimate of \$0.25 per patient day. When this \$0.25 figure is applied to your 510 monthly patient days, it produces a potential recovery of \$127.50 per month.
-

Curry General Hospital Administrator's Response:

There has been a substantial decrease in inventory and an increase in annual turnover up to four times a year. Problems with expired items have decreased since we do not have to order in larger quantities.

There is a definite need to improve drug control and we plan to implement the Parke, Davis Medication Control Modules. There are far too many people that have access to the drug room. The physical set up of the hospital and the personnel relationships between employees have been detrimental to good drug control.

I would tend to favor the Medication Control Module if it can store enough drugs. The problem would be educating personnel. From a standpoint of record keeping and billing patients, it would be extremely valuable. It would save money and provide a valuable control. The only hazard may be an inability to educate personnel who have been doing the same wrong things year after year.

The pharmacy consultant should continue to look into staffing, workload and equipment on a scheduled basis. The pharmacist must come down routinely and reimbursement would be to Bay Area Hospital for the time and services rendered.

Bay Area Hospital Director of Pharmacy's Response:

If Curry General Hospital does not have the local appropriately trained personnel, Medication Modules by Parke Davis would be a logical approach to drug control. Many of these small institutions could economically justify a pharmacist of its own. In American Society Hospital Pharmacists reporting

hospitals, the ratio of a pharmacist per patient beds was one pharmacist per 34 beds.

The clinical support for drug use control can evolve through the shared services concept plus the use of computers. This combination could meet all the clinical needs of the hospitals in our area.

Curry General Hospital Director of Nursing's Response:

We definitely have a need for stronger drug control. We would like to have the Medication Control Modules by Parke Davis on a trial basis.

Drug use control is needed and should be done by the consultant pharmacist. He should also be reviewing Curry General Hospital drug distribution systems for efficiency.

Curry General Hospital Staff Nurses' (3) Responses:

There is no urgent feeling of need for any increase in drug control to prevent loss. The Medication Control Modules system would be acceptable but only on a trial basis. There is some fear that increased drug control means increased "red tape" for the nursing staff even though there may be the need.

Policy and Procedures

The results of the policy and procedure study of the Shared Pharmacy Services Program are evidenced throughout the methodology section of this thesis. A procedure was written in each area of administrative and clinical study to meet Medicare and JCAH requirements for documenting operating procedures and objectives.

The subjective assessments are provided by the post-project interviews with the participating personnel at Curry General Hospital.

The following are the subjective results obtained from the post-project interviews.

Curry General Hospital Administrator's Response:

The consulting pharmacist should be the expert that provides us with the input and maintenance of our policy and procedure manuals. Since this study, the administrator has become very aware of the problem of having the community pharmacist being the consultant since they do not have the institutional expertise. They do fill the requirements of the accreditation people but they do not provide the service that is required. I am very enthusiastic about having a pharmacist with institutional expertise managing the policies and procedures.

Curry General Hospital Director of Nursing's Response:

The pharmacist is the person who should be responsible for this task, not the Director of Nursing. There should be follow up by the pharmacist to insure that the policies and procedures are being carried out. Annual updates should be done by the pharmacist along with internal reviews.

Pharmacy Inservice Education

Table 8 outlines the cost analysis of the three pharmacy inservice programs presented to CGH & MS personnel. Program I

Table 8. Cost Analysis of Pharmacy Inservice Education.

| Personnel Attending | | | | Personnel | Program | |
|---------------------|-------------|-------------|------------------|---------------|---------------|---------------|
| Nurses | MD | Admin. | Nurses' Aides | Costs (\$) | Costs (\$) | Diff. (\$) |
| <u>Program I</u> | | | | | | |
| 11 | 1 | 2 | 8 | 1061.12 | 85.60 | 975.52 |
| <u>Program II</u> | | | | | | |
| 13 | 0 | 1 | 9 | 993.96 | 85.60 | 908.36 |
| <u>Program III</u> | | | | | | |
| 0 | 0 | 4 | 0 | 124.80 | 85.60 | 39.20 |
| <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| <u>Total</u> | | | | | | |
| 24 | 1 | 7 | 17 | 2179.88 | 256.80 | 1923.08 |

concerned "Available Drug Information Sources and How to Use Them." Program II dealt with "The Abbott Piggyback System." Program III presented ideas on "Improving the Hospital's Drug Pricing System."

When calculating the cost CGH & MS would have incurred had they sent their personnel to Coos Bay the following schedule was used: Wages--Nurses \$5.49/hr, Physicians \$20.00/hr, Clerical personnel \$2.85/hr, Nurses Aides \$3.10/hr; Travel--12 cents/mile for the driver only (180 miles round trip), 5 people per car; Meals--Lunch only was calculated at \$3.00 per person. Each person would be paid for one eight-hour working day to attend a program at Coos Bay.

When calculating the program costs, the pharmacist's salary was computed at \$8.00/hr and transportation costs at 12 cents per mile. Lunch and/or dinner was provided for the pharmacist by the hospital cafeteria.

The following are the subjective results obtained from the post-project interviews.

Curry General Hospital Administrator's Response:

The benefit is when one individual coming to Curry General Hospital can reach 20 to 30 people.

We should be able to ask for certain things but also the pharmacist should be aware of the latest things that should be taught.

The program should be continued in the volume that would enable the staff to carry out their responsibilities with pharmaceutical products.

Curry General Hospital Pricing Clerks' (3) Responses:

We now know where to go for generic and brand names. The expanded "pharmacy library" has helped us tremendously. Also the inservice program that was given has helped us in our overall knowledge of pharmacy.

Bay Area Hospital Director of Pharmacy's Response:

This is probably the most meaningful area that we can serve in an on-going manner to the closer hospitals. It requires more on site involvement than we have done since the study. More appropriate drug references are needed at the other hospitals in our area and the personnel need to be instructed on how to use them.

Curry General Hospital Director of Nursing's Response:

There has been a tremendous dollar savings by having inservice education brought to us. The nursing staff has taken a tremendous interest in improving their drug education and have asked for more programs to be presented.

There was a marked improvement in the nursing staff in the area of drug knowledge and where to find it. They took a special interest in the new "pharmacy library." They know now that the Physicians Desk Reference is not the only place for drug information.

The inservice program is a must and needs to be expanded.

Curry General Hospital Staff Nurses' (3) Responses:

The programs that were presented were of benefit. The first one increased our awareness of how and where to find drug information. The inservice for the piggyback system was needed to show us how it functioned. Both were very successful and appreciated.

We would like to see a pharmacy program presented on a quarterly basis. We do like the idea of having a say in what we would like to learn since we do not have the same type of patients as Bay Area Hospital.

Drug and Poison Information

The Administrator and Director of Nursing, realizing the need for an improved pharmacy library, authorized the purchase of the texts in Table 9 and their updates or new issues in the future.

The next step was to provide the nursing staff with quick reference charts for emergency and intravenous additive medications. The intravenous additive chart provided them with information on the most common drugs used in the Abbott piggyback system. This information included maximum recommended concentration, minimum infusion time, appropriate vehicle for dilution, and miscellaneous information such as expiration and storage requirements. The chart on emergency drugs detailed information on proper use, appropriate

Table 9. Pharmacy Reference Library.

| Item | Cost (\$) |
|--|--------------|
| 1. Facts and comparisons | 20.00 |
| 2. American Drug Index | 10.50 |
| 3. American Hospital Formulary Service | 45.00 |
| 4. The Pharmacological Basis of Therapeutics | 25.00 |
| 5. Manual of Medical Therapeutics | 7.50 |
| 6. Clinical Toxicology of Commercial Products | 25.00 |
| 7. Drug Interactions, Hansten | 9.50 |
| 8. Parenteral Drug Information Guide | 5.00 |
| 9. Intravenous Incompatibilities, University of Wisconsin | 7.50 |
| 10. Martindale's Extrapharmacopeia | 39.00 |
| 11. ASHP Intravenous Injection Handbook | <u>10.00</u> |
| Total | 204.00 |

dose and route of administration, compatibility information and special requirements for each drug. The only cost involved with providing Curry General Hospital with these quick reference charts was the paper. The charts had been developed by this investigator for Bay Area Hospital.

Another educational requirement that needed to be met for the CGH & MS staff was providing them with the most recent drug information possible. This was done by two methods. First, the monthly Drug Information Newsletter published by Bay Area Hospital pharmacy department for the physicians and nurses and the quarterly Nursing-Pharmacy newsletter published jointly by the Bay Area Hospital pharmacy and nursing services was sent to Curry General Hospital and Medical Services personnel. The cost of the newsletters was minimal since they were already being prepared for Bay Area Hospital personnel. It was calculated that \$10.00 per month was spent on reproductions of newsletters for all the nurses and physicians involved with Curry General Hospital and Medical Services.

Second, literature searches were done for both the physicians and nurses upon request as displayed in Table 10.

The following are the subjective results obtained from the post-project interviews.

Table 10. Drug Information Requests.

| Approximate Time (min/request) | Number of Requests | Percent of Total | Total Time per Category (min) | Percent of Total | Cost (\$) | Percent of Total |
|---|-----------------------|---------------------|--|---------------------|--------------|---------------------|
| 15 minutes | 41 | 66 | 615 | 37 | 82.00 | 37 |
| 30 minutes | 15 | 24 | 450 | 27 | 60.00 | 27 |
| 60 minutes | 4 | 7 | 240 | 14 | 32.00 | 14 |
| 60 minutes (sent to OSU Drug Information Service) | <u>2</u> | <u>3</u> | <u>360</u> | <u>22</u> | <u>48.00</u> | <u>22</u> |
| Total | 62 | 100 | 1665 | 100 | 222.00 | 100 |

Curry General Hospital Administrator's Response:

I am not aware of how frequently the reference books or Bay Area Hospital is used for drug information resources. However, it is very important to keep people informed on how and where to get drug information. I feel that in this respect the program has been successful.

The Drug Information Newsletter has been of great interest to the physicians and nurses.

Bay Area Hospital Director of Pharmacy's Response:

Without the services of an available pharmacist, and considering the type of nursing service that Curry General Hospital has, there are a number of questions that are not recognizable by the nursing staff. During the post study we have had a few questions, but not as many as during the study period when there was a pharmacist available to them on site.

The program was successful during the study period but since then they have not provided the pharmacy input to recognize problem and question areas.

Curry General Hospital Director of Nursing's Response:

Any time we have a drug question we have been able to call Bay Area Hospital Pharmacy. We have received a complete and rapid response. The drug information newsletter from Bay Area Hospital has helped us keep updated on pharmac matters. We have a definite feeling of security when we have someone that we know and is close to us that we can call for drug information. We did not have that feeling when we called to the University of Oregon Poison Information Center.

Curry General Hospital Staff Nurses' (3) Responses:

The expanded "pharmacy library" has met the majority of drug information needs of our nursing staff. We even have the physicians looking in the other books rather than the Physicians Desk Reference. There has been a number of times that Bay Area Hospital has been called and they have been of assistance. However, on two occasions after the study, they did not have the time to devote to our questions. We would like to see this drug information resource expanded via the consultant pharmacist. During the project we were able to have special literature searches completed and our questions answered without any problems. The newsletters were helpful in keeping us up on new areas in pharmacy.

Curry General Hospital Staff Physicians' (3) Responses:

We did appreciate the availability of a drug information service. The primary source of information still remains the manufacturers' representative and medical journals. The medical staff drug information newsletter published by Bay Area Hospital Pharmacy was of benefit to us. Although only one physician attended one of the pharmacy inservice programs they all said they would attend future programs if it was convenient for them.

Pharmacy and Therapeutics Committee

Positive results were obtained from the Pharmacy and Therapeutics Committee study from the mere fact that two meetings were held. Prior to the Shared Pharmacy Services program there had never been

any attempt to deal with pharmacy matters at the hospital committee level.

The first meeting was held in conjunction with the Medical Staff meeting and outlined the Shared Pharmacy Services study and its ramifications. The members of the committee approved the program with great interest and support. The second meeting was held, again in conjunction with the Medical Staff Committee, to brief the members on the program and outcome of the various projects that had been studied. Future considerations for pharmacy projects at CGH & MS were presented to the members. These included establishing a formulary for the participating hospitals in the shared services group, implementation of Parke, Davis Medication Control Modules and continuation of the Shared Pharmacy Services program.

The cost of the consultant pharmacist's participation can be calculated by the time spent in and in preparation for the meetings. Preparation time is difficult to calculate since it depends on the subject. The time was minimal since all the material was being used for other purposes besides the Pharmacy and Therapeutics Committee. The actual time spent in the two meetings was two and one-half hours which computes to \$20.00.

The following are the subjective results obtained from the post-project interviews.

Curry General Hospital Administrator's Response:

Acceptance by the physicians was good, however we must have a pharmacist to "trigger" the meeting. The physicians are not going to meet as a separate committee. Without a pharmacist, there would not be an effective Pharmacy Therapeutics Committee.

The committee could be of benefit in establishing a formulary. The pharmacist would have to do the initial work and let the physicians "pick it apart."

We are going to have to have more involvement by a pharmacist in this area in the future.

Curry General Hospital Director of Nursing's Response:

The consultant pharmacist has been of benefit to nursing service in elucidating drug problems and pharmacy needs to the physician at the committee meetings. It is difficult for the nurse to do this since she is not the drug expert.

There is a need for the consultant pharmacist to assist the physician in creating a drug formulary. This would help reduce inventory and drug costs for the hospital and patient.

More work is needed by the consultant pharmacist in the area of the Pharmacy and Therapeutics Committee. The surface has just been scratched.

Curry General Hospital Staff Physicians' (3) Responses:

We all felt a need for a pharmacist to take an active consulting role in the area of the Pharmacy and Therapeutics Committee. We want to have the pharmacist consult with us through the committee on all proposed changes and be kept informed on the results of new programs. We feel that in the

future a formulary restricting multiple brands of the same drug is a definite possibility. We do want the pharmacist to prepare proposals for our review.

Intravenous Admixture System

An audit of the intravenous admixture system was conducted to determine the status of intravenous services at Curry General Hospital. This was at the request of the Director of Nursing to prepare for an accreditation survey. Table 11 lists the discrepancies for the pre-study intravenous admixture program using the Recommended Methods for Compounding Intravenous Admixture in Hospitals by the National Coordinating Committee on Large Volume Parenteral.¹⁹

The first two discrepancies, equipment and facilities for IV admixtures, were brought to the attention of the Administrator and Director of Nursing at Curry General Hospital. A separate area near the nurses' station providing for the preparation of IV additives was recommended. In addition, a laminar air flow hood should be purchased by Curry General Hospital to provide a sterile work area in which to prepare IV additives. The recommendations will be considered in future remodeling plans for the hospital. Hospital engineers estimated the additional cost of a separate IV additive room and laminar air flow hood to be approximately \$5,000.00.

Table 11. Pre-study Discrepancies of the Intravenous Admixture System.

| | |
|-----|---|
| 1. | Equipment |
| 2. | Facilities |
| 3. | Texts and references |
| 4. | Policies and procedures |
| 5. | Availability of compatibility data |
| 6. | Quality control |
| 7. | Consultant pharmacist input |
| 8. | Compounding technique |
| 9. | Volume control devices used for intermittent administration of drugs |
| 10. | Labeling |

Discrepancies in the area of texts, references and availability of compatibility data were rectified in the Pharmacy Inservice Education and Drug Information projects.

Policies and Procedures were provided using the National Coordinating Committee on Large Volume Parenteral recommendations.¹⁹ This service was provided during the policy and procedure project.

Quality control, labeling and compounding technique discrepancies were rectified in the pharmacy continuing education class dealing with the Abbott Piggyback system. In addition, each nurse who had responsibilities preparing large volume parenterals was given a personal inservice class while performing assigned duties.

An inservice education program was presented to Curry General Hospital personnel entitled "The Abbott Piggyback System" which was held in conjunction with changing the system Curry General Hospital employed in the intermittent administration of intravenous drugs. This change in Curry General Hospital's IV system provided a service with the following advantages:

1. Proper labeling of intermittent IV medications.
2. Improved sterility.
3. Decreased incompatibilities.
4. Easier preparation.
5. Decreased manipulation problem.

6. Better scheduling.
7. Safer intermittent drug infusion system.
8. Decreased nursing time required for IV medication administration.

The following are the subjective results obtained from the post-project interviews.

Curry General Hospital Administrator's Response:

I have not heard anything about how the piggyback system is going. That is usually a good sign since if it is not working I will hear about it.

Any changes in the new IV area should be reviewed as a whole Pharmacy-Nurse system change since we are restricted in our space. Any physical change in one area will affect another area. The requirement for an expanded IV area and laminar air flow hood will be reviewed in our remodeling plans at a future time.

Curry General Hospital Director of Nursing's Response:

The piggyback system has been the greatest benefit to nursing services in the whole program. It has universal acceptance among the nurses and physicians. At first there were some negative feelings but those did not last.

There has been a benefit to the patient in the consultant pharmacist providing IV information to the nursing staff.

Curry General Hospital Staff Nurses' (3) Responses:

We think the piggyback system is terrific and it has saved us considerable time. It has proven to be a lot safer than

the Solusets[®] since the IV's do not run dry or plug up anymore.

IV drug information before the study was non-existent. There was a definite need to improve this and it was done during the study. The compatibility charts have also been of help.

Curry General Hospital Staff Physicians' (3) Response:

We approve of the new piggyback system, but feel that the nurses should be the ones to evaluate the system since they are the ones that must make it work.

Subjective results were obtained for the overall program performance in addition to the interviews conducted concerning the individual Shared Pharmacy projects. The following are the subjective evaluations obtained from post-project interviews.

Curry General Hospital Administrator's Summery Response:

My overall assessment of the program is that the Shared Pharmacy Service has moved into uncharted seas as far as small hospitals are concerned. There has been a real gap that has been filled in showing how upgrading pharmacy services, at minimal expense, can be accomplished.

Whether small hospitals like it or not, they are going to be required to have more control and more professional guidance. This project has answered a lot of questions as to how it is to be done. There is still more to be done.

The program has been accepted very well by the nursing staff which was the biggest hurdle.

The stumbling block, presently, for total implementation to the other hospitals, is a lack of a formalized and scheduled program with Bay Area Hospital staff. Outside of the group

purchasing program, there must be routinely scheduled visits by a pharmacist. Many of the problems we have encountered during the post study are organizational. The participating hospitals have been slow in getting together to carry out the implementation phase of the shared consultant pharmacist. Much of the success of the various projects requires the routine services of a consultant pharmacist. This area, plus all other shared hospital services, requires cooperative cost sharing.

We desperately need this regionalization of services. The small hospitals do not have the purchasing power or the skilled personnel resources. The Shared Hospital Services is the only way we can take advantage of these resources.

The Biomedical Technician and Pharmacy projects of the Shared Hospital Services program have saved us the most money. One problem the four small hospitals face after the pilot project is that additional personnel at Bay Area Hospital will be required to coordinate the pharmacy programs. However, even with additional personnel there will still be cost savings to the participating hospitals. There are also intangible advantages such as ordering what you want rather than being at the mercy of the manufacturers.

Curry General Hospital Billing Clerks' (3) Summary Responses:

The Shared Pharmacy Inservice Project helped us tremendously since we were doing our job with no knowledge of the drugs we were pricing. We have become more aware of the pharmacy and nursing procedures and know where to find the information we need without bothering other people. We

would like to see the program expand to full time and would like to see the consultant pharmacist at least once a week.

Curry General Hospital Director of Nursing's Summary
Response:

The Shared Pharmacy Service Program Study has been the best thing that has happened to me as a Director of Nursing and to the hospital as a whole. It has given us much more insight of drug incompatibilities. Our awareness has increased to the point that we are going to the textbooks to double check the appropriateness of the physicians' orders when incompatibilities are a possibility. The program should be continued and expanded to include a full time consultant pharmacist for all the participating hospitals.

Curry General Hospital Staff Nurses' (3) Summary Responses:

We would like to see more inservice education programs. There is also a need to have one consultant pharmacist with whom we could identify. He needs to make frequent visits and be available for questions by telephone.

Shared Hospital Services have been very good and will continue to be good as long as they continue to meet our needs.

The Medication Control Modules would be helpful especially controlling losses in the emergency rooms.

After the study period, we had some breakdown in supplying drugs to us. We need to have a consultant pharmacist to monitor the program like we had during the study period.

Curry General Hospital Staff Physicians' (3) Summary Responses:

Two of the four physicians in the area are provided by the Public Health Service. They are allowed to set up their private practice which is organized by the Curry County Health Services. The physicians operate out of a clinic at Port Orford, Brookings and Curry General Hospital in Gold Beach.

The physicians are interested in improving the availability of all hospital services to the area and see the Shared Hospital Services program as a solution. The one concern they expressed is that they did not want "Big Brother" dictating to them from Coos Bay. The program must answer their needs. They do realize that some compromises must take place and are willing to do so.

Bay Area Hospital Director of Pharmacy's Summary Response:

By improving economy of operations, the small hospital will benefit from Shared Hospital Services. The problems are caused by the large degree of independence and rivalry among hospitals. Getting hospitals to work together ideally is good but practically it is difficult.

The opportunity in these hospitals is great if we can sell to the board of directors that the value of a pharmacist is unique and necessary. The actual opportunities relative to programs are infinite depending upon one's own imagination. However, it must be paid for by the receiving institution.

The obstacle during the post study has been the shared pharmacy program has become a dilution to our efforts in establishing our own pharmacy program at Bay Area Hospital. This may be the way it has to be since these programs must be tested first to be sold. Any program that becomes on-going

that consumes a large amount of time must be reimbursed by the other hospitals. Our first commitment must be to the patient of our own medical service area.

Generally the program has a lot of merit and potential. We have been in the process of selling the program to the other hospitals. It could have a very positive influence in any hospital that would participate in the program.

Bay Area Hospital Administrator's Summary Response:

Our organization for shared medical services will assume an even more all encompassing role in the near future for Curry General Hospital. Many small hospitals across the country will probably be managed by a hospital management group. However, the four small hospitals in our area would rather be managed with Bay Area Hospital in a Shared Services Program. In this manner they would not lose their local community autonomy.

Our basic philosophy of any shared service we undertake must be mutually beneficial to all parties concerned. We do not undertake a lot of administrative overhead to pass on a small discount to them. It is possible to take a sizable discount and add some administrative overhead so that Bay Area Hospital is the focal point of the program. In this way Bay Area Hospital is able to maintain itself without subsidizing the smaller hospitals. The mechanics of actually billing for services should be separated from Bay Area Hospital and should come under the auspices of Shared Medical Services Organization.

There has been one major problem which is the frustration that occurs when you lay out a model. You begin to

progress through the various stages, then comes the "down time" waiting for people to make decisions and compile data. The smaller hospitals have lived such day to day existence it has been difficult for them to think of planning for the future. That has been the major problem in moving from the study phase to implementation. We have had success which has been indicated by the inquiries from other hospitals desiring inclusion into the program.

The pharmacy project has probably been the easiest service with which to demonstrate success. It has really "shaken up" the administrator and made him realize where they are and where they could be. The Shared Pharmacy Service project took their hospital from the "woods" and made them a very viable group in terms of everyday demands that were presented to their pharmacy. We have not had the magnitude of success in the other shared services as we have had in pharmacy.

With renewed legislation in the area of cost controls, if we do not do anything, it will be done for us. I would like to see us expand the pharmacy program not only to the other small hospitals but also to nursing homes and any other areas that could use these services.

Our program has had a great deal of notoriety in the state. State medical planning agencies and the Oregon Association of Hospitals have all shown interest in what we have accomplished. Similar medical service areas in Oregon have shown interest in duplicating our shared hospital services organization.

DISCUSSION

The primary interest in the shared pharmacy services project was to improve the level of pharmacy service to the small hospitals of the southern Oregon coast. In doing so, there needed to be a maximum effort to minimize expenditures for the small hospitals. Since all four hospitals had either no pharmacy services or minimal pharmacy services, any increase in outside personnel involvement implied increased costs.

Areas of pharmacy operation which could be made more cost efficient must be identified. Only in this manner could direct cost savings be made to the institutions. During the pre-project interviews with the administrators, it became apparent that there were only two areas that could produce either increased revenue or decreased costs to the institution. Those were implementation of a group purchasing program to reduce drug costs and inventory and a statistical and financial data review to standardize and improve pharmacy revenue to the institution.

The other pharmacy services, administrative and clinical, would improve the institutions' pharmacy departments by providing for programs that were required by Medicare and JCAH standards.¹⁵ However, hospitals would incur costs not before realized. Even though these programs would bring these institutions in line with

required standards, they needed to be provided at the least possible cost. The only way this could be done was to share a regional hospital pharmacist and his expenses. The individual hospitals could not afford to hire a pharmacist and the community pharmacists had neither the time nor expertise to deliver the required pharmacy services.

The community pharmacists performed primarily a supply function based from their retail establishments. There were few clinical services provided. This is not to imply that a motivated community pharmacist could not be integrated into the shared regional pharmacy services concept. On the contrary, this integration should be explored. The community pharmacist could provide the daily requirements while being supported by the expertise of the regional hospital pharmacist and the central hospital.

The supply function provided to the hospitals by the community pharmacies had to be curtailed as the hospitals were paying unnecessarily inflated prices. The money saved by group hospital purchasing could be used within the institution.

Resistance from local pharmacists developed to the whole shared pharmacy and hospital services program when purchasing agreements were changed. Pride in local institutions and local financial arrangements were, and probably still are, the biggest road blocks to total implementation of the Shared Hospital Program.

The formation of the South Coast Shared Hospital Organization has overcome most of the resistance to change. The Board of Directors and administrators of each institution have been able to see the benefit that could and has been provided. In this manner the institution has benefitted rather than individual businesses in the respective communities. This completes the objective by providing better health care for the lowest possible cost.

As stated in the interview summaries of the participants, it is nearly impossible for these small hospitals to provide the required quality services individually. They must combine resources to meet the health care needs of their respective populations. A cooperative triage system of health care must be developed if costs and quality are to be controlled.

One of the difficulties in measuring cost and service effectiveness of the Shared Pharmacy Services project was finding an overall measurement tool. Because of this, each service was evaluated on its own merits whether it be subjective or objective. However, the overall measurement was a subjective evaluation of the individual programs.

There was a unanimous decision among the participants in the pilot project at Curry General Hospital and Medical Services that the Shared Pharmacy Services program be expanded to total implementation. However, not every participant felt certain programs were

ideal. These interviews were conducted three months after the pilot project was completed to provide the opportunity to see the effect of these programs over time while still having the pilot project fresh in their minds. The investigator participated extensively in the pilot project to show what could be accomplished by having input from a consulting hospital pharmacist. The post study era did not have a consulting pharmacist actively participating at the hospital.

Bay Area Hospital did provide the basic services as previously outlined, but due to the lag in assignment of the regional pharmacist, they did not provide the consulting services to which Curry General Hospital had become accustomed.

In the June 1975 meeting of the South Coast Shared Hospital Services group, the participants voted to continue the Shared Pharmacy Services program through the implementation phase in all the participating hospitals. The pharmacy program would progress at a rate that would not conflict with the Bay Area Hospital pharmacy services. The Bay Area Hospital pharmacy residents would continue to act as consulting pharmacists until the other hospitals could obtain the services of a full time consultant pharmacist from Bay Area Hospital. It was also decided that a pharmacy technician would be needed to fulfill the group purchasing requirements once all four hospitals were included.

Group Purchasing Project

The savings derived from group purchasing should provide a good percentage of capital to help finance the services of the regional consultant pharmacist. Using the figure of 15 percent savings to Curry General Hospital on annual drug purchases of \$25,000, a savings of \$3,750 is realized. The salary for a regional consulting pharmacist, including benefits, would be approximately \$20,000 for the southern Oregon coast. The savings would increase as the volume of patient care would increase.

Further savings are possible when the consultant pharmacist is able to standardize drug product selection by having a drug formulary. There is potential for saving money, but it takes the time and expertise of a full time shared regional pharmacist.

Another cost consideration would be the services of a full time pharmacy technician at Bay Area Hospital to coordinate the group purchasing activities of the participating hospitals. The salary for a well trained pharmacy technician, including benefits, would be approximately \$10,000.

Another consideration to the administrator of the small hospital is the time savings a centralized group purchasing program provides for their institution. It was estimated that the Curry General Hospital Director of Nursing spent approximately 20 percent of her

time in pharmacy related activities that could be handled by the shared consultant pharmacist. The Director of Nursing time savings cannot be calculated in cost savings to the institution since the time will not be eliminated. However, she will be able to perform her required functions more efficiently and attend to matters previously neglected.

The Curry General Hospital Director of Nursing also felt she was inadequately trained to perform her pharmacy related tasks. These tasks did not provide her with the job satisfaction she desired. The Directors of Nursing at other institutions related the same dissatisfactions during the pre-study interviews.

Financial Data Review

This is the second area investigated that had the potential to produce a direct cost savings to the institution. By providing pharmacy inservice education and drug resource material to the billing clerks and changing the drug billing system, Curry General Hospital was able to realize a 25 percent increase in pharmacy revenue from April 1975 to September 1975. The billing clerks were able to perform their jobs in a more efficient manner and their job satisfaction increased. In addition, lost charges have been recovered throughout the hospital.

Curry General Hospital pharmacy revenue for fiscal year 1974 was \$25,717. By realizing a 25 percent increase in revenue from April to September of 1975, this could be extended through the fiscal year 1975. This increase would amount to approximately \$8,900. Some of this can be attributed to increased patient load (8 percent). However, with an increase in patient load there also may have been an increase in missed charges under the old system.

Centralized Prepackaging

Prepackaging of drugs in unit dose form is part of the group purchasing project. The prepackaging project was separated from the group purchasing because of its special effects on the drug inventory. Almost \$4,000 in pharmaceuticals was found to be expired or overstocked. Much of this could be attributed to the package size available to the institution from the manufacturer. The manufacturers' representatives were notorious for promoting a "deal" to the small hospitals. However, the Director of Nursing was interested in saving money but was not aware of the benefit of increased turnover to reduce dollars invested in inventory.

The amount of money saved for the two month study period was small, \$328.96. However, that computes to approximately \$2,000 over a year. The possibility of medication errors from administration of expired drugs was also reduced. It is impossible to place a

dollar value on the possibility of an error, but it must be considered. The cost of one law suit could finance the Shared Pharmacy Service program for a long time.

Staffing, Workload and Equipment Review
for the Drug Distribution System

This area again meshes with group purchasing, inventory control and the pricing system. By reducing the pharmacy inventory, the greater the annual turnover, the more money the institution has for other programs or investments.

The pharmacy inventory had been reduced by approximately \$10,000 at the end of the study period.

The study by Parke, Davis utilizing their Medication Control Module under a purchase agreement to provide increased drug and inventory control showed an annual cost recovery of \$5,185. This figure is in line with the \$8,900 forecast in increased revenue for the financial data review.

Utilizing the Medication Control Module with the cost plus fee system, and well trained billing clerks, will certainly provide the hospital with an efficient drug control and billing system. The following advantages are outlined for Parke, Davis Medication Control Module;

1. Medications in the Parke, Davis unit are accessible only

to authorized personnel. A record (via the paper charge set) is automatically created for every issue made through the module. In addition, an audit trail for each transaction is provided by the separate charge recorder tape which duplicates the charge set record of each such issue and which can be reviewed by pharmacy on a scheduled basis. Shrinkage of medications stocked at nursing units is practically eliminated.

2. Inventory levels are increased when the preinstallation prepackaging is being done. Start up requires a back up supply as well as the inventory for initial stocking of the modules. The overall inventory will drop back in about three to six months to a figure slightly below the pre-MCM level.
3. The recommended MCM System will assist pharmacy in directing the medical staff toward a formulary approach to prescribing. While no restriction is obviously placed on the physician's right to prescribe whatever he chooses, pharmacists using Medication Control Modules usually program just one of several generic products in their modules. The others are available from the pharmacy on the usual requisition basis. The immediate availability of the module brand for his patient generally

overrides a physician's inclination toward the similar products and prescribing patterns start to follow module programming to a considerable extent.

4. Charge data for a major share of pharmacy charges are provided automatically in a clear, machine imprinted format. The incidence of erroneous charges caused by illegible handwriting and inadvertant transpositions is greatly reduced. A large share of overall patient charges involves pharmacy items and those processed via the modules will not require research or verification.
5. Each patient's drugs are stored separately in individually locked, patient identified drawers. Each medication is prepared individually and is administered immediately after preparation. If a Parke, Davis charting system is selected, the record of administration can be created immediately after administration to help insure charting accuracy. A Parke, Davis charting system will also help to isolate and identify medication errors more rapidly and effectively.
6. Based upon reports from hospitals using MCM systems, it is conservative to predict a reduction of one-third in medication nursing time per major medication round. The MCM procedure suggested reduces transcriptions,

pre-pouring, return trips to the nursing station and charting time. Parke, Davis' recommendations encompass the entire medication administration procedure-- from pre-pouring through charting. They should not be considered in a restricted perspective which might be limited, for example, to comparison of only those times when either the medication tray or Parke, Davis' medication chart is absent from the nursing station on their respective round.

7. The recommended MCM system makes a broad spectrum of frequently prescribed medications available to authorized nursing personnel. Many of the orders written are urgently required for patient care and can be expedited in minutes through the MCM.
8. The MCM module eliminates the possibility of lost charges for medication withdrawn. The charge must be created by inserting the three identification plates before the module will issue the medication. In addition, in contrast to hurried, illegible hand extended charges, the MCM transaction records are clear and readable. Any system for charge retrieval which depends on after-the-fact creation of charge records by busy professional people will inevitably involve failure to

create a considerable number of charge documents.

Lost charges total to a substantial cost to the hospital which can be reduced by utilizing the Medication Control Module.

9. The MCM equipment proposed can be adapted to automate production in the data processing center of punched card records of all drug issues at the modules throughout the hospital. This conversion can be ordered at a future time when the hospital's management feels that manual key-punching of medication charges can be automated at sensible cost. The MCM EDP input terminals can provide the hospital with a unique combination of physical control with data processing capability. In addition, unlike most EDP input terminals currently available, a manual backup via creation of an additional hard copy record is inherent to the unit's design.
10. The installation of a MCM system has never eliminated professional personnel. It has, however, made it possible for the same staff to contend with the additional workload generated by hospital expansion or to assume additional in-house responsibilities. This potential professional time transposition possible with a MCM

system is frequently translated directly to enhancement of patient care.

11. Justification of drug charges for third party reimbursement frequently requires considerable research effort by hospital business offices. Records automatically produced by the MCM can be collected and interpreted easily.
12. Parke, Davis trains all personnel involved in the use of its equipment (pharmacy, nursing on all shifts and maintenance) and assists in installation of the new charting system if desired. The latter is the most difficult installation challenge and its successful, continuing implementation will depend heavily on the inservices for the nursing staff and on the cooperation of the medical staff.
13. MCM packaged medications issued by Medication Control Modules make administration of medications easier and safer. Medications go directly from package to patient, therefore there is no need for medication cups. Each dose is clearly identified as to medication contained and provides a last minute safety check immediately prior to administration.

14. The Recordatrol Base being proposed for the hospital enables one to extend control to those items too bulky to be placed in the upper section of the Medication Control Module. A charge voucher must be imprinted by the charge recorder on the MCM before access can be gained to any of the six drawers. These machine imprinted vouchers insure proper patient billing, aid in inventory control and provide excellent records for thier party reimbursement.

Policies and Procedures

The agencies that survey hospitals (Medicare and JCAH) first look at the various departments' policies and procedures manuals to see if they are in compliance with current standards. The policies and procedures manuals provide the surveyors with an easy check. The surveyor then compares the written policies and procedures with what is actually accomplished by interviewing the appropriate personnel. Minutes of required meetings are also requested for verifications of survey standards.

Even though no direct savings of money can be shown, a hospital that does not pass Medicare certification is no longer eligible for federal health care funds. This can be a problem for a hospital that is on a very strict budget.

The shared regional pharmacist would also have the ability to help standardize policies and procedures for the various hospitals. In this effort he may be able to produce cost savings and improved quality of care by standardizing the various pharmacy systems. This standardization could take advantage of economy of operation by increased volume.

Pharmacy Inservice Education

The providing of a service that was not previously available to Curry General Hospital would not save money. This would add to their pharmacy expenses, but it would provide a required service.

It is difficult to attach a dollar figure to a piece of information and try to measure its cost effectiveness. The subjective results show that the pharmacy inservice education programs were well received and did influence patient care.

The hospital and nursing administration are firmly committed to quality patient care and nursing education. This project provided Curry General Hospital with the means to maximize the value of their inservice education dollar. An 8.5-fold increase in purchasing power for drug education was realized by the shared pharmacy services program. Curry General Hospital can now better guarantee its quality of pharmacy care that it provides to patients.

Drug and Poison Information

This project will also cost the participating hospitals money. It does provide a necessary service which is a vital component in quality patient care and was not previously available.

The quality drug information must be provided to those practitioners who need it. Often the people are not aware of the need for drug information. As this project developed, increased usage was noticeable.

One cannot put a price on a piece of information and measure its effect. The subjective results provided by the post-project interviews plus the increased usage of the service are evidence of its popularity.

Pharmacy and Therapeutics Committee

This is another area where the pharmacist expertise was not utilized prior to the Shared Pharmacy Services project. The Pharmacy and Therapeutics Committee is a requirement set forth by JCAH and Medicare.

The consultant pharmacist must be assertive in this area. The physicians will not seek the pharmacist's advice. He must provide the physicians of the committee with his expertise. This must be diplomatically done to avoid alienating the physician, nurse, and administrators.

Results of the consultant pharmacist work will not be rapidly realized. On the contrary, months or even years may be needed to effect change in areas where old habits prevail. The Pharmacy and Therapeutics Committee is the vehicle to create the change to a cost efficient formulary.

It is important to have a permanent, full time consultant pharmacist in whom the physicians, nurses and administrators have confidence.

Intravenous Admixture System

The intravenous admixture system prior to implementation of the Shared Pharmacy Services was completely outdated and dangerous. When dealing with this dosage form, it is extremely important that the system be the safest and most current. The sole purpose for the development of this system was to provide a safe and efficient intravenous additive program which would meet required standards. No financial comparisons were undertaken.

It is felt by this investigator that the change in the intravenous additive system had the greatest effect on direct patient care. Again, it is impossible to put a price tag on the effects of this change.

The insertion of a pharmacist in an area before considered only as the nurses' domain was at first viewed with skepticism. It did not take long for the nurses to be convinced of the contribution

that could be made by the pharmacist. Reference material, text books, and inservice education provided the first change in attitude. However, the new piggyback system proved itself. The nurses had fewer problems and more time to devote to other nursing responsibilities.

The pharmacist's intravenous additive expertise should be continued through the Shared Pharmacy Services program.

CONCLUSION

A study was conducted to compare shared pharmacy services with the traditional pharmacy services in a small hospital. The Shared Pharmacy Services program decreased capital investments, decreased operating expenses and increased revenue totaling approximately \$22,650. This savings can be broken down as follows:

(1) group purchasing, \$3,750; (2) decreased inventory, \$10,000; and (3) increased revenue, \$8,900.

Other areas of decreased operating expenses were also found but specific measurements could not be determined within the time frame of this study. These include: (1) drug and poison information; and (2) pharmacy and therapeutic project-formulary development.

The third area of financial concern was finding ways to better utilize existing monies in the hospital budget. The Pharmacy Inservice Education project produced an 8.5-fold increase in the hospital's inservice dollar purchasing power.

The cost of a shared regional pharmacist would be approximately \$20,000 including the benefit package available at Bay Area Hospital. The personnel costs of one pharmacy technician including the benefit package would be approximately \$10,000. It is anticipated that one pharmacist and one pharmacy technician would be needed to begin implementation of the Shared Pharmacy Services program to the

other three hospitals. At a later date the services of another pharmacist may be needed. The maximum personnel cost of two pharmacists and one technician would be approximately \$50,000.

Similar financial benefits can be obtained by the other small hospitals in Bandon, Coquille and Reedsport through implementation of the Shared Pharmacy Services program. Decreased operating expenses and increased revenue amounting to \$50,600 could be expected if the program were to be implemented by all four hospitals in the south Coast area. Additionally, a reduction in capital investment of approximately \$40,000 could be realized which would increase the hospital's return on investment.

Each hospital will present some different problems, but they all are operated in the same basic manner as Curry General Hospital. The hospital personnel have similar backgrounds and educational experience. It is important to provide latest technology and knowledge available which can best be done by sharing the expense when resources are limited.

Shared Pharmacy Services program utilizing a shared regional pharmacist for Curry General Hospital and Medical Services has been shown to be both financially and clinically beneficial. It is recommended that the following areas be explored to further increase the efficiency of the program.

1. Coordinate the services of a regional consultant hospital

pharmacist with a local community pharmacist in the small hospital.

2. Investigate computer applications in a shared hospital pharmacy services system.

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APPENDICES

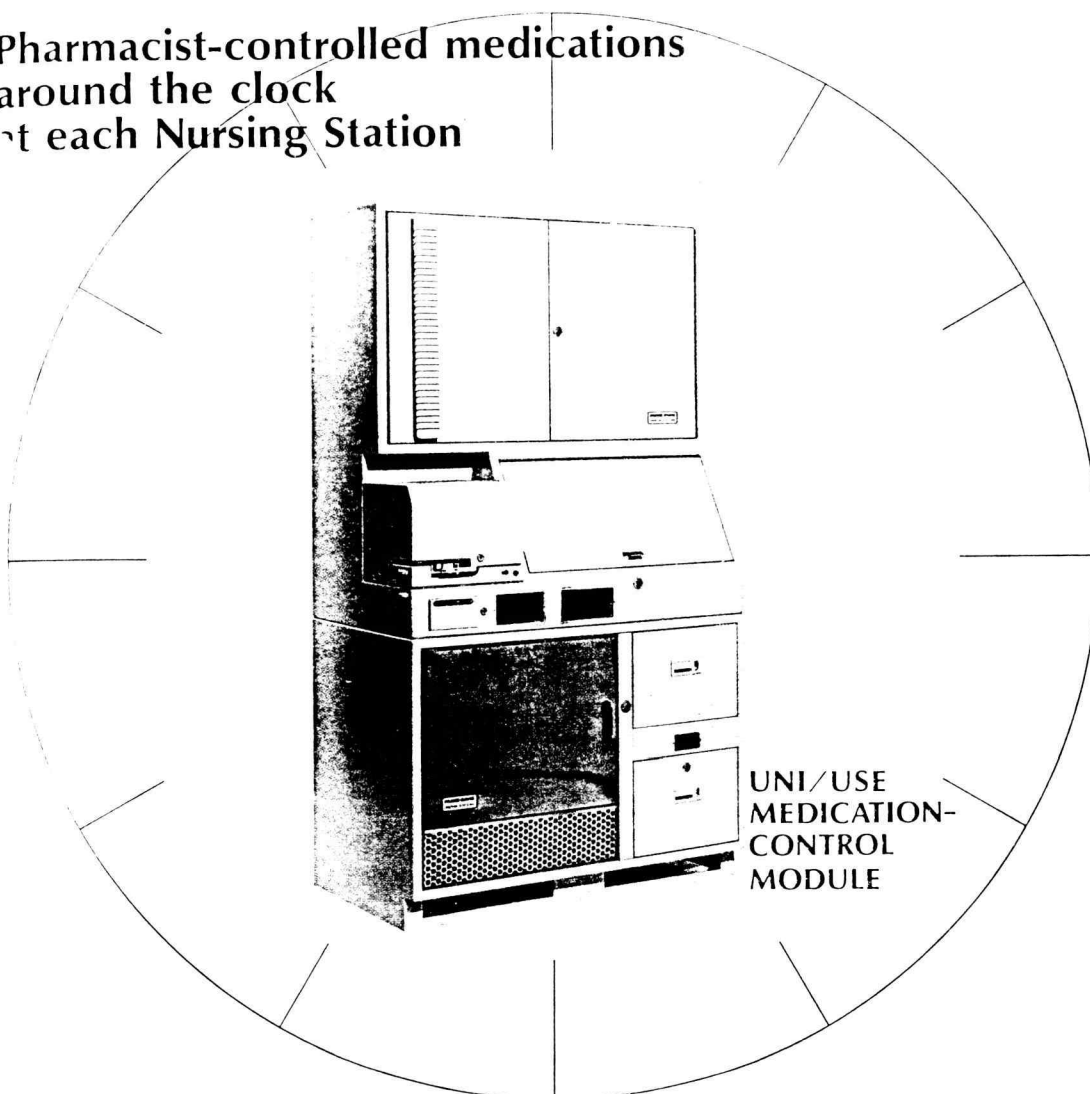
APPENDIX A

| <u>Item</u> | <u>BAH cost</u> | <u>CGH cost</u> | <u>Difference</u> |
|-----------------------------|---------------------|---------------------|-------------------|
| Aldomet 250 mg #30 | \$ 1.91 | \$ 2.80 | \$ 0.89 |
| Halog Cream 1% 15 gm | 3.26 | 4.28 | 1.02 |
| Aldomet 250 mg #20 | 1.27 | 2.02 | 0.75 |
| Negram 500 mg #56 | 9.01 | 12.62 | 3.61 |
| Halog Cream 15 gm | 3.26 | 3.68 | 0.42 |
| Gantrisin 500 mg #14 | 0.36 | 0.60 | 0.24 |
| Elixophyllin 16 oz | 3.06 | 4.34 | 1.28 |
| Colymycin Otic 5 ml | 2.40 | 3.47 | 1.07 |
| Darvon Cpd 65 mg #20 | 1.25 | 1.85 | 0.60 |
| Pathibamate 200 #20 | 1.67 | 2.68 | 1.01 |
| Mycostatin Oral Susp. 60 ml | 3.95 | 5.26 | 1.31 |
| Darvon 65 mg #25 | 1.51 | 2.35 | 0.84 |
| Trancopal 100 #25 | 2.24 | 2.22 | - 0.02 |
| Cyclospasmol 100 #25 | 1.05 | 1.40 | 0.35 |
| Quibron #20 | 1.21 | 1.79 | 0.58 |
| Pavabid #20 | 2.08 | 2.71 | 0.63 |
| Castor Oil 16 oz | 1.49 | 3.07 | 1.58 |
| K-Lyte #30 | 3.04 | 5.60 | 2.56 |
| Cordran Lotion 60 ml | 6.29 | 8.80 | 2.51 |
| Calamine Lotion 4 oz | <u>0.33</u> | <u>0.57</u> | <u>0.24</u> |
| Total | \$50.64 | \$72.11 | \$21.47 |
| Percentage saved | | | 29.77% |

APPENDIX B

UNI/USE MEDICATION-CONTROL MODULE

Pharmacist-controlled medications around the clock at each Nursing Station



Pharmacist controlled—The UNI/USE Medication-Control Module provides secure storage, with controlled accessibility, for medications at various locations throughout the hospital.

Immediate availability—Prescribed medications are available within seconds, but only to authorized personnel. Complete and legible records of each medication issued are automatically created for pharmacy service and business office. These records are particularly appropriate for helping to extend pharmacy service control to those critical areas in the hospital that constantly require a great variety and supply of medications.

Broad coverage—The pharmacist selects the most

frequently prescribed medications for each nursing unit for storage in the Medication-Control Module, which has a capacity of up to 96 different drugs. With careful programming he can assure a sufficient spectrum to cover between 70 to 90% of the medication needs for each hospital service. **Night or weekend coverage**—Provides controlled medication availability throughout the hospital at all times—helping to eliminate frequent trips by nurses to the pharmacy “after hours.”

E.D.P. potential—A UNI/USE Medication-Control Module with a special charge recorder provides a unique combination of physical control with simultaneous electronic recording of all data.



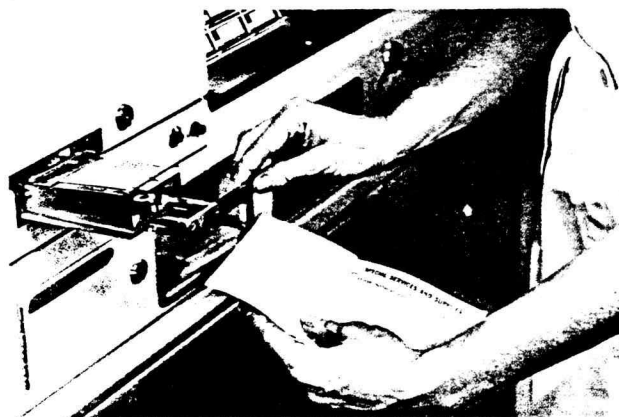
Pharmacist Reviews Medication Supply

Only the pharmacist has access to the medication storage cabinet. A wide range of medication package sizes allows the pharmacist to prepackage almost any amount of medication from a single unit dose to several days' supply in each medication carrier. Each module can be programmed with a maximum of 96 different drugs having a potential capacity of 1,560 medication packages. When Medication-Control Modules are used throughout the hospital, they provide controlled storage of several hundred different drugs. As the pharmacist monitors the Medication-Control Module, he has greater opportunity for professional consultation at each nursing station.



Prescribed Medication is Selected

An alphabetized and numbered listing shows the medications available in that UNI/USE Medication-Control Module. It also serves to key the prescribed medication to the correct drug identification plate numbered and stored in the drug plate panel.



Input Necessary for Drug Withdrawal is Provided

Three metal or plastic plates identify (1) the patient, (2) the prescribed medication, and (3) the nurse withdrawing the medication. These plates must be placed in the charge-recorder shuttle, along with a multicopy charge-voucher set before a drug can be withdrawn from the module. This simple procedure assures control and accountability by requiring "input before output."



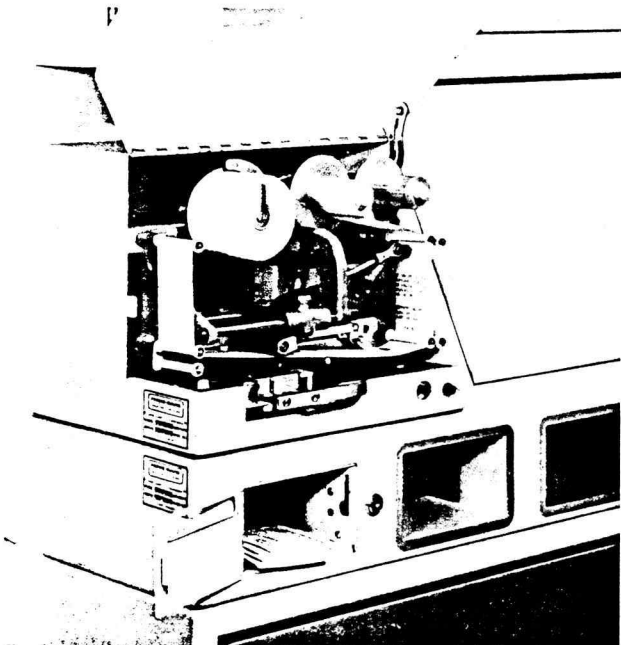
Desired Medication is Withdrawn

When all inputs necessary for drug withdrawal are correct, the start light will come on, indicating that the Medication-Control Module is ready to issue the desired medication. The nurse pushes the start button and the desired medication is released into the medication chute. Simultaneously a complete record of the transaction is imprinted on the charge voucher and validating tape. These clear printouts provide accurate records for charging and inventory control.



Accuracy is Checked

After the nurse removes the medication carrier from the chute, she checks the imprinted data on the voucher against the pharmacy-labelled medication package. The imprinted data on the voucher identifies the patient, the medication issued, the nurse or pharmacist withdrawing the drug, and the location of the UNI/USE Medication-Control Module. The charge-voucher set is separated and the pharmacy and business office copies filed for pickup, thus facilitating positive and accurate patient billing. Finally, an additional imprinted section is detached from the voucher and affixed to the carrier itself for proper patient identification.



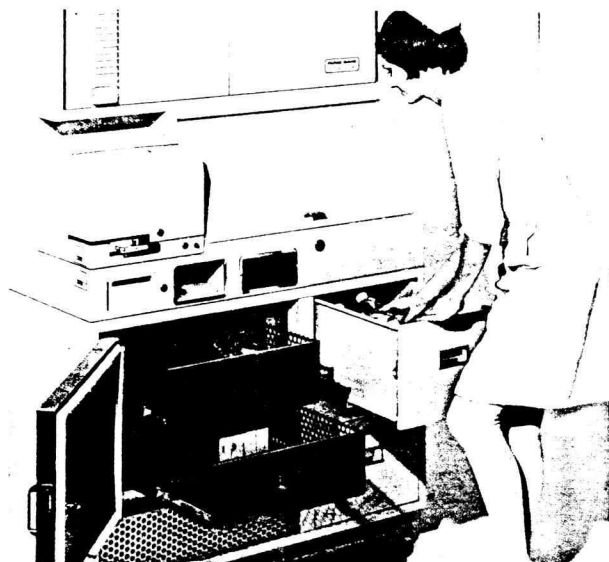
Management Record of Each Transaction is Automatic

A permanent record of each medication withdrawal from the Medication-Control Module is automatically recorded for review on a special continuous tape accessible only to designated management personnel.

An optional E.D.P. Charge Recorder can be used to simultaneously transmit a record of each transaction to the Business Office data center.

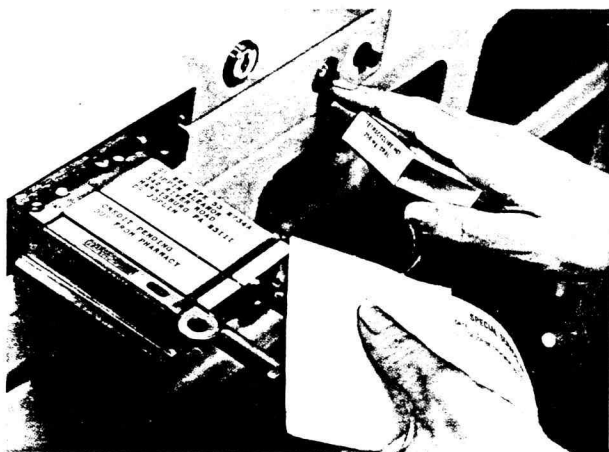
UNI/USE Medication-Control Module Base Offers Security and Flexibility

Each module can be installed with a base having a combination of drawers and/or refrigerator, as required. Generous drawer space is provided for I.V. solutions, noncharge drugs, other supplies, and credit returns. The base is locked in order to assure access only by authorized personnel. Record keeping and charging for items stored in the base is also effected by using the charge recorder with appropriate identification plates and vouchers.



Charges for Special Services Are Easy to Record

The UNI/USE Charge Recorder can also be used to record charges for special services not involving medication. When the appropriate plates and charge-voucher form are correctly positioned, the charge recorder is activated by pushing the "separate operation" start button.



Specifications

UNI/USE is a trademark of Parke, Davis & Company.

- Constructions**
1. Welded self-supporting frameless constructions
 2. Sixteen-gauge level stretched steel #1010 S.A.E.
 3. Piano-type nickel-plated hinges

- Security** Combination of Best and Corbin locking systems

- Size**
1. Weight 575 pounds (with refrigerated base 665 pounds)

2. Height 77" (without base 45")
3. Width (upper doors closed) 42"
4. Width (upper doors open) 81"
5. Depth (base drawers closed) 26"
6. Depth (base drawers open) 42"
7. Depth (with refrigerator door open) 48"

- Electrical**
1. 5 amp fuse
 2. 115 volt A.C., 60 cycle, 2.5 amp, 289 watts

3. Visual and/or audible signals and controls for proper operation, operator error, and empty drug storage bins

Charge Recorder

1. Electrical heavy-duty type
2. Prints from embossed metal or plastic plates
3. Accepts multiple copy forms
4. Duplicates all transactions on internal paper tape



PARKE-DAVIS UNI/USE SYSTEMS DIVISION
208 Welsh Pool Road • Lionville, Pa. 19353

APPENDIX C

PERCENT CHANGE IN POPULATION BY COUNTY

OREGON

