A STUDY TO DETERMINE THE MOST EFFECTIVE METHOD OF ADMINISTERING MEDICATIONS AT PROVIDENCE MEMORIAL HOSPITAL, EL PASO, TEXAS

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CHAPTER I

INTRODUCTION

The communication media of this country has for years carried to the public eventful and significant happenings from around the world. Probably no single event has had more impact on the people in the health care industry and the people of this nation than the message carried to them in 1965. The message referred to is that delivered by the former President of the United States, Lyndon B. Johnson, indicating that health care is a right of every citizen. Since that time, revolutionary actions have taken place in the health care industry. Society is demanding, at less expense to the individual, more extensive health care than ever before in the history of this nation. These revolutionary demands have forced the leaders of the health care industry to adopt new methods of delivering health care to society. This is no mean task, considering the traditions that must be broken. The boom in medical technology has had a significant impact in breaking these traditions and advancing progress in our medical institutions. The acceptance, teaching, and practicing of these constant changes have caused diversification and specialization to take place throughout the rank and file of the health care delivery system.

There is some controversy that a system does exist. It may be that specialization and diversification have resulted in the fragmentation of the health care industry.[1] The problem of administering health care to society is further complicated by the shortage of qualified personnel at

almost every level of employment within the health care field from the aide to the physician.[2] The shortage of personnel, coupled with the increasing demands for better and more health care, has resulted in the delegation of responsibilities and technical tasks previously held sacred by the physician to the nurse, aide, technician, and others.[3] The current literature abounds with arguments for and against the multiple approaches and solutions offered by medical and nonmedical personnel to improve the health care system. It appears likely to this writer that even more of the traditional responsibilities of the physician and nurses will have to be delegated to supra specialists or technicians if the health care industry is to succeed in satisfying the demands of its consumers. However, in delegating these tasks and responsibilities, steps must be taken to insure that the consumer is protected from quack medicine and that the delegated task actually results in more responsive care of patients.

The emphasis placed on protecting the patient-consumer is important; however, in some cases the provider seems to be hampered by statutory and licensing limitations in his efforts to furnish "quality" medical care, i.e., the requirement for registered nurses to pass and record all medications and to start intravenous fluids. Perhaps an easing of these limitations and the standardization nationally of licensing requirements would prove beneficial to the health care industry's continuing efforts to provide every citizen quality health care.

It is this same complex maze of personnel shortages, licensing, and statutory limitations facing the health care leaders across the nation that has caused the administrator of Providence Memorial Hospital at El Paso, Texas, to consider the use of paramedical personnel in administering medications. The administrator at Providence Memorial is interested in maximizing the utilization of all personnel within their individual capabilities and the scope of their training. The critical shortage of qualified manpower in the health care industry, and particularly registered nurses, has been felt at the hospital. Therefore, the concern is how the duties and responsibilities of the registered nurses can be changed to provide them more time for direct patient care.

One portion of the nurses' duties at this time is that of administering medications. The administrator's concern is that this very time-consuming activity might better be accomplished by a less qualified individual than the registered nurse, thereby freeing the nurse to accomplish more direct patient care. The director of nursing is very much interested in developing a system that will free the registered nurse from this administrative responsibility, thus returning the nurse to the patient's bedside. With this extra time available, the nurse can then evaluate the patient's condition, develop patient-nurse rapport, and teach the patient preoperative, postoperative, and home care, so essential for full recovery from his illness.

The chief pharmacist is interested in developing a program which will insure that the patient receives the right medication at the right time, while also reducing the number of medication errors. In

concert with the administrator, director of nursing, and chief pharmacist, it was agreed that a study should be made to determine the most effective method of administering medications at Providence Memorial Hospital.

Hospital Setting

Providence Memorial Hospital was opened in 1902 by Dr. M. P. Schuster; the facility is a community-owned, voluntary, nonprofit hospital. The corporation for the hospital was formed on September 1, 1945, under state, county, and municipal law.

The main building originally had 272 beds. Over the years renovation, internal reorganization, and expansion programs were completed to meet new bed requirements and add 32 beds to the original structure. In 1967, financed in part by Hill-Burton funds, construction was completed on a 132-bed addition. This addition is accessible through an enclosed hallway; therefore, the entire facility is essentially one building.

Presently, the hospital has expanded to a 436-bed facility fully accredited by the Joint Commission on Accreditation of Hospitals.[4] In addition to providing the customary acute care services, Providence Memorial has a 44-bed psychiatric unit, an intensive care unit, cobalt therapy, radio-active isotopes, electroencephalography, electromyography, inhalation therapy, physical therapy, and furnishes full-time complete radiological and pathological services. The hospital is also the Congenital Heart Center, approved by the Department of Health, Education, and Welfare, and receives referrals from West Texas, New Mexico, and Arizona.

The hospital is located in the southwest section of downtown El Paso and serves a population estimated at 386,000 people. It is easily accessible in that it is within walking distance from the residences of most of the city's indigent population. The city transit system provides bus service to the hospital eighteen hours per day. The population served is approximately 86 per cent Mexican-American.

The average occupancy rate for 1970 was 84.7 per cent, representing a total of 132,793 patient days with 17,285 admissions.[5] The length of patient stay at the hospital averaged 7.5 days with a $60.99 average total cost per patient day.[6]

Statement of the Problem

To determine the most effective method of administering medications at Providence Memorial Hospital.

Limiting Criteria

The criteria for this study are:

1. The system must relieve the nurse of responsibility for administering routine medications.

2. The system must provide the right patient with the right medication at the right time.

3. The system must be simple to operate and provide clear and vivid instructions to pharmacy personnel.

4. The system must reduce the number of medication errors at Providence Memorial Hospital.

5. The system must fall within the purview of the State of Texas's statutory limitations.

6. A registered pharmacist must monitor the system to reduce the likelihood of medication errors.

7. The original physician's drug order must be interpreted by a registered pharmacist.

8. The system must provide medication services on a twenty-four-hour, seven-day-a-week basis.

9. The system must provide an accurate and up-to-date drug bill at time of patient's discharge.

Facts Bearing on the Problem

Facts bearing on the problem are:

1. A shortage of registered nurses exists in the El Paso area.

2. A shortage of qualified pharmacy technicians exists.

3. Any drug-administration system devised must be practical and economically feasible within budgetary limitations.

4. A requirement exists to develop within the system devised a more adequate and complete drug profile card.

5. Providence Memorial Hospital plans to expand its present capabilities by building a twelve-bed Coronary Care Unit.

6. Nursing service personnel spend approximately 30 per cent of their duty time accomplishing administrative functions in conjunction with the passing of medications.

7. At Providence Memorial Hospital approximately twenty-four nurses are used per day as medication nurses.

8. The Medelco communications system is operational at Providence Memorial Hospital which greatly reduces communication problems between units and the pharmacy.

Assumptions

The assumptions are:

1. That the shortage of R.N.'s will continue to be a problem in the El Paso area.

2. The advancement in technology and procedures will continue to increase the complexity of treatment which will require more bedside time of the nurse performing patient care.

3. The pharmacist is not being fully used in his role as a clinician in pharmacology and in counseling of the staff.

4. Funds will be made available for the hiring of eleven additional personnel and the procurement of required equipment.

Review of the Literature

At a meeting in Washington, D.C., November 2-4, 1969, two professional associations - the pharmacists and the nurses - discussed their changing roles in the delivery of health care.[7] This may have been the first official attempt of the two professional associations to work out their mutual problems and look ahead toward the future. The agenda for discussion included the impact of hospital-centered group practice, comprehensive health insurance, consumer involvement, and emerging trends in pharmacy and nursing services. This article

pointed out quite clearly that the nurses could expect to receive more responsibility for direct patient care, especially in the areas of coronary care, emergency care, intravenous therapy, and medicine. The pharmacist in the same light must be prepared to perform his functions as an associate to the doctor and provide clinical judgment in pharmacology. It is possible in the future that the pharmacist will receive the physician's medication order directly from the physician, possibly with some help of the computer or other automated devices, and will be held responsible for not only the drug compounding and reconstituting, but the complete drug distribution and administration system.[8] To accomplish this, there may be a unit-dose distribution system developed, using single individual dose dispensing methods performed by a drug distribution administration team under the supervision of the pharmacists. It is important to note that these emerging trends are no longer the talk of the future but the facts of today in many hospitals across the nation.

Mr. Jack J. Fulton stated in his article, "Medication Errors," that errors are a constant and frustrating source of danger to every patient in every hospital or other health care facility.[9] Disturbances on a ward unit, incomplete drug profile cards, and the fact that people are human and therefore subject to making mistakes cause the threat and existence of medication errors. The potential for making errors is further increased by the complexity in the type of drugs available today and the number of medications each individual patient receives. An example of this complexity as stated from this article follows: "One

nurse handled 245 medications in 24 hours on 26 patients. This amounts to almost 10 per patient."[10] This is not unlike the workload that many nurses are expected to accomplish in addition to bedside care on a daily basis. These same concepts and procedures have been subjected to criticism from many quarters of the health care industry because of the increased potential of medication errors occurring within the system.[11] Although this article does not advocate reducing in number the nurse team, it does advocate that someone be specifically identified to administer medications.[12]

"The problems of detecting medication errors in hospitals are numerous."[13] Although each error is supposedly reported on an incident report, it has been found that numerous errors are never reported.[14] Barker and McConnel found in their study, "The Problem of Detecting Medication Errors," that of 51,200 medication errors estimated to have occurred in a hospital studied, only 36, or .07 per cent, were actually reported.[15]

Drug distribution systems in hospitals are past-due for a critical analysis to determine which method would provide the best care to the patient.[16] Only recently has the drug distribution system been recognized as a separate activity; previously it had been lost among the many other services of a hospital. Today, however, with the continual high cost of health services and the increased importance of the role that pharmacists play in caring for the patient, the pharmacy is being recognized for its important role in health care.[17] That role is to determine how best the pharmacists might accomplish these responsibilities that has brought forth researchers such as Dr. Mark Blumberg,

Senior Health Economist, Division of Economics Research, Stanford Research Institute, who advocates automation of pharmacy procedures; the Veterans Administration in connection with Systems Development Corporation,[18] and Dr. W. Heller's group at University of Arkansas Medical Center, all in search of a breakthrough to improve efficiency of drug distribution systems.[19] Previous studies have indicated that the average nurse spends 1.2 minutes of preparation time per medication, or approximately 1-1/2 hours per shift, on a busy ward. In addition, although no complete cost analysis has been accomplished, a cost study of twenty hospitals by a consulting firm, which was determining the cost of losses from inventory outside the pharmacy, showed the average hospital in this group lost (1) $77.63 in costs, and (2) $128.30 in revenue per bed annually.[20] It appears the unit-dose system may be the inevitable end to the distribution system, since a pilot study conducted at Providence Hospital in Seattle, Washington, some years ago concluded that 1-1/2 hours of nursing time per shift could be saved using the centralized unit-dose system.[21] Although Memorial Hospital, Long Beach, California, has been satisfied with a decentralized system -- which consists of pharmacy units at every ward level -- the centralized system appears to be more economical than the decentralized system, even though variations of the unit-dose system may be more appropriate and fall within the legal and statutory operation limitations that face most hospitals.[22] Systems using automated dispensing machines such as the Brewer system may lead to more innovative ideas in the future.

The Brewer automatic drug dispensing system, although accepted by only a limited number of states, provides a device which automatically dispenses medications on the ward and records each transaction.[23] The

nurse activates the machine by inserting a patient identification plate, drug identification plate, and a ward master plate. After the machine accepts the plates it dispenses the medication. Some hospitals using this system are well satisfied with the results, but it is a system that cannot be standardized because of the statutory limitations in some states.

Drug control by automation -- A system developed at the University of Arkansas, primarily to reduce medication errors, utilizes electronic data-processing equipment. A secondary advantage of this system is that it reduces the ward stock and places all medications formerly stored on nursing stations in a central pharmacy.[24]

The Hospital Administrator's responsibility for drug distribution is often neglected.[25] It has now become imperative that hospital administrators give more attention to the delivery of safe and efficient pharmaceutical services. Changes must be implemented that will save nursing time, reduce medication errors, and provide full pharmacy services around the clock.

Mr. Connors' article, "The Hospital Administrator's Responsibility for Drug Distribution," suggests to hospitals developing new distribution systems that the new system should relieve nurses from requisitioning, storing, preparing, and perhaps administering medications; that the pharmacist can provide more of a contribution to patient care than he presently provides; that properly trained personnel can assume some of the routine pharmaceutical procedures. Lastly, the system should be simple, as a complicated system propagates errors.[26]

Research Methodology

A survey of literature was conducted to gain an understanding of the problem as it exists in the hospital industry and to determine approaches for conducting further research. An initial visit to Providence Memorial Hospital was made to identify the scope of the problem as presented by the administrator and director of nursing service. Extensive research of the problem was then initiated. Requests for published material regarding statutory limitations were directed to the Texas Medical Association; the Texas State Board of Pharmacy; the Texas State Department of Health; and the Board of Nurse Examiners, State of Texas. Information concerning an on-going drug distribution system was requested from the Director of Pharmacy Service, Long Beach Memorial Hospital, Long Beach, California, to provide a data base of an on-going system with which to analyze and compare Providence Memorial's existing system; and Director, Pharmacy Service, Methodist Memorial Hospital, Lubbock, Texas. A second visit was made for the purpose of conducting extensive research at Providence Memorial Hospital, El Paso, Texas.

Several methods of gathering data were used while conducting on-site research. A review of applicable records in the pharmacy and nursing service, observations, time studies, and interviews with all levels of management personnel were conducted. Information relative to the administration and administering of medications by nursing personnel was collected and a review of current methods was made by observation.

The purpose of the interviews was to gain an insight into the individual acceptability of nursing service personnel and management toward changing the responsibilities of administering medications. Interviews were conducted with the administrator, associate administrator, director of nursing, and nurses occupying key supervisory positions.

Observations of the current system were directed primarily toward the medical nurse's activities and were conducted during day and evening operations. The writer observed step-by-step activities of medication nurses to determine actual time that they were performing activities related to administering of medications. It was found that each medication nurse spent between 3.5 and 4.2 hours out of each eight-hour shift either administering medications or performing administrative functions connected with administering medications.

A review of the drug-distribution system was conducted from the time the physician initiated the written order to the administration of the medication to the patient, in order to obtain a complete understanding of the current system.

Footnotes

[1]R. B. Eastin, "Arresting Executive Obsolescence and Organizational Decay," Hospital Administrator, XV, (Fall, 1970), 38.

[2]"Step Up Your Productivity," Medical Economics, XLV, (September, 1968), 78.

[3]Ibid.

[4]Guide Issue, Hospitals, XXXXV, (August, 1971), 204.

[5]Ibid.

[6]K. Schairer, private interviews with selected key employees, March, 1971.

[7]Helen V. Emerson, "Pharmacists and Nurses Discuss Changing Roles," Hospital Management, CIX (January, 1970), 54-55.

[8]Ibid.

[9]Jack J. Fulton, "Medication Errors," Hospital Forum, VIII (June, 1965), 40-43.

[10]Ibid.

[11]Kenneth N. Barker and Warren E. W. McConnel, "The Problems of Detecting Medication Errors in Hospitals," American Journal of Hospital Pharmacy, XIX (August, 1962), 360.

[12]Fulton, 42.

[13]Barker and McConnel, 361.

[14]Ibid.

[15]Ibid.

[16]Kenneth N. Barker, "Trends in Drug Distribution Systems in Hospitals," American Journal of Hospital Pharmacy, XIX (December, 1962), 595.

[17]Ibid, 596.

[18]Ibid, 597.

[19]Ibid, 599.

[20]Ibid, 600.

[21]Donald F. Beste, Jr., "An Integrated Pharmacist-Nurse Approach to the Unit-Dose Concept," American Journal of Hospital Pharmacy, XXV (August, 1963) 403.

[22]John A. Oliver, "A New Concept for Hospital Pharmacy Practice," Hospital Management, CIII, (June, 1967), 78.

[23]R. F. Hosford, "Automatic Drug Dispensing," Hospitals, XXXVII (January, 1963), 96-103.

[24]Kenneth N. Barker and W. Heller, "The Development of a Centralized Unit-Dose Dispensing System, Part I; Description of the U.A.M.C. Experimental System," American Journal of Hospital Pharmacy, XX (November, 1963), 568-79.

[25]Edward J. Connors, "The Hospital Administrator's Responsibility for Drug Distribution," Hospitals, XLII (December, 1968), 46.

[26]Ibid.

CHAPTER II

DISCUSSION

In the initial review of this problem, it was necessary to determine the statutory limitations enacted by the State of Texas that affect the art of administering medications. Vernon's Civil Statutes of the State of Texas Governing Examination, Registration, and Disciplinary Proceedings of Registered Nurses Under Jurisdiction of the Board of Nurse Examiners for the State of Texas clearly defines the art of administering medications as a responsibility of a nurse.

Section 5, Article 4518, Chapter Seven of the Statutes reads as follows:

> 'Professional Nursing' shall be defined for the purpose of this Act as the performance for compensation of any nursing act (a) in the observation, care and counsel of the ill, injured or infirm; (b) in the maintenance of health or prevention of illness of others; (c) in the administration of medications or treatments as prescribed by a licensed physician or dentist; (d) in the supervision or teaching of nursing, insofar as any of the above acts require substantial specialized judgment and skill and insofar as the proper performance of any of the above acts is based upon knowledge and application of the principles of biological, physical and social science as acquired by a complete course in an approved school of professional nursing. The foregoing shall not be deemed to include acts of medical diagnosis or prescription of therapeutic or corrective measures.[1]

Section 5c, Article 4528c, Vernon's Statutes on Vocational Nurse Act states the following reference for the training of a vocational nurse:

> In conducting examinations and in accrediting schools of Vocational Nurses and hospitals as provided for in this Act, it shall be mandatory upon the Board to ascertain that each Vocational Nurse shall have been taught the fundamentals of basic bedside nursing in the home and in the hospital. The course prescribed shall include cooking and preparation of

> standard simple diets for the sick; room cleaning and arrangement of the sick-room in the home and hospital; bed making; bathing and personal care of patients; cleansing and care of utensils used by the sick; the simple principles of hygiene and sanitation in the home and hospital; the methods of taking and recording temperature, pulse rate, respirations, blood pressure readings, fluid intake and output measurements, administration of foods and drugs by mouth, by rectum, by subcutaneous hypodermic injection, and such other subjects and procedures as may be regularly taught in the majority of such training programs.[2]

Dispensing is defined by the Texas State Department of Health thusly:

> Dispensing includes the acts of making proper identification of the drug ordered as to its specifications and dosage form, of compounding or of transferring from a bulk container, packaging with proper protection, labeling with the required information, and, in the case of prescriptions, properly relating the label to a specific patient.[3]

Section 5, Article 4518, and Section 5c, Article 4528c, of Vernon's Civil Statutes of the State of Texas, coupled with the definition of dispensing as defined by the Texas State Department of Health, caused the writer to conclude that the use of paramedical personnel to administer medications is legally questionable and therefore would not prove satisfactory for implementation at Providence Memorial Hospital. Thus, a search for a more practical and agreeable solution to the problem was conducted that would not place the hospital in legal jeopardy.

A review of current literature disclosed a trend which combined the drug distribution systems and the administration of drugs into one system. Today, however, there can still be found two basic drug distribution systems in the United States which are generally categorized as follows: (1) a total floor stock system which characteristically stocks bulk quantity of drugs on the wards; (2) an individual patient order system which supplies practically all drugs on an individual order basis

with several days' supply being dispensed at a time. Various combinations of the two systems also exist in numerous hospitals. The actual drug administration functions on nursing stations are usually considered to consist of drug selection, ordering, storing, preparation for administration, administration, "charting," evaluation of effects, and action upon evaluation.[4] Studies have shown that the nurse supervisor spends up to 60 per cent of her time performing administrative functions, while the general duty nurse spends 20 to 30 per cent of her time on administrative functions.[5] It is these administrative functions that must be delegated to other medical personnel.[6] Possibly the administrative functions that nurses are required to perform are the cause of much of the criticism received by health facilities. A nurse on the hospital ward today is expected to follow many doctors' orders for multiple types of patients, pass numerous medications in a variety of dosages, recognize reactions to medications, and provide antidotes if necessary.[7] These factors have led to substantial changes in the philosophy of nursing in the form of specialization which demand even more of the nurse's time at the bedside.[8]

Traditions have limited the scope of the pharmacists to those activities surrounding manufacturing, storing, ordering, and dispensing of drugs. Current trends have recognized the significance of the pharmacist as a member of the patient treatment team. The time has passed when the pharmacist can satisfy the requirements of his role by concocting

and dispensing medications. The complexity of pharmacology and the turnover rate of new drugs that overwhelms the average practitioner and nurse have forced the pharmacist out of the cocoon-like shelter of the pharmacy into active patient care.[9] The pharmacist today is expected to be a consultant, advisor, and educator in the field of pharmacology. Next to the physician, perhaps the pharmacist is the best-trained professional on the health care team in terms of basic academic requirements for graduation and licensure, and is a logical person to assume an expanded role in the modern health care program.[10] The demands of society and the efforts of personnel within the health care industry to satisfy these demands force this role upon the pharmacist. His role must involve people, patient care, and interprofessional communications.[11]

In discussing functions and activities of nurses, pharmacists, and systems in hospitals, one must never lose sight of the prime reason for their existence -- the patient. Barbara Conway summarized the importance of the drug distribution system and administration of drugs to the patient in her article, "The Seventh Right," as the right patient, the right medication, the right route of administration, the right dosage, the right technique, and the right time as the right approach.[12] In these few words, much has been said that points toward utopian patient care and what every level of health care servant should be striving to reach in his services to the patient. It is this "Seventh Right" philosophy that has brought the team of nurse, pharmacist, and physician together in an effort to reduce the number of medication errors to which every

patient is subject during his period of treatment. More today than ever before, medication errors haunt the conscience of the physician, nurse, pharmacist, and administrator, because of the complexity of the pharmaceutical field resulting from the technological advances in the field. Jack J. Fulton summarized the feelings of many members of the health care field regarding medication errors in one word -- "frustration."[13]

Some of the steps that have been identified by numerous authors as weaknesses in distribution and administration systems are: transcription of the order from the chart to the medication chart or index card, ordering of drugs from the pharmacy, dispensing of drugs in properly labeled containers, transportation of drugs from the pharmacy to the ward, sorting of the drugs, and the observance of the seven rights.[14] During the course of these activities, the personnel involved vary from the highly skilled and professional pharmacist to the untrained volunteer worker used in many hospitals for these activities.[15] This practice increases handling, cost, and the number of medication errors that occur in most hospitals. Most traditional systems of distribution and administering of medications are wasteful of health resources, inequitable in their distribution of the cost of patient care, and are becoming an increasing danger to the health of the patient.

Combination System at Providence Memorial Hospital

Providence Memorial Hospital is currently operating a combination distribution system which consists partially of a unit-dose system and floor-stock system, with all medications administered by a ward nurse. This combination system is typical of many found across the nation in hospitals of similar size. It also is plagued with the problems of similar hospitals.[17] Providence Memorial's combination system does provide for a review by the pharmacist of a carbon copy of the physician's original order prior to dispensing of a drug to the ward by using a multiple copy form for doctors' orders. There still exists under the combination system a great potential for medication errors. A review of the step-by-step procedures in administering medications at Providence Memorial is flow charted at Appendix A. The flow chart discloses that a medication is handled seven times prior to administration to the patient. This system is error prone and consumes approximately four hours per eight-hour shift of valuable nursing time for those individuals designated as medication nurses on the ward. This time does not include intravenous preparations and administration, which are accomplished at Providence Memorial by an I.V. team.

Analysis of the Findings

Separation of the distribution and administration of medications is the practice at Providence Memorial Hospital. Nationally the vulnerability of separating these two functions has been recognized by progressive and realistic leaders in the health care field. Grover C. Bowles, noted author in the field of pharmacy, suggested that the functions of dispensing and administering of medications be combined and placed under the responsibility of the pharmacist.[18] In considering the desires of the administrator of Providence Memorial to free the ward nurse for patient care, this system, as suggested by Bowles, appears worthy of consideration. Under the present system, the ward nurse is performing both dispensing and administering functions.

The pharmacy is dispensing three to four days' supply of drugs to the ward via a delivery system which is manned by volunteers. The unit medications are delivered to each nursing unit and given to the individual manning the reception desk at that time. The medication is then passed from the recipient to the individual nurse or nurses designated as medication nurses for that shift, who then place the medication in the medication cabinet. At designated times the medication nurse prepares the medication tray by placing paper cups and medication cards on the tray for each individual. Depending on how the medication was dispensed by the pharmacy, unit-dose or open stock, the nurse selects the appropriate drug from the medication cabinet. The medication cabinet is conveniently divided into separate bins for each patient; however,

with some patients receiving from three to seven medications during hospitalization,[19] at times the selection of the right drug from the bin system can be time-consuming and hazardous to the patient. After the drug is selected, it is matched with the medication card and placed in the paper cup. The medication is then delivered to the patient by the medication nurse. If an emergency should arise and the nurse's assistance is required, the tray is left in the open medication room until time permits her to return and continue her "primary" function of administering medications. Conditions like this are typical of a combination system and indicative of some demands which may tend to increase the probability of medication errors. In addition, the administrative burden of charting must be accomplished. Although specific steps are outlined as to what must be charted, each medication nurse observed during this study charted the medications as time was available from other duties. Therefore, the medication chart retained on the ward may or may not have been current at the time the physician visited the patient on daily rounds. Under this system it is understandable why Rutherford found that nurses spend up to 60 per cent of their time performing administrative functions.[20]

It is in a typical system such as this that Jeanne C. Quint, R.N., research sociologist, School of Nursing at the University of California in San Francisco, conducted a study of medication errors made by nurses. Based on the results of her studies it was determined that the error ratio of the average nurse was one error per every six medications given.[21] This figure was substantiated by a study conducted by Kenneth Barker and Warren McConnel, who estimated, based on actual observation and review of

records then extrapolating over a year's time, that 51,200 medication errors could have occurred in the 150-bed, long-term hospital they studied, but only 36 errors were reported on Incident Reports. They further concluded that although 75 per cent of the nurses believed all errors should be reported, only 48 per cent included omissions, and only 21 per cent included late or early doses in their definition of medication errors.[22]

Although Barker and McConnel suggest that Incident Reports do not provide a true picture of the number of errors, this writer reviewed the Incident Report file at Providence Memorial to determine the number of reported errors over a six-month period (September, 1970-February, 1971) and found that only thirty-four medication errors had been reported. An arithmetic regression was run by the writer between the total number of medications administered each month and the number of errors reported, in an attempt to determine if the workload was related to the number of errors reported. No correlation was found to exist between the number of medications administered and the number of errors reported.

Many previous studies made indicate that persons making errors are ignorant of the fact that an error has been committed, and therefore never report the error. On the other hand, the fear of losing a job or being severely criticized for making an error are other reasons given for not reporting the error.[23] Barker and McConnel further concluded that since the death rate and other statistics relating to mortality did not increase or begin to approach the error rate, most medication errors do not have extremely serious consequences.[24] This, however, does not relieve the hospital of its responsibility to prevent medication errors.

The pharmacist, nurse, physician, and administrator should review their own areas of responsibility in the drug administration system to insure that the best methods are being used. The present system at Providence Memorial Hospital has several weaknesses that were detected during the course of this study. A review of those weaknesses follows:

1. Minimal control of packaging procedures exists in the pharmacy.

2. All packaging is completed manually by pharmacy technicians and volunteer workers.

3. Medications are dispensed to wards from the pharmacy on the basis of a three or four days' supply.

4. Medication charges are completed by the pharmacy at the time medication leaves the pharmacy. Some medications must be returned for credits when for some reason the patient does not receive the medication.

5. Untrained volunteer personnel are used to deliver medications to wards.

6. Drug inventory is dispersed throughout the hospital.

7. It is necessary to stock several different types and styles of medication containers on the wards and in the pharmacy.

8. Three hours per day are required to process credits for medications returned to the pharmacy, at a cost of approximately $2,190 a year (3 hrs. x $2.00/hr. x 365 days = $2,190), two dollars an hour being the current wage of the pharmacy clerk who is responsible for processing credits in the pharmacy.

9. Workload fluctuates in the pharmacy with several peak and slack periods daily, making scheduling difficult and full employee utilization nearly impossible.

10. No patient drug profile card is maintained.

11. Medication nurses spend approximately 50 per cent of their time administering medications.

It can be seen from the weaknesses indicated that errors may occur and inefficiencies may exist in the combination system at Providence Memorial Hospital.

Trends in Medication Systems

Progressive administrators involved in planning medication systems are breaking away from the traditional concepts presented earlier by combining the administering of medications with the delivery of the medication as a central service under the supervision of the pharmacist.[25] This innovative system combines individual dose and delivery service provided under the control of the pharmacist into a heretofore unattainable system of accurate and efficient drug distribution and administering procedures. A centralized unit-dose medication team -- a concept which evolves around the nurse and pharmacist working together to deliver medications to the patient while observing his "seven rights" -- provides such a system and promises to minimize errors in drug administration.[26] Yet, many hospitals continue with their antiquated and traditional systems that require nurses on the ward to spend 25 to 30 per cent of their valuable time administering medications. Charles A. Heineman developed a system which would delegate

to the nurse those tasks for which she is best prepared, and delegate those tasks which require a different talent to those best prepared to do them.[27]

It may be that although administrators recognize the weakness of their present systems, they are hesitant to consider new and innovative ideas due to budgetary restraints. Yet, why continue with a practice that could result in danger to the patient, embarrassment to the hospital, or a lawsuit?[28] Lawsuits have caused some hospitals financial losses in excess of one million dollars,[29] a loss that few hospitals can afford.[30]

Proposed Medication System for Providence Memorial Hospital

It is proposed as a result of this study that Providence Memorial Hospital adopt a new medication system (see Appendix B). The pharmacist should be assigned the responsibility of managing and controlling all aspects of the medication functions of the hospital. Those medication functions previously accomplished by the ward nurse should be modified and transferred to the pharmaceutical nurse assigned to the pharmacy, thereby freeing a minimum of ninety-six man hours a day of nurses' time for more bedside care on the ward. This figure is based on using twelve nurses per twenty-four-hour day as medication nurses on the ward.

It is proposed that the pharmaceutical nurse will, jointly with the unit-dose pharmacists, check the medications in each patient's drawer against the Patient Profile Card; transport medications to the ward, using a light-weight medication cart that contains individual patient bins, each assigned to a particular patient on the nursing unit, i.e., Conserva-nurse, McKesson, or MacBick medication carts; prerecord medications on

the Medication Chart in the patient's record on the ward; check the patient's arm band against imprinted data on the cart-drawer to insure the right patient is receiving the right medication; administer medication to the patient; and report any reactions from the medications to the ward nurse immediately and to the pharmacist upon return to the pharmacy. The success of this system makes it imperative to adopt an individual unit-dose system. Trends presented by the major pharmaceutical manufacturers at a conference in Houston, Texas, in March, 1971, indicated that they were moving toward the single-unit package. Many of the manufacturers have been holding off for feed-back from the field to see if the individual unit-dose system was going to be accepted. Since it has been accepted and is in great demand, manufacturers have either converted or are in the process of converting to the unit-dose packaging process. However, with an open formulary such as Providence Memorial Hospital is currently operating, there will undoubtedly always be some manufacturing required at the hospital which will necessitate the purchase of some packaging equipment. It is felt that the advantages of this system in contrast to the present system are expected to be far more beneficial than any initial cash outlay for equipment.

The operation of the proposed modified system will revolve around the proposed Patient Profile Card (see Appendix C). This card would be initiated by the admissions office for each new admission. The biographical data would be entered in the upper left-hand corner by the admissions office and forwarded to the pharmacy. The pharmacist would

then interview on the ward all new admissions for drug sensitivity, allergy history, and information regarding current medications, and make appropriate entries on the patient's medication profile card. The card is a recapitulation, then, of the patient's medications and enables the pharmacists to advise the physician and ward nurse of any possible physical or pharmacological incompatibilities. Since the pharmacist at Providence Memorial is presently receiving a copy of the physician's original medication order, there is no reason to change this procedure. Once the pharmacist receives this order from the ward via the pneumatic tube, he can verify the information on the Patient Profile Card with diagnosis, current medication orders, and known allergies. In so doing, the pharmacist is able to determine if the patient is allergic to medication ordered, duplication of medications under other trade names, the existence of therapeutic incompatibilities, and if prescribed medication is compatible with physician's diagnosis. Provided none of these conditions exist, the pharmacist passes the order to the pharmacy clerk, who then prepares the Medelco charge card; Medelco Drug Identification Card; updates the Patient Profile Card by entering date, name of drug, quantity issued, unit of dose, manufacturer's lot number, initials of pharmacist dispensing medication, and places the order in the "fill box" for the pharmacy technician to fill. The pharmacy technician then compares the order with identification information on unit-dose and patient's name with medication carts drawer identification data to insure the right patient is receiving the right medication. The Medelco Drug Identification

Card would be used to print out, by name and ward, a schedule of medications in effect which provides the technician with information to load the carts in preparation for the pharmaceutical nurse to assume her duties.

Under this modified system the only medications stored on the nursing unit are those items contained in the Emergency Drug Box. "PRN" and "STATS" are all verified telephonically by the head nurse with the pharmacist and the medication is returned to the ward via the pneumatic tube for administration by the ward nurse. The pharmacist initiates a Pharmacy Drug Notice Card to insure that the pharmacy clerk receives the information on all outgoing drugs with which to post all the records as required. This same form is initiated by ward clerks and forwarded to the pharmacy, if the patient is discharged or expires, to notify the pharmacy that a drug or drugs are no longer required for that patient. A discussion of various factors involved in implementing the proposed modified medication system follows:

A. Equipment requirements and estimated cost

1.	Unit Dose Packer	$3,000.00
2.	Packaging Material	30.00
3.	Syringe Filler	500.00
4.	Laminar Flow Hood	1,200.00
5.	Drawer Carts (11)	2,800.00
6.	Drug Notice Card	200.00
7.	Patient Profile Cards	300.00
	Subtotal	$8,030.00

B. Additional personnel cost

1. Seven Licensed Vocational Nurses	$31,668/year
2. One Pharmacist	11,000/year
3. Two Pharmacy Technicians	8,000/year
Subtotal	$50,668
Total	$58,698

C. Cost: Drugs are dispensed to the patient by medication cycle and special request from the pharmacy, which eliminates the need for floor stock, reduces pilferage and deterioration, reduces total inventory cost, and provides for centralized control of all dangerous drugs and narcotics. Cost of container materials can be reduced from $3.50/1000 to $.07/1000 using the centralized unit-dose system. Credits can be processed more expeditiously, avoiding the identification and counting process necessary in the pharmacy under the present system, since the pharmaceutical nurses know immediately if credit is due. The cost of additional personnel will be offset by the savings from reduced inventory, increased drug revenue gained from previously unrecorded drug charges and drug losses, and minimization of the cost of processing drug credits.

D. Safety: All prescriptions are prepared and dispensed under the supervision of the pharmacist, who reviews the original drug order signed by the physician. A Drug Profile Card is established and the pharmacist is immediately aware of potential pharmacological incompatibilities triggered by medication order. The centralized drug distribution system provides more rigid controls of all pharmaceutical supplies and

reduces the number of times a medication is handled by inexperienced personnel prior to the medication being administered to the patient. The legal position of the hospital is strengthened as a result of the direct supervision of the pharmacist of all preparation and dispensing activities and the administering of medications by the pharmaceutical nurse.

E. Legality: This proposed medication system would strengthen the hospital's position by insuring that qualified personnel are performing all functions of dispensing and administering medications as required by the Texas statutes that govern the practice of pharmacy and nursing. The centralized service would establish more rigid controls on all drugs being used within the hospital by placing them under the control of one individual -- the pharmacist.

F. Patient Care: Ward nurses are freed from all administrative functions in passing or administering medications. These functions are performed by the pharmaceutical nurse on a cyclic basis on each ward. A Drug Profile Card is established for each patient, better enabling the pharmacist to counsel and advise the doctor and staff when formulating a drug therapy program. A sound drug program and the freeing of the ward nurse to spend more time at the bedside should provide a shorter, more effective, and pleasant hospital stay for each patient.

G. Disadvantages: The reluctance of ward nurses to accept the proposed medication system for fear of losing their drug proficiency may be a disadvantage to nurses. However, advantages to the patient override this factor as a major consideration. Initial cost of implementation

may be a deterent for conversion to the proposed system throughout the hospital at once. Therefore, phased implementation may require Providence Memorial Hospital to maintain a dual medication system until the new system is implemented throughout the hospital.

The proposed medication system is simple and more efficient than the present system and will free the ward nurse to devote more time to bedside care and the pharmacist more time for consultation and administering of pharmacy activities.

Footnotes

[1]Vernon's Civil Statutes of the State of Texas, Governing Examination, Registration and Disciplinary Proceedings of Registered Nurses under Jurisdiction of Board of Nurse Examiners for the State of Texas, June 10, 1969.

[2]Vernon's Civil Statutes of the State of Texas, Governing Examination, Registration and Disciplinary Proceedings of Vocational Nurses under Jurisdiction of Board of Nurse Examiners for the State of Texas, June 10, 1969.

[3]Letter, State Board of Pharmacy, "Administering Drugs," February, 1971.

[4]"Statement on Hospital Drug Distribution Systems," Hospitals, XXXIX (July, 1965), p. 140.

[5]John A. Oliver, "A New Concept for Hospital Pharmacy Practice," Hospital Management, CIII (June, 1967), p. 78.

[6]Ibid., p. 78.

[7]Warren L. Rutherford, "Can Evening and Night Nursing Supervisors Meet Their Administrative Demands?" Hospital Topics, XLI (November, 1963), p. 33.

[8]Ibid., p. 33.

[9]Sister M. Cassell, "A Nurse Views the Trends in Pharmaceutical Dispensing Practices," Hospital Management, XCV (June, 1963), pp. 80-84.

[10]Joseph N. Gallina and Louis D. Jeffery, "Clinical Pharmacists in Today's Health Care Delivery System," Hospital Pharmacy, V (August, 1970), p. 64.

[11]Ibid., p. 64.

[12]Barbara Conway, "The Seventh Right," American Journal of Nursing, LXX (May, 1970), p. 1040.

[13]Fulton, p. 43.

[14]Jeanne C. Quint, "Pharmacy Can Help Nursing Control Medication Errors," Hospital Topics, XLIV (July, 1966), p. 93.

[15]Ibid., p. 93.

[16]Barker and Heller, p. 568.

[17]W. M. Frazier, "Utilization of Nonprofessional Personnel in the Hospital Pharmacy," Hospital Pharmacy, XI (July-August, 1954), p. 257.

[18]G. C. Bowles, Jr., "Pharmacist Could Help Nurse More if the Law Let Him," Modern Hospital, CXIII (December, 1969), p. 136.

[19]Mrs. Carolyn Gonzalez, Nurse Supervisor, Providence Memorial Hospital, 16 February 1971.

[20]"Statement on Hospital Drug Distribution System," p. 140.

[21]Jeanne C. Quint, "Pharmacy Can Help Nursing Control Medication Errors," Hospital Topics, XLIV (July, 1966), p. 93.

[22]Barker and McConnel, p. 368.

[23]Providence Memorial Hospital, El Paso, Texas, interviews with ward nurses, February, 1971.

[24]Gallina and Jeffery, p. 368.

[25]F. C. Danielson, "Unit Dose Dispensing: Yea or Nay?" Hospital Pharmacy, IV (July, 1969), p. 4.

[26]Julius Hauser, "Federal Regulation of Unit Dose Drug Packages," Hospital Pharmacy, V (March, 1970), p. 17.

[27]Charles A. Heineman, "A Pilot Study of the Unit Dose Drug Dispensing System in a General-Acute Hospital," Thesis (March, 1966).

[28]Fulton, p. 41.

[29]Ibid., p. 42.

[30]Ibid., p. 42.

CHAPTER III

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the most effective method of administering medications at Providence Memorial Hospital that would free the ward nurse to perform bedside care. The combination ward stock and unit-dose system of distribution currently being utilized requires twenty-four nurses per twenty-four-hour day to use 50 per cent of their time administering functions of the medication process. A detailed analysis of this system was conducted and the results compared to a modified unit-dose system using a nurse-pharmacist team concept. A review of the literature indicates that although several hospitals are using a system similar to the combination system used at Providence, these same hospitals are losing considerable funds each year due to lost charges, pilferage, deterioration, and excessive drug inventory. In addition, medication error rates are high, and nurses often perform dispensing functions normally reserved by statutory limitations as a function of the pharmacist. The patient is the one who normally suffers from such inefficient systems, either physically from receiving the wrong medication, or from monetary charges passed on to cover the inefficiencies of the system. It is recognized that many hospitals cannot adopt a completely new system of medications because of financial limitations, but in the interest of patient safety and providing quality care, many hospitals can modify current systems at minimum cost. It is essential

during this period of unrest in the health care industry that every effort be made to provide the quality of care that the patient and society expect. One way to accomplish this is to free the ward nurse of her administrative functions and return her to the patient's bedside, thus insuring that the patient receives quality care.

Conclusion

The use of a unit-dose medication delivery system utilizing the integrated nurse-pharmacist team concept at Providence Memorial Hospital will return the ward nurse to the patient's bedside. This modification of the current combination floor stock and unit-dose system will initially require spending $58,698.00 of operating funds. However, this cost will be offset by the savings in stock levels, administrative time, and safety to the patients.

The adoption of this system allows the patient to benefit from the complete professional knowledge of the pharmacist by producing a more accurate and complete drug therapy program. In addition, the professional services of the nurse are more properly used to attend to the patient's other needs.

Recommendations

Based upon the foregoing conclusion and information contained elsewhere in this report, it is recommended that:

1. The Administrator of Providence Memorial Hospital consider the adoption of the unit-dose medication system administered under the nurse-pharmacist team concept.

2. The Patient Drug Profile Card be established by the pharmacists under the control and responsibility of the pharmacy.

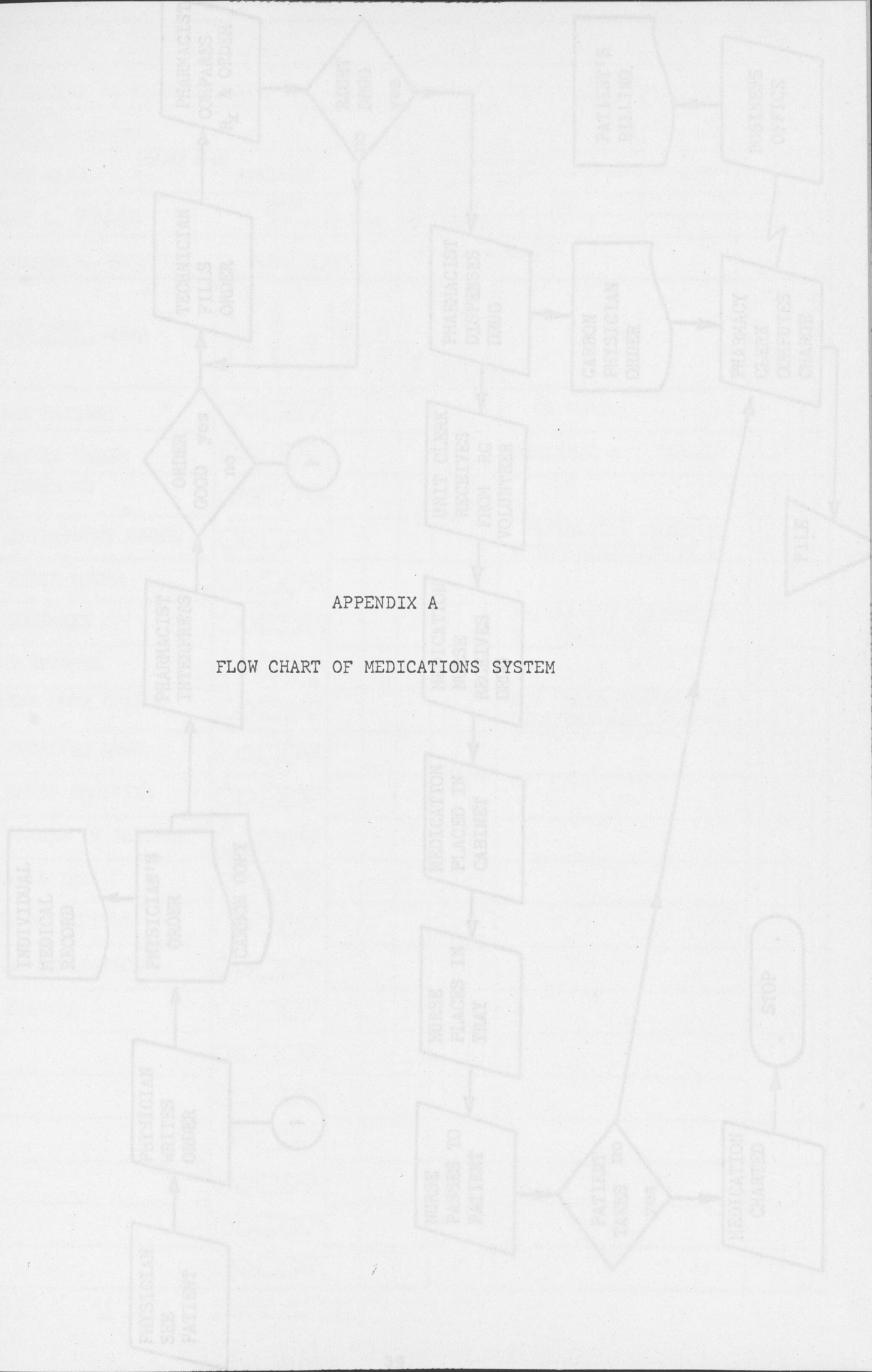
3. The Purchasing Agent purchase light-weight medication carts such as the Conservanurse or McKesson.

4. The Personnel Director hire one additional pharmacist, two pharmacy technicians, and seven licensed vocational nurses to fill manpower requirements necessary to implement the program.

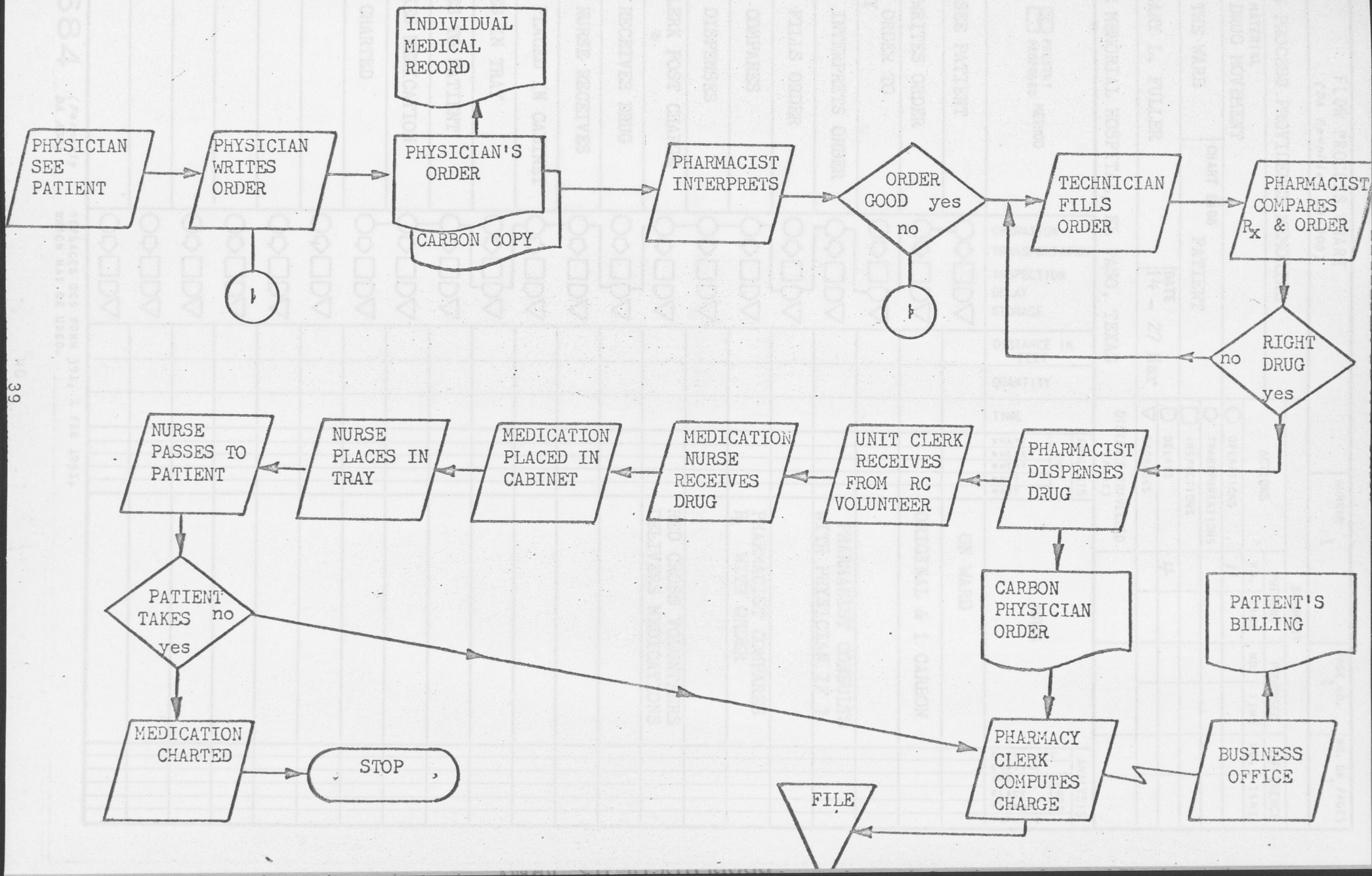
5. The Materiel Management Officer consider a future study to computerize the Patient Drug Profile Card.

APPENDIX A

FLOW CHART OF MEDICATIONS SYSTEM



PRESENT MEDICATION SYSTEM



FLOW PROCESS CHART
(DA Pamphlet 20-300)

NUMBER 1 | PAGE NO. 1 | NO. OF PAGES 1

PROCESS: MEDICATION PROCESS PROVIDENCE MEMORIAL

☐ MAN OR ☒ MATERIAL: DRUG MOVEMENT

CHART BEGINS: ON THE WARD | CHART ENDS: PATIENT

CHARTED BY: MAJOR GARY L. FULLER | DATE: 14 - 27 Mar

ORGANIZATION: PROVIDENCE MEMORIAL HOSPITAL, EL PASO, TEXAS

SUMMARY

ACTIONS	PRESENT NO.	PRESENT TIME	PROPOSED NO.	PROPOSED TIME	DIFFERENCE NO.	DIFFERENCE TIME
○ OPERATIONS	11					
⇨ TRANSPORTATIONS						
□ INSPECTIONS						
D DELAYS	4					
▽ STORAGES						
DISTANCE TRAVELLED *(Feet)*						

DETAILS OF ☒ PRESENT ☐ PROPOSED METHOD	OPERATION / TRANSPORTATION / INSPECTION / DELAY / STORAGE	DISTANCE IN FEET	QUANTITY	TIME	ANALYSIS: WHY? WHAT?	WHERE?	WHEN?	WHO?	HOW?	NOTES	ANALYSIS: ELIMINATE	COMBINE	CHNGE: SEQUENCE	PLACE	PERSON	IMPROVE
1 PHYSICIAN SEE PATIENT	○									ON WARD						
2 PHYSICIAN WRITES ORDER	○ ⇨									ORIGINAL & 1 CARBON						
3 CARBON OF ORDER TO PHARMACY	○ ⇨ □ D															
4 PHARMACIST INTERPRETS ORDER	○ ⇨ □ D ▽									PHARMACIST CONSULTS WITH PHYSICIAN IF ?						
5 TECHNICIAN FILLS ORDER	○ ⇨ □ D															
6 PHARMACIST COMPARES	○ ⇨ □ D ▽									PHARMACIST COMPARES R_x WITH ORDER						
7 PHARMACIST DISPENSES	○ ⇨ □ D ▽															
8 PHARMACY CLERK POST CHARGE	○ ⇨ □ D ▽									RED CROSS VOLUNTEERS DELIVERS MEDICATIONS						
9 UNIT CLERK RECEIVES DRUG	○ ⇨ □ D															
10 MEDICATION NURSE RECEIVES	○ ⇨ □ D ▽															
11 MEDICATION PLACED IN CABINET	○ ⇨ □ D ▽															
12 NURSE PLACES IN TRAY	○ ⇨ □ D															
13 NURSE PASSES TO PATIENT	○ ⇨ □ D ▽															
14 PATIENT TAKES MEDICATION	○ ⇨ □ D ▽															
15 MEDICATION CHARTED	○ ⇨ □ D ▽															
16	○ ⇨ □ D ▽															
17	○ ⇨ □ D ▽															
18	○ ⇨ □ D ▽															
19	○ ⇨ □ D ▽															
20	○ ⇨ □ D ▽															
21	○ ⇨ □ D ▽															

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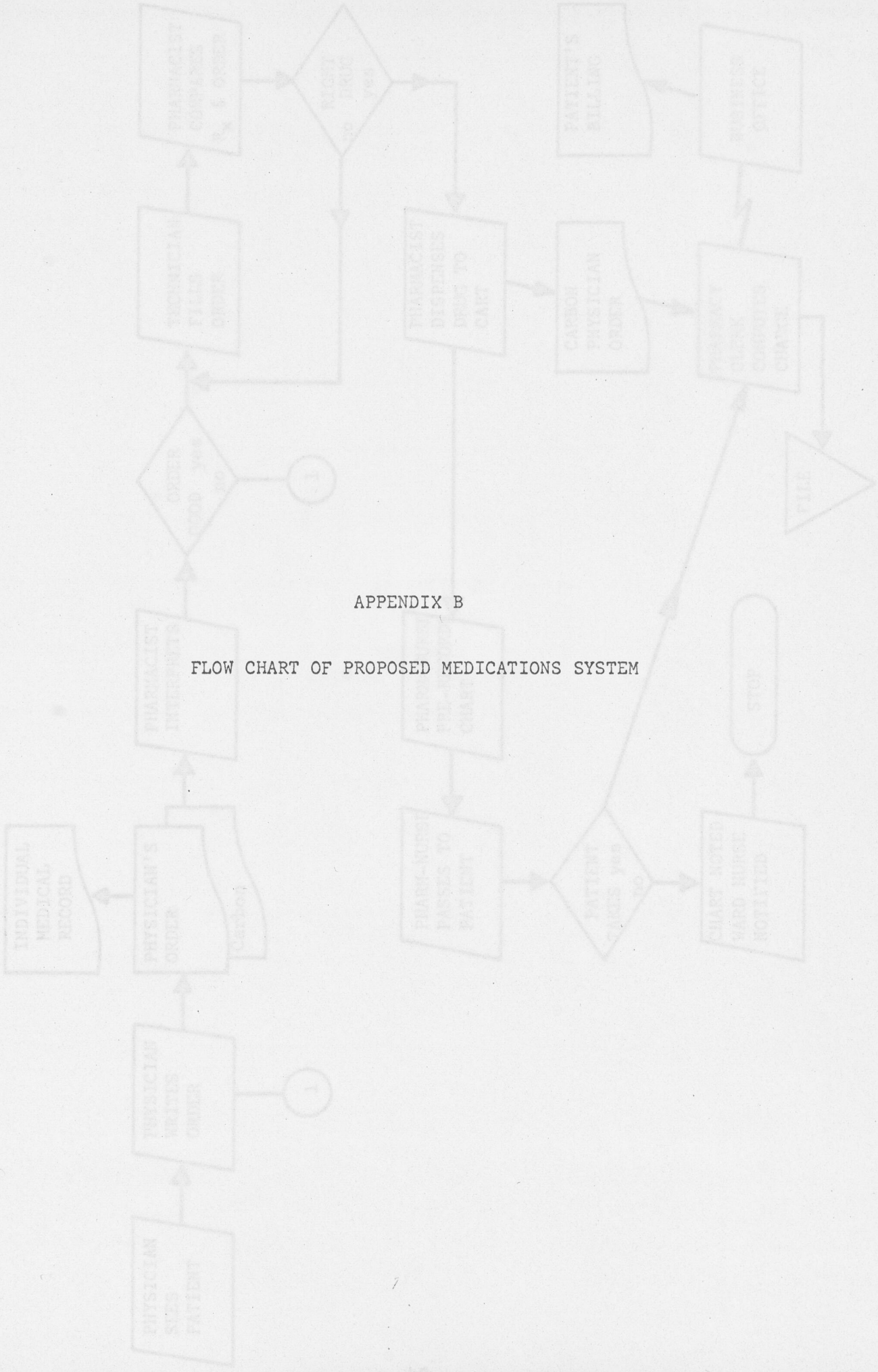
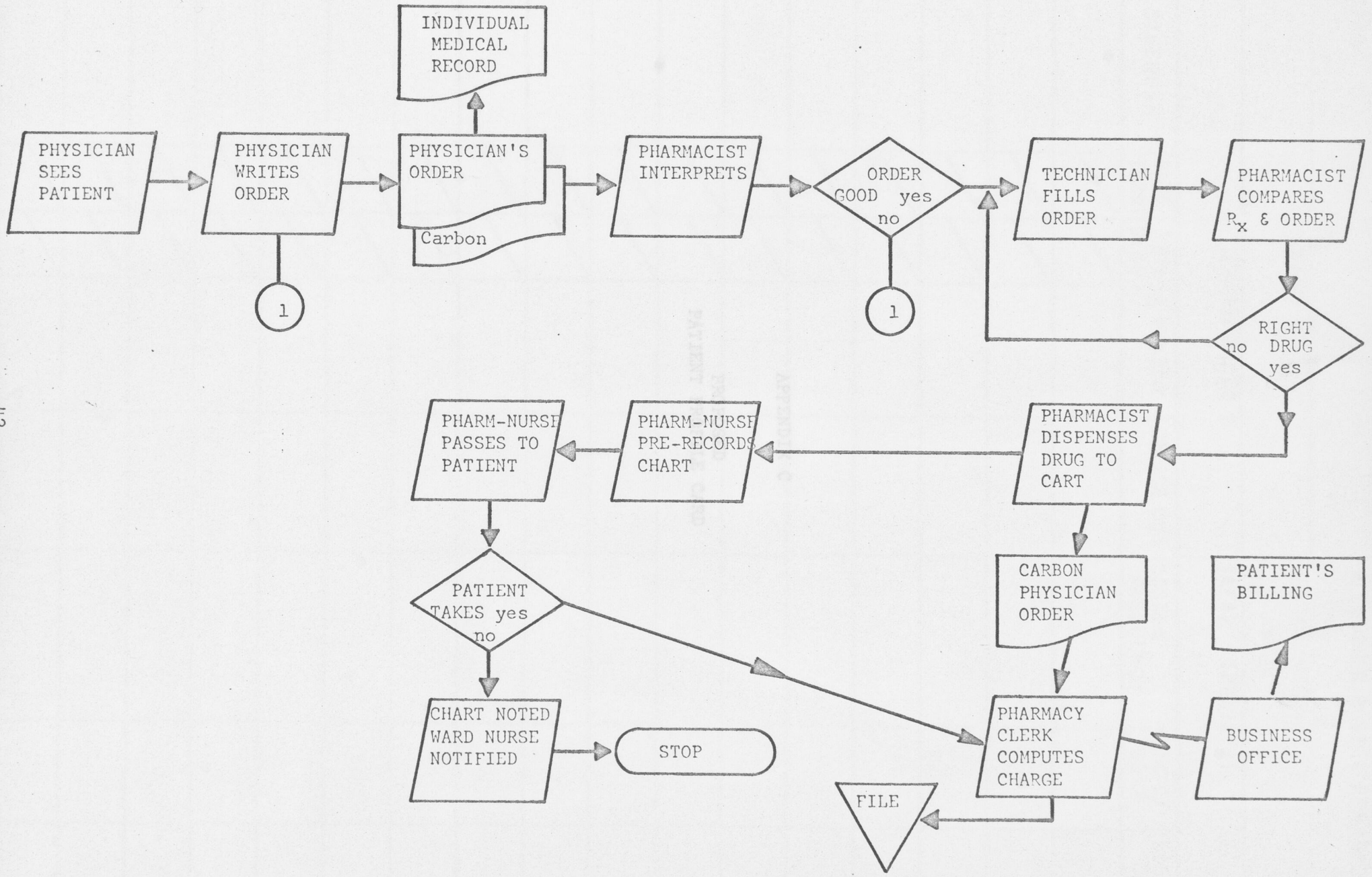


APPENDIX B

FLOW CHART OF PROPOSED MEDICATIONS SYSTEM

PROPOSED MEDICATION SYSTEM



APPENDIX C

PROPOSED
PATIENT PROFILE CARD

RUG PROFILE CARD

ATIENT

WARD

OCTOR

STATION & BED #

ALLERGIES & SPEC REMARKS

NO.

(AFA) (PRIVATE) (

EDICATION & STRENGTH	DATE START	DATE STOP	R_x NUMBER	OFFICE USE	DOSAGE FREQUENCY	UNITS/ DOSE	COST COD
	/	/					
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Vernon's Civil Statutes of the State of Texas, Governing Examination, Registration and Disciplinary Proceedings of Vocational Nurses under Jurisdiction of Board of Nurse Examiners for the State of Texas, June 10, 1969.

ABSTRACT

A STUDY TO DETERMINE THE MOST EFFECTIVE SYSTEM OF ADMINISTERING MEDICATIONS AT PROVIDENCE MEMORIAL HOSPITAL, EL PASO, TEXAS

A Problem Solving Thesis Submitted to the Faculty of Baylor University in Partial Fulfillment of the Requirements for the Degree of Master of Hospital Administration

by
Major Gary L. Fuller, MSC

August 1972 50 pages

A copy of this document may be obtained from University Microfilms, University of Michigan, Ann Arbor, Michigan 48108.

This study has described a variation of the unit-dose drug distribution system and introduced the nurse-pharmacist medication team concept under the direct supervision and control of the pharmacist. The nurses are assigned to the pharmacy and work out of the pharmacy assuming responsibility for the administrative activities and passing medications, formerly the responsibility of a ward nurse. The combined system frees the ward nurse to perform bedside care and reduces the possibility of medication errors by placing tighter controls on the drug system and getting maximum utilization from the professional talent of the pharmacist and the nurse.