HOSPITAL PHARMACY

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UNIT -1

INTRODUCTION

TO HOSPITAL PHARMACY

DEFINITION OF HOSPITAL AND HOSPITAL PHARMACY

Hospital

The hospital is a complex organization utilizing combination of intricate, specialized scientific equipment, and functioning through a corps of trained people educated to the problem of modern medical science. These are all welded together in the common purpose of restoration and maintenance of good health

Hospital Pharmacy

The department or service in a hospital which is under the direction of a professionally competent, legally qualified pharmacist, and from which all medications are supplied to the nursing units and other services, where special prescriptions are filled for patients in the hospital, where prescriptions are filled for ambulatory patients and out-patients, where pharmaceuticals are manufactured in bulk, where narcotic and other prescribed drugs are dispensed, where injectable preparations should be prepared and sterilized, and where professional supplies are often stocked and dispensed.

The computerization of the pharmacy department makes it possible for the staff to participate in patient education programs, poison control center activities, preparation of patient drug use profiles, parenteral nutrition program participation, cooperating in the teaching and research programs of the hospital, communicating new product information to nursing service and other hospital personnel and dispensing radiopharmaceuticals

GOALS FOR HOSPITAL PHARMACY

Just as any organization must have long-range goals toward which its daily activities are directed, so must a profession, its members, and their representative societies. For example the American Society of Hospital Pharmacists, in its Constitution and Bylaws, sets forth the following objectives:

1. To provide the benefits of a qualified hospital pharmacist to patients and health care institutions, to the allied health professions, and to the profession of pharmacy.
2. To assist in providing an adequate supply of such qualified hospital pharmacists.
3. To assure a high quality of professional practice through the establishment and maintenance of standards of professional ethics, education, and attainments and through the promotion of economic welfare.
4. To promote research in hospital pharmacy practices and in the pharmaceutical sciences in general.
5. To disseminate pharmaceutical knowledge by providing for interchange of information among hospital pharmacists and with members of allied specialties and professions.

More broadly, the Society's primary purpose is the advancement of rational, patient-oriented drug therapy in hospitals and other organized health care settings.

To the preceding can be added the following objectives:

1. To expand and strengthen institutional pharmacists' abilities to:
   (a) Effectively manage an organized pharmaceutical service.
   (b) Develop and provide clinical services.
   (c) Conduct and participate in clinical and pharmaceutical research
   (d) Conduct and participate in educational programs for health practitioners, students, and the public.
2. To increase the knowledge and understanding of contemporary institutional pharmacy practice by the public, government, pharmaceutical industry, and other health care professionals.
3. To promote compensation and benefits commensurate with pharmacists responsibilities and contributions to patient care.
4. To help provide an adequate supply of qualified supportive personnel for institutional pharmacy services.
5. To help ensure that health care reimbursement and payment systems do not inhibit the implementation of innovative pharmaceutical services or adversely reflect on institutional pharmacy practice.
6. To assist in the development and advancement of the pharmacy profession.

The foregoing serves as a collective statement of goals of the Society and its constituency. Transforming these goals into realities will require the dedicated efforts of all institutional pharmacists, both as individuals and as members of the Society.

MINIMUM STANDARD FOR HOSPITAL PHARMACY

Pharmaceutical services in institutions have numerous components, the most prominent being

(1) The procurement, distribution, and control of all pharmaceuticals used within the facility.

(2) The evaluation and dissemination of comprehensive information about drugs and their use to the institution's staff and patients.

(3) The monitoring, evaluation, and assurance of the quality of drug use.

These functions are carried out in cooperation with other institutional departments and programs.

The primary function of this document is to serve as a guide for the development and provision of pharmaceutical services in institutions. It will also be useful in evaluating the scope and quality of these services. It does not, however, provide detailed instructions for operating a pharmacy—other Society publications serve this function.

Standard 1: Administration

The pharmaceutical service shall be directed by a professionally competent, legally qualified pharmacist. He or she must be on the same level within the institution's administrative structure as directors of other clinical services. The director of pharmaceutical services is responsible for:

(1) Setting the long- and short-range goals of the pharmacy based on developments and trends in health care and institutional pharmacy practice and the specific needs of the institution.

(2) Developing a plan and schedule for achieving these goals.

(3) Supervising the implementation of the plan and the day-to-day activities associated with it.

(4) Determining if the goals and schedule are being met and instituting corrective actions where necessary.

The director of pharmaceutical services, in carrying out these tasks, shall employ an adequate number of completent and qualified personnel

Standard II: Facilities

There shall be adequate space, equipment, and supplies for the professional and administrative functions of the pharmacy.

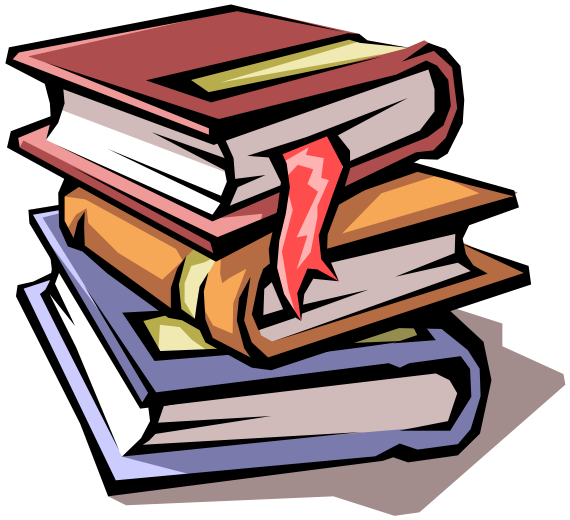
- The pharmacy shall be located in an area (or areas) that facilitate (s) the provision of services to patients. It must be integrated with the facility's communication and transportation systems.
- Space and equipment, in an amount and type to provide secure, environmentally controlled storage of drugs, shall be available.
- There shall be designated space and equipment suitable for the preparation of sterile products and other drug compounding and packaging operations.
- The pharmacy should have a private area for pharmacist-patient consultations. The director of pharmaceutical services should also have a private office or area.
- Current drug information resources must be available. These should include appropriate pharmacy and medical journals and texts and drug literature search and retrieval resources.

Standard III: Drug Distribution and Control

The pharmacy shall be responsible for the procurement, distribution, and control of all drugs used within the institution. This responsibility extends to drugs and related services provided to ambulatory patients. Policies and procedures governing these functions shall be developed by the pharmacist with input from other involved hospital staff (e.g. nurses) and committees (pharmacy and therapeutics committee, patient-care committee, etc.). In doing so, it is essential that the pharmacist routinely be present in all patient-care areas, establish rapport with the personnel, and become familiar with and contribute to medical and nursing procedures relating to drugs.

Standard IV: Drug Information

The pharmacy is responsible for providing the institution's staff and patients with accurate, comprehensive information about drugs and their use and shall serve as its center for drug information.



Standard V: Assuring Rational Drug Therapy

An important aspect of pharmaceutical services is that of maximizing rational drug use. In this regard, the pharmacist, in concert with the medical staff, must develop policies and procedures for assuring the quality of drug therapy.

Standard VI: Research

The pharmacist should conduct, participate in, and support medical and pharmaceutical research appropriate to the goals, objectives, and resources of the pharmacy and the institution.

ROLE OF PHARMACY TECHNICIANS IN THE PHARMACEUTICAL SERVICES

The pharmacist and pharmacy technician are important professionals on the healthcare team. The primary responsibility of the pharmacist is to see that drugs are dispensed properly and used appropriately. The technician assists the pharmacist in this endeavor. It has become increasingly important for pharmacist to focus their expertise and judgment on direct patient care and counseling. Accordingly, responsibilities related to dispensing have shifted to the pharmacy technician. A pharmacy technician is defined as an individual working in a pharmacy who, under the supervision of a licensed pharmacist, assists in activities not requiring the professional judgment of a pharmacist. The rules and regulations that set limits on the roles and responsibilities vary from country to country. Technicians are involved in all faces of drug distribution. A few of their responsibilities include:

- receiving written prescriptions or requests for prescription refills from patients or their caregivers.
- verifying that the information on the prescription is complete and accurate.
- counting, weighing, measuring, and mixing the medication
- preparing prescription labels and selecting the container
- establishing and maintaining patient profiles
- ordering and stocking prescription and over-the-counter medications
- assisting with drug studies
- taking prescriptions over the telephone
- transferring prescriptions
- tracking and reporting errors
- “tech check tech” in preparation of medicine carts

ORGANIZATIONAL STRUCTURE OF PHARMACY DEPARTMENT

With the selection and categorizing of the employees, it now becomes essential to develop a chart showing the flow of administrative authority. Obviously, in the very small departments, this is usually generally understood and no problems arise. However, in the large units with assistant chief pharmacists, supervisors, and lay personnel, authority must be delegated by the chief pharmacist.

Sample distributions are depicted in Figures (1-1) and (1-2). Clearly this can and should be tailored to meet the specific requirements of the department and hospital. Once prepared and approved, it should be conspicuously posted for each of the departmental employees to read and adhere to.

In large hospitals, departments of pharmacy have a more complex organization. Note for example, the Ohio State University Hospital's Department of Pharmacy organizational chart. It should seem obvious to the student that each of the subdivisions of the department are assigned specific responsibilities. The following are some of the responsibilities of each division.

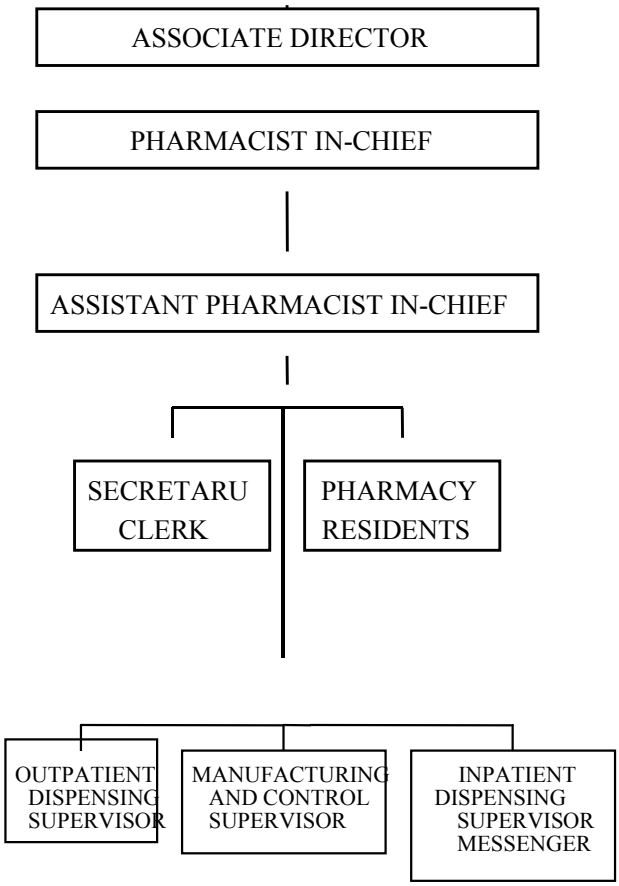


Fig (1-1). Departmental organization

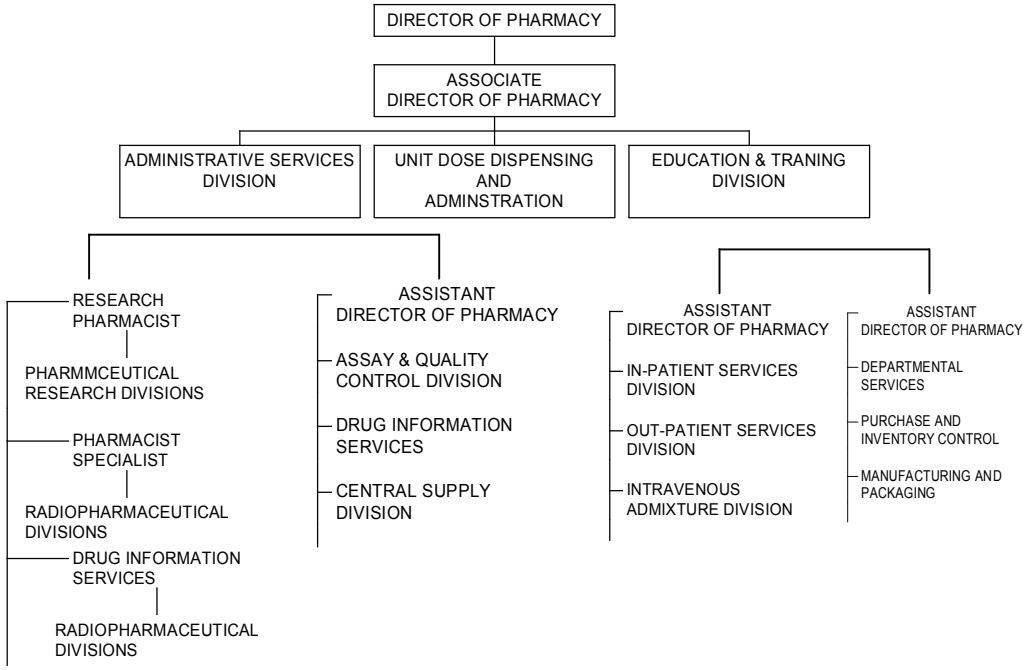


Fig (1-2). Departmental organization in a large university hospital pharmacy operation

Administrative Services Division

1. Plan and coordinate departmental activities.
2. Develop policies.
3. Schedule personnel and provide supervision.
4. Coordinate administrative needs of the Pharmacy and Therapeutics Committee.
5. Supervise departmental office staff.

Education and Training Division

1. Coordinate programs of undergraduate and graduate pharmacy students.
2. Participate in hospital-wide educational programs involving nurses, doctors etc.
3. Train newly employed pharmacy department personnel.

Pharmaceutical Research Division

1. Develop new formulations of drugs, especially dosage forms not commercially available, and of research drugs.
2. Improve formulations of existing products.
3. Cooperate with the medical research staff of projects involving drugs.

In-Patient Services Division

1. Provide medications for all in-patients of the hospital on a 24-hour per day basis.
2. Inspection and control of drugs on all treatment areas.
3. Cooperate with medical drug research.

Out-Patient Services Division

1. Compound and dispense out-patient prescriptions.
2. Inspect and control all clinic and emergency service medication stations.
3. Maintain prescription records.
4. Provide drug consultation services to staff and medical students.

Drug Information Services Division

1. Provide drug information on drugs and drug therapy to doctors, nurses, medical and nursing students and the house staff.
2. Maintain the drug information center.
3. Prepare the hospital's pharmacy newsletter.
4. Maintain literature files.

Departmental Services Division

1. Control and dispense intravenous fluids.
2. Control and dispense controlled substances.
3. Coordinate and control all drug delivery and distribution systems.

Purchasing and Inventory Control Division

1. Maintain drug inventory control.
2. Purchase all drugs.
3. Receive, store and distribute drugs.
4. Interview medical service representatives.

Central Supply Services Division

1. Develop and coordinate distribution of medical supplies and irrigating fluids.

Assay and Quality Control Division

1. Perform analyses on products manufacturered and purchased.
2. Develop and revise assay procedures.
3. Assist research division in special formulations.

Manufacturing and Packaging Division

1. Manufacture wide variety of items in common use at the hospital.
2. Operate an overall drug packaging and prepackaging program.
3. Undertake program in product development.
4. Maintain a unit dose program.

Sterile Products Division

1. Produce small volume parenterals.
2. Manufacture sterile ophthalmologic, irrigating solutions etc.
3. Prepare aseptic dilution of lyophylizal and other "unstable" sterile injections for administration to patients.

Radiopharmaceutical Services division

1. Centralize the procurement, storage and dispensing of radioisotopes used in clinical practice.

Intravenous Admixture Division

1. Centralize the preparation of intravenous solution admixture.
2. Review each 1.V. admixture for physio-chemical incompatibilities.

PHARMACY AND THERAPEUTICS COMMITTEE

The multiplicity of drugs available and the complexities surrounding their safe and effective use make it necessary for hospitals to have an organized, sound program for maximizing rational drug use. The pharmacy and therapeutics committee, or its equivalent, is the organizational keystone of the program.

The pharmacy and therapeutics committee is an advisory group of the medical staff and serves as the organizational line of communication between the medical staff and pharmacy department. This committee is composed of physicians, pharmacists, and other health professionals selected with the guidance of the medical staff. It is a policy-recommending body to the medical staff and the administration of the hospital on matters related to the therapeutic use of drugs.

Role or purposes of committee

The primary purposes of the pharmacy and therapeutics committee are as specified in the following:

1. *Advisory*. The committee recommends the adoption of, or assists in the formulation of, policies regarding evaluation, selection, and therapeutic use of drugs in hospitals
2. *Educational*. The committee recommends or assists in the formulation of programs designed to meet the needs of the professional staff (physicians, nurses, pharmacists, and other health-care practitioners) for complete current knowledge on matters related to drugs and drug use.

Organization and Operation

While the composition and operation of the pharmacy and therapeutics committee might vary from hospital to hospital, the following generally will apply:

1. The pharmacy and therapeutics committee should be composed of at least three physicians, a pharmacist, a nurse, and an administrator. Committee members are appointed by a governing unit or elected official of the organized medical staff.
2. A chairman from among the physician representatives should be appointed. A pharmacist usually is designated as secretary.
3. The committee should meet regularly, at least six times per year, and more often when necessary.
4. The committee should invite to its meetings persons within or outside the hospital who can contribute specialized or unique knowledge, skills, and judgments.
5. An agenda and supplementary materials (including minutes of the previous meeting) should be prepared by the secretary and submitted to the committee member's insufficient time before the meeting for them to properly review the material.
6. Minutes of the committee meetings should be prepared by the secretary and maintained in the permanent records of the hospital.
7. Recommendations of the committee shall be presented to the medical staff or its appropriate committee for adoption or recommendation.
8. Liaison with other hospital committees concerned with drug use (e.g., infection control, medical audit) shall be maintained.

Functions and Scope

The basic organization of the hospital and medical staffs will determine the functions and scope of the pharmacy and therapeutics committee. The following list of committee functions is offered as a guide:

1. To service in an advisory capacity to the medical staff and hospital administration in all matters pertaining to the use of drugs (including investigational drugs).
2. To develop a formulary of drugs accepted for use in the hospital and provide for its constant revision. The selection of items to be included in the formulary will be based on objective evaluation of their relative therapeutic merits, safety, and cost. The committee should minimize duplication of the same basic drug type drug entity, or drug product.
3. To establish programs and procedures that help ensure cost-effective drug therapy.
4. To establish or plan suitable educational, programs for the hospital's professional staff on matters related to drug use.
5. To participate in quality-assurance activities related to the distribution, administration, and use of medications.
6. To review adverse drug reaction occurring the hospital.
7. To initiate (or both) drug-use review programs and studies and review the results of such activities.
8. To advise the pharmacy in the implementation of effective drug distribution and control procedures.
9. To make recommendations concerning drugs to be stocked in hospital patient-care areas.

THE HOSPITAL FORMULARY

Definition of formulary and formulary system

The *formulary* is a continually revised compilation of pharmaceuticals (plus important ancillary information) that reflects the current clinical judgment of the medical staff.

The *formulary system* is a method whereby the medical staff of an institution, working through the pharmacy and therapeutics committee, evaluates, appraises, and selects from among the numerous available drug entities and drug products those that are considered most useful in patient care. Only those so selected are routinely available from the pharmacy.

The formulary system is thus an important tool for assuring the quality of drug use and controlling its cost.

The formulary system provides for the procuring, prescribing, dispensing, and administering of drugs under either their nonproprietary or proprietary names in instances where drugs have both names

Benefits of the formulary system

The potential benefits of a formulary system are threefold:

(l) Therapeutic. (2) Economic. (3) Educational.

The therapeutic aspect of a formulary system provides the greatest benefit to the patient and physician in that only the most efficient products are listed and available.

The economic merit also has a double benefit in that the formulary eliminates duplication thus reducing inventory duplication and the opportunity for volume purchasing means lower charges to the patient.

The educational benefit is also significant for the resident staff, nurses and medical students because many good formularies contain various prescribing tips and additional drug information of educational value.

Format and appearance of the formulary

The physical appearance and structure of the formulary is an important influence on its use. Although elaborate and expensive artwork and materials are unnecessary, the formulary should be visually pleasing, easily readable, and professional in appearance.

The need for proper grammar, punctuation, correct spelling, and neatness is obvious. There is no one single format or arrangement which ail formularies must follow.

A typical formulary must have the following composition:

1. Title page
2. Names and titles of the members of the pharmacy and therapeutics committee
3. Table of contents
4. Information on hospital policies and procedures concerning drugs
   - 4.1 The pharmacy and therapeutics committee of XYZ hospital
   - 4.2 Objectives and operation of the formulary system
   - 4.3 Hospital regulations and procedures for prescribing and dispensing drugs
   - 4.4 Hospital pharmacy services and procedures
   - 4.5 How to use the formulary
5. Products accepted for use at XYZ hospital
   - 5.1 Items added and deleted since the previous edition
   - 5.2 Generic-brand name cross reference list
   - 5.3 Pharmacological/therapeutic index with relative cost codes.
   - 5.4 Descriptions of formulary drug products by pharmacology therapeutic class

6. Appendix

6.1 Central service equipment and supply list

6.2 Rules for calculating pediatric doses

6.3 Nomogram for estimating body surface area

6-4 Schedule of standard drug administration times

Several techniques can be used to improve the appearance and ease of use of the formulary. Among these are:

1. Using a different color paper for each section of the formulary,
2. Using an edge index,
3. Making the formulary pocket size (approximately 4" x 7") and
4. Printing the generic name heading of each drug entry in boldface type or using some other methods for making it stand out from the rest of the entry.

THE FIVE RIGHTS FOR CORRECT DRUG ADMINISTRATION

There are five "rights" of medication administration that offer useful guidelines when filling prescriptions for patient medications. These concepts have been widely used to avoid medication errors. A drug misadventure occurs whenever these are not followed correctly.

Figure (1-3) illustrates the concepts, and the five rights are overviewed below.

- **Right Patient** Always verify the patient name before dispensing medicines
- **Right Drug** Always check the medication against the original prescription and the patient's disease state. The medication label contains important information about the drug that will be dispensed to the patient.
- **Right Strength** Check the original prescription for this information and pay attention to the age of the patient. Pediatric or elderly patient can easily get the wrong dose.
- **Right Route** Check that the physician's order agrees with the drug's specified route of administration. Many medications can be given by a variety of routes and the route of administration can affect the medication's absorption.
- **Right Time** Check the prescription to determine the appropriate time for the medication to be administrated. Some medications must be taken on an empty stomach (one hour before or two hours after a meal) while others should be taken with food. Sometimes, a certain time span is needed between doses to maintain a therapeutically effective blood level.

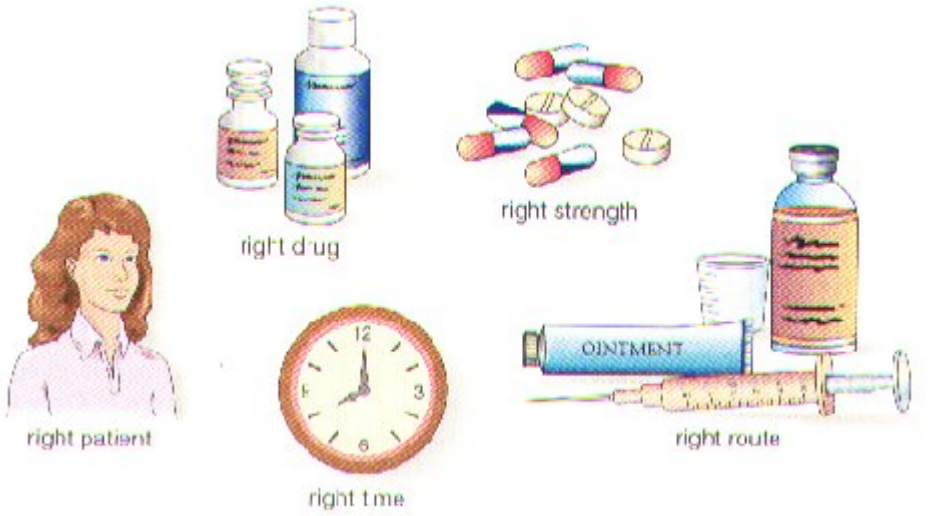


Figure (1-3). The five "rights" for correct drug administration

Unit review

1- Define Pharmacy Technician

2- Briefly discuss, Role of Pharmacy Technician in Pharmaceutical Services

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3- What are the main goals for hospital pharmacy?

4- What is the role of Therapeutics Committee?

5- What Hospital Formulary?

6- Explain, the Organizational Structure of Pharmacy Department

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7- What are"The Five Rights for Correct Drug Administration"?

UNIT - II

IN-PATIENT PHARMACY

HOSPITAL DRUG DISTRIBUTION SYSTEM

Traditional methods of distributing drugs in hospitals are now undergoing reevaluation, and considerable thought and activity is being directed toward the development of new and improved drug distribution systems. Some of the newer concepts and ideas in connection with hospital drug distribution systems are centralized or decentralized (single, or unit-dose) dispending, automated (mechanical and/or electronic) processing of medication orders and inventory control, and automated (mechanical and/or electronic) storage and delivery devices. Several investigators are at work in each of these areas, and the results of their studies may greatly alter current practices and procedures.

Because of the present state of uncertainty regarding the proper scope and optimum design of drug distribution systems for the modern hospital, and as an aid to pharmacists, nurses, physicians, and administrators who are faced with making decisions concerning drug distribution systems during this period of change, the following guidelines for evaluating proposed changes or new ideas or equipments are presented.

Though some of the practices recommended may not be widespread at the present, the adoption of these practices is believed to be a desirable and practical goal. Therefore, it is urged that they be given prime consideration in the design of new drug distribution systems and in modifications of existing ones (particularly where such changes would commit a hospital to a considerable financial investment in a system not including, or not easily altered to include, the recommended practices).

1. Before the initial dose of medication is administered the pharmacist should review the prescriber's original order or a direct copy.

2. Drugs dispensed should be as ready for administration to the patient as the current status of pharmaceutical technology will permit, and must bear adequate identification including (but not limited to); name or names of drug, strength or potency, routes(s) of administration, expiration date, control number, and such other special instructions as may be indicated.
3. Facilities and equipment used to store drugs should be so designed that the drugs are accessible only to medical practitioners authorized to prescribe, to pharmacists authorized to dispense, or to nurses authorized to administer such drugs.
4. Facilities and equipment used to store drugs should be designed to facilitate routine inspection of the drug prior to the time of administration.
5. When utilizing automated (mechanical and/or electronic) devices as pharmaceutical tools, it is mandatory that provision be made to provide suitable pharmaceutical services in the event of failure of the device.
6. Such mechanical or electronic drug storage and dispensing devices, as require or encourage the repackaging of drug dosage forms from the manufacturer's original container, should permit and facilitate the use of new package, which will assure the stability of each drug and meet the standards for the packaging and storing of drugs, in addition to meeting all other standards of good pharmacy practice.
7. In considering automated (mechanical and/or electronic) devices as pharmaceutical tools, the distinction between the accuracy required in accounting practices versus that required in dispensing practices should be clearly distinguished.

There are four systems in general use for dispensing drugs for inpatients**.** They may be classified as follows:

(i) *Individual Prescription Order System.*

(ii) Complete Floor Stock System.

(iii) Combination of (i) and (ii).

(iv) The unit dose method.

Individual prescription order system

As has been previously stated, this system is generally used by the small and/or private hospital because of the reduced manpower requirement and the desirability for individualized service.

Inherent in this system is the possible delay in obtaining the required medication and the increase in cost to the patient.

Advantages of this system:

(i) All medication orders are directly reviewed by the pharmacist.

(ii) Provides for the interaction of pharmacist, doctor, nurse and patient.

(iii) Provides closer control of inventory.

Complete floor stock system

Under this system, the nursing station pharmacy carries both "charge" and "non-charge" patient medications. Rarely used or particularly expensive drugs are omitted from floor stock but are dispensed upon the receipt of a prescription or medication order for the individual patient.

Although this system is used most often in governmental and other hospitals in which charges are not made to the patient or when the all-inclusive rate is used for charging, it does have applicability to the general hospital. Obviously, there are both advantages and disadvantages to the complete floor stock system.

Advantages of complete floor stock system:

(i) Ready availability of the required drugs.

(ii) Elimination of drug returns.

(iii) Reduction in the number of drug order transcriptions for the pharmacy.

(iv) Reduction in the number of pharmacy personnel required.

Disadvantages of complete floor stock system:

(i) Medication errors may increase because the review of medication orders is eliminated.

(ii) Increased drug inventory on the pavilions.

(iii) Greater opportunity for pilferage.

(iv) Increased hazards associated with drug deterioration.

(v) Lack of proper storage facilities on the ward may require capital outlay to provide them.

(vi) Greater inroads are made upon the nurse's time.

To be borne in mind by the student is the fact that in some hospitals the complete floor stock system is successfully operated as a decentralized pharmacy under the direct *supervision* of a pharmacist.

Obviously, when this occurs, many of the disadvantages associated with such a system disappear. In addition, the use of the decentralized pharmacy concept provides for a "home base" for the clinically oriented pharmacist.

In the past, floor stock containers were pre-labeled multiple dose units. Today, the floor stock is in unit-of-use packaging thereby assuring better packaging, control and identity of the medication.

Charge floor stock drugs and non-charge floor stock drugs

Each pavilion in the hospital, regardless of its size or specialty care, has a supply of drugs stored in the medicine cabinet even though the nursing unit is serviced by a unit dose system. However, the use of floor stock medications should be minimized. In addition, research has shown that the system of drug distribution has an effect upon the incidence of adverse drug reactions. These medications may be classified under two separate headings, each of which serves a specific purpose. Drugs on the nursing station may be divided into "*charge floor stock drugs*" and "*non-charge floor stock drugs*".

Definitions

Charge floor stock drugs may be defined as those medications that are stocked on the nursing station.

Charge floor stock drugs represent that group of medications that are placed at the nursing station.

It is the responsibility of the hospital pharmacist, working in cooperation with the nursing service, to develop ways and means whereby adequate supplies of each are always on hand and, in appropriate situation that proper charges are made to the patients account.

Combination of Individual prescription order system and complete floor stock system

Falling into this category are those hospitals which use the individual prescription or medication order system as their primary means of dispensing, but also utilize a limited floor stock. This combination system is probably the most commonly used in hospitals today and is modified to include the use of unit dose medications.

Unit dose system

Unit-dose medications have been defined as:

"Those medications which are ordered, packaged, handled, administered and charged in multiples of single dose units containing a predetermined amount of drugs or supply sufficient for one regular dose application or use."

Advantages of unit dose system:

(1) Patients receive improved pharmaceutical service 24 hours a day and are charged for only those doses, which are administered to them.
(2) All doses of medication required at the nursing station are prepared by the pharmacy thus allowing the nurse more time for direct patient care.
(3) Allow the pharmacists to interpret or check a copy of the physician's original order thus reducing medication errors.
(4) Elimination excessive duplication of orders and paper work at the nursing station and pharmacy.
(5) Eliminates credits.
(6) Transfers intravenous preparation and drug reconstitution procedures to the pharmacy.

(7) Promotes more efficient utilization of professional and non-professional personnel.

(8) Reduces revenue losses.

(9) Conserves space in nursing units by eliminating bulky floor stock.

(10) Eliminates pilferage and drug waste.

(11) Extends pharmacy coverage and control throughout the hospital from the time the physician writes the order to the time the patient receives the unit-dose.

(12) Communication of medication orders and delivery systems are improved.

(13) The pharmacists can get out of the pharmacy and onto the wards where they can perform their intended function as drug consultants and help provide the team effort that is needed for better patient care.

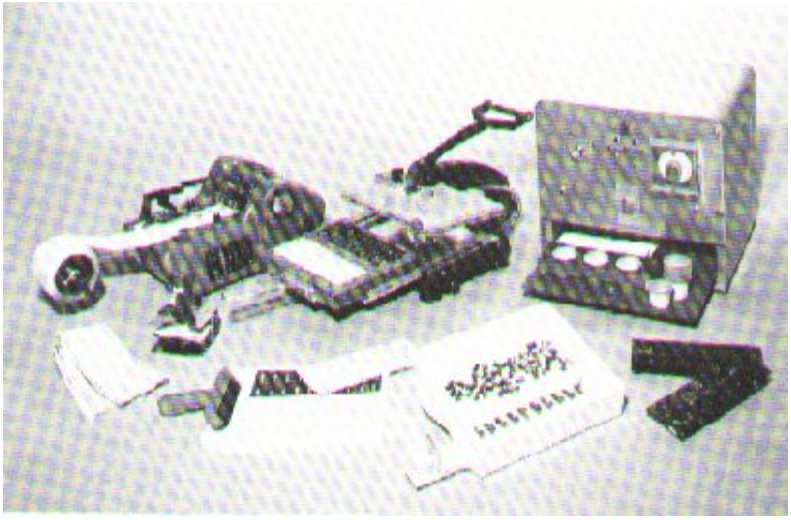


Fig (2-1) A full range of unit dose packaging equipment

Unit dose dispensing procedure

The characteristic features of centralized unit-dose dispending are that all in-patient drugs are dispensed in unit-doses and all the drugs are stored in a central area pharmacy and dispensed at the time the dose is due to be given to the patient. To operate the system effectively, electronic data processing equipment is not required, however delivery, systems such as medication carts and dumbwaiters are needed to get the unit-doses to the patients; also suction tube system (called pneumatic tube) or other means are required to send a copy of the physician's original medication order to the pharmacy for direct interpretation and filling.

The decentralized unit-dose system, unlike the centralized system, operates through small satellite pharmacies located on each floor of the hospital. The main pharmacy in this system becomes a procurement, storage, manufacturing and packaging center serving all the satellites.

The delivery system is accomplished by the use of medication carts.

This type of system can be used for a hospital with separate buildings or old delivery systems.

Fig (2-2) nursing cart for use in unit dose system

Although each hospital introduces variations, the following is a step-by-step outline of the procedure entailed in a decentralized unit-dose system:

1-Upon admission to the hospital, the patient is entered into the system. Diagnosis, allergies and other pertinent data are entered on to the Patient Profile card.

2-Direct copies of medication orders are sent to the pharmacist.

3-The medications ordered are entered on to the Patient Profile card.

4-Pharmacist chicks medication order for allergies, drug –interactions, drug-laboratory test effects and rationale of therapy.

5- Dosage scheduled is coordinated with the nursing station.

6- Pharmacy technician picks medication orders. Placing drugs in bins of

a- Transfer cart per dosage schedule fig. (2-2) and (2-3).

7- Medication cart is filled for particular dosage schedule delivery.

8- Pharmacist checks cart prior to release.

9-The nurse administers the medication and makes appropriate entry on her medication record.

10-Upon returns to the pharmacy, the cart is rechecked.

11-Throughout the entire sequence, the pharmacist is available for consultation by the doctors and nurses. In addition he is maintaining surveillance for discontinued orders.

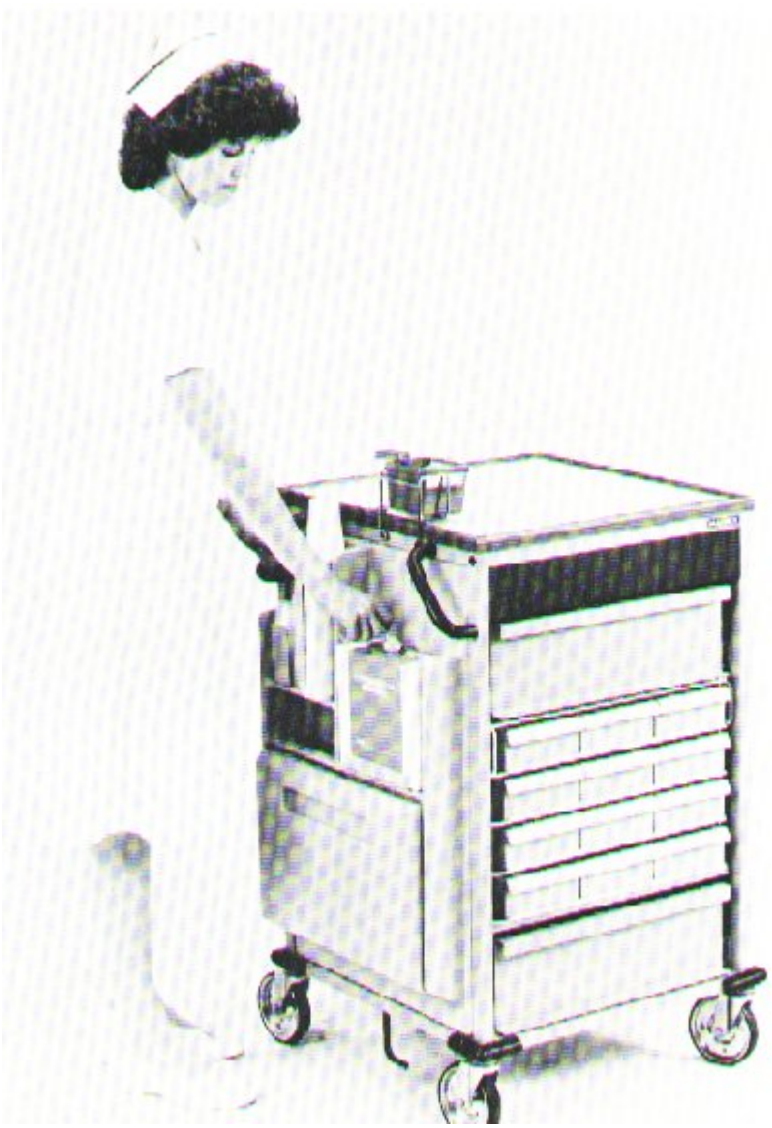


Fig (2-3) Nursing cart for use in unit dose system

DRUG DISTRIBUTION AND CONTROL (UNIT DOSE SECTION)

Medication distribution is the responsibility of the pharmacy. The pharmacist, with the assistance of the pharmacy and therapeutics committee and the department of nursing, must develop comprehensive policies and procedures that provider for the safe distribution of all medications and related supplies to inpatients and outpatients.

For reasons of safety and economy, the preferred method to distribute drugs in institutions is the *unit dose system*. Though the unit dose system may differ in form depending on the specific needs, resources, and characteristics of each institution, for elements are common to all.

Elements of unit dose distribution:

(1) Medications are contained in, and administered from, single unit or unit-dose packages

(2) Medications are dispensed in ready-to-administer form, to the extent possible

(3) For most medications, not more than a 24-hour supply of doses is provided to or available at the patient care area at any time

(4) A patient medication profile is concurrently maintained in the pharmacy for each patient. Floor stocks of drugs are minimized and limited to drugs for emergency use and routinely used “safe” items such mouthwash and antiseptic solutions.

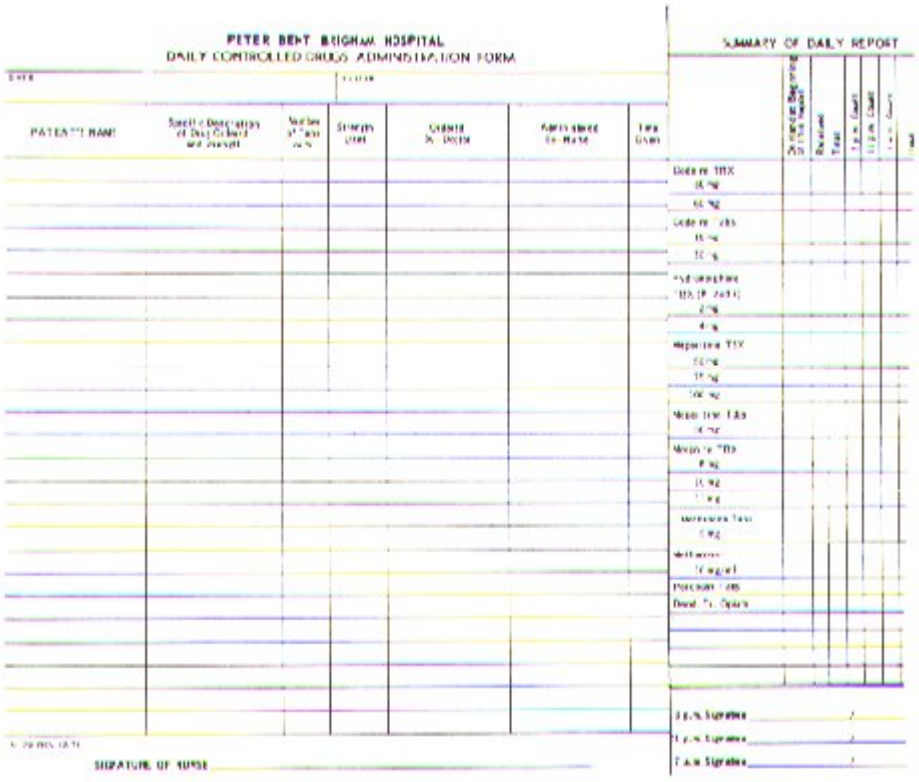


Fig (2-4). Daily controlled drugs administration form

Writing the Order:

Medications should be given (with certain specified exceptions) only on the *written* order of a qualified physician or other authorized prescriber. Allowable exceptions to this rule (i.e., telephoned or verbal orders) should be put in written form immediately and the prescriber should countersign the nurse's or pharmacist's signed record of these orders within 48 (preferably 24) hours. Only a pharmacist or registered nurse should accept such orders. Provision should be made to place physician's order in the patient's chart, and a method for sending this information to the pharmacy should be developed.

Prescribers should specify the date and time medication orders are written.

Medication orders should be written legibly in ink and should include:

- Patient's name and location (unless clearly indicated on the order sheet).
- Name (Generic) of medication.
- Dosage expressed in the metric system, except in instances where dosage must be expressed otherwise (i.e., units, etc)
- Frequency of administration.
- Route of administration.
- Signature of the physician.
- Date and hour the order was written.

Any abbreviations used in medication orders should be agreed to and jointly adopted by the medical, nursing, pharmacy, and medical records staff of the institution.

Any questions arising from a medication order, including the interpretation of an illegible order, should be refer to the ordering

physician. It is desirable for the pharmacist to make (appropriate) entries in the patient's medical chart pertinent to the patient's drug therapy. Also, a duplicate record of the entry can be maintained in the pharmacy profile. In computerized patient data systems, each prescriber should be assigned a unique identifier; this number should be included in all medication orders. Unauthorized personnel should not be able to gain assess to the system.

Medication Order Sheets:

The pharmacist (except in emergency situations) must receive the physician's original order or a direct copy of the order before the drug is dispensed. This permits the pharmacist to resolve questions or problems with drug order before the drug is dispensed and administered. It also eliminates errors, which may arise when drug orders are transcribed onto another form for use by the pharmacy. Several methods by which the pharmacy may receive physician's original orders or direct copies are:

1. Self-copying order forms. The physician's order form is designed to make a direct copy (carbon or NCR), which is sent to the pharmacy. This method provides the pharmacist with a duplicate copy of the order and does not require special equipment. There are two basic formats:
    a. Orders for medications included among treatment orders. Use of this form allows the physician to continue writing his orders on the chart as he has been accustomed in the past, leaving all other details to hospital personnel.
    b. Medication orders separated from other treatment orders on the order form. The separation of drug orders makes it easier for the pharmacist to review the order sheet.

2. Electromechanical. Copying machines or similar devices may be used to produce and exact copy of the physician's order. Provision should be made to transmit physician's orders to the pharmacy in the event of mechanical failure.

3. Computerized. Computer systems in which the physician enters orders into a computer, which then stores and prints out the order in the pharmacy or elsewhere, are used in some institutions. Any such system should provide for the pharmacist's verification of any drug orders entered into the system by anyone other than an authorized prescriber.

Special Orders:

Special Orders (i.e., "stat" and emergency orders, and those for nonformulary drugs, investigational drugs, restricted-use drugs or controlled substances) should be processed according to specific written procedures meeting all applicable regulations and requirements.

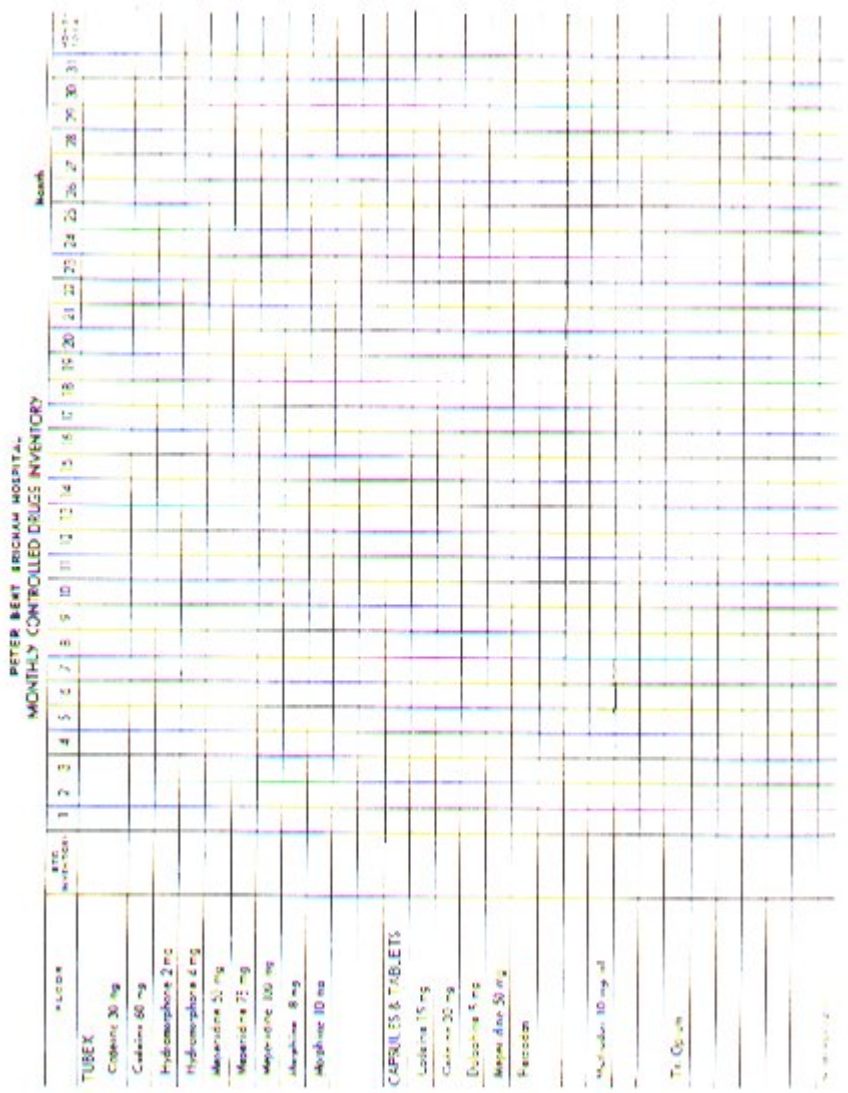


Fig. (2-5). Monthly controlled drug inventory form

DISPENSING OF CONTROLED SUBSTANCES

Definitions:

- ***Addict:*** Any individual who habitually uses any narcotic drug so as to endanger the public morals, health, safety or welfare, or who is so far addicted to the use of narcotic drugs as to have lost the power or self-control with reference to his addiction.
- ***Administer:*** The direct application of a controlled substances to the body of a patient or research subject by a practitioner or his agent or by the patient or research subject at the direction and in the presence of the practitioner.
- ***Controlled Substances:*** A drug or other substance, or immediate precursor, included in schedule I, II, III, IV or V of Part B of this title. The term dose not includes distilled spirits, wine, malt beverages or tobacco.
- ***Depressant Or Stimulant Substance:***

[A] a drug which contain any quantity of (1) barbituric acid or any of the salts of barbituric acid; or (2) any derivative of barbituric acid ;or

[B] a drug which contains any quantity of (1) amphetamine or any of its optical isomers; (2) any salt of amphetamine or any salt of an optical isomer of amphetamine; or (3) any substance which the Attorney General, after investigation, has found to be, and by regulation designated as habit-forming because of its stimulant effect on the central nervous system; or

[C] Lysergic acid diethylamide; or

[D] any drug which contains any quantity of a substance which the Attorney General, after investigation, has found to have, and by regulation designated as having, a potential for abuse because of its depressant or stimulant effect on the central nervous system or its hallucinogenic effect.

- ***Narcotic Drug*:** means any of the following, whether produced directly or indirectly by extraction from substances of vegetable origin, or independently by means of chemical synthesis, or by a combination of extraction and chemical synthesis.

[A] Opium, coca leaves and opiates.

[B] A compound, manufacture, salt, derivative, or preparation of opium, coca leaves or opiates.

[C] A substance (any compound, manufacture, salt, derivative, or preparation thereof) which is chemically identical with any substance referred to in [A] or [B] above. Excluded are decocainized coca leaves or extracts of coca leaves, which do not contain cocaine or ecgonine.

SCHEDULES FOR CONTROLLED SUBSTANCES

(1) SCHEDULE I
[A] The drug or other substance has a high potential for abuse.
[B] The drug or other substance has no currently accepted medical use in treatment in the (United States).
[C] There is a lack of accepted safety for use of the drug or other substance under medical supervision.

(2) SCHEDULE II
[A] The drug or other substance has a high potential for abuse.
[B] The drug or other substance has recurrently accepted medical use in treatment in the (United States) or a currently accepted medical use with severe restrictions.
[C] Abuse of the drug or other substances may lead to severe psychological or physical dependence.

(3) SCHEDULE III
[A] The drug or other substance has a potential for abuse less than the drug or other substances in schedules I and II.
[B] The drug or other substance has a currently accepted medical use in treatment in the (United States).
[C] Abuse of the drug or other substances may lead to moderate or low physical dependence or high psychological dependence.

(4) SCHEDULE IV
[A] The drug or other substance has a low potential for abuse relative to the drug or other substances in schedules III.
[B] The drug or other substance has a currently accepted medical use in treatment in the (United States).
[C] Abuse of the drug or other substances may lead to limited physical dependence or psychological dependence relative to the drugs or other substances in schedule III.

(5) SCHEDULE V
[A] The drug or other substance has a low potential for abuse relative to the drugs or other substances in schedules IV.
[B] The drug or other substance has a currently accepted medical use in treatment in the (United States).
[C] Abuse of the drug or other substances may lead to limited physical dependence or psychological dependence relative to the drugs or other substances in schedule IV.

PRESCRIPTIONS

In dispensing of controlled substances, the following requirements should be considered with prescriptions:

1. Except when dispensed
2. Drugs may be dispensed on the oral prescription in an emergency situation.
3. Prescription shall be retained in conformity with the requirements of this law.
4. No prescription for a controlled substance in Schedule II may be refilled.
5. Controlled substances in Schedule III or IV may not be dispensed without a written or oral prescription in conformity.
6. Such prescriptions may not be filled or refilled more than 6 months after the date thereof or be refilled more than 5 times after the date of the prescription unless renewed by the practitioner.
7. No controlled substance in Schedule V that is a drug may be distributed or dispensed other than for a medical purpose.

Prescriptions filled with controlled substances in Schedule II may be written in ink or indelible pencil and must be signed by the practitioner issuing them. Prescriptions for narcotic substances in Schedules III, IV and V, must be kept in a separate file.

REGULATIONS OF HOSPITAL CONTROLLED SUBSTANCES

Definitions:

1. "Order": The direction for the drug, strength and frequency of administration as written on the Doctor's Order Sheet of the patient's Medical Record.

2. "Prescription": The direction for the drug, strength, quantity, and frequency of administration as written on a prescription blank by a doctor for dispensing by the Pharmacy.

3. "Administer": The word "administer" is employed when a nurse or other properly qualified individual gives medication to a patient, pursuant to the order of a qualified practitioner.

4. "Dispense": The word "dispense" is employed when a pharmacist gives medication to a nurse or other properly qualified individual in accord with the directions of a properly written prescription.

5. "Doctor": This term is herein employed to indicate and individual who has qualified for and has received a number from the Drug Enforcement Agency.

Registration of doctors who can prescribe

Doctors (Practitioners), in order to prescribe narcotics for or order administered (dispensed) to their patients in the hospital, must be licensed to practice under the laws of the (state) and must be duly registered with the DEA.

INTERNS and RESIDENTS

Registration requirements were waived to allow interns and residents to dispense and prescribe controlled substances under the registration of the hospital by which they are employed.

Responsibility for controlled substances

The administrative head of the hospital is responsible for the proper safeguarding and the handling of controlled substances within the hospital. Responsibility for the purchase, storage, accountability and proper dispensing of bulk controlled substances within the hospital is delegated to the Pharmacist-in-Chief. The Head Nurse of a nursing unit is responsible for the proper storage and use of the nursing unit's controlled substances.

Preparation of orders

All controlled substances orders and records must be typed or written in ink or indelible pencil and signed in ink or indelible pencil.

Telephone orders

A doctor may order a controlled drug by telephone in case of necessity. The nurse will write the order on the doctor's order sheet, stating that it is a telephone order and will sign the doctor's name and her own initials. The controlled drug may then be administered at once. The order must then be signer by the doctor with either his signature or his initials within 24 hours.

Verbal orders

A verbal order may be given by a doctor in an extreme emergency where time does not permit writing the order. The nurse must write the order on the doctor's order sheet. The doctor must sign the order with either his signature or his initials within 24 hours.

Information on daily controlled drug administration sheet

The full information required on the Daily Controlled Drugs Administration Sheet is as follows:

1. Date.
2. Amount given.
3. Patient's full name
4. Patient's hospital number.
5. Name of doctor ordering.
6. Signature of nurse administering.

The following information is requested for auditing purposes and is not required by Federal law:

1. Number of tablets or ml administered
2. Filing out inventory column (to be retained for Pharmacy).

Prescribing controlled drug in out patient department

Prescriptions for Schedule II and other controlled substances drugs may be dispensed from Pharmacy and must include the following information.

a. Patient s full name

b. Patient's address or hospital number

c. Date

d. Name and strength of drug prescribed.

e. Quantity of drug to be dispensed

f. DEA number and signature of physician

g. Frequency and route of administration

The prescription must be written in ink or indelible pencil and shall not bear cross outs or erasures. Discharge prescriptions for Schedule II drugs must be picked up by a registered nurse.

Dispensing controlled drugs for home use

Occasionally patients who require drugs for use at home are discharged from the hospital or released from The Emergency Ward during hours when the Pharmacy is closed. Whenever possible, a prescription signed by a member of the staff who has a License to practice medicine and a DEA number should be obtained.

A staff physician whose DEA number is issued to an outside office should use his own prescription blank. If this is not available, then he must insert his office address on the hospital prescription blank. This will permit the patent or his relative to purchase the drugs at an outside pharmacy. If no physician is available, or during hours when the local pharmacies are closed, the following procedure is allowed, but only as an *EMERGENCY MEASURE:*

The attending doctor will calculate the smallest amount of the drug necessary to treat the patient until the Pharmacy opens. He will write a prescription for this amount and the nurse may dispense the medication from her stock supply. The prescription will be presented to the pharmacy the following morning for replacement of stock.

Procedure in case of waste, destruction, contamination etc

1. Aliquot Part of Narcotic Solutions Used for Dose:

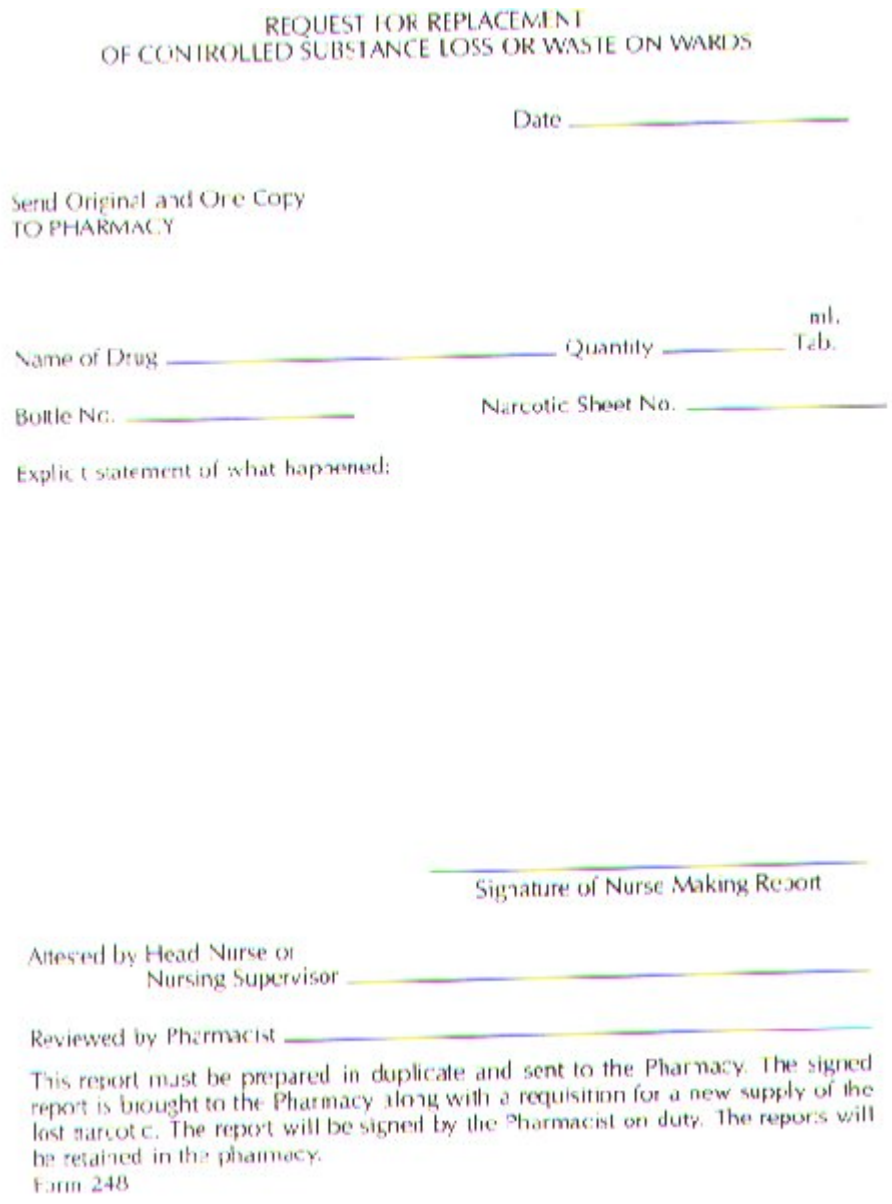
The nurse shall use the proper number of tablets or ampoules from nursing stock. She shall record the number of tablets or ampoules used and the dose given in the proper columns on Daily Controlled Drugs Administration Form. She shall, in arriving at the proper aliquot part, expel into the sink that portion of the solution that is not used.

2. Prepared Dose refused by Patient or Cancelled by Doctor:

When a dose has been prepared for a patient but not used, due to a refused by the patient or because of cancellation by the doctor, the nurse shall expel the solution into the sink and record why the drug was not administered. Examples: "Discarded," "Refused by patient" or "order cancelled by Dr. _____." The head nurse of the unit shall countersign the statement.

3. Accidental Destruction and Contamination of Drugs:

When a solution, ampoule, tablet etc., is accidentally destroyed or contaminated on a Nursing Unit, The person responsible shall indicate the loss on figure (2-4).



REQUEST FOR REPLACEMENT
OF CONTROLLED SUBSTANCE LOSS OR WASTE ON WARDS

Date _____

Send Original and One Copy
TO PHARMACY

Name of Drug _____ Quantity _____ ml. Tab.

Bottle No. _____ Narcotic Sheet No. _____

Explicit statement of what happened:

_____
Signature of Nurse Making Report

Attested by Head Nurse or
Nursing Supervisor _____

Reviewed by Pharmacist _____

This report must be prepared in duplicate and sent to the Pharmacy. The signed report is brought to the Pharmacy along with a requisition for a new supply of the lost narcotic. The report will be signed by the Pharmacist on duty. The reports will be retained in the pharmacy.
Form 248

Fig (2-6). Controlled Substance Loss or Form

PREPACKING

Prepackaging of drugs is not a new concept to the profession of pharmacy. It has been in practice since the apothecary of old grew his own herbs and drugs and harvested and packaged them for sale. Many retail pharmacies purchase various over-the-counter tablets and syrups in bulk quantities and prepackage the material in smaller-sized containers.

In the hospital pharmacy, the concept of prepackaging is utilized in both the large and the small hospital for it is, oftentimes, the means of coping with the periods of peak demand for pharmaceutical service. In the small hospital, the pharmacist may prepackage only those items which he considers require too much time if filled only when called for. In some hospital pharmacies, items, which fall into this category, are narcotics, barbiturates oily products, heavy syrups or magmas.

Most large hospitals have found it economical to prepackage all ward stock items as well as the often-prescribed tablets; capsules, syrups, ointments and creams used both by the in-patients as well as the outpatient clinics. Because of the scope of thus phase of a large hospital pharmacy operation, it often requires a separate work force, special equipment, and detailed control procedures to ensure against the possibility of errors.

Factors considered in prepacking

a. Demand for the product.

Is it a year 'round demand or is it a seasonal demand?

Is the demand one, which originates from the clinics or the pavilions?

Can this product be purchased in quantities to meet the demand, yet have it packaged in small units by the manufacturer at a price lower than the hospital cost to prepackage the same item in a similar container?

b. What size units should be packaged? How many of each size?

c. What type of containers and closures must be used in order to maintain therapeutic integrity?

d. What special labeling will be required?

e. Can the item be machine packaged or must hand counting be resorted to?

f. What is the stability of the product? Is it dated?

g. What will the unit cost of prepackaging amount to? Who should pay it?

STERILE MEDICATION DOSES AND I.V NUTRITION

Parenteral Hyperalimentation

Parenteral hyperalimentation is the intravenous administration of sufficient nutrients above the usual basal requirements to achieve tissue synthesis, positive nitrogen balance and anabolisin.[0]

The preparation of parenteral hyperalimentation solutions must be considered as an integral part of the pharmacy department's manufacturing program irrespective of its size. The procedures employed are not unduly complicated and do not require extensive capital outlay for equipment.

Most hospital pharmacists prepare these solutions by using a technique described as the "wet method" through the extemporaneous compounding techniques of an intravenous admixture program.[10] This consists of mixing the dextrose solution from one flask with the fibrin hydrolysate solution in another flask utilizing a solution transfer set. In the "dry method" the pharmacist adds the appropriate amount of anhydrous glucose to the fibrin hydrolysate solution. Both methods must be carried out under a laminar flow hood.

Because of the nature of these products, the pharmacy must have available appropriate refrigeration equipment and the pharmacist must become familiar with membrane filtration processes in view of the fact that the heat associated with the normal sterilization process will cause caramelization of the dextrose contained in each formula.

Intravenous additive program

One writer has stated that an *intravenous additive program* and an *intravenous additive service* may not be the same. The differentiation cited is that an IV additive program consists of policies and procedures for both the preparation and administration of intravenous fluids to which drugs are to be added under aseptic conditions, on an around-the-clock basis, and controlled as to location and person preparing the product. On the other hand, the IV additive service usually refers only to the preparation of the product by individuals who may not necessarily be the same as those who will administer them and assume the responsibility for the monitoring of its clinical effects. The conclusion arrived at is that an IV additive service is a part of an IV additive program.

Through the implementation of an IV service, the hospital pharmacist might be expected to achieve the following objectives:

A- That the preparation of the final product be accomplished under aseptic condition

B- That the drug interactions be avoided through the judicious choice of additive and mixing techniques

C- That the final product is appropriated labeled, dispensed and stored.

In the not too distant past, the preparation of intravenous solutions with their additives was a task performed on the nursing floor by nurses or interns and residents. The concept that the preparation of these products requires the skills of a pharmacist has raised many other questions not the least of which is availability of the product at odd hours particularly if the site of preparation is moved to the main pharmacy. Thus, has evolved

the satellite pharmacy, staffed by a clinical pharmacist and pharmacy technicians. On final analysis, it is irrelevant where the additives are added so long as definite policies are formulated which spell out responsibilities. In addition, it is imperative that the pharmacist becomes involved in the preparation of these products in an environment conducive to the efficient and safe preparation of them.

Preparation of I.V additive solutions

In the preparation of these solutions, the pharmacist should work from the physician's original order sheet or from a direct copy. Upon receipt of the order, a pressure-sensitive label must be prepared which provides the following information:

(a) Patient identification
(b) Patient location
(c) Physician's name
(d) Name of drugs with quantities added
(e) Date of compounding
(f) Expiration date
(g) Identification of the pharmacist preparing the product.

If necessary, any ancillary labeling should also be prepared at this time. When applying the label to the container, it must be positioned in an upside down order to facilitate reading when the container is hung from an intravenous solution pole on the patient's bed.

Preparation of the solution should always take place under a laminar flow hood using sterile needles and syringes or double-ended transfer needles. In some instances, a Cornwall syringe is useful in reconstitution procedures.

Once the transfer is made, the metal disc must be replaced and a new seal crimped on to the container. As a safety device, a different colored seal should be used in view of the fact that it warns individuals that drugs have been added.

Before permitting the admixture to leave his control, the pharmacist must carry out a final inspection of the product. The inspection should include a review of the label, clarity of the solution, and the mathematics involved in the preparation.

Laminar flow hoods

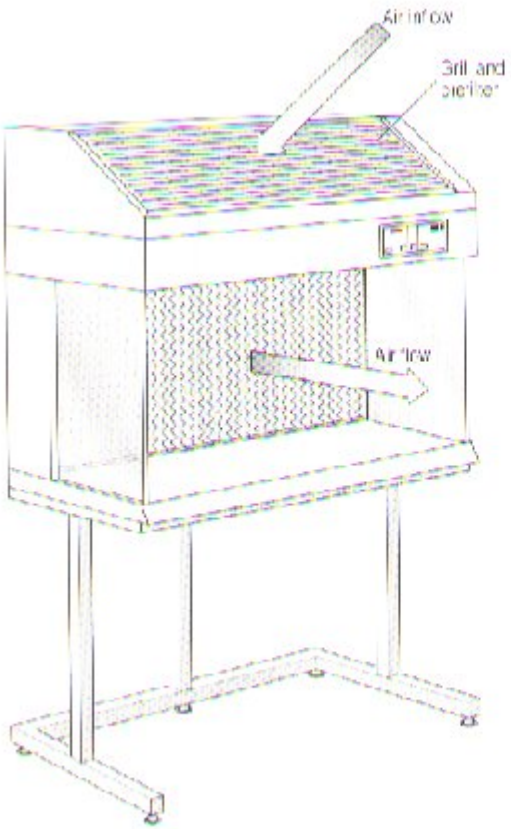
Although many hospitals have abandoned the preparation of large volume, sterile intravenous fluids, a large number have commenced other programs, such as the intravenous solutions additive procedure, which require sterile techniques to be performed in an atmosphere of micro-filtered air.

In order to create such an atmosphere, various manufacturers of hoods have incorporated into them the laminar flow principle.

Laminar airflow is defined as:

"Air flow in which the entire body of air within a confined area moves with uniform velocity along parallel flow lines, with a minimum of eddies."

By providing a constant outward flow of micro-filtered air over the entire face of the hood's work area opening, dust particles may be kept from entering the work area from the ambient atmosphere.



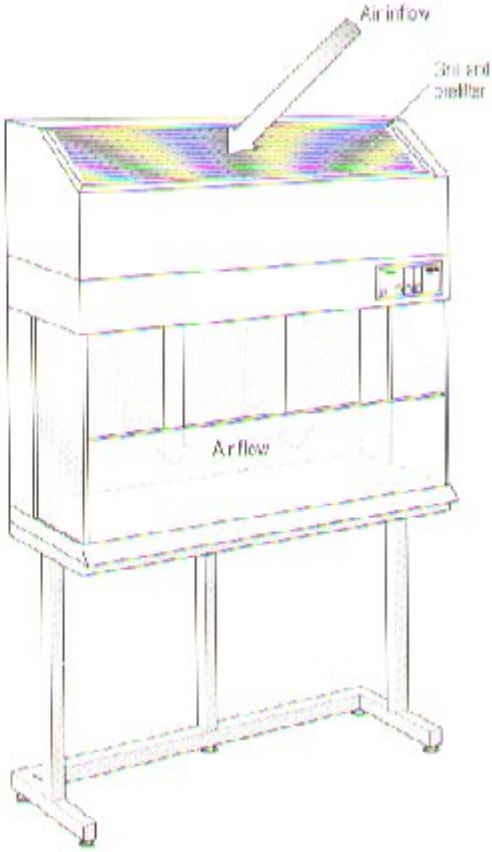


Fig (2-7) Horizontal laminar airflow unit fig (2-8) Vertical laminar airflow unit

Hospital pharmacists who plan to commence intravenous solutions additive programs or those who are called upon to produce special sterile research products should investigate the possibilities, which such an installation offers.

Pharmacy-Central Sterile Supply Rooms that still produce parenteral fluids should install laminar flow hoods in order to ensure safe, sterile products.

Fig (2-9) laminar airflow unit

Emergency medications

Because in most true emergencies time is of the essence, it is imperative that emergency drug or "Stat' boxes containing drugs and supplies be readily available for use by the bedside. The pharmacy and therapeutic committee should develop a list of supplies and drugs, which ought to be in an emergency box and instruct the pharmacist and nursing service supervisors of their joint responsibility to have the box ready for use at all times.

Once the content of the box has been established and the responsibility for its stocking assigned, the units should be prepared and placed on each pavilion, in the clinic, in the emergency ward and in the special procedures room of the department of radiology.

After the emergency boxes have been placed on the ward, it is mandatory that a program be developed whereby they are checked daily either by the hospital pharmacist or by the nursing supervisor responsible for the ward.

The following list of contents is provided to serve as a guide.

Supplies to be Maintained in Emergency Box:

Syringes:
- 1—2 ml
- 1—5 ml
- 1—20 ml
- 1 insulin

Needles:
- 2 #16
- 2 #18
- 2 #20
- 2 #23
- 2 cardiac, #20, 4"

Files ampul
Airway
Tourniquets

Drugs for the Emergency Box:

Aminophylline 0.25 gm/20 ml
Amphetamine Sulfate 20 mg/ml
Amy. Nitrite Inhalation
Atropine Sulfate 0.4 mg/ml
Caffeine Sodium Benzoate 0.5 gm/2 ml
Calcium Gluconate 1 gm/10 ml
Chlorpropphenpyrimadine Maleate 50 mg/ml
Digoxin 0.25 mg/ml
Diphenylhydantoin Sodium 50 mg/ml
Epinephrine HCl 1:1000
Heparin 10,000 Units/ml
Hydrocortisone 100 mg
Isoproterenol 1:100
Magnesium Sulfate Injection 10% and 50%
Metaraminol Bitartrate 10 mg/ml
Mannitol Injection 25%
Nalorphine HCl 10 mg/2 ml
Neostigmine Methylsulfate 0.25 mg/ml
Nor-epinephrine Injection 0.2%
Pentobarbital 50 mg/ml
Pentylenetetrazol Injection 0.1 gm/ml
Phenobarbital 120 mg/ml
Phenylephrine HCl 10 mg/ml
Phytonadione Injection 50 mg/ml
Picrotoxin Injection 3 mg/ml
Procaine Amide 100 mg/ml
Protamine Sulfate 10 mg/ml
Saline for Injection 30 ml
Sodium Molar Lactate Solution
Water for Injection 50 ml

Supplies for Cabinet or Pavilion Utility Room:

- 1 Venous cannulization set
- 2 each—#14 and #17 venous catheters
- 2 6" shock blocks
- 2 Oxygen catheters
- 3 Sterile suction catheters
- 1 Sengstaken-Blakemore tube
- 1 Razor with blades
- 1 pkg. sterile gelatin sponge
- 1 Resuscitation tube

Other Emergency Supplies:

- Resuscitation carts
- Phlebotomy sets
- Oxygen equipment
- Tracheostomy sets
- Dextran and tubing
- Burn sheets

Unit Review

1- What are the four classes of drug distribution systems?
a---------- b- ----------
c- ---------- d- ----------
2-Discus, advantages and disadvantages of unit dose system.

3- What are the main elements of unit dose distribution?

4- What is the difference between U.D.S and C.F.S.S.?

4- Define the following:
A- Addict: ----------
B- Controlled Substances: ----------
C- Narcotic Drug: ----------

5- What is laminar flow hood?

6- If a doctor needs to write (Pethadine) injection he must use:
a- Narcotic prescription
b- Normal prescription
c- Flour stock request
d- All of the above

7- The arrangement of the drugs in hospital pharmacy is done by the following methods except:
a- Alphabetical method
b- Therapeutic category
c- Dosage form
d- Arranged according to company name

UNIT– III

OUT-PATIET PHARMACY

DISPENSING TO AMBULATORY PATIENTS

DEFINITIONS:

Ambulatory care, primary care, tertiary care, emergency care

"**Ambulatory**" refers to patients not occupying beds in hospitals or other in patient settings, and to care given in physicians' offices, clinics, health centers, and other places where ambulatory patients usually go for health care. Today hospitals break down their ambulatory patient load into three categories—emergency, referral or tertiary care and primary care. The term **emergency** care is self explanatory and **tertiary care** means care beyond that of primary care. Stated simply, primary health care is what most people use most of the time for most of their health problems. **Primary care** is majority care. It describes a range of services adequate for meeting the great majority of daily personal health needs. This majority includes the need for preventive health maintenance and for the evaluation and management on a continuing basis of general discomfort, early complaints, symptoms, problems, and chronic intractable aspects of disease.

Most primary care is used by patients who are ambulatory, and most, but not all, ambulatory care is primary care. Primary care does not include service that is intensive, or very specialized, or both. These characteristics describe other levels of comprehensive health care.

In an organizational sense, primary health care describes a locus which should serve the patient as an entry point into a comprehensive health care system. Once entry is made—and initial care needed at the time of entry given—the primary care locus or program should be responsible for assuring continuity of all the care the patient may subsequently need.

The growth of ambulatory care clinics may be attributed to the following:

A. The need of the hospital to supplement its in-patient teaching program.

B. The demand by the community lay as well as professional, for comprehensive diagnostic and treatment centers.

C. The new philosophy of hospitals—to take a more active role in the community health programs.

D. The need of the hospital and physician to exercise greater control over patients receiving investigational use drugs.

E. The lack of a sufficient number of physicians in some areas, thereby causing the population to travel to the medical center for comprehensive care.

F. The fact that the emergency service of a hospital is always available, whereas a physician, in some rural areas, may not always be available.

Because of this volume and the prospect of growing larger within the next 20 years, many community pharmacists have been quick to cite the economic hardship this trend may create in the community. Although this is an important factor to be considered, it would appear that the crux of the problem is the lack of understanding by the community practitioner of the purpose and scope of a complete or comprehensive ambulatory service.

MINIMUM STANDARD FOR AMBULATORY-CARE PHARMACEUTICAL SERVICES

Services to ambulatory patients are an important part of many institutional pharmacy programs. The need for such services probably will increase substantially in the 1980s.

The Society has identified 12 activities in which institutional pharmacists will be involved in the ambulatory-care setting. However, providing all these services in all institutions at all times is not feasible. At a minimum, ambulatory patients require certain critical pharmaceutical services. The essential elements of any ambulatory-care pharmaceutical service program are as follows:

1. The ambulatory-care pharmacy program must be directed by a qualified pharmacist.
2. The appropriateness of the choice of drug and its dosage, route of administration, and amount must be verified by the pharmacist. This will require the maintenance of medication profiles for patients routinely treated at the institution to prevent duplicate drug therapies and the use of contraindicated drugs.
3. All medications dispensed to patients will be completely and correctly labeled and packaged in accordance with all applicable regulations and accepted standards of practice.
4. Upon dispensing a new (to the patient) medication, the pharmacist will ensure that the patient or his representative receives and understands all information required for proper use of the drug.
5. All drugs in ambulatory-care service areas will be properly controlled.

LOCATION OF OUT-PATIENT DISPENSING AREA

There is no set rule as to the best area to locate an out-patient dispensing pharmacy. This is evidenced by the fact that in today's practice three equally suitable provisions are made for this area:

a. A separate out-patient pharmacy is available.
b. A combined in-patient and out-patient unit with service provided from the same "window."
c. A combined in-patient and out-patient unit with service provided from separate "windows."

A separate out-patient pharmacy is usually established whenever the out-patient department and the pharmacy are geographically widely separated. Although this arrangement has the advantage of being a separate and distinct unit with a specialized function, it possesses the disadvantages of requiring a separate staff as well as consuming a great deal of time, on the part of other pharmacy department personnel, in transporting supplies and drugs to the area.

The above disadvantages are obviously eliminated whenever both in- patient and out-patient facilities are combined. An additional advantage to this arrangement is that the director of the pharmacy service is able to exert a greater degree of control and supervision.

TYPES OF PRESCRIPTIONS RECEIVED

Depending upon the location and kind of hospital, the prescriptions received in the out-patient department pharmacy will generally include those of private patients (where permitted by the state board of registration in pharmacy), indigent patients, non-indigent patients, employees, and patients being discharged from the hospital. It is a known fact that in any large metropolitan teaching hospital, the largest volume of prescriptions comes from the indigent or partially indigent group of patients. It is also established that every patient who visits the clinics does not have his prescription filled in the hospital. Indeed, hospitals with 500 or more beds fill approximately I prescription per 3 out-patient visits, whereas the 100 to 199-bed hospitals average about 1.25 prescriptions for each visit.

Because many of these indigent patients are supported by some type of welfare program, their prescriptions require special identification, and the billing for such must be in accord with the requirements of the particular agency.

DISPENSING ROUTINE

The dispensing pattern involved in providing clinic patients as well as those patients being discharged with "take home drugs" is identical with that carried on by a community pharmacy.

In both instances, a prescription is written by the physician and the patient takes it to the pharmacy where it is compounded by a pharmacist. If there is to be a waiting period, the pharmacist will make use of a prescription call check which numerically identifies the patient, and the finished prescriptions (Fig.3-1). Once in the hands of the pharmacist, the prescription and label are numbered by a numbering machine; the directions and other pertinent information are placed on the label; ancillary labels are affixed; the proper medication is then placed in the container; a check for accuracy is then conducted; and finally the prepared prescription is wrapped and dispensed.

For internal audit purposes, hospital prescriptions are separated into out-patient and in-patient discharges and therefore may utilize two different colored blanks.

Figure (3-2) represents one type of hospital prescription. It is rather ingenious combination of prescription call check, prescription and label in a single form was that of the Philadelphia General Hospital now closed. This form Fig (3-3) has many advantages in that it combines three forms into one; it saves the pharmacist's time in handing out a call check and typing a label; and finally, it is probably more economical. It would seem that it's only disadvantages are that the prescription on file does not carry the directions for use and that the directions for use written by the physician on the label portion of the form, more often than not, will be illegible to the patient.

Many other types of prescription forms are in current use in the

hospitals of the nation. Some consist of multiple pages attached to a pre-punched card ready for use in a computer system; others consist of a prescription blank the back of which is affixed with coded magnetic tape thereby rendering the prescription suitable for use in automatic billing and electronic data-retrieval systems.

PRESCRIPTION CHECK

No. 5007

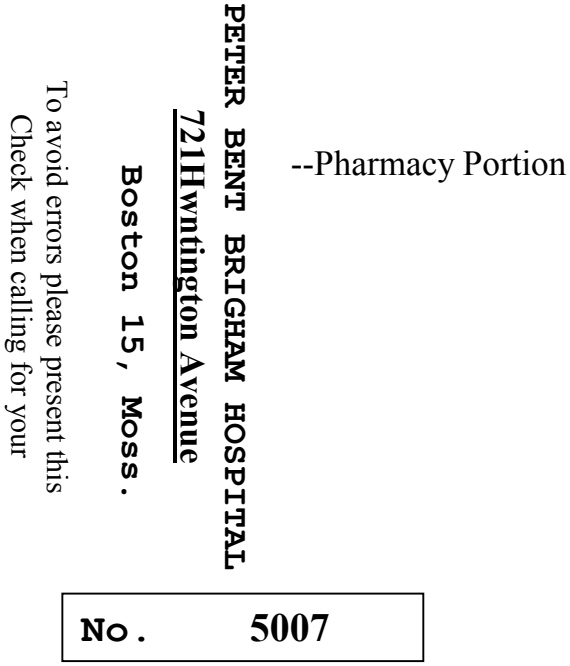
Name _____

_____ --Pharmacy Portion

Address _____

PRICE

PETER BENT BRIGHAM HOSPITAL
721Hwntington Avenue
Boston 15, Moss.



--Pharmacy Portion

Fig (3-1) Prescription call check used in the out patient dispensing pharmacy as a means of matching the correct patient and prescription

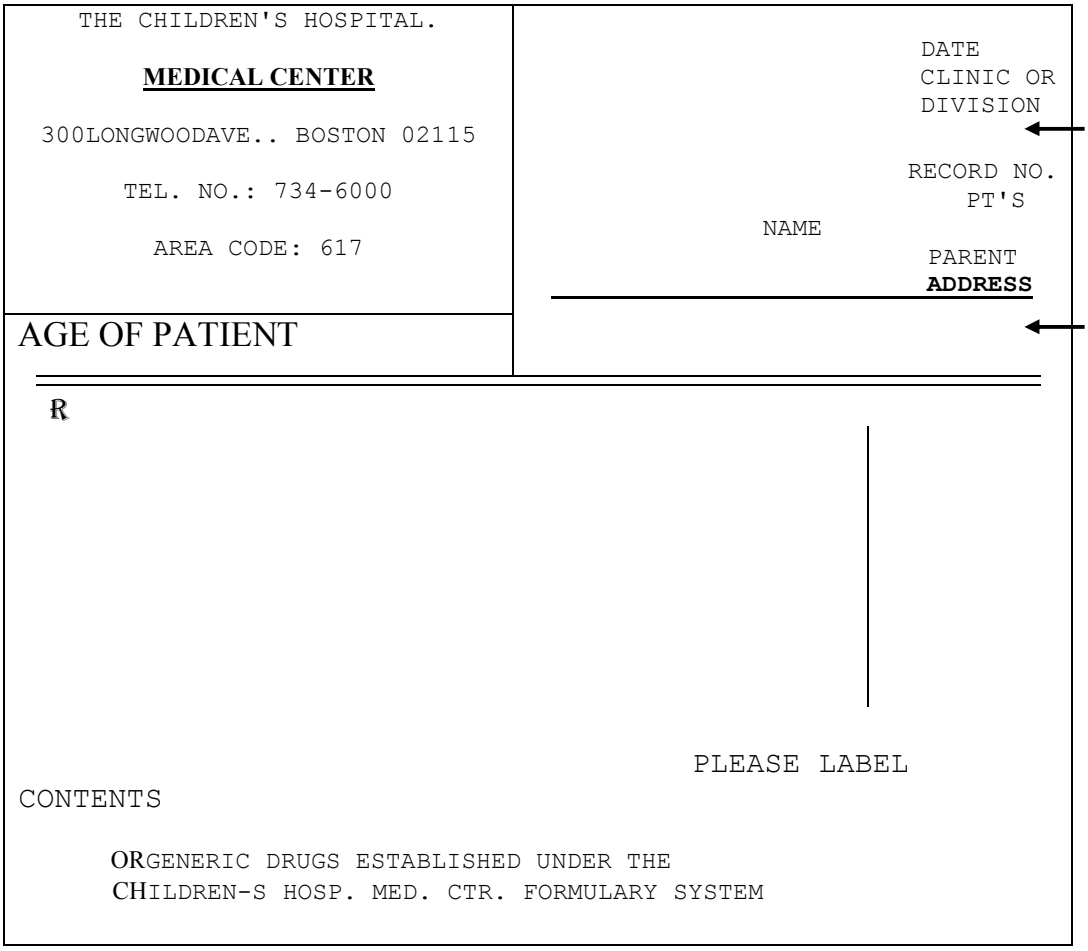


Fig (3-2). A prescription blank developed by The Children's Hospital Medical Center in Boston. Note the emphasis on the patient's age.

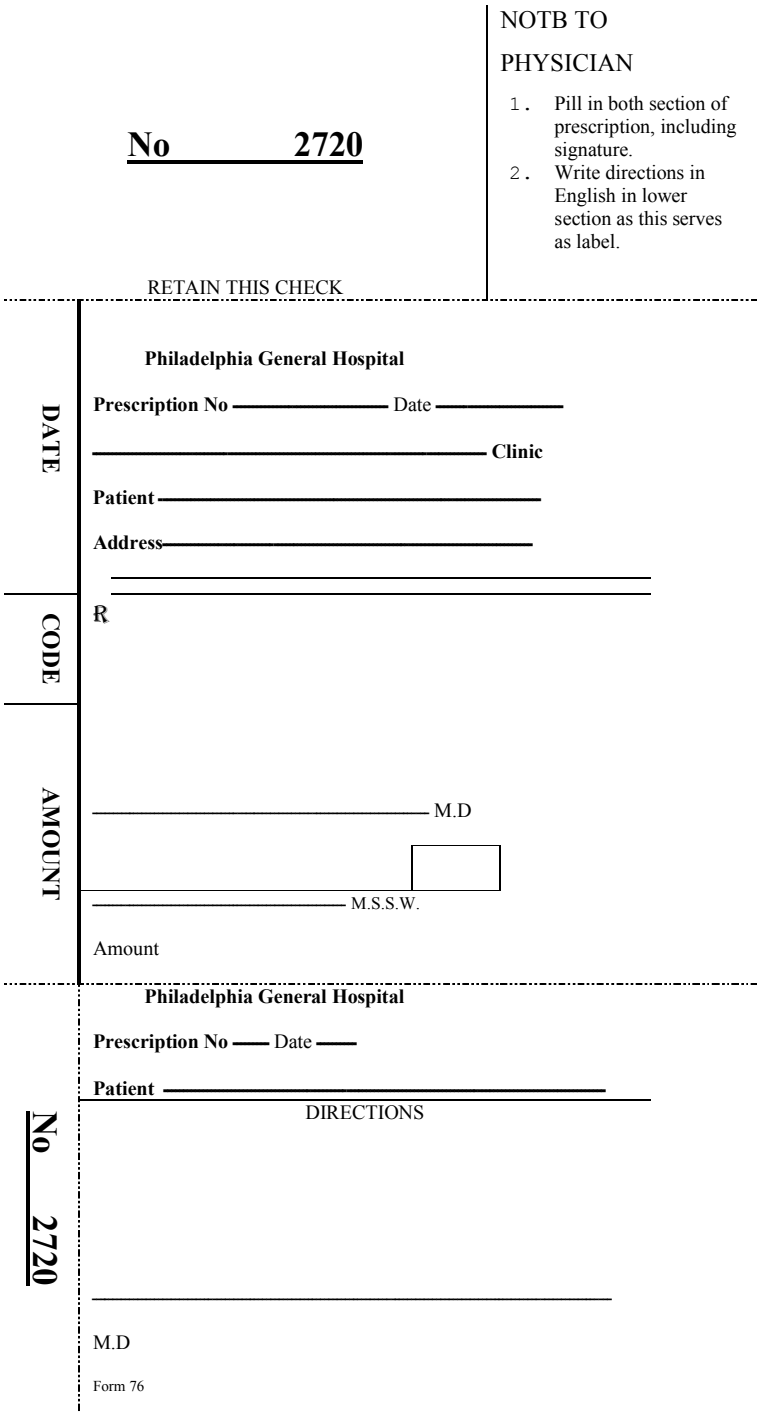


Fig (3-3). A prescription blank developed by the children's hospital medical center in Boston. Note the emphasis on the patient's age

INVENTORY CONTROL

CENTRAL STORAGE VS. PHARMACY STORAGE

The dichotomous storage arrangement of supplies is prevalent in many hospitals, although it is common knowledge that central storage is ideal.

The proponents of centralized storage facilities are quick to demonstrate the reduction in labor and record keeping, as well as the tight control afforded by centralization.

In contrast, it should be pointed out that the responsibility for the storage of drugs should be placed with competent individuals who have been educated, trained and licensed to handle pharmaceuticals. These individuals are the pharmacists.

In order that the pharmacist may properly supervise the storage of drugs, they should be stored in an area directly under his control. This allows him the freedom of stock arrangement, instituting of inventory controls, the adjustment of inventory based upon his knowledge of the prescribing trends of the staff and the preparation of inventory cost reports to management.

Therefore, all merchandise ordered by or for the pharmacy should be shipped directly to the pharmacy receiving area. Should the merchandise be received by the hospital post office or central storeroom, it should immediately be forwarded to the pharmacy in the unopened state.

Upon the receipt of the merchandise in the pharmacy receiving area, the department personnel then process it in the routine manner, namely, checking the receiving slip with the copy of the purchase order and preparing a receiving memorandum.

STOREROOM ARRANGEMENT

There is no definite rule specifying how a pharmacy storeroom should be arranged. Each individual may so arrange the area to meet both his and the institution's needs.

In general hospitals handling a variety of supplies, the storeroom is divided into the following areas.

1. Alcohol and Liquors	7.Biologicals and other cold room inventory
2. Capsules and Tablets	8.Laboratory Instruments
3. Chemicals	9.Surgical Instruments
4. Gallon Goods	10.Rubber Goods
5. Narcotic Vault	11.Sutures
6. Ointments	12.Medical and Surgical Supplies

Alphabetical arrangement is followed, where possible, within the section. Each shelf, drawer, or bin within the section is numbered to facilitate location of the item during the taking of a physical inventory as well as to locate the item for new personnel.

Unit Review

1- Define the following:

- Ambulatory care

Primary care

- Tertiary care

Emergency care

2- Mention the minimum standard for ambulatory- care pharmaceutical services

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3- What are the methods of arrangement of drugs and inventory control in out- patient department?

4- Out patient pharmacy is used in:
a- Daily clinics
b- Specialist clinic
c- Emergency services
d- All of this

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