

Patient Housing System

The patients are admitted to a hospital facility at his doctor's choice, but the patient is the most important customer in the entire system. A patient profile reflecting current preferences and specific needs is a valuable tool in planning and daily performance.

General nursing units:

- Good nursing services result from and are part of coordinated administrative and clinical planning. The primary of the nursing department is to give safe, effective and well –organized nursing care to all patients.
- This department constitutes the largest single group of hospital personnel. While dependent upon all other hospital department, it serves as focal point for much of the administrative coordination necessary among department.
- A nursing unit is a self –contained, independently operated and controlled group of rooms for patients designed for either special or general care. The size, shape and components of the nursing units affect the hospital efficiency.
- Traditionally, the size of nursing unit has been 20 -30 beds.

Intensive Care Units (ICU)

- Specially designed intensive care facilities, an innovation of the early 1960's, are acknowledged as being essential for good medical care.
- Centralizing acutely ill patients in contiguous units, including medical surgical, coronary, and specialty units, provides close, skilled nursing observation, care for complications, burn treatment, renal dialysis, psychiatric care, and spinal care.
- The intensive care complex focuses on concentrating the most critically ill patients, extending physician capacity through centralized support and specialized equipment, maximizing equipment utilization, and improving patient care by reducing nursing staff workload.

- The location of ICU: The intensive care units should be easily accessible allowing for quick access to clinical services in emergencies. They should be close to emergency rooms, operating suites, radiology rooms, and general nursing units to minimize the time and movement required for patient transfers.

Intermediate or step-down units

This unit contain patients who do not have intensive care needs, such as twenty-four hours observation, but who must be monitored before progressing on into a general patient unit. Intermediate, or step-down, care beds are provided for these acutely ill patients, who may be admitted directly to this level or from the intensive care complex when they are moved from the critical list. The unit, should be therefore, adjoin the intensive care unit.

Long-term care units

The function of long-term care facilities is to provide therapeutic or compensating environments in which patients stay weeks, months, or years rather than a few days. In theory, patients in these facilities can be classified into two groups; one requiring protected rehabilitative therapy and the other needing supportive care. In practice, institution may house varying proportions of each category with few environment distinctions. For example, an effort is usually made to segregate persons with mental disabilities from those with physical ailments, but the distinction often cannot be made for geriatric or neurologically impaired patients.

Support Service System

Healthcare facilities, despite being primarily staffed by doctors, nurses, and bill collectors, also include support services like housekeeping, central stores, and laundry-linen. These services are crucial for the overall operation of the facility, making their programming and design a major consideration.

Dietary:

- Food service is one of the most important services in any health care facility.
- Good dietary service must be based on optimum nutritional requirements and contribute to the care and recovery of patients and the well-being of hospital staff.
- The various elements of dietary service include (Dry storage and refrigeration areas, Food preparation areas, Tray assembly and cart storage areas, dishwashing area, Cafeteria, Private dining rooms, Administration areas.

Housekeeping:

- Good housekeeping is crucial for patient care, economic efficiency, and employee morale. Maintaining a clean and sanitary hospital environment benefits patients, visitors, and staff, and contributes to overall efficiency. New trends in housekeeping management include consulting, contract services, and window washing. Building design changes also affect housekeeping functions and operation, such as central vacuum systems and floor carpeting.
- The housekeeping department is responsible for daily and periodic cleaning of patient care, clinical, and office areas to control infection, preserve facilities, and make the hospital more aesthetically pleasing. It is part of environment sanitation and has a representative on the hospital infections control committee.

Central supply:

The major responsibility of central supply include:

- Storing and distributing all disposable sterile supplies.
- Storing and distributing all patient charge items.
- Cleaning and storing portable medical equipment.
- Reprocessing, storing and distributing patient bedside items.
- Reprocessing all instruments and equipment for surgery and delivery.

Central sterilization:

The basic function of central sterilization include:

- Receiving and storing decontaminated material from the decontamination department.
- Specialized cleaning of equipment and supplies.
- Inspecting and testing instruments, equipment and linens.
- Assembling treatment trays, sets and linen packs.
- Sterilizing, labeling and dating material.
- Participating in supply and equipment research in an effort to provide the most suitable for patient care.

Medical records:

The medical records department exists primarily to support optimum patient care and must be organized to serve the patient, medical staff, hospital administration and community. In the interest of economy, accuracy of data and good communication, all information about a patient should be concentrated in his or her medical record, indexed and filed in the main medical records departments. The records area must have adequate space for storage of active and inactive records, for personal and for equipment. Design must be functional with logical placement of work area, good intra-and interdepartmental communication systems and the best possible means for transporting individual medical records.

Engineering and maintenance:

The specific needs of the hospital's central plant include all aspects of the design and space requirements for the generation, storage and distribution of steam; of hot and cold water; for refrigeration; for ventilation and air condition; and for electricity. They are highly specialized and will be finally determined by the consulting engineers and architects on the planning team. Energy use, storage, conservation, recovery and new source are the current elements of goal-setting within the hospital.

Functions included in the engineering and maintenance department are preventive maintenance, repair and operation of all equipment, machinery and distribution lines

concerned with steam, hot and cold water, electrical systems and vertical transportation equipment.

The best location for engineering-maintenance is on ground level in a nonprime area. Access to service elevators, the boiler plant, mechanical areas and loading dock are essential. The main shop areas should be on an outside wall for ventilation and for future expansion. Normal telephone and internal communications systems should be considered. A storage area for grounds maintenance equipment should be provided (outside entrance) and contiguity with the engineering shop areas is desirable, but not essential.

Basically, the engineering and maintenance department requires a large open space and consists of three main elements; an administrative area, the shop areas and mechanical equipment space.

Pharmacy:

Factors that affect other areas of the health field also affect pharmacy, for example, population growth, discoveries of drugs preparation and automated equipment, new distribution techniques and increased use of drugs in the treatment of disease. A good pharmacy program blends qualified personnel, a modern and efficient facility, sound budgeting and the support and cooperation of the medical, nursing and administrative staff of the hospital.

The basic functions of pharmacy are to:

1. Requisition, store, compound, package, label and dispense pharmaceutical items.
2. Make information concerning drugs readily available to pharmacists, physicians, nurses and other health care personnel.
3. Participate in educational programs approved by the hospital.
4. Plan, organize and direct pharmacy policies and procedures in accordance with established hospital policies.

Medical Services System

The medical services areas of a health care facility are those areas dedicated to specific diagnostic and treatment procedures. Many of these procedures are not only specialized as such but require equipment with extraordinary utility hook-ups and structural housing requirements. Because of these requirements, the individual areas categorized within medical services are physically the most varied and least interchangeable in the health care facility and careful attention must be paid to their design and construction.

Emergency Service:

The concept of emergency has changed from a life and death situation, as defined by the hospital staff, to the patient's interpretation of what constitutes an emergency; for example, inability to locate a private physician, a closed doctor's office, a visitor who no local physician, or a patient who does not feel he can afford a physician. Sever emergencies requiring hospital admission will constitute only 5-20% of the total visits, depending on geographic location. The remaining visits can be described as outpatient visits occurring twenty-four hours rather than the usual eight.

Outpatient Services:

Outpatient services should be adjacent to emergency services, social services, admissions, laboratory and medical records. There should be rapid access to radiology, human functions, physical therapy, nuclear medicine and radiation therapy. Rapid service should be available from the pharmacy also. Outpatient services should be on the ground level with its own entrance from its own parking lot and must be able to handle wheelchair and stretcher patients without hazard to walking patient.

Clinical Laboratory:

The laboratory should serve and be convenient to the ambulatory care unit of emergency and outpatient, surgery and obstetric, radiology and intensive care. The amount of space needed by the laboratory department can be related to the number of project-test and cannot be satisfactory related to the number of beds in the hospital. The test, however, are increased every year, not only due to increase

number of test per patient admissions, but also due to the growing utilization of hospital laboratory facilities for outpatient services.

The laboratory needs hot, cold, distilled and ionized water. Not all laboratory subdivisions require all kind of water, however, flexibility is enhanced if each unit can be converted easily by adding or deleting portable equipment. Air conditioning with a well-defined pattern of air movement is necessary to provide an acceptable environment in the laboratory. Chemical fumes, vapors, heat from equipment and undesirability of open windows contribute to this need. A slight negative air pressure relative to other hospital areas should be maintained in the laboratory because of contaminants and odors that originate there. Strict attention must be given to the effect of various hoods required in certain of the laboratories on the problem of the maintaining a smooth and controlled flow of conditioned air.

Diagnostic Radiology:

It serves both inpatient and outpatient needs and is critical in determining what treatment or surgical procedure is necessary. Nuclear medicine and scanning are likewise diagnostic tools. Radiation therapy is a treatment facility. Advance in technology and treatment within the fields of radiology and oncology will vary the space needs of the future. Improvement of the image intensification, reduction exposure, radio and color scanning, new radioactive element selection, thermography (scanning with infrared light), sonography-ultrasonic visualization, wound sound scanning, laser radiation, magnetic resonance, xerography and computer adaptations are all recent advances. Radiology should be adjacent to emergency, convenient to surgery and accessible to patient travel from the bed units.

Radiation Therapy:

It is basically a tissue-destroying procedure. This department varies in size according to the type of services and program offered. Because of the dense shielding required by radiating therapy and specific standards of design, this department must be carefully located so does not block future planning and expansion. Three-foot thick walls and ceiling with required access for the placements or removal of the equipment are a major design element. Radiating therapy is used to treat both inpatients and outpatients and should, therefore, require easy access to radiology, ambulatory care and vertical transport facilities.

Electrocardiography-EKG↔ECG:

Electrocardiography produces hard copy readouts of heart function line order to assist the physician in diagnosing disease, establishing a treatment plan and evaluating the effect of the treatment on the patient. Equally important functions are evolving in preventive care and observation of the patient's heart function during surgery. Electrocardiography unit should be located within the human functions area and easily accessible to ambulatory patients and designed to allow personnel to leave rapidly for other areas of the hospital. The work-preparation area is space for cutting, splicing and preparing recordings for interpretation and filming. It should be adjacent to either the reading room and diagnostic laboratories or the computer-telemetry recording and readout space. There should be space close to the entrance and exit, for housing equipment not currently in use.

Electroencephalography-EEG:

The electroencephalography suite should be located in a quiet section of the human functions area in order to avoid distraction of the patients during examination. It should also be separated as far as practical from main electrical corridors or equipment that will affect recordings. There should be easy access to intensive care, mental health, ambulatory services and vertical transport to other patient areas. The preparation and control room are designed for preparing (wiring) the patient for an EEG and contains equipment for recording while observing the patient through a glass wall. The EEG laboratories will accommodate a patient lying down or in a supine position during the testing procedure.

Physical Therapy:

Modern hospital, in its efforts to deliver comprehensive care, must consider carefully the contribution of rehabilitative medicine as part of its inpatient and ambulatory patient care. The department of physical therapy should be organized to provide for continued specialized treatment of a variety of prolonged physical and mental disabilities. The function of the physical therapy department is closely related to its location within the hospital. The area should be centrally located to minimize travel and transportation problems, to accommodate ambulatory patients and to facilitate bedside treatment.

Surgery:

A surgical suite, which is also called operating room (OR), is the unit of a hospital where surgical procedure is performed. Such rooms are sterile environments; all personnel wear protective clothing called scrubs. They also wear shoe covers, masks, caps, gloves, eye shields and other coverings to prevent the spread of germs. The operating room is brightly lit and the temperature is very cool; operating rooms are air conditioned to help infection. Surgical suite may be designed and equipped to provide care to patients with range of conditions, or it may be designed and equipped to provide specialized care to patients with specific conditions. The monitoring equipment and anesthesia used during surgery are usually kept at the head of the bed. The anesthesiologist sits here to monitor the patient's condition during surgery. The instruments used during a surgical procedure are different for external and internal treatment; the same tools are not used on the outside and inside of the body. Once internal surgery is started, the surgeon uses smaller, more delicate devices.

Planning of Hospital Equipment

Proper planning and management of hospital's equipment requires a lot of attention in order to enhance the efficiency of health care service. This can only be done through a team effort with a multi-disciplinary staff that including planners, engineers and users.

Categories of Hospital's Equipment:

New and expanding healthcare facilities have many equipment needs. As an executive, one wants to ensure that those needs are met by best and the most cost-effective equipment available. To do that, though, one needs to spend time on assessment, planning, procurement and implementation-time one may not have.

Group 1: Fixed Equipment:

Medical equipment permanently attached to the facility structure and /or requiring services for installation or removal. This equipment is normally acquired a competitive bid process and is included in the facility construction documents developed by the architect /engineer. Examples of fixed equipment include walk-in refrigerators having medical /pathology functions, sterilizers, surgical lights, X-ray darkroom equipment, ...etc.

Group 2: Major Moveable Equipment:

Medical equipment capable of being moved without modification of facility structure or services, but with physical size great enough to demand designer attention and /or building services required for function. Examples include EKG units, laboratory instruments, mobile X-ray units, electric beds and physiologic monitoring ...etc.

Group 3: Minor Moveable Equipment:

Medical equipment that requires no building services for operation. Examples include plinth table, stretchers, carts and intravenous stands ...etc.

Group 4: instruments:

Medical instruments not normally considered equipment. Examples include endoscopes, bone saws and drills, surgical instrument...etc.

Group 5: Furniture

Furniture not normally included in any of the above groups. Examples include: desks, couches, chairs, window coverings...etc

Problem Related with Equipment:

Most equipment requires continuous care, maintenance and reliable supply of spare parts. That most often require relatively sophisticated user and well-trained service personnel. Therefore, lack training, experience and awareness among decision makers are serious reasons to characterize some of the following major problems which should be seriously anticipated;

1. No one knows how to use the equipment.
2. No one knows how to install the equipment.
3. No proper space for the equipment.
4. Equipment are broken when it arrived, hence no care taken during transportation or loading with or shipping it.
5. No proper utilities available in the hospital engineering services (like electrical power or water supply).

6. No maintenance plan with insufficient budget for this plan.
7. Necessary spare parts are not available in the local market.
8. Equipment are not appropriate for the country climate and environment.

Maintenance Plan and Staff

Maintenance can be categorized into preventive or regular standard maintenance and repairs. After an inventory of the available equipment (time and spare parts), it will be possible to develop stock requirements and efficient maintenance schedules for each health facilities. These lists for estimating the maintenance requirements for many pieces of standard health equipment, most equipment will be best maintenance on-site, some equipment which need specific testing may have to be transported to the workshop or laboratory. Always, it should be remembered that the maintenance costs are a substantial percentage of the capital costs of equipment.

Generally, health care technical staff team consists of the following three categories;

1. Staff with only primary education, or some secondary education such as craftsman (carpenter and plumber) and polyvalent technicians.
2. Staff with specialized technical training in a polytechnic schools or institutes. Such as specialized technicians for district workshop.
3. Staff with advanced training in management of engineering, such as clinical engineers or biomedical engineers for advanced technical work and biomedical policy development.

Thank you