

Hospitals

Definitions:

A hospital and other health facilities shall be planned and designed to observe appropriate architectural practices, to meet prescribed functional programs.

A hospital is a health care institution providing patient treatment with specialized staff and equipment.

An institution providing medical and surgical treatment and nursing care for sick or injured people.

Why hospital design science is important?

- Hospitals are the most complex of building types. Each hospital is comprised of a wide range of services and functional units.
- A functional design can promote skill, economy and comforts; a non-functional design can impede activities of all types, detract from quality of care, and raise costs to intolerable levels.

Hospital design staff

- Architect.
- Biomedical Engineer.
- Doctors.

Biomedical engineer and Doctors responsible for: **Function, Proper Location, Utilities & Operating Conditions of Medical Equipment.**

Architect responsible for: **studying information given by the biomedical engineer and considering it for the final design.**

Layout of a Hospital

Hospitals are the most complex of building types. Each hospital is comprised of a wide range of services and functional units. These include diagnostic and treatment functions, such as clinical laboratories, imaging, emergency rooms, and surgery; hospitality function, such as food service and housekeeping; and the fundamental inpatient care or bed-related function. Hospital functions constantly evolved, including highly complicated mechanical, electrical and telecommunications systems. This diversity needs a specialized knowledge and expertise; which is why specialized consultants play an important role in hospital planning and design. The designer also has to be advocate for the patients, visitors and support staff. Good hospital design integrates functional requirements with the human needs of its varied users.

The basic form of hospital is ideally, based on its function:

- Bed-related inpatient functions.
- Outpatient- related functions.
- Diagnostic and treatment functions.
- Administrative functions.
- Service functions (food, supply).
- Research and teaching functions.



Division / Units

1. Administration division.
2. Outpatients division: Outpatient clinics, Pharmacy, Emergency, Bed-Related Inpatient Functions.
3. Diagnostic services division: Laboratories, Radiology (Diagnostic).
4. Therapeutic services division: Physical therapy, Radiology (Therapeutic).
5. Internal medical treatment division: Operation Theaters, Intensive Care Unit, Maternity Section, Central Sterilization Department.
6. Inpatient division: Patient wards, Nurses wards, Inpatient services.
7. Research and Teaching Division.

Bed Need and Size of Hospital

The size of hospital commonly indicated by the number of beds. This can be a misleading factor, as the proportion of the hospital is given over to the nursing unit or bed areas which varies greatly from as little as 25% of the whole in teaching hospitals, of over 60% in psychiatric and geriatric specialized hospitals.

The use of hospital beds can be related to the type of medical program serving a population. **In general, to form the bed need of a hospital, it must be known of the following commonly criteria:**

- Administration rates per thousand populations.
- Average daily hospital census per thousand populations.
- Bed-death ratio.
- Bed-birth ratio.
- Age group utilization.
- Federal government estimates.
- State and municipal estimates.
- Local utilization experience.
- Area- wide planning recommendations.

Types of Hospitals

Some patients in a hospital come just for diagnosis and/ or therapy and then leave (“outpatients”) while others are ‘admitted’ and stay overnight or for several weeks or months (“inpatients”). Hospitals are usually distinguished from other types of medical facilities by their ability to admit and care for inpatients. Also, hospitals can be described as short-stay or long term, depending on the length time of a patient spends before discharge. Short-stay facilities include community, teaching, and public hospitals. Long-term hospitals are usually rehabilitation and psychiatric hospitals or facilities for the treatment of pulmonary (respiratory) diseases. Hospitals also are distinguished by ownership, scope of services, and they are teaching hospitals with academic affiliations. Hospitals may be operated for profit owned by corporations or individuals such as physicians on staff; or they may be not for-profit (voluntary) owned by religious organizations or operated by federal, state, or city governments. Commonly there are four major types of hospitals which are:

(1) General Hospitals

The most- known type of hospital is the general hospital, which is large enough set up to deal with many kinds of disease and injury, and typically has an emergency ward to deal with immediate threats to health and the capacity to dispatch emergency medical services. A general hospital is typically, the major health care facility in its region, with large numbers of beds for intensive care and long- term care; and specialized facilities for surgery, plastic surgery, childbirth, bioassay laboratories, and so forth. Larger cities may have many different hospitals of varying sizes and facilities. Its size measured in terms of bed numbers range from 200 to well over 1000.

(2) Teaching Hospitals

Teaching hospitals (or university hospitals) are those health-care facilities combine assistance to patients with teaching to medical student and are often affiliated with medical schools, nursing schools, or allied- health professions training programs and may have several hundred beds. They are the primary sites to provide the clinical training for new physicians where interns and residents work under the supervision of experienced physicians. One advantage of obtaining care at teaching hospital is to receive treatment from highly qualified physicians with access to the most advanced technology and equipment. A disadvantage is the inconvenience and

invasion of privacy that may be results from multiple examinations performed by residents and students. Its size measured in terms of bed numbers more than 2000.

(3) Community Hospital

Is the term used for smaller hospitals (50- 250 beds) where most people receive care, intended to be staffed by general practice physicians (GP's) and requiring less intensity of medical, nursing and teaching services. These hospitals provide for patients transferred from the district general hospitals (DGH), for routine medical cases where home circumstances prevent domiciliary care and for some longer stay geriatric patients. A few also include maternity units; community hospitals are often associated with health center. Most of these hospitals offer emergency services as well as a range of inpatient and outpatient medical and surgical services.

(4) Specialized Hospital

They are dealing with one category of patient only, from a different class. These hospitals may be a single building or campus. Some hospitals are affiliated with universities for medical research and training of medical personnel. Types of specialized hospitals include trauma centers, rehabilitation hospitals, children's hospitals, geriatric hospitals and hospitals for dealing with specific medical needs such as psychiatric problems, certain disease categories and so forth. Such hospitals are very large in size (over 200 bed or more) and remote in location.

Hospital Planning

Modern hospitals are complex social institutions providing health services, including prevention, diagnosis, treatment, and support for acutely ill, long-term care, and ambulatory patients. They must maintain high professional personnel and equipment concentration.

Hospitals are now integral to the community, requiring a common language for planning, programming, and construction. This language should include clear tasks and schedules, understood by hospital staff, consultants, and architects to meet society's healthcare needs.

Shapes of hospital

Modern hospital buildings are designed to minimize the effort of medical personal and the possibility of contamination while maximizing the efficiency of the whole system. Travel time for personnel within the hospital and transportation of patients between units is facilitated and minimized. The building also should be built to accommodate heavy departments such as radiology and operation rooms while space for hospital wiring, plumbing, and waste disposal must be allowed for in the design.

Location of Hospital

Rebuilding hospital often takes place on the edges of towns, where land is cheaper and more plentiful, such site is often bought at the cost of impaired accessibility, specially where cross town journeys are involved. Besides, a large and growing proportion of patient are elderly- aged, hence they and their visitors are the least likely to own car. Also, the lower paid staff, like porters and domestics, may prove hard to recruit if access by public transport is poor.

Attributes of Hospital Planning

Regardless of their location, size, or budget, all hospitals should certain common attributes.

1. Efficiency and Cost Effectiveness
2. Flexibility and Expandability
3. Therapeutic Environment
4. Cleanliness and sanitation
5. Circulation
6. Relationship between Departments
7. Aesthetics
8. Sustainability
9. Fir safety and security

Hospital design

Common factors that should be taken in consideration in the design of any given hospital. Factors common to all modern hospital include:

- 1-Design standards.
- 2-The elements in the architectural and engineering design process.
- 3-Long –range facility plans.
- 4-Structural systems.
- 5- Functional adjacencies.
- 6-Traffic and transportation.
- 7- Site and parking (including external traffic patterns and entrances).
- 8-Materral handling systems.
- 9-Electronic systems.
- 10-Engineering systems.
- 11- Heating, ventilation, air conditioning and electrical system.