

medical architecture planning systems

hospital planners & medical technology consultants

Principles of

Hospital Planning

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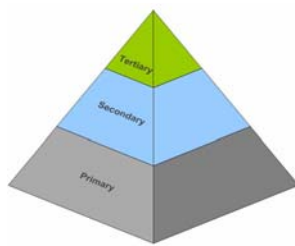
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Course outline

1 Health Services Organization

Hospitals do not exist in a vacuum. They influence and are influenced by the manifold of demographic, epidemiologic, economic, and socio-cultural settings within which they operate.



This course will start with an introduction to the different contexts within which hospital facilities exist and operate. Focus will be given to the **“healthcare organization system”**. Referral patterns between the different types of healthcare facilities, e.g. health centers, general hospitals and teaching hospitals, will be examined. The impact of healthcare organization system on hospital design will be assessed with contrasting examples from different countries.

The Architect should have an understanding of the healthcare system within which the hospital is being built. Otherwise he or she would be planning in a vacuum.

2 Morphology and Design of Modern Hospitals

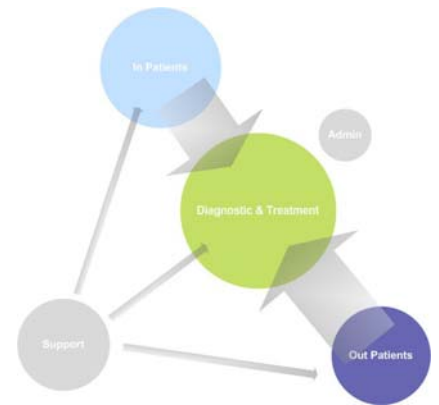
Hospitals are the most complex of building types. Each hospital is comprised of a wide range of services and functional units. These include diagnostic and treatment functions, such as clinical laboratories, imaging, emergency rooms, and surgery;

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hospitality functions, such as food service and housekeeping; and the fundamental inpatient care or bed-related function.

In this part of the course, participants will learn about the different functional zones and departments of modern hospitals, their physical and functional relationships. The workflow of inpatients, outpatients, visitors, staff and materials will be analyzed. Segregation of traffic according to patient type, sterility degree, urgency and other criteria will be illustrated with examples from recently built hospitals.



Hospital design has been subject to many changes over the past 100 years or so in both layout and size. In the early 20th century hospitals were basically places where the very sick spent their last days! Nowadays, emerging concepts of a hospital are calling for designs that promotes wellness and wellbeing rather than merely the treatment of diseases.

HOSPITAL PROGRAMMING

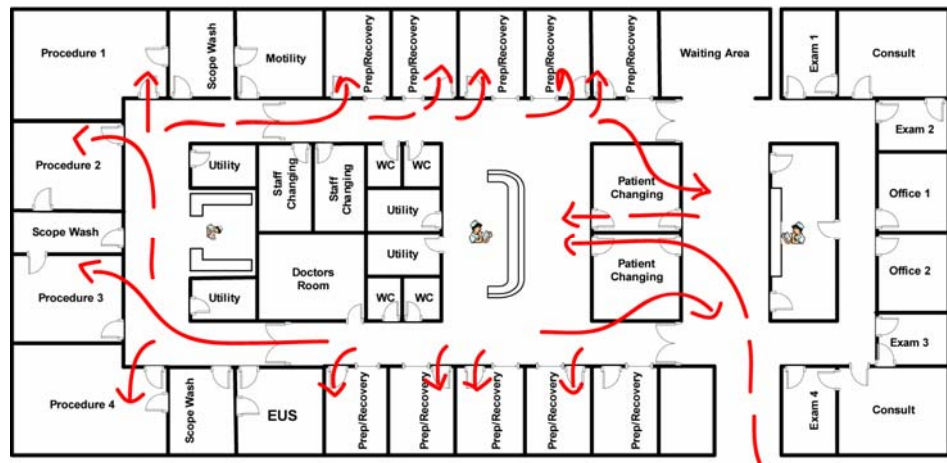
Before the Architect puts a line on the drawing board, he or she will formulate a detailed “Functional & Space Programs” for the proposed hospital project. Ideally, the design process incorporates direct input from the owner and from key hospital staff early on in the process. The designer also has to be an advocate for the patients, visitors, support staff, volunteers, and suppliers who do not generally have direct input into the design. Good hospital design integrates functional requirements with the human needs of its varied users.

Functional Zoning

3 Hospital design is almost totally centered around their complex functional requirements. The form and layout of hospital facilities have to meet the criteria for sterility, segregation of workflow, un-obstruction of emergency routes, nurse observation, patient and staff safety, and many others. This does not meet at all that hospital architects have no room for architectural design quality and aesthetics. To the contrary, aesthetics are mostly needed in hospitals where patients are vulnerable and staff is always under pressure. However, the challenge is to apply the elements of aesthetics without compromising the requirements for sterility, workflow, and infection control.

A basic principle in hospital zoning is **“controlled movement”**. Patients, staff, visitors and materials should move throughout hospitals according to certain criteria that meet the requirements to segregate soiled traffic from clean traffic. This creates restricted areas or zones where only staff or clean traffic can enter. For organizational and privacy reasons also, patients’ movement is organized into inpatients and outpatients.

Another basic principle is functional proximities and relationships where certain department are required to be adjacent or close to other departments for reasons that relate to patient and staff movement, in both normal and emergency cases.



Hospital Space Programming

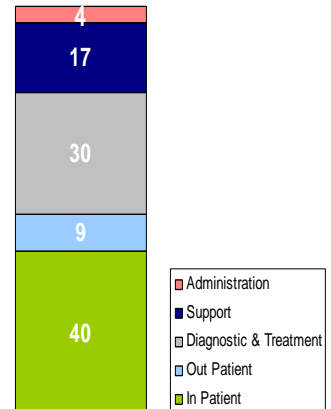
4 The hospital's space and functional programs comprise the foundation for all subsequent design activity. A hospital can only be as good as its program. The hospital planner shall determine the number of all functional units in the project such as the number of operating rooms, outpatient clinics, Endoscopy rooms, as well as major equipment capacities such as CSSD equipment, laundry and kitchen equipment. These calculations are based on standard formulas and ratios which are also available in software format. The functional units are further detailed into a full space program with departmental and gross areas.

In this section, the principles and methods of formulating the hospital's space program will be presented. Participants will use automated applications to determine the space requirements of a hospital project based on international hospital planning codes.

Over-sizing the hospital cost unnecessary expenses, both capital and running. Under-sizing leads to operational problems and deficiencies. The Hospital Planner should arrive, through calculations, at the Right-Size of the facilities and functional units such as number of operating rooms, clinics, etc.

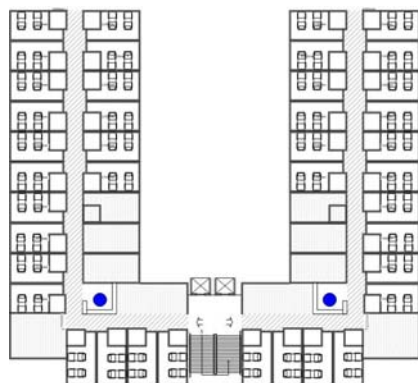
Endoscopy Unit

Space Description	Unit Area	Qty	Total Area
<i>Entrance Areas</i>			
Entrance vestibule	6.0	1	6.0
Patients reception/ records	6.0	1	6.0
Waiting area, outpatients / relatives	6.0	2	12.0
wheelchairs / stretchers bay	5.0	1	5.0
<i>Patients' & Treatment Areas</i>			
Patient preparation/ recovery cubicle	7.5	4	30.0
Patient changing/ wc, male	6.0	1	6.0
Patient changing/ wc, female	6.0	1	6.0
Procedure room, endoscopic	20.0	2	40.0
Patients' toilet	2.5	2	5.0
<i>Support, storage & staff areas</i>			
Staff base	6.0	1	6.0
clean workroom	6.0	1	6.0
soiled workroom	6.0	1	6.0
Scope washing and storage	8.0	1	8.0
Mobile xray / C-arm bay	5.0	0	0.0
Store, sterile supplies	0.0	0	0.0
Store, general	0.0	0	0.0
Disposal holding	4.0	1	4.0
Janitor closet	4.0	1	4.0
Staff rest / beverage- <i>Optional</i>	0.0	0	0.0
Staff lockers and toilets	6.0	2	12.0
Office - medical staff	10.0	1	10.0
Office - Secretary workstation	0.0	0	0.0
			172.0
			1.35
			232.2



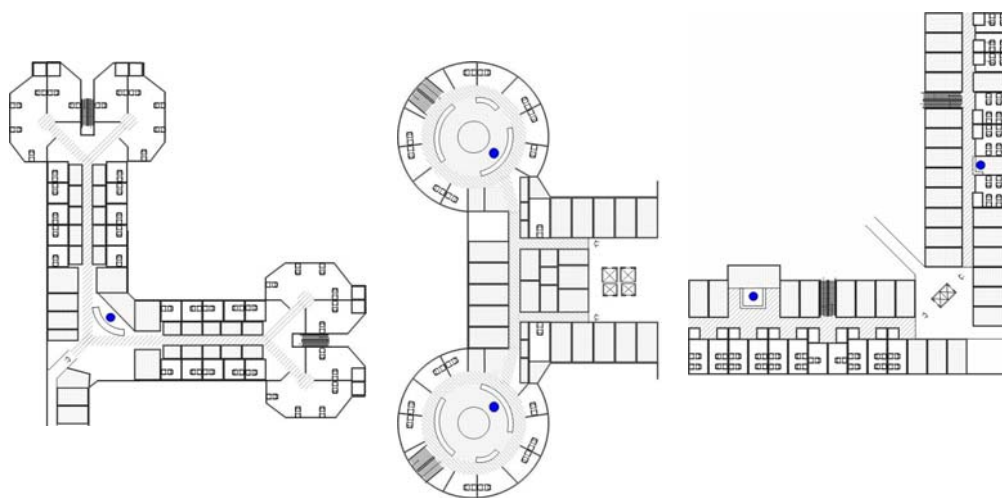
Planning Inpatients Wards

5 Ward design has been subject to many changes over the past 50 years or so in both layout and size. The introduction of controlled mechanical ventilation systems into hospitals had prompted hospital planners to move away from the long and narrow “Nightingale Ward” – see below – whose shape and layout was specifically adopted by the founder of modern nursing Florence Nightingale



to induce natural cross-ventilation. Increasing patients’ expectations (e.g. need for visual and audio privacy) have more recently prompted for private and semiprivate patient rooms and away from the larger capacity rooms (12-bed, 8-bed, 6-bed, and 4-bed rooms). In the USA, single private rooms are now mandatory for all new construction.

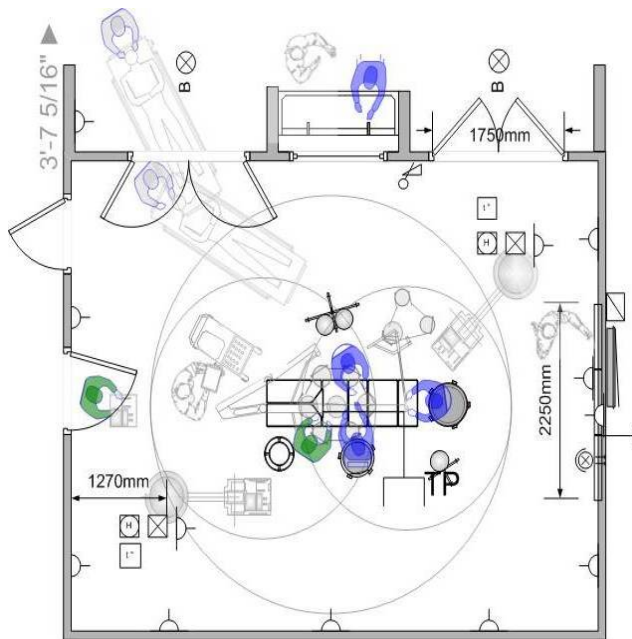
In this section of the course, participants will be introduced to the many options and alternatives in the layout of inpatients wards. The basics of ward configuration including parameters such as the number of beds per ward, nurse walking distance, patient room layout and options, will be discussed amongst other points.



6 Planning Outpatients Clinics

Outpatients Areas are the busiest of hospital areas. The principles and design concepts to streamline the patient traffic in the outpatients department will be examined with exemplary layout.

7 Planning The Operating Department



Perhaps of all other departments in the hospital, the surgical suite has been the most department studied and researched over the past 50 years or more. Many different options of the surgical suite layout have been proposed and used. The primary design criteria was to segregate the soiled from sterile traffic.

In this section, the different options of surgical suite design layouts will be examined and compared. Examples from American and European hospitals will be illustrated.

Planning the Delivery

8 Department

The objective in planning the delivery suite is to recognize functional requirements with pleasant healing environments. Concepts from modern birthing centers in Europe and USA will be illustrated.

If any one department should be taken out of the hospital, it will most likely be the "Delivery Suite", reason being that it is a place for family to rejoice the newborns and not to recover from illness. The architect should design this department as homely as possible, without compromising clinical needs.

Planning

Other Hospital Departments

9 In subsequent sections, the planning and design principles of other principal department in the hospital will be examined, including:

- **Emergency Department**
- **Radiology Department**
- **Endoscopy Unit**
- **CSSD**
- **Pharmacy**

10

Current Concepts in Hospital Planning

Healthcare organization, medical and pharmaceutical advances, and medical technology developments and patient expectations are continuously changing at a fast pace. The implications of these changes on the planning and design of healthcare facilities are direct and evident and the design response to them manifests itself in emerging planning concepts and ideas. In this section, some of these concepts will be examined and discussed:

- **Healing healthcare environments**
- **Patient focused design**
- **Patient hotels**
- **The universal patient rooms**
- **The digital hospital**

Impact of Medical Technology on Hospital Planning and Design

11 Advances in medical technology are very fast paced. Their implications and impact on the design of hospital facilities will be discussed in this section. Technologies including digital radiology, endoscopic surgery, surgical robots among other advances will be examined and their impact on the hospital layout illustrated by recently built exams.