

**University of Salahaddin  
College of Engineering  
Department of Architecture**



# **General Comments about Hospital**

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2022-2023**

# General Comments



## General comments

Nowadays a shift can be seen towards hierarchic increasing humanization of the facilities.

Modern hospitals tend to be rather like hotels in nature.



The length of patients stay is getting progressively shorter, and there is a growing preference for rooms with one or two beds (particularly for private patients).



# General Comments

## Hospital types

Hospitals are divided by function into:-

- General, Specialist and university hospitals.
- Specialist hospitals are growing fast because of the increasing focus on individual types of treatment or medical fields.
- University hospitals with maximum provision are to be considered equal to the medical Academies (research and teaching) and some large general hospitals.



Hôpital Riviera-Chablais

Genève, Switzerland

Architect:

Sheppard (David Sheppard),  
JJB Architects  
(London, UK)



Cancer Centre at Guy's

Architect:

Sheppard (David Sheppard),  
JJB Architects  
(London, UK)

London, UK



Center for Surgical Medicine, University Hospital Düsseldorf

Düsseldorf, Germany

Architect:

Behnisch, Welter and Partner

Client:

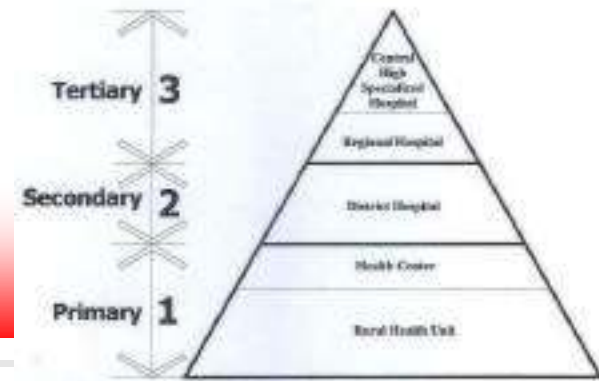
University Hospital Düsseldorf

Completion:

2011

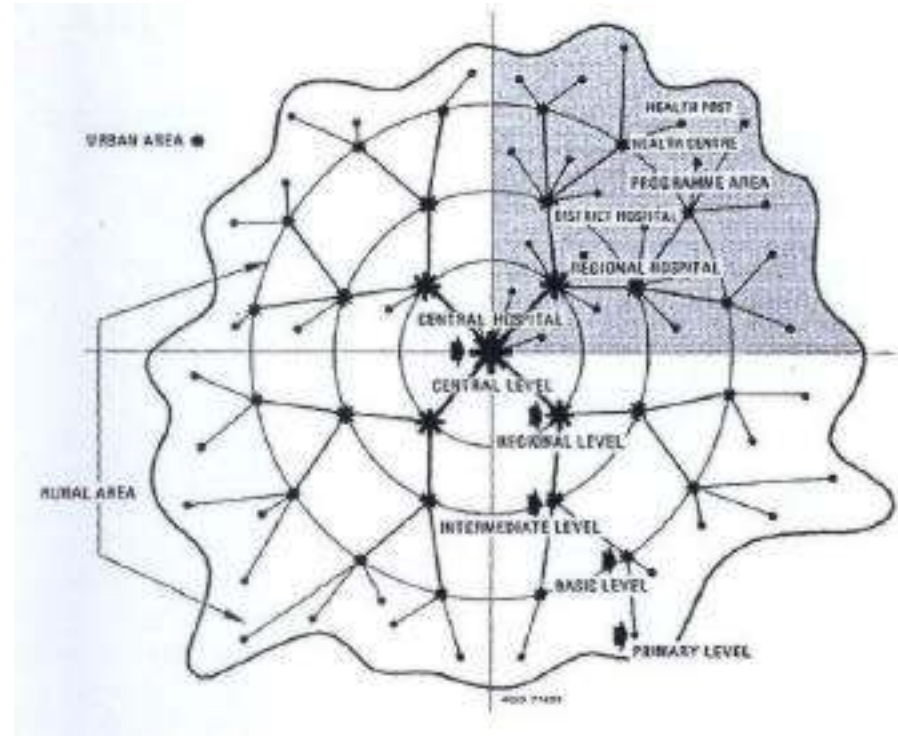


# General Comments



## First Classification

## Second Classification



Pyramid Hierarchic For Health Care Buildings according to Health Care Levels

# General Comments



Milstein  
Family Heart Center  
New York-Presbyterian  
Hospital  
New York, New York, USA

Address	46 York Road & E 68th Street at 21st Avenue
Class	Medical-Professional Hospital
Completion	2010
Floor area	1,000,000 sq ft (92,901 sq m)
Capacity	100 beds (100 beds) (100 beds)

## 1. Hospitals may be subdivided into the following categories:

- a) smallest (up to 50 beds),
- b) small (up to 150 beds),
- c) standard (up to 600 bed)
- d) and large hospitals (up to 1000 bed).



St. Olav's Hospital

Trondheim, Norway

Address	St. Olavs Hospital N-7000 Trondheim
Class	Medical-Professional Hospital
Completion	2010
Floor area	1,000,000 sq ft (92,901 sq m)
Capacity	100 beds



Trondheim, Norway

Extension Kolding  
Hospital

Kolding, Denmark



Address	St. Olavs Hospital N-7000 Trondheim
Class	Medical-Professional Hospital
Completion	2010
Floor area	1,000,000 sq ft (92,901 sq m)
Capacity	100 beds



Trondheim, Norway

Zinn Medical  
Centrum

Trondheim, Norway

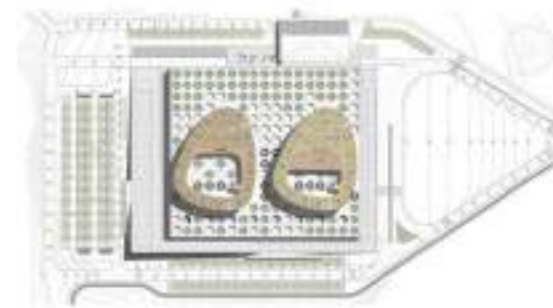


Address	St. Olavs Hospital N-7000 Trondheim
Class	Medical-Professional Hospital
Completion	2010
Floor area	1,000,000 sq ft (92,901 sq m)
Capacity	100 beds

# General Comments

## 2. According to the size of the medical specialists:

- a) Specialist hospital; pediatric hospital, eye hospital.. etc.
- b) General hospital; all medical specialists are provided.



Theater floor plan

Theater floor plan



Juliana  
Children's Hospital  
The Hague, the Netherlands

Architect

NVSA Architects as part of  
the 'VolkerWessels/Agis  
winning team



Rey Juan Carlos Hospital (2008) designed with the general  
layouts (Access to emergency Department)



Rey Juan Carlos  
Hospital  
Madrid, Spain

Architect

Julian de La Vega

Client

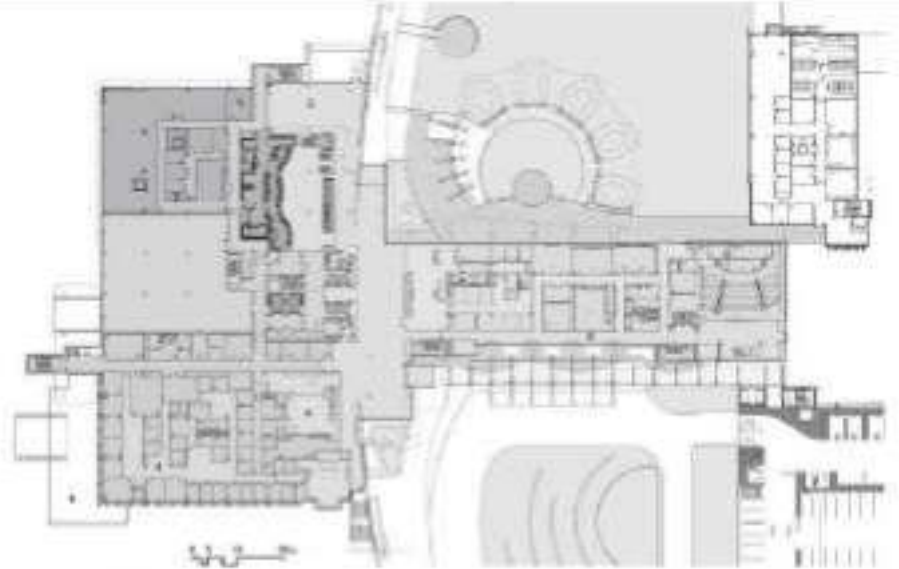
City of Madrid  
Public Health Service



# General Comm



- Ground floor plan
- 1 Library
  - 2 Dining
  - 3 Adult ward bed
  - 4 Patient space
  - 5 Roof
  - 6 Learning center
  - 7 Data center



Nemours  
Children's Hospital

Orlando, Florida, USA

Architect

Building Designer & Interior Architect

2008 - 2011

(www.nemourschildrens.org)

# General Comments

## 3. According to the owners of the hospital:

- a) Private hospitals.
- b) Public hospitals; university hospitals,...



Site plan



East elevation



Cross section showing courtyard and covered walkway



Akershus University Hospital  
Oslo, Norway

Architect

© © Studio Architecture



Private Hospital  
Villeneuve d'Ascq

Architect

Jean-François Poiroux  
Architects

Lille France



# Hospital Future Expansion

It takes 8-10 years for a hospital construction Project to move from initial planning discussions to commissioning.

Hospitals are often build in several phases or are added in stages to existing hospitals. Therefore, the design(circulation system, floor levels) and construction must be such as to allow a variety of expansion possibilities.

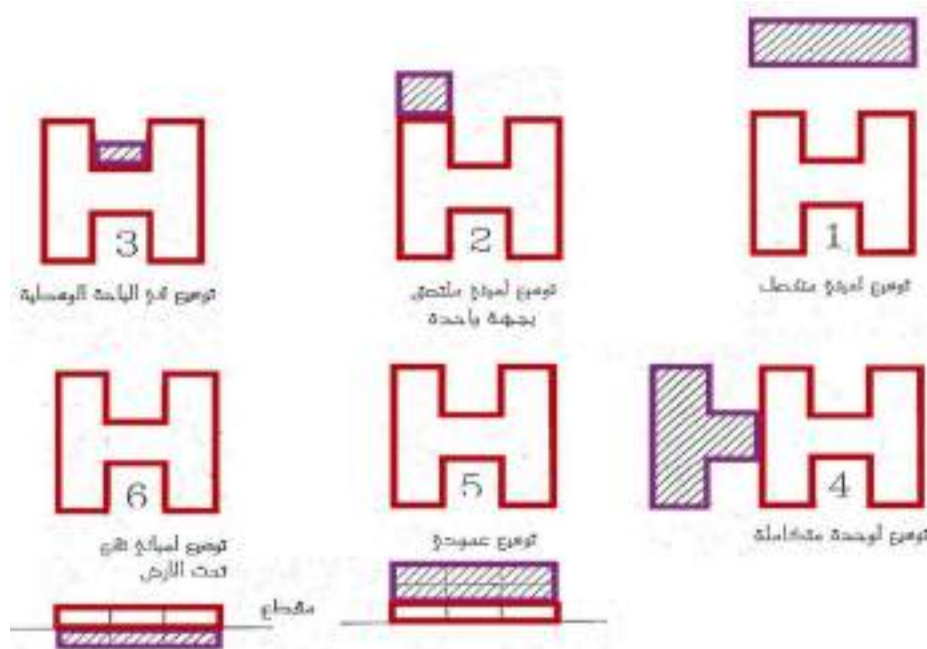
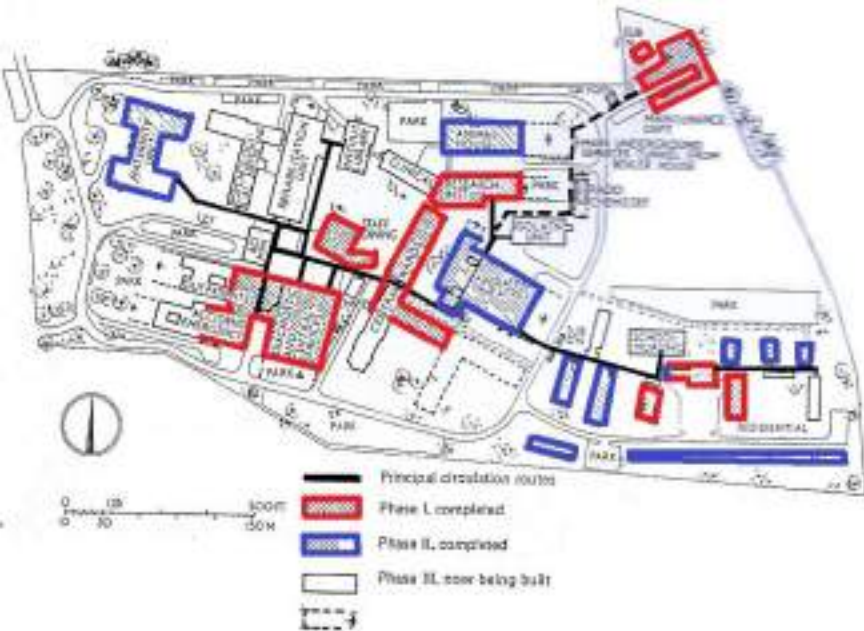


The hospital's modern wing (left) is only one of the many new buildings with connecting bridges

Meander Medisch Centrum

Kampong van Oudekerke

Address	Akron 1017, 3813 AC, Groningen
Class	Meander Medisch Centrum
Completion	2011
Floor area	1,000,000 m <sup>2</sup>
Capacity	1,000 beds



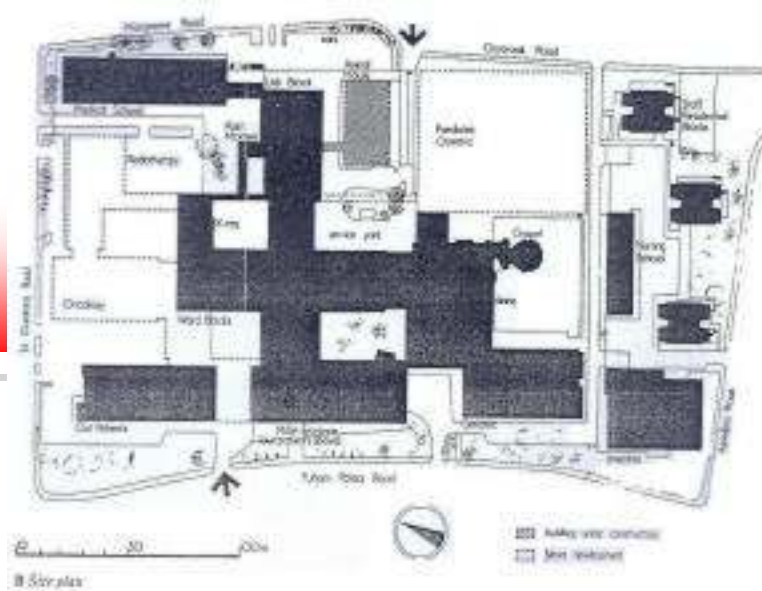
# General Comments

## Planning Conception

**Location:** The site should offer sufficient space for self-contained residential areas and hospital departments.

It should be a quiet location with no possibility of future intrusive development not excluded by regulations on adjacent sites.

No loss of amenity should result from fog, wind, dust, smoke, or insects. The land must not be contaminated and adequate open areas for later expansion must also be planned.



Project: View of building at night (overlooking) | The main entrance (Downtown street)



Interior view with view of the surrounding city (viewed from the building) | Glass-walled corridor with panoramic view of the main square



# General Comments

## Planning Conception

**Orientation:** The most suitable orientation for treatment and operating rooms is between north-west and north-east.

For nursing ward facades, south to south-east is favorable:

The orientation of wards in hospitals with a short average stay is not so important.

Some specialist disciplines might require rooms on the north side so that patients are not subjected to direct sunlight.



Glassed connecting bridge to the existing buildings |  
Main entrance with pedestrian stairs to the new  
building | Building has large test rooms with total view  
and large windows | Operating room with daylight



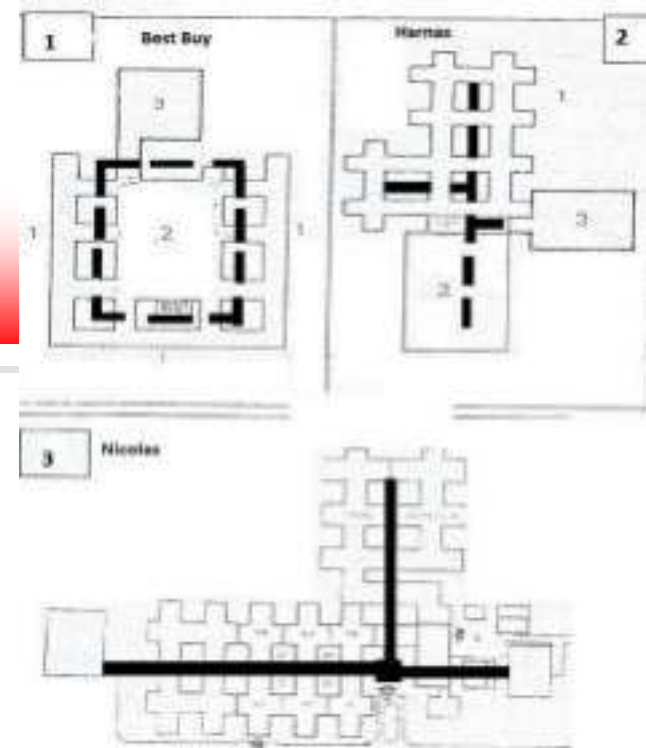
# General Comments

## Planning Conception

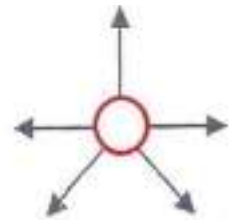
The form of a building is strongly influenced by the choice of access and circulation routes. It is therefore necessary to decide early on whether to choose a spine form with branching sections (individual departments), or whether circulation will be radial outwards from a central core.

Consideration must be given to future expansion.

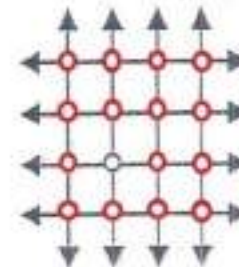
The vertical arrangement within a hospital should be designed so that the functional areas care, treatment, supply and disposal, access for bedridden patients, service yard, underground garage, stores, administration, medical services can be connected and accessed most efficiently.



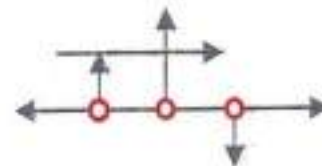
Linear



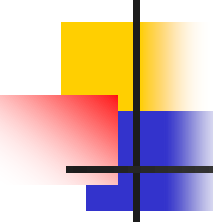
Radial



Grid



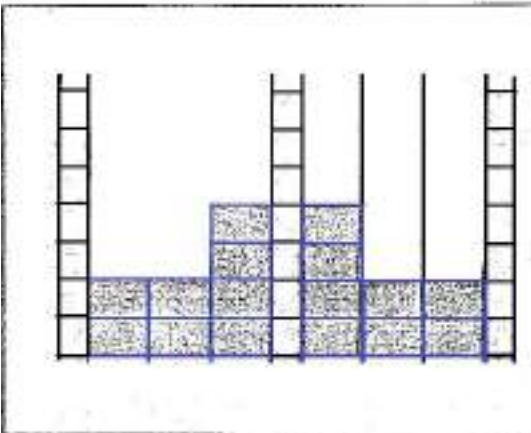
Tree - Shaped



	240	360	480	600
240	5.76	8.64	11.52	14.40
360	8.64	12.96	17.28	21.60
480	11.52	17.28	23.04	28.80
600	14.40	21.60	28.80	36.00

## Structural grid

The various operations centers can be planned most appropriately with a column grid spacing of 7.20m or 7.80m.



## Dimensional Coordination

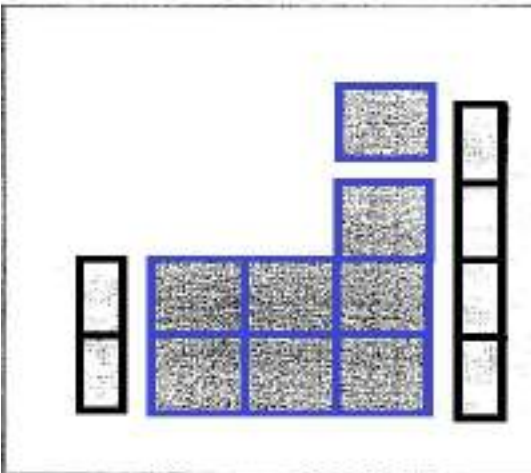
**Modules:** Modular dimensional coordination is the best starting point for meeting strategic design requirements.

For hospital construction the preferred module dimensions 12M= 1.20m are recommended, or 6M or 3M if the increments are too numerous.

In this system all the building components are coordinated with each other.

The supporting structure can be drawn in by producing a horizontal and vertical basic grid.

The benefits of dimensional coordination are shorter construction periods and easier replacement of interior fittings, with less disruption of service.

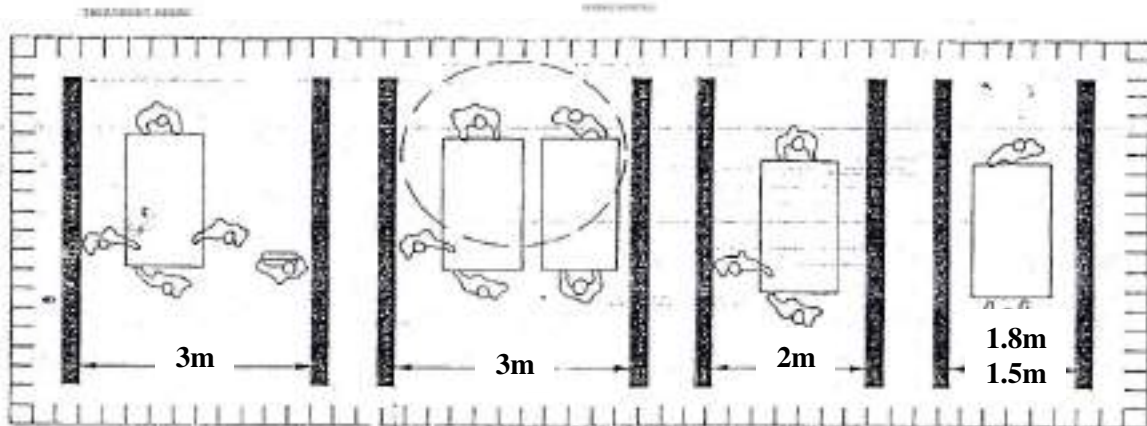


# Corridors

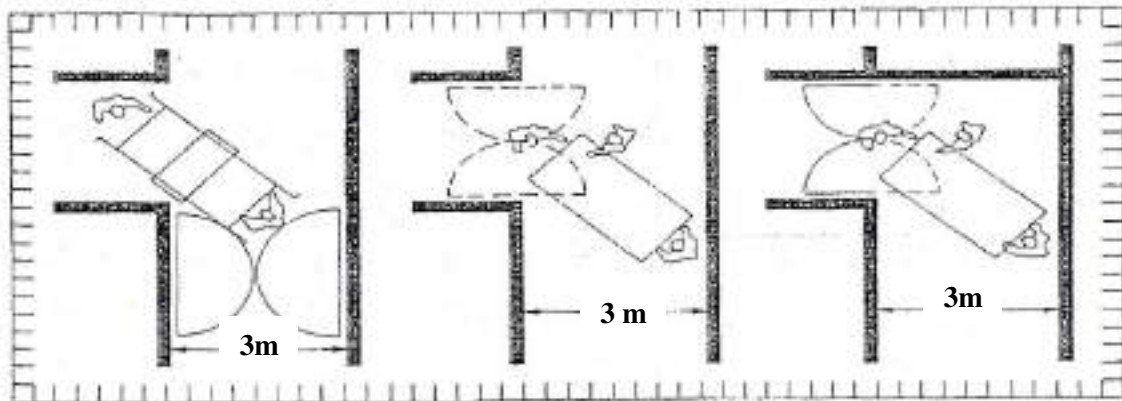
## Corridors

Corridors must be designed for the maximum expected circulation flow. Generally, access corridors must be at least 1.50m wide.

Corridors in which patients will be transported on trolleys should have a minimum effective width of 3.0 m. The suspended ceiling in corridors may be installed up to 2.40 m.



Los Arcos del Mar Menor University Hospital, Murcia, Spain, Casa Solo Arquitectos, 2011. Corridor in the operating department

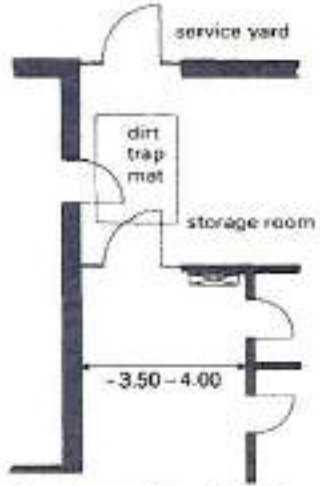




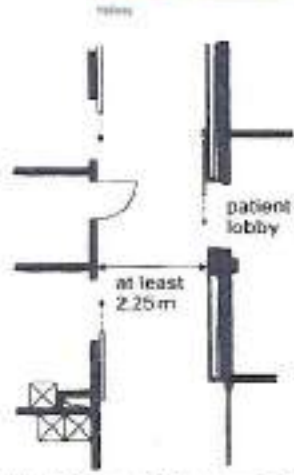
# Corridors



Alameda (Grovecrest Hospital), Ohio, 2008  
 © E. Miller Architects, 2008. An infection  
 -resisting workday provides privacy



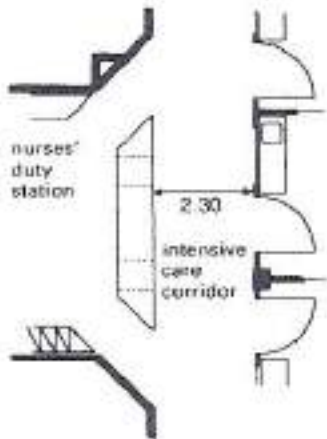
④ Service corridor, deliveries, storage area



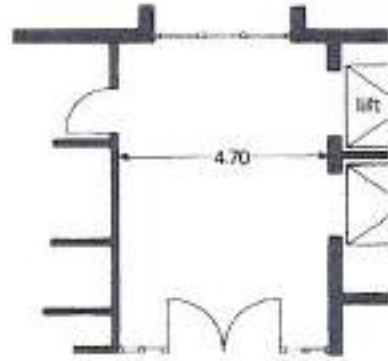
⑤ Working corridor, surgical area



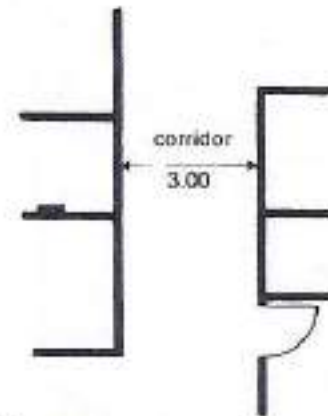
① Ward corridor/nursing area



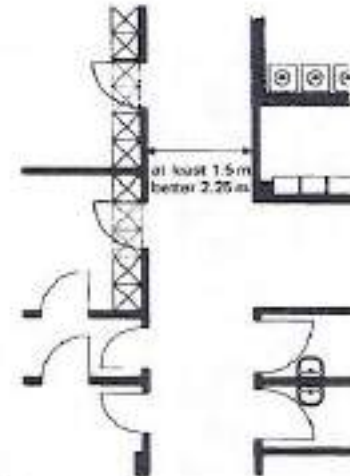
⑥ Ward corridor, intensive care



⑦ Lift lobby



② Main corridor (spine)



③ Medical services corridor

# Corridors



Beignoni-Itak | Glass panels with artwork in the corridor | View of corridor | A mix of materials creates the flow



Beignoni-Itak | The lobby | View of atrium area | View of lobby area with reception desk and seating area | Day by Day





# Corridors-Waiting Area

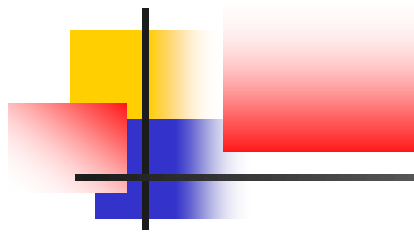


KEMPEL HOSPITAL



Daylit hall with staircase | View of the building across the hospital garden | Generous circulation spaces connect the floors | Waiting areas.





Akademicki Szpital Kliniczny, Wrocław, Poland.  
Designer Jarek Kowalowyk, Studio Fuente,  
conceived a combination of consistent signage  
systems, nameplates, a colored floorplan and  
pictograms.





Cleveland Clinic  
Abu Dhabi

Abu Dhabi, United Arab Emirates

Address: 118



Center for Surgical  
Medicine, University  
Hospital Düsseldorf

Düsseldorf, Germany

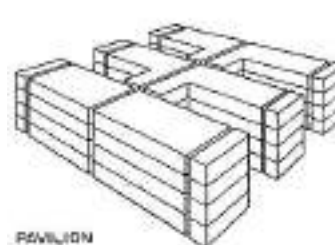
Architect	Herrn & Partner Architects
Client	University Hospital Düsseldorf
Completion	2015
Plot area	10,000 m <sup>2</sup>
Volume	100,000 m <sup>3</sup>

Hôpital Rivière  
Chablais

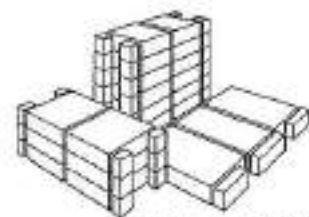
Geneva, Switzerland

Address:

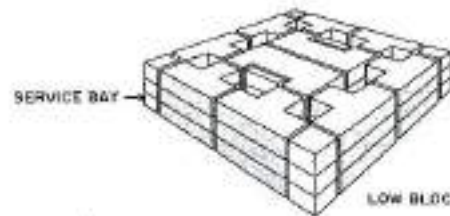
Project: Geneva University  
CHU de Genève  
Espace Chablais



REVLION



ARTICULATED TOWER

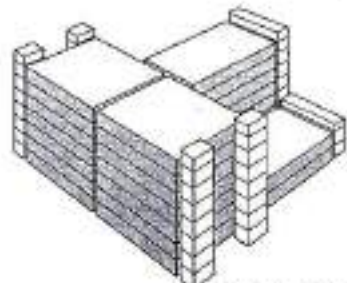


SERVICE BAY

LOW BLOCK



HIGH BLOCK



TOWER ON BASE



Project: Extensive Röding Hospital

Extensive Röding  
Hospital

Wolfsburg, Germany



Address:	Wolfsburg, Germany
Client:	Extensive Röding Hospital
Completion:	2015
Plot area:	10,000 m <sup>2</sup>
Volume:	100,000 m <sup>3</sup>



Cancer Centre  
at Guy's

London, UK

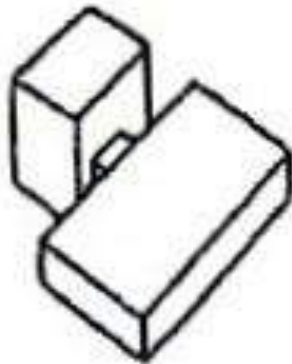


Address: Guy's and St Thomas' NHS Foundation Trust

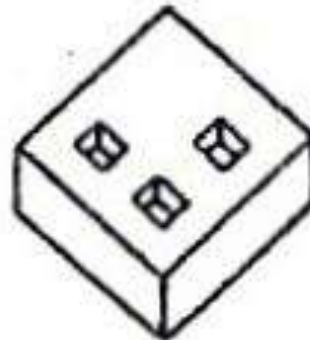
# Hospital Forms



1 Tower on base



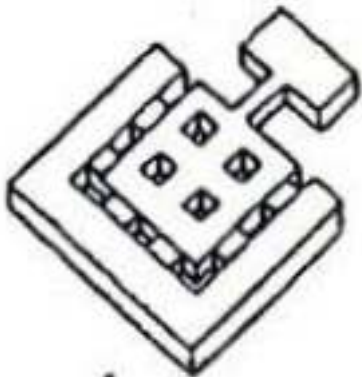
2 Horizontal + tower



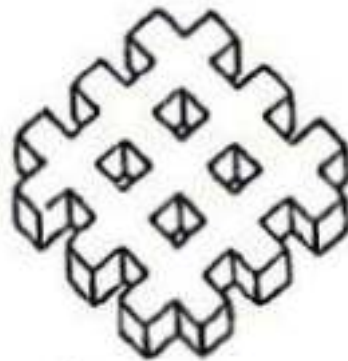
3 (Low block) Complex



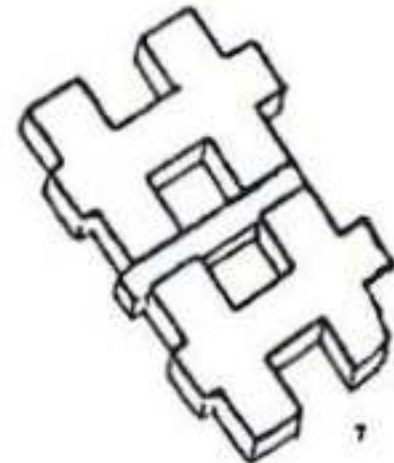
Tower as T shape



(Low block) with wings



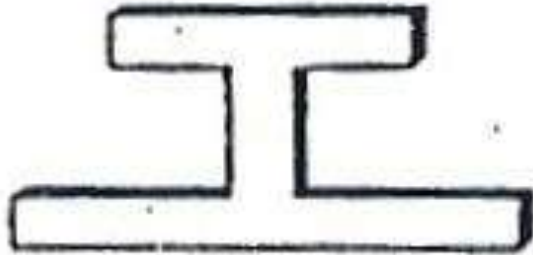
(Low block) Cells



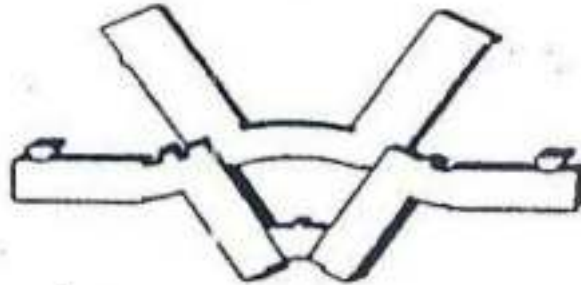
(Low block) Repetition as H shape



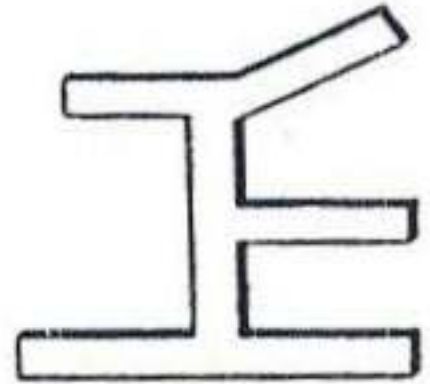
# Hospital Shape



مستطبی علی شکل II



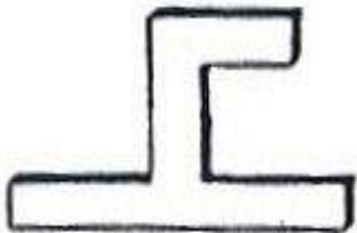
مستطبی علی شکل حرف V منفرع  
(نموج لمستطبی فی کوبنهاکن)



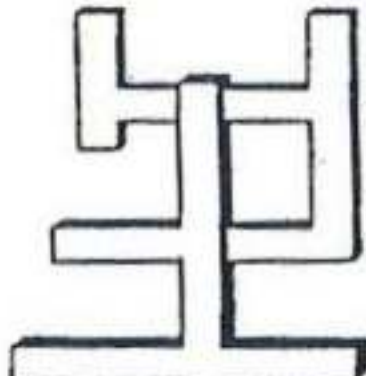
مستطبی علی شکل منفرع



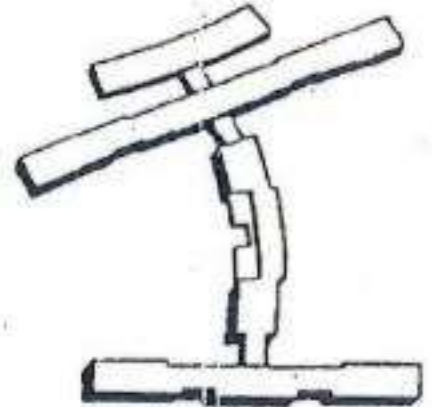
مستطبی علی شکل T



مستطبی علی شکل T معکوف

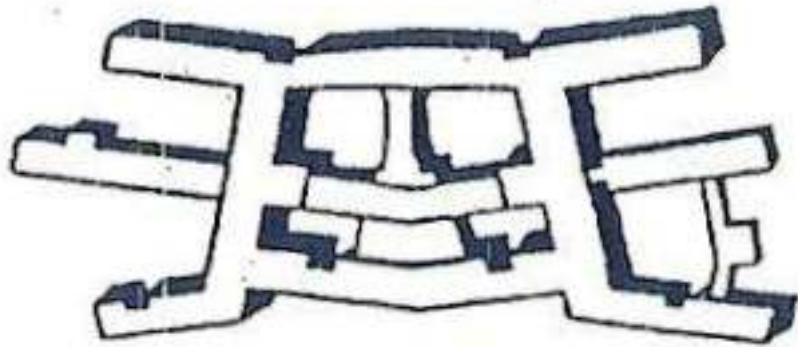


مستطبی علی شکل منفرع ومرتبط النهایات

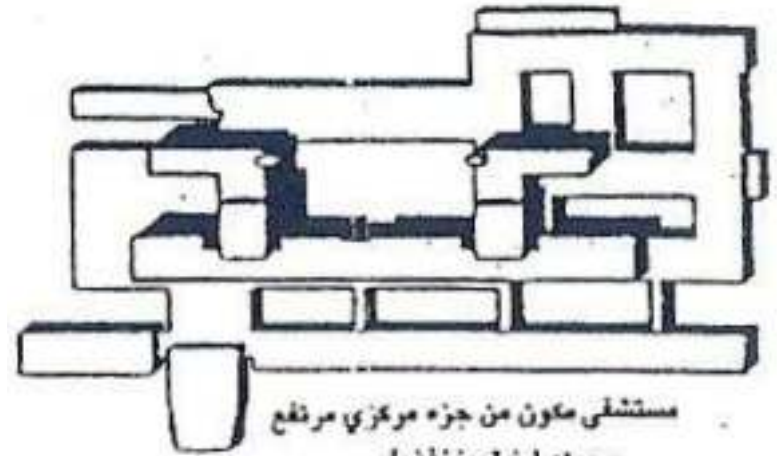


مستطبی علی شکل II مع انحناء وسطی  
(مستطبی فی روما)

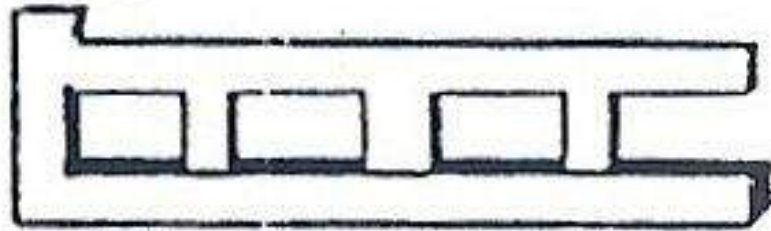
# Hospital Shape



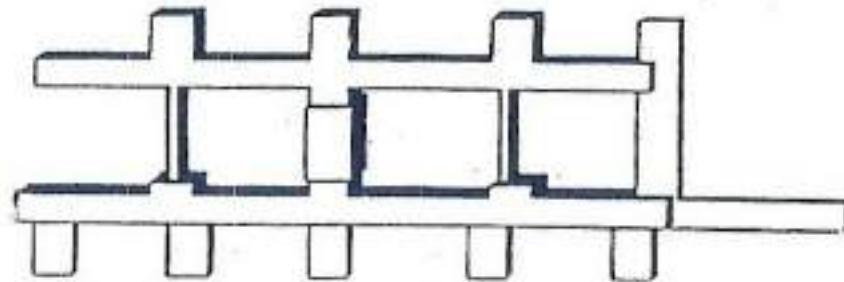
مستشفى على شكل غير منتظم



مستشفى مكون من جزء مركزي مرتفع  
وحوله ابنية منخفضة



مستشفى على شكل جناحين متوازيين مع اتصال عرضي

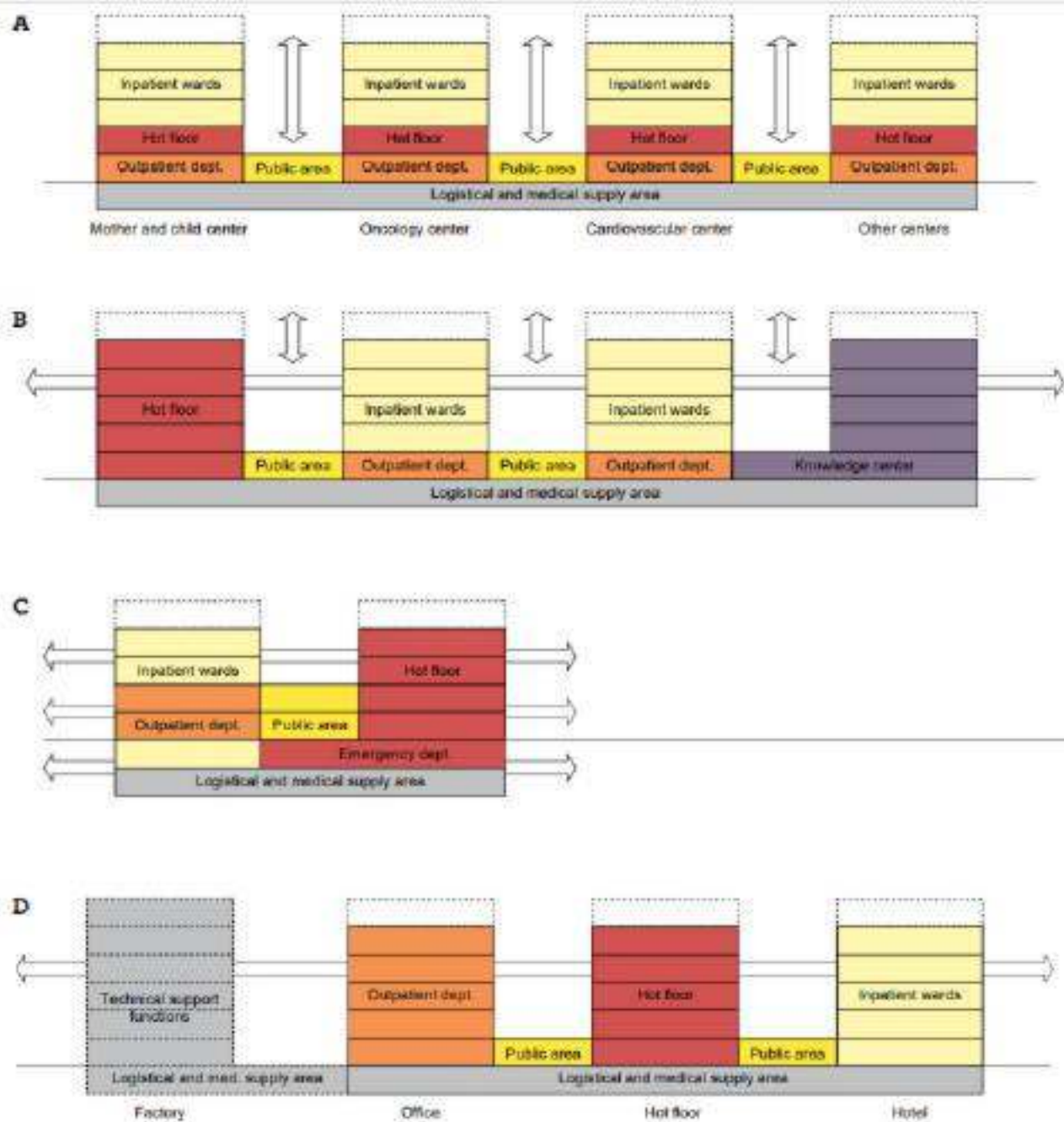


مستشفى على شكل مربعات متراصة (مستشفى في استوكهولم)

Overview of functional zones within the hospital and possible design approaches

<p><b>Public area</b></p> <ol style="list-style-type: none"> <li>1 Entrance</li> <li>2 Reception/admission</li> <li>3 Waiting areas</li> </ol>	<p><i>Customer-oriented Shopping mall design</i></p>	<p><b>Logistical and medical supply areas</b></p> <ol style="list-style-type: none"> <li>1 Medical: <ul style="list-style-type: none"> <li>- Pharmacy</li> <li>- Off-site laboratories</li> <li>- Instrument sterilization</li> </ul> </li> <li>2 Non-medical: <ul style="list-style-type: none"> <li>- Food, linen, disposables</li> <li>- Housekeeping, cleaning</li> <li>- Waste disposal</li> <li>- Equipment maintenance</li> <li>- Building maintenance</li> </ul> </li> </ol>	<p><i>Process-oriented Factory design</i></p>
<p><b>Outpatient department</b></p> <ol style="list-style-type: none"> <li>1 Outpatient consultation and treatment</li> <li>2 Pre-operative screening</li> <li>3 Dialysis</li> </ol>	<p><i>Customer-oriented Shopping mall design</i></p>		<p><i>Process-oriented Warehouse design</i></p>
<p><b>Hot floor with advanced diagnostic and treatment facilities</b></p> <ol style="list-style-type: none"> <li>1 Diagnostics: <ul style="list-style-type: none"> <li>- Radiology</li> <li>- Nuclear imaging</li> <li>- Functional assessment</li> <li>- On-site laboratories and front offices (sample collection)</li> </ul> </li> </ol>	<p><i>Process-oriented Factory/high-tech design</i></p>	<ol style="list-style-type: none"> <li>3 Office facilities: <ul style="list-style-type: none"> <li>- Workspaces</li> <li>- Meeting rooms and conference facilities</li> <li>- Education facilities</li> </ul> </li> <li>4 Staff facilities: <ul style="list-style-type: none"> <li>- Changing areas</li> <li>- Relaxation areas</li> <li>- Overnight stay</li> </ul> </li> </ol>	<p><i>Customer-oriented Office design</i></p>
<ol style="list-style-type: none"> <li>2 Endoscopy</li> <li>3 Emergency department</li> <li>4 Operating rooms</li> <li>5 Delivery rooms</li> <li>6 Cardiac diagnosis and intervention</li> <li>7 Radiological diagnosis and intervention</li> <li>8 Radiotherapy</li> </ol>	<p><i>Outcome-oriented Factory/high-tech design</i></p>		<p><i>Customer-oriented Hotel design</i></p>
<p><b>Inpatient department</b></p> <ol style="list-style-type: none"> <li>1 Admission, discharge, transfer</li> <li>2 Day treatment</li> <li>3 Standard nursing wards</li> </ol>	<p><i>Customer-oriented Hotel design</i></p>		
<ol style="list-style-type: none"> <li>4 Specific recovery wards: <ul style="list-style-type: none"> <li>- ICU/MCU</li> <li>- CCU</li> <li>- Neonatology</li> <li>- Pediatrics</li> <li>- Psychiatry</li> </ul> </li> </ol>	<p><i>Customer-oriented Hotel design</i></p>		





## Typical hospital configurations

**A** The theme model divides an often large-scale complex into subdivisions for specific medical conditions or patient groups.

**B** The center model is organized around multidisciplinary medical processes, with strict separation of patient and staff traffic flows.

**C** The three-flow model differentiates between acute patients, outpatients and inpatients; the focus is on patient traffic flows.

**D** The typological model distinguishes four types of spaces: the 'factory' housing technical functions, the office, the hot floor (treatment areas) and the 'hotel' (patient ward).