The Architecture of Hospitals
BUILDING HOSPITALS
— HOSPITAL BUILDINGS
Markus Schaefer

Context
In a culture, specifically a building culture, where every detail is regulated, defined by specialist planners and scientifically assessed, hospital buildings are the most scrutinized of all. Yet, in spite of all the good intentions, money and energy spent, more often than not the result is not better buildings, but complex, labyrinthine islands in the city, their architectural form as inscrutable as the process that led to it. The innate inclination to technological and managerial solutions is exacerbated by the complexity of decision making in an institution where government, management, doctors, nurses and increasingly patients struggle for influence.

Yet this paradigm is changing: health is not anymore just a risk to be covered, but — with ‘wellness’ — a commodity to be consumed. Individualism, alternative medicine and sustainability, but also high technology, specialization and privatization, are changing the context.

Against this background and on the occasion of an International conference initiated by the University Hospital of Groningen, the Berlage Institute, Postgraduate Laboratory for Architecture, was invited to look for new possibilities for hospital design. The studio had the additional agenda to explore trans-disciplinary ways of working and to determine what role the architect could play when confronted with the hospital as an institution. How could he communicate with an institutional client with a complex and fragmented decision process? What is the unique knowledge and approach an architect can bring to a team of planners, many of them highly specialized and knowledgeable? What are openings for innovation?

A look at history
The timeline of hospital typologies shows how hospital buildings have always reflected the medical and institutional practices that evolved over time, in the push and pull between architectural clarity and institutional needs, two periods can be highlighted during which architects were able to produce buildings where concept, the medical practice of the times and architectural form were most aligned.

The first of these periods was the Enlightenment. Architecture at the time was a tool for bringing about the rational society that the contemporary thinkers advocated, founded on the principles of nature, science and equality. The idea of typology emerged. Typologies are primary architectural principles that give particular functions a particular organization and form. They are to architecture what Linne’s species are to biology. At a time when the medical profession was not yet established as an academic discipline, the first hospitals were conceived of as healing buildings. Clearly structured with access to fresh air and greenery, they exemplified the belief in the healing powers of rationality and nature.

The second peak of architectural involvement was modernity. Modern architecture had an instrumental role in building up the modern welfare state. A social agenda coincided with new methods of building and large amounts of new construction. The belief in technology and organization, social concerns and new building construction methods resulted in healing machines with a modular layout and the clear separation of functions.

Yet with the increasing size of hospitals, the complexity of planning and decision processes and of structures and technologies that needed to be accommodated, hospitals lost their clarity of form. They turned into complex conglomerates of parts, often a wild mix of buildings and infrastructures from different times where new organizational principles had to be found, ranging from internal streets as in shopping malls, to abstract grids, to a bewildering array of way finding solutions and numbering methods.

The healing building stripped the patient of her privacy and individuality, the healing machine of her body. Now she got stripped also of her spatial frame of reference, of place.

Current situation
At the moment, all great institutions of modernity are being questioned, first of all the modern welfare state. It was a successful instrument to deal with the difficulties of the social changes prompted by industrialization, and allowed for the change from a society that was organized in local networks, to one organized in large systems and institutions managed by the public hand, like social security, education or public health. Yet, as the instrument was created to deal with the effects of growth, it was also built on the expectation of growth, an attitude that increasingly turned into a liability. On the other hand, fixated on mass and standardized quality the welfare state did not anticipate the effects of individualization and consumer culture and the degree to which individuals are eager to consume specialized services.

A series of tendencies are part of this overall change. The scrutiny of the welfare state is accompanied by privatization. Individualization, lifestyle and wellness result in heterogeneous patient segments. The medico-technological complex still plays a large role with technology, information and virtuality, while in architecture the issue of urban context and representation is discussed again.
Hospitals are currently subjected to two divergent movements. On the one hand, the centralization and intensification of hospitals continues. On the other hand, privatization and individualism create a trend to specialization and fragmentation. Successful solutions seem to be a new combination of both trends or exemplary solutions for each.

What can architecture contribute?
The discipline of architecture is in a difficult position. While architects gained visibility in the process of architecture becoming a medium and architects worldwide (especially in the home countries of some of the students in the team) working on projects of an unprecedented scale and with an unprecedented effect on the built environment, the discipline of architecture provides few certainties or shared values. The drive for individual expression of the architect in one segment and mindless mass-production in the other make it often difficult to see it as a coherent and historically anchored discipline.

During Modernity, architecture was a clearly defined medium. It had content (progress and universalism), a broadcaster (the public and the supporting power structures of architects from CIAM, universities and professional associations) and an audience (the public). Now the medium is formless and diverse, the professional group fragmented in particular Interests and personal biographies, the audience unclear and the ideology increased replacing by commercial interests or brand identities. Architects are like loyal employees of a public TV station, that happened to become deregulated, who still dream nostalgically of public TV and its clear ideological message.

From typology to performative typology
One approach to the current situation marooned between stylistic competition and the phantom pain of the lost public sphere might be to return to a core competence of architects, the typology. Typology is a recurrent theme in architecture since the Enlightenment. In a text in the magazine *Oppositions*, Anthony Vidler described three different recurrences of typology. We are postulating a fourth.

The first one was developed together with architecture’s formation as an academic discipline during the Enlightenment. It was initially formulated by Abbé Laugier and proposed that the origin of architecture was to be found in the model of the primitive hut. This view found its culmination in the canon of typologies developed by Durand in his *Lessons at the École*. The second understanding arose of architecture confronted with mass production. Most clearly stated by Le Corbusier, it proposed that architectural design should be founded in the production process itself and in this way correspond to the new spirit of the times. Aldo Rossi exemplified the third one. He and the New Rationalists contended that architecture is an autonomous language that has a collective memory of forms, which they saw embedded and exemplified in the built city. With this idea, widely discussed in the pages of *Oppositions* of the 70’s, they stood in opposition to the Neo-realists, like Venturi and later Koolhaas, who preferred architecture to be contemporary rather than ideal.

We believe that typologies in order to remain relevant and avoid being nostalgic and easily consumable flashbacks on better times should not be based on form alone, but include performance, even business models. The traditional concept of typology was questioned by technical progress in the coordination and connection of space, its production and maintenance. Artificial light and air conditioning rendered contact with the exterior obsolete. Elevators and escalators allowed for a stacking of discontinuous spaces. Information technology and media allowed for continuous workflows and experiences without spatial proximity, while Muzak, artificial nature, scenography and all that became known as ‘experience’ created a new type of continuity. Digital technologies – as they provide an alternative to spatial continuity, media – as they affect meaning and issues of the collective, and branding as it affects representation, have fundamentally changed the way we understand and use space and the way the production of space is affecting the city.

In the studio we looked at typology as architectural organizations, much like the body plans of animal species that evolve over time, adapt to new conditions and interbreed occasionally. Each typology brings in its history and built-in intelligence. We were interested to work with these typologies as with found pieces of DNA, a gene pool with inherent complexity and fitness. We called this understanding of typology ‘performative typology’.

Performative typologies would evolve, interbreed and span a new spectrum of scales and dimensions, but always define and organize space. A provisional categorization could be Landscape – Architecture – Conglomerates – Networks – Information.

In rethinking hospitals, the aim was to reposition typology as a tool for the architect to participate in innovation and communication. Performative typologies as principles of organization and as metaphors for communication could be a platform to integrate planning and decision processes across different disciplines.

Process
A confrontation of typologies
The first assignment was to take an existing architectural typology, such as an airport, a greenhouse, a library or a shopping mall, and to turn it into a project for a hospital. The aim was to define, in a diagrammatic way, new potential organizations, new approaches to representation or new architectural forms, harnessing the cultural intelligence embedded in the chosen architectural typology.

What if a hospital could be organized like an airport, a large piece of infrastructure full of amenities surrounded by a choice of different specialized service providers – the airlines, in the case of the hospital potentially the technology partners? Technological obsolescence of the specialized services and the trend to increase amenities would be taken care of as well as the division into a hospital side (airside) and a side for the public (landside).

What if the hospital could be a network of small, agile stations embedded in the city, like the cybercafé Easy-Everything? Sharing logistics, brand and digital infrastructure, such a network could be a better combination of the individual and local services of house doctors and the knowledge sharing and efficiencies than a larger institution.

What if the hospital could be built as a large wellness center with a spectrum of public functions and services at its periphery such as the old Roman bath? Why do hospitals have to be segregated worlds in the city?

Analyzing the hospital interior
The second assignment was based on scenarios, documented in storyboards, with the aim to look at processes and interior spaces. The students were hospitalized for 24
hours in the University Hospital in Groningen, some as ‘patients’, others as observers.

For each station in the scenario relevant parameters were indicated that organize the spaces in flows. Examples of such parameters, not all of which needed to be binary, could have been public — clinical, naturally ventilated — air-conditioned, naturally lit — artificially lit, part of a specialized clinic — not specialized, supervised — not supervised, sterile — not sterile, patient known — patient not known, walls transparent — walls opaque, long-term — ambulatory, flexible — permanent, etc.

The difference to a functionalist flow diagram is that scenarios include parameters that go beyond function. Issues like the daily life, ritual, narration, experience, personal and cultural idiosyncrasy should have a place.

What if waiting were turned into time filled with quality in a space filled with program? What if the hospital would be in, rather than segregated from the city? What if patients had more choice in their accommodation?

The results of this assignment were presented at the conference The Architecture of Hospitals organized at the UMC in Groningen where issues of hospital architecture were discussed over the course of three days with experts from around the world.

Seven ways to reconceptualize the hospital

The final assignment was to define a project based on the first two exercises that addresses the criticism developed by the students and proposes alternatives.

We worked with the site and the program of the Erasmus Medical Center in Rotterdam that will be rebuilt in phases until 2025. The aim was less to define an architectural solution for the EMC than to test the concepts developed in the context of a real project. This exercise resulted in seven projects.

1. Free market hospital, by Yoko Sano and Chang Ho Yeo

If healthcare were going to be transformed from a public amenity into a free market dominated by commercial interests, competition would focus on those aspects customers can fully comprehend. Medical treatment being as sophisticated as it usually is, it is hardly likely that competition will concentrate on the core business of the hospital.

Instead, healthcare providers will promote the quality of stay, in other words: their hotel functions. One of the basic assumptions of the free market concept is the presentation of health insurance companies as the main players. They make separate contracts with all functional components of the traditional hospital. Ultimately, this may lead to the virtual disappearance of the traditional hospital organization, which might be replaced by health consultants who may define the best solutions for individual patients.

In this project, the new market driven healthcare system is represented by a cluster of hotels, ranging from top-level five star luxury hotels to more basic amenities. These hotels are used for hospital patients as well as for normal guests. They tower above several layers of medical facilities. Though the concept includes several luxury hotels, it derives part of its rationale from the belief that the free market may help to reduce costs — which, naturally, implies that the health market is strictly regulated. The main motive behind this concept, however, is the expectation that the market will fundamentally improve the quality of healthcare, and — being a market — will be able to satisfy the needs of the people. Deconstructing existing management structures and their bureaucracies, the market will return the hospital to the people — the essence of what in this book has been identified as the fifth revolution.

2. Medical kingdom, by Florian Heinzelmann, Jung Bim Kim and Su Kyeong Kim

The Groningen workshop made clear how much time patients spend waiting. Waiting happens at the convenience of the hospital staff usually in unappealing, even dreadful spaces. A better control and communication system, be it electronic devices or message boards, would make the physical proximity of waiting and treatment unnecessary and would allow for consolidating the waiting areas into more spacious accommodations free to be reinvented. All the small efforts lavished on waiting areas could become more generous amenities — many TVs turn into one cinema, many potted plants into one garden, many well-thumbed children’s books into one storytelling area. The typological exercise, on the other hand, focused on the theme park as a typology that has a positive attitude to technology and an ability to embed it in nature, that consists of recognizable, even iconic, rather than featureless parts, and that is organized efficiently by an underlying level of technology and infrastructure. Iconography and representation in a hospital could make orientation easier, could increase the understanding of the institution and allow for recognition. The particular site of the hospital opens up a unique opportunity to connect two parks adjacent to the site, and integrate the large waiting area or lobby as the link between the two. The shape of the new hospital is determined by a series of curvilinear, bent ‘stripes’ that connect the two parks; the main entrance is located at the intersection of the busiest traffic arteries. Added to the lobby are facilities that promote health so that the hospital is not anymore a place just for the ill. Above the lobby is a public park, below it the service level. The iconic building elements give the hospital an identity on the different levels, the lobby as well as the park.

3. Re-urbanizing the hospital, by Ross Adams, Tina Jelic and Iovine Santoyo

The evolution of hospitals is marked by different concepts of (anti-)urbanity. Whereas the hospital was seen as a particularly urban artefact in the middle ages and early modern times, the enlightenment ideally projected it in a green, park-like setting outside the city. Since the hospital has to cater for the needs of the urban population, this ideal was hardly ever realized (except, naturally, in psychiatric clinics where patients usually spent many years).

The Groningen hospital demonstrates that an urban setting is no guarantee for integration: it is surrounded by physical barriers and opens itself only from the inside; the oversized entrance hall faces the connection to the highway, not the city. The main motives to re-urbanize the hospital are that it should not only functionally integrate in the city, but also physically connect to the urban tissue. The interrelation between the building and the city is seen as a very dynamic one, resulting in a flexible hospital that benefits from the capacity of the urban morphology to accommodate change. To facilitate this interaction, the hospital is seen as a combination of three components, only one of which is specific for the hospital: whereas the office block (outpatient department), the apartment building (patient wards) are seen as generic, the medical machine (representing the treatment areas) is very specific.

Naturally, the very nature of the hospital demands that the
three components are connected. The concept of re-urbanization is a generic strategy of urban integration and functional flexibility and allows the hospital to strategically affect, even manage, its immediate surroundings.

4. Hospital skyscraper, by Minoru Amano and Yoon Kyung Bae
People who are in need of treatment in a hospital abhor the amount of time they lose when trafficking from the entrance to the department where the medical staff awaits them, or when they have to visit several departments. What sets this concept apart from earlier attempts to create high-rise hospitals is that it is completely determined by the need to reduce time loss by travelling. The tower consists of four vertical tubes that are connected by corridors. The ensuing transparent skyscraper is made even more translucent by introducing open floors, which sometimes serve as gardens. They help to overcome what has always been considered the major disadvantage of high-rise buildings: their inherent inflexibility. This skyscraper concept aspires to solve this problem internally, within the tower. Since the tower's footprint is relatively small, a considerable part of the terrain is left open for different uses, the exploitation of which may help to cover the costs for this monumental landmark, which would be by far the highest structure in the Netherlands.

5. Wellness hospital, by Xiang Qun Yan
Why separate health promotion from the medical crisis management? This, obviously, is what happened when the hospital developed into a medical institution. In ancient Rome, on the other hand, the baths of Caracalla functioned as a leisure facility for the entire city; apparently, no distinction was being made between what was medically necessary and physically pleasant, between health therapy and bodily gratification. The concept of the Spa continued this combination of leisure and health, which has always been centred on baths and pools. Concentrating exclusively on medical crisis management, the hospital has eliminated every feature that could be seen as pleasurable. As ‘Kingdom', the movie by Lars von Trier demonstrates, hospitals are easily associated with horror. The transformation of hospitals into wellness centres could help to get rid of the terrible stigma that hovers over them, and change them in temples dedicated to the cultivation of healthy minds and bodies.

6. The green hospital, by Agata Mierzwa and Dusanka Popovska
Modern hospitals are heir to a tradition that originated in the late eighteenth century. What distinguishes a hospital as modern is the way it is determined by scientific and philosophical ideas and ideals of its function, and, obviously, its roots in the enlightenment. Doctors were almost absent in the first modern hospital concepts. Their healing qualities were seen as inherent in the specific environment they offered their patients – in other words: in their hospital architecture. This concept revitalizes this very basic idea. Its cyclic nature is epitomized by the medical sciences that dominated hospital architecture from the late nineteenth century until the 1980s. By then it became clear that the high hopes invested in them in the middle of the twentieth century were being frustrated: the nuclear catastrophe in Chernobyl, demonstrated that modern society caused more problems than it could cope with, the quick spread of AIDS marked medicine’s limitation, and by

now the end of antibiotics (caused by hereditary immunity by providing them too easily) may become a real problem. Nobody knows what might happen if a more dangerous form of SARS will appear, but many experts fear that the consequences could be even worse than the havoc caused by the Spanish flu that resulted in millions of casualties in the years 1918 – 1919. Naturally, progress in medicine never stopped, and even today revolutionary innovations are not rare – gene-technology, for instance – but it has become clear that what is gained on one end is lost on the other. This awareness stimulated the rediscovery of the heating potential of the environment, and especially of nature. Attributing positive effects to nature is not new, but what was a matter of common sense and, in the age of the enlightenment, philosophy, is now scientifically underpinned by hard data collected, mainly, by environmental psychologists working in the field of Evidence Based Design. Their findings justify a shift in attention from medicine to the environment. The concept of the green hospital is the first systematic exploration of the best ways to introduce as much greenery in the hospital as possible.

7. Inside out, by Shizue Karasawa
Hospitals strip patients of their privacy and separate them from their known environment. This project investigates whether essential components of an apartment, a ‘home', can be made available in a very compressed manner. With a closet, a shelf, a table or a screen for privacy a patient can start to define a personal territory. The spatial layout of the apartment becomes a question of the ergonomics of the immediate surroundings of the hospital bed. Yet, while some people want solitude others want company. The project also offers choice in terms of the size of the rooms and the amount of social interaction desired.
ancient world
globalization

megahospitals

muffin type

matchbox type

patients tower

K type

T type

cake type

block plan hospitals

1960

MRI scan

CT scanner

plastic surgery

1970

House doctor / Gate keeper

1980

hybrid management

keyhole surgery

Dolly the sheep

1990

Computer

Measles vaccine

AIDS

Hepatitis B vaccine

Smallpox - eradication

Ebola

Vietnam War

Cultural Revolution China

Fall of the Berlin Wall

Tian 'Anme protest

Operation Desert-Storm

Monte E U
Digital media

day-case surgery

describes HIV virus

SARS

Iraq War

European Union 25
Criteria to analyse hospital typologies

- **Connection between wards and care units**
  - horizontal
  - vertical
  - combination

- **Growth/change**
  - facility floor
  - modular
  - expanded wing

- **Centralization**
  - spread
  - compact

- **Flow**
  - core
  - street

- **Shape of ward**
  - vertical box
  - horizontal box
  - ring
  - terrace

- **Flow in ward**
  - core
  - one-face corridor
  - two-face corridor
  - double corridor
Medical companies are able to plug themselves into the facility which supports the patient with efficient infrastructure.

CONVENTION CENTER

A neutral space hosts the changing treatment facilities while being represented by an iconographic building for the public.
The issue of logistics allows a flexible distribution of various programs.

The program is arranged in relation to the infrastructural hub.
Various spatial qualities which are related to the height of the building offer patients different kinds of accommodations.

The treatment facilities are separated from the wards which offer a unique character of being at home.
Vacant buildings host temporarily treatment facilities according to requirements of the city.

DOMINO'S NETWORK

Basic medical facilities are spread throughout the city to guarantee fast emergency treatment.
In a green surrounding each patient will get his individual accommodation.

Medical treatment is structured according to themes in a green environment.
The central treatment and ward areas in the healing garden are flanked by commercial facilities.

Functions are stacked due to different demands on spatial qualities.
<table>
<thead>
<tr>
<th></th>
<th>Individualization</th>
<th>Commercialization</th>
<th>Dismantling of Welfare State</th>
<th>Technology</th>
<th>Information / Virtuality</th>
<th>Logistics / Facilities</th>
<th>Urban Context</th>
<th>Representation</th>
<th>Green Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOURIST CAMP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THEME PARK</td>
<td></td>
<td></td>
<td></td>
<td>CBA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROMAN BATH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRUISE SHIP</td>
<td></td>
<td></td>
<td></td>
<td>CBA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIRPORT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAREHOUSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPARTMENT STORE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOTEL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOUSING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTERNET CAFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOMINO'S NETWORK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOCK EXCHANGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
An exchange platform for various interests in the medical sector.
How much time do you have to wait, for having the medical procedure?

**40% OF TIME IS SPENT**

**Bureaucracy interrupts the service**

**The passive waiting, attached to the service**

**The passive waiting, attached to the service**

**Daily life, gives people hope? Life is in the city**

**URBAN PROPOSAL**

**existing**

- hospital is isolated from the city.

**proposal**

- extending the existing "streets"

- hospital as a city extension

**"city" within the hospital the encapsulated "city"**

**MANAGEMENT**

- Save time
- Manage information
- Cutting costs
- Improving the quality of healthcare
- Improve patient care

**How much time do you have to wait, for having the medical procedure?**

- 10 Hours

- The fastest your service ever could be

- The fastest your service ever could be

**INTEGRA**
THE ENCAPSULATED CITY

within the hospital

Technology gives freedom to the patient.

ORGANIZATION

PATIENT BENEFITS

The reduction of unrelated hospital program adds more individualized space for patients. It rather incorporates the city into the hospital than recreating the city inside.

The CITY
WAITING FOR TREATMENT

50% of the time spent consists of waiting

**Waiting, 7 h 50 min**
**Limited activities, 6 h 40 min**

**TIME LINE**

- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24

- 15 min.
- 20 min.
- 70 min.
- 65 min.
- 195 min.
- 105 min.

**PROCEDURE**

- Emergency waiting area
- Treatment area
- X-ray waiting area
- Blood test waiting area
- Ward waiting area
- Toilet
- Ward waiting area
- Hospital TV
- California TV

**TREATMENT**

**LEVEL of EXCITEMENT**

**WAITING SPACE**

**WAITING ROOM, EMERGENCY**

**WAITING ROOM, X-RAY**

Waiting happens in terrible surroundings

---

The patients in hospitals have to act according to the hospitals' schedule. We free the patients and enable them to act according to their own wishes.

By introducing simple communication technology spatial proximity between patients and staff and finally waiting rooms would become obsolete.

---

Billboard:
- Spread throughout the Hospital
- Patient has to pay attention, no possibility for responding

---

By introducing simple communication technology spatial proximity between
Waiting is eliminated

Activities, 14 h 30 min

Treatment, 1 h

Accumulation of the atomized waiting rooms creates an exciting, diverse and generous environment.

Wrist message device:
- Patient gets message, when and where to go
- Patient confirms arranged treatment

The network of fragmented waiting rooms of each station could be re-arranged and re-densified into one single space. Instead of lots of minor efforts we could do one big effort. This space could become truly a place of activities rather than a mere space for waiting.

tients and staff and finally waiting rooms would become obsolete.
A DAY IN HOSPITAL

SCHEDULE OF HOSPITAL

E. R.
Exposed twice
There is only one emergency treatment unit at A23, so patients by ambulances and patients visiting on their own are mixed. In this case, some seriously injured patients can be seen by others including non-patients who accompany other patients.

Ceiling indicator
Emergency patients are limited by their conditions and cannot get up the bed. They are not able to practice what is going to happen next.

Bedrooms
Patients have no choice in bed locations and the patients they share the room with. Although patients are provided with a locker to store their belongings, patients still have to get of their bed to access it.

Personal space
There is not enough space and furniture for simultaneous ongoing activities. The patient has constantly to re-arrange his belongings.

Interior streets
The interior streets are the only protected space, where the patient is able to take a walk. The environment and atmosphere tends to become monotonous because of its spatial limitations.

Bedrooms II
Private activities are limited in the bedrooms. Patients are not allowed to use their own laptops.

Bedrooms III
Incidents often occur in the evening and night. Patients call the nurses to get help whether they really need it or not. The other patients could get disturbed by such calls.
SOLUTIONS

Efficient Circulation

Emergency room
Reception
Waiting room
Ambulance

New emergency routine

Intrance and exit should be widened in order to prevent seriously injured patients to be known to other people.

Shopping wall pavilion

Smooth shopping circulation make patients enjoy normal shopping.

Shop layouts should have a one route to enable patients to maneuver.

Interactive ceiling

Existing Ceiling System

Public or private...It is up to you

Private
Public
Lift

Rooms that are not occupied by patients can be used for different purposes.

The bedrooms lack sufficient private spaces for the patients. There should be a way to keep your privacy even in a 4-bed room.

The idea is to offer flexible facilities to differentiate public and private spaces on different levels.

Floor table

A centered table avoids one patient being isolated from the others.

Patients always ask roommates for help instead of calling the nurses. The idea is to enable patients to declare their states to keep their privacy.
FREE MARKET HOSPITAL

Rebuilding of the biggest hospitals in the Netherlands.

What if the insurance company organizes separate contacts for all components of the hospital?

NOW

NEW

The hospital could be the insurance company, the insurance company could be the hospital. That means the free market hospital can be started.

existing program

patient accommodation

medical care: examination

medical care: treatment

paramedical care

management and training

civil and technical services

staff supply

PM position

WBMV-functions

wished extension

Y-factors

rest

4e flow of funds

commercial functions

themes

6, faciliteten centrum

GAK of elders

A

staying

B

cure

C

studying

D

entertainment

existing program

re-organiz program

reshuffled program

addition

addition
TYPOLOGY STUDY: the terminal department store
there is competition and cooperation in the terminal department store.

What can the hospital learn from the terminal department store?

Hospitals provide infrastructure and space to the components.

2. Everything is charged separately on the basis of separate contracts with the insurance company.

3. Hospital has two kinds of employees

- directly employed
- contract worker
- private companies (temporary employment agency)

patient A

The plan for the new Erasmus MC hospital proposed to divide it into six big categories. Additionally, we re-classified it into four categories which is more suitable for our scheme.
Having a variety of privatized components, the patients could get a guide book like this. They are able to get any service they want. There is competition and cooperation between components, so they will work hard to offer better services. The hospital is interested in maximizing the patients' freedom of choice.
The hotels are connected with the care and treatment in some floors. It should connect smoothly without destroying the hotel typology. Their identities flow into each care and treatment area, and finally to be re-influenced by each to them.

The privatized service (hotel and restaurant, etc.) is not only available for patients but also for other people. Therefore are those facilities not only supported by the hospital. Moreover, the city block is redesigned, and is accessible directly from the metro. This is similar to the typology of the terminal department store.
MEDICAL KINGDOM

Waiting for treatment, Groningen workshop

Proposal

Waiting is eliminated

Generous environment

Analysis theme park

Magic Kingdom, Florida

Resulting concept

site analysis, connection museum and heuvel park

Current situation

Proposal

Museum park

Hospital

Heuvel park

Disconnected

Connected

Theater

Gallery

Shopping

Cinema

Theme analysis

Theme 1: BRAIN & SENSES

- Special or dominant program
- Psychiatric care
- Pain treatment
- Special functions
- Psychiatry

Characteristics

- Close to elderly and emergency
- Controlled enclosed
- Easy orientation

Patient

- Older, stroke, Alzheimer etc.
- Mental illness incidents

Brain & senses has a need for enclosed space

Theme 2: ONCOLOGY

- Special or dominant program
- OK therapy
- Protocols
diagnosis
- Radiotherapy

Characteristics

- New technologies
- Outpatients on chemotherapy or radiotherapy
dose to brain, senses
- Pain treatment

Patient

- Tiredness
- Need for special food
- 50% healing chance
- Close to death

Many outpatients need to be well connected

Theme 3: DEFENSE, METABOLISM, AGING

- Special or dominant program
- Geriatric
- Special care consultation
- Hemodialysis

Characteristics

- Wellness
- Greenery
- Flexibility to extend (aging population)
close to cafe, restaurant
- Easy orientation

Patient

- 50 years and older
- Interested in health program

Elderly people have a need for easy orientation
RE URBANIZING

HOSPITALS' CANCEROUS GROWTH HAS BEEN EXCLUDED FROM THE URBAN CONTE

ENLIGHTENMENT  MODERNITY  POST MODERNITY  RE URBANIZING

CAUSE: INTERNAL MARKET BASED GROWTH

NEW YORK PRESBITERIAN  LOS ANGELES  0 km  ROTTERDAM ERASMUS HOSPITAL  AZG HOSPITAL GRONINGEN

EFFECT: ARCHITECTURE SPRAWL, WALL EFFECT & INTERIOR RECREATION OF THE CIT

BENCHMARKING CONSIDERS ONLY THESE TWO FACTORS WHEN SPONSORING A HOSPITAL: 1. PATIENT LOGISTICS AND 2. HOSPITAL REPUTATION

CORPORATE SPONSOR

SIECENES

INSURANCE

AEGON

PHARMACOLOGICAL COMPANIES

THE COMPETITIVE LEVEL OF THE UNIVERSITY DETERMINES THE QUALITY OF THE DOCTORS OPERATING IN THE HOSPITAL

PERSONNEL

UNIVERSITAIR MEDICISCH CENTRUM GRONINGEN

PHARMACOLOGICAL COMPANY

NOVARTIS

WELFARE STATE

UNIVERSITAIR MEDICISCH CENTRUM GRONINGEN

PATIENT

CORPORATE SPONSORS

SIECENES

WELFARE STATE

THE STATE GIVES MONEY STRICTLY VIA THE MINISTRY OF EDUCATION

THIS MONEY IS ALSO INVOLVED IN CORPORATE DRUG DEVELOPMENT PROGRAMS

STAYING AT 70% EXERTING NEW PRESSURES VIA HIGHER RISK MANAGEMENT COSTS

FINALLY THE PHARMACEUTICAL COMPANIES WITHIN THE CLUSTER CONTRIBUTE AN ELUSIVE 5% EXTRA TO THE OVERALL BUDGET

HOSPITALS ARE COMPLICATED, BUT NO LONGER COMPLEX. TOWARDS A PLANNED SIMPLIFICATION: REURBANIZING
WHAT THE HOSPITAL DESPERATELY NEEDS IS ARCHITECTURAL SIMPLIFICATION COUPLED WITH A PROCESS OF HOSPITAL GROWTH WHICH IS COEXISTENT WITH THE CITY.

PROGRAM SIMPLIFICATION

QUALITIES ORIENTATION

BOUNCING BY PROGRAM EXTENSIONS
ARCHITECTURE STRATEGY: PATIENT LOGISTIC “QUALITY ASSURANCE” REDUCE HEAVY BURDEN OF RISK MANAGEMENT COSTS ON A HOSPITAL

BUFFER SUPPORTS THE FLUCTUATIONS OF HOSPITALS AND INTEGRATES IT WITH THE CITY.

BUFFER MODEL OF HOSPITAL DEVELOPMENT THAT CAN ALSO PROVIDE A MODE OF GROWTH THAT IS NOW INTEGRATED WITH THE CITY AS A MANNER OF REAL ESTATE MANAGEMENT THE BUFFER ENABLE EXPANSIONS AND RETRACTIONS WITH THE GENERIC TOWERS, SURROUNDING THE TECHNOLOGICAL

THEME (ACTIVE AND PASSIVE) + BUFFER FLOORS

CONNECTIONS

PROXIMITY OPTIMIZED BY BRINGING INTENSIVE PROGRAM INTO BRIDGES PROMOTING HORIZONTAL LINK
INTENSIVE CONNECTIONS SHARED BY TWO THEMES

DOUBLE FUNCTION SERVICE FLOOR
CONCENTRATES BOTH INTERNAL INFRASTRUCTURE AS WELL AS STRUCTURAL EFFORTS

THEMES ORGANIZATION

EMERGENCY AT STREET LEVEL

PATIENT LOGISTICS

EXPANSIONS INTO SURROUNDING TOWERS
HOSPITAL SKYSCRAPER

CENTRALIZATION vs DECENTRALIZATION  VERTICAL vs HORIZONTAL

In the horizontal hospital, the distance from the patient ward to the medical departments are often extremely long. Patients are going to be tired and sometimes they feel as if they were in a labyrinth.

### Distance Research

<table>
<thead>
<tr>
<th></th>
<th>Operating Theater</th>
<th>Diagnosis</th>
<th>Examination Area</th>
<th>Entrance Hall</th>
<th>Commercial Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farthest way</td>
<td>65.5</td>
<td>65.5</td>
<td>68.2</td>
<td>65.5</td>
<td>65.5</td>
</tr>
<tr>
<td>Shortest way</td>
<td>60.51</td>
<td>40.38</td>
<td>40.38</td>
<td>40.4</td>
<td>40.38</td>
</tr>
<tr>
<td>Farthest way</td>
<td>9.15 (minutes)</td>
<td>7.69</td>
<td>4.95</td>
<td>6.35</td>
<td>4.68</td>
</tr>
<tr>
<td>Shortest way</td>
<td>1</td>
<td>2.22</td>
<td>2.46</td>
<td>2.43</td>
<td>2.17</td>
</tr>
</tbody>
</table>

For the vertical hospital, it is balanced with shorter distances.

### Vertical Model

- Patient Ward (P): 52.1 m, 17 minutes
- Treatment (T): 54.2 m, 2.52 minutes

Bed: 3100
Area: 19F, Base
Floor Area: 78,206 sqm
Floors: 19F, Base
WHAT IS THE THEME?

The new building will be organized to ensure optimal functioning of the 'healthcare chain'. To this end, the medical departments have been grouped under six so-called themes. Physically, each theme will have its own facilities, but it is important to realize that the themes do not present 'small hospitals'—they merge into one another at the edges. At the heart of each theme is the 'patio': the open space where ambience and color scheme shows the theme's identity.

MODEL OF VERTICAL HOSPITAL

Most of themes are occupying 2 blocks and are distributed equally.

Fac (Facility) is divided into 2 and each is occupying 4 blocks to serve each theme efficiently.

Theme 4 (Emergency) is located at the ground floor and top floor in order to be swiftly approachable by ambulances and helicopters.

Theme 6 (ChildrenCare) occupies lower parts to reduce the stress coming from height and provide horizontal human circulation.

DEPARTMENT DISTRIBUTION

The relationship between diagnosis dept. and patient ward is very strong. In addition, in many cases, administration, treatment, and examination are neighboring each other. From this principle, we can generate 12 cases of different organizations.

LEVATOR RESEARCH

Average of interval
Time which is divided by whole number of elevator in same group in one cycle. This shows the standard of elevator service in terms of quality.

Ability of transit in 5 min
Percentage of people which all elevator in same group is able to carry within 5 minutes in peak time in a building. This shows the standard of elevator in terms of quantity.
THEME IDENTITY
Each theme has an amenity space connected by the hub station not only for the inpatients, but also for the visitors to recognize the "THEME".
The vertically organized hospital enables us to think about new housing blocks and commercial streets in the leftover space. Normally, it costs a lot to build a new hospital so that money coming from the new residence development reduces the financial burden.

The building is a mega-structure with four core parts which are connected by several braces, 'skeletons'. These skeletons are varied in order to associate the complex hospital functions. Inside of the skeleton, the infill can be located freely; furthermore, the height of floor can be diverse according to the function because the skeleton can accommodate more than two floors.
Traditionally patients are isolated from the normal world. So the critical question is how to create interactive spaces for the sick and the healthy. Basically all the wellness hotels are located in the countryside. Then, where is the wellness within cities? We should turn hospitals from places of sickness in cities into wellness in cities.

The proposal is to add another level which functions as a wellness platform. The wellness centers on this level are related to different themes underneath. Insurance companies could be the investors to this extra programs.

Groningen tries to have a "city-like hospital". However, it is fake because the "city functions" in the "inner streets" are not related to healthcare functions. The healthy public population has no reason to go to the hospital.

Program for the new Erasmus MC and additional wellness programs.
The proposal gives each theme a unique identity and different lighting solutions.

In the moment the canal is a barrier between the hospital and museum park. The proposal connects the museum park. The museum visitors could be potential wellness consumers to the hospital.

The existing hospital is a super block in the city. It never becomes a part of city center. The proposal connects itself through various access ramps back to the city.

A highway separates the hospital and the level park. The proposal connects them under a highway in order to foster a good connection failure.
THE GREEN HOSPITAL

evolution of hospital typology - disappearance of green hospitals...

The immense impact of medical science since the last quarter of the nineteenth century, culminated in the ideal that medical science and technology are eventually able to solve all health problems. Environmental concerns were driven to the background. The medical establishment became heavily criticized since the 1970s as too machine like, too impersonal. Since the 1980s it became clear that medical science could not realize its promises (aids, sars, ordinary bacteria becoming resistant to medicine). Many institutions in the US investigate the impact of nature environment as an increasing factor of healing. As the future is highly unpredictable new typology have to provide additional values going beyond functional solutions.

The green distribution, user vs need, and space vs user are critical in designing a green hospital. Types of green, such as trees and lawns, and their perception of the green - tree are crucial in shaping the building according to the size of tree and positioning of the tree in the context of the building.

Arrangement of the program according to the view of the tree is essential. Shaping the building according to the size of tree, such as the height of the tree, is also important. Inside the building, the tree is at 7 m, 12 m, and 10 m. Outside the building, the tree is at 10 m and 11 m. On the building, the tree is at 5 m.

Added green space to the program is considered in terms of users within certain spaces, length of stay, and needs to perceive the green, open air and light.
variations of organization according to the need of space - different themes representing specialized departments. The focus is on medical needs of the patient. According to the needs - particular diseases and length of stay we define variations of openings and spreading of the green spaces.
Some inpatients aren't mobile and therefore can't participate in regular activities. Since those patients stay most of the time in the wards, they should have the freedom to choose how they want to be accommodated.

A. Number of people

B. Area

C. New Furnitures

D. Case Studies

1. Ultimate private
   Erasmus Medical Center
   - Ward
   - Inpatient room
   - Study space
   - Suite for visitors
   - Balcony
   - Private bathroom & toilet
   - Small kitchen

2. Interspace
   Erasmus Medical Center
   - Ward
   - Inpatient room
   - Limited space for visitors
   - Shared sink
   - Shared shower & toilet
   - Small garden
   - Built-in furniture

3. Ultimate public
   Erasmus Medical Center
   - Ward
   - Inpatient room
   - Limited space for visitors
   - Shared sink
   - Shared shower & toilet
   - Small garden
   - Built-in furniture

Ranking of average inpatient room areas

Shared rooms
- 9.2 sqm
- 8 sqm
- 7.5 sqm
- 7.25 sqm
- No data

Private rooms
- 11.5 sqm
- 10 sqm
- 9 sqm
- 4.3 sqm
- 6.3 sqm
Selection of inpatient room layouts

Ultimate private: Single room & facility

Interspace: 3 beds room & facility

Ultimate private: Function of single rooms

Interspace: Function of 3 beds rooms