

REVISTA | MAGAZINE

IPH

14

INSTITUTO DE
PESQUISAS
HOSPITALARES
ARQUITETO
JARBAS KARMAN

ESPECIAL CENTENÁRIO
JARBAS KARMAN



Revista IPH

Edição Nº14

Segundo Semestre de 2017

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Revisão e Versão

Marina Aun

ISSN 2358-3630 *digital*

ISSN 1519-14-51 *impresso*

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Editorial	69
Current Hospital Master Plan	70
Architecture Regulations for Healthcare Facilities in Brazil	81
<i>Santa Casa de Misericórdia de São Paulo:</i> a hospital architectural heritage	98
How Architecture Has Influenced the Promotion of Hospital Hotel Services and Humanization	107
The healthcare hub	117

Special Edition: the Centenary of Jarbas Karman

On April 13, 1917, Jarbas Karman was born in Campanha, MG, Brazil, the contriver of IPH that, today, honors him with a new edition of the IPH Magazine. This is also a tribute to his independent and critical spirit. Jarbas Karman would not give in when searching for creative solutions to overcome the countless challenges hospitals have always faced. Being faithful to the culture of excellence established by its creator, the current edition of IPH Magazine deepens and updates important discussions concerning the anxieties and problems that contemporary hospitals must deal with.

Therefore, the *IPH Magazine #14 – Special Edition: The Centenary of Jarbas Karman* gathered a group of professionals well known in this area of expertise. The architect Jonas Badermann writes about the “Master Plans for hospitals nowadays”; the text written by Professor Antonio Pedro, PhD, revises the Rules and Regulations for Architecture for healthcare facilities in order to deepen the discussions that have been taking place about the revision of RDC 50; the article written by Professor Evandro Pereira da Silva, MSc, studies the history of the architecture of Santa Casa de Misericórdia de São Paulo, emphasizing the importance of knowing the history of architecture within the health area; the specialist in Hospitality in Hospitals, Ana Augusta Blumer, throws light on the importance of the concept of hospitality to achieve the so-called humanization. Moreover, there is the translation of a text by American researcher Jeanne Kisacky, never published in Portuguese before, which brings an interesting study regarding the history of ventilation and lighting in hospital buildings in the USA since the 18th until nowadays.

In this issue, we grieve the loss of and honor the Italian architect Romano del Nord, who, with generosity and competence, always provided those interested in healthcare projects with material and good conversations. You can read the article “Future Trends in Teaching and Research Hospital Design” at *IPH Magazine Editorial nº 10*, which he wrote especially for IPH in 2014.

We hope that this issue may serve as a source of information and reflection to those working in healthcare. We remind you that IPH Magazine continues with its policy of being completely open for contributions.

Current Hospital Master Plan

Arq. Jonas Badermann de Lemos

A hospital is a building that accommodates a variety of functions, it is the most dynamic space of the contemporary society. Overseeing it represents a great challenge, considering the countless services and diversity of activities that are held there. Inside this building one may find a variety of facilities from a hotel, laboratory, laundry, pharmacy to even a restaurant. Such institution must have qualified administrative management and its healthcare services must respect strict protocols. Inside hospitals we find unique interpersonal relationships standards and continuing education takes place daily. There we can find a variety of treatments and a variety of patients, each one presenting a specific pathology going to the hospital searching for health, to keep it or recover it. Besides, in hospitals there are people – from patients to those working there – from the most diverse backgrounds, such as: doctors, nurses, managers, suppliers, pharmacists, general workers, maintenance technician, among others, which makes it hard to establish professional perspectives. Finally, a hospital deals with critical topics for the human being, among them: health, sickness, death, birth, fear, beliefs, altogether, it deals with psychological and subjective matters, i.e. the aspects that demand emotional self-control.

Over the last few years, hospitals have felt the need to adjust to the new type of customer. They have become more demanding with expectations equally more specific due to the increasing evolution of technology, higher levels of education and more access to information. The relationship between healthcare providers and patients reflects the new reality since the latter expects higher quality of services. Adding to that, the number of people with health insurance has skyrocketed over the last years, which has forced hospitals to rethink and expand their facilities

This process of changing and modernization is clear in the Brazilian regulations, perceptible, among other aspects, in the evolution of hospital heterogeneity. By studying the Diagnosis and Therapy Care Services (Serviços de Apoio ao Diagnóstico e Terapia) that deals with outpatients and inpatients, for instance, we see a staggering increase. The Ordinance 400 from 6 December 1977, in chapter 5, which concerns the Diagnosis and Treatment Complimentary Services Unity, establishes few unities in comparison to the same group in the current regulation, emphasizing the lack of technology from four decades ago. In the case of imaging exams, the X-ray device was all the technology used at the time.

The unities described were as follows:

- Physical Therapy Unity;
- Hemotherapy Unity;
- Clinical Pathology Unity;
- Anatomical Pathology Unity;
- Clinical Radiology Unity;
- Electrocardiography Unity and
- Medications Dispensary.

We may also notice, in the 1977's regulation, the emphasis on the total built area of at least 45 m²/bed for general hospitals with up to 150 beds. Nowadays, the rule is to consider twice or even three times this area. Specifically, for the Diagnosis and Therapy Care Unity, the recommendation used to be 12 m²/bed. Nowadays, the area reserved for the services of this unity are not proportional to the number of beds, but to the caring nature of the organization, stretching to the commercial nature of the healthcare facility, surpassing, most of the time, the area recommended in the 1977's regulation that guided the architectonic design.

On 11 November 1994, the Ordinance 1884 was published. It added many other services to that comprehensive group of Diagnosis and Therapy Care Services. It was therefore proved the technological improvement and, consequently, the doors were open for the hospitals to embrace them. Besides the unities mentioned above, there was the establishment of the Imaging Unity, which included ultrasonography, MRI and radiology exams through the results of fluoroscopic or radiographic studies. They are obtained through cardiovascular radiology or tomography. Echocardiogram, ergometry, phonocardiogram and electroencephalogram exams were added to the list of exams expressed in graphic drawings. The activities concerning Nuclear Medicine, Radiotherapy, Chemotherapy and Dialysis were also included. The technological improvement of the Ordinance 1884 can also be proved by their decision to

merge the Surgery Unit with the Therapy and Diagnosis Care Services. The evolution of surgical techniques enabled the concept of ambulatory surgery, in which patients stay under observation for 12 to 24 hours and do not need to be admitted. Therefore, the ambulatory treatment was expanded with the help of all the several teams within the hospital and, consequently, other medical disciplines were included, inaugurating the concept of Partial Hospital Program. The hospitals, then, progressively received patients that were not admitted, they are called outpatient and stay for 24 hours maximum in the hospital and receive similar care to the ones admitted since they perform diagnostic and therapeutic procedures and receive infusions.

The Regulation – RDC #50 from 21 February 2002, that replaced the Ordinance 1884, showed little improvement regarding the new technologies. From it, it is worth mentioning the inclusion of the hyperbaric oxygen therapy program.

Nowadays, when we compare the Brazilian regulation with the medical care technique used in hospitals and the use of new technologies, we become conscious of a misalignment the need of modernization. The regulation is not consistent with several procedures carried out, thus leading to a compulsory practice of an obsolete normative planning. Now that we are discussing the re-examination of the RDC 50, we must think about its character. What type of normative instrument should be established? One that is open to regular adaptations and transformations or one that rules activities, programs, areas and dimensions, cancelling out the architectonic correlation with new processes? An instrument that corresponds to the strategic planning and is flexible or the one that accords with the normative planning with strict rules that forbid developments? We cannot forget that the necessity program suffers constant alterations and processes are often evaluated. In the search of ultimate quality, architecture and facilities are rapidly changed. The complexity and functional aspect of a hospital demands a strategic planning supported by enduring discussion and analysis, whose focus is the appreciation of the patient and healthcare processes. We understand, therefore, that the work of hospital architecture assumes a professional training that goes beyond the simple formal and programmatic conception of a building, requiring an architect with specific, comprehensive, circumstantial and updated knowledge.

The use of technology in healthcare, considering the group perspective and medical, economic, social and ethical implications, is of great value for hospitals and causes a rupture in the traditional hospital model (SILVA, 2011). Healthcare work was no longer “craft work” once it made use of the technology available, thus reshaping the organization of healthcare work in its various professional connections that relate within the hospital. Consequently, the building must adapt to the new processes. There is the need for constant reviews and developments that are compatible with the humane and technological evolutions. Buildings must be progressively adapted to the: strategies of the institution, effortlessness of healthcare processes, operational costs, undemanding maintenance, water consumption and energy efficiency. Therefore, architecture assumes another perspective and begins to participate decisively in the healing process of patients, corresponding to the current results from the Evidence Based Design studies, which confirms the positive impact that elements such as natural ventilation, natural light exposure indoors, the view to outdoors areas and “positive distractions” have on patients and employees. Positive distractions are activities or events that the hospital organizes that inspire positive feelings in the patient, detracting their attention from their physical and emotional aspects through, for an example, music, art exhibitions, plays, social encounters, playing with pets, among others.

Gradually, hospitals have become centers of high technology with swaying functions, i.e. on one hand the functions that keep people healthy, through diagnosis and prevention treatments, and on the other, caring for critical patients that demand the most advanced technology to survive. At the same time, hospitals must be connected to the healthcare network of a location, region and country, acting as a reference guided by strategies of ultimate quality and developing permanent activities of investigation, process evaluation and feedback.

The hospital administration of nowadays presents some attributes that are different from the ones of the past, since hospitals are currently conceived as institutions that provide healthcare services and that are at the clients’ permanent disposal and ready to perform in a world of competency and quality (MALAGÓN-LONDOÑO, 2000). Such competency must be based on: planning, organization, employee satisfaction, budget, management evaluation, feedback and ethics.

The strategic planning, therefore, acquires relevant importance: it consists of a process of devising and putting into effect organizational strategies to implement the organization and its mission in the environment where they are action. The strategic planning takes on a determinant role, since it represents a course of action chosen by the organization from the assumption that an anticipated and different position may represent gains and advantages regarding

the present situation. Changing is a matter of survival for organizations. It is the process of strategic planning that is going to guide them towards the development and designing of actions that might assure their ongoing and sustainable evolution (CHIAVENATO; SAPIRO, 2010).

Strategic planning is the first step of the Master Planning. First, the purpose of the hospital must be clearly defined, since organizations have a *raison d'être*, a goal, a mission, which is the operative synthesis of its natures and central values. The *raison d'être* of a hospital is its commitment with the society in five topics: what it is done, why it is done, where it is done, for whom it is done and how it is done. Unfortunately, this is not what we can usually observe in healthcare institutions. The solution for specific problems prevail, overloading the system with unsuitable answers that, most of the time, compromise the functionality of the. We can often observe this situation in inappropriate employment relationships between the unities and a temporary organization, triggering an unorganized growth that did not had a systemic vision of planning. The Hospital Master Planning, therefore, it is essential when planning an organization and it is imperative during two stages: at first, to reorganize the physical and functional aspects of an existing hospital, and, secondly, to conceive the architect project of a new hospital.

During both stages, the physical and functional architectonic planning is needed to guide the evolution of the work through a methodology that may be applied in both situations.

In an existing hospital, the information system allows to rapidly get acquainted with administrative and medical care activities. This collection of data makes it possible to identify the epidemiologic environment in which the organization is, thus helping to eventually change course of action that will be proposed in the Master Planning, which will be responsible for defining the types of intervention to be carried out based on the improvement of existing capacity, the situation of the infrastructure and on the estimation for service demands. Moreover, the Master Planning will be accountable for the remodeling and potential expansions of the building using required qualifications, always prioritizing scaling down risks.

Designing a Hospital Master Planning in an existing organization – Stages and Goals

Stage	Equivalence	Goals
I. Analysis	Strategic Planning	To understand the purpose of the hospital and the strategies related to social and commercial interests.
	Locoregional Epidemiology	To study patients and their cultural and socioeconomic aspects, morbid tendencies, demography, births and deaths. To study the estimation for the population and the ageing rates. To understand the situation of reference and counter-reference of patients.
	Locoregional healthcare structure	To study the healthcare network (basic, ambulatorial and hospital medical care), number of facilities, number of specialized professionals, equipment and financing. To observe future Technologies that could be added to the services.
	Public perception of the organization	Understand what is the perception that patients, clients and employees have of the organization.

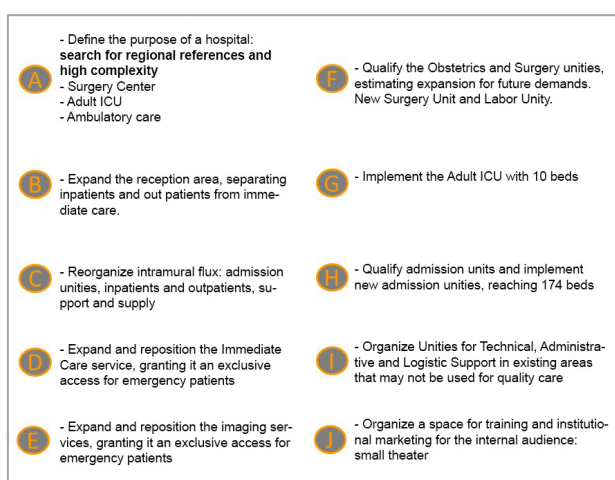
Stage	Equivalence	Goals
	Infrastructure	To verify the maintenance of the building infrastructure, considering electric wiring, hydraulic and sewer systems, firefighting system, climatization, dispensing hood, medical gases, energetic efficiency, sewage system, among others.
	Architectonic aspects	To analyze the functional, social and cultural aspects of the building, considering accessibility, contiguity between unities/services and their functional relationships, circulatory organization, outdoor access, control and reception, distribution of meals and supplies, flexibility, building's useful life and matters concerning humanization. To exam the process of the activities that guide the architectonic plan.
II. Diagnosis	Development of the Architectonic and Infrastructure Diagnosis Report	To verify if the healthcare and commercial purposes are accomplished by the architectonic plan. To compare the required regulation concerning physical and functional aspects to the current situation. To list conflicts. To provide an infrastructure diagnosis.
III. Prognosis	Development of the Functional Plan	To establish which are the required services to run a hospital and which should be included to the program of needs by projecting the demand according to the strategic planning. To verify the management style of healthcare facilities and the number of employees. To ascertain the assignments and list of activities for the healthcare facility according to the RDC # 50 and the processes carried out. To develop the Program of Needs and department board. To verify the Program for Biomedical Equipment and its spatial, installation and energetic consumption aspects.

Stage	Equivalence	Goals
IV. Hospital Master Planning	Designing the Hospital Master Plan	To sum up the Functional Plan into a Prognostic Report and use it for the architectonic solution for the organization through schematic two-dimensional or three-dimensional plans. To propose a new zoning, if necessary, considering the land, the access, the interdepartmental relationships, the circulatory organization and the energetic efficiency. To indicate the possibility of future expansions. To represent the final architectonic solution.

We may observe from the above table the introduction of an internationally known concept: *Hospital Master Planning*, which is the synthesis of all the requirements for a hospital to operate – not only architectonic aspects, but also the ones concerning the institution, management and the building infrastructure.

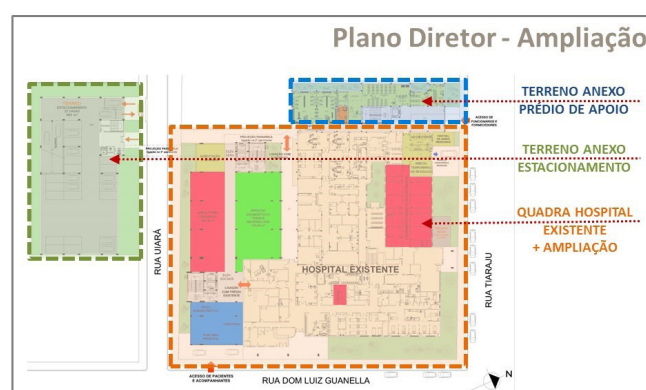


Picture 1 – Case 1 – Hospital Master Plan for an existing hospital – Floor plan with the existing zoning of the functional unities. Source: Badermann Arquitetos, 2015.



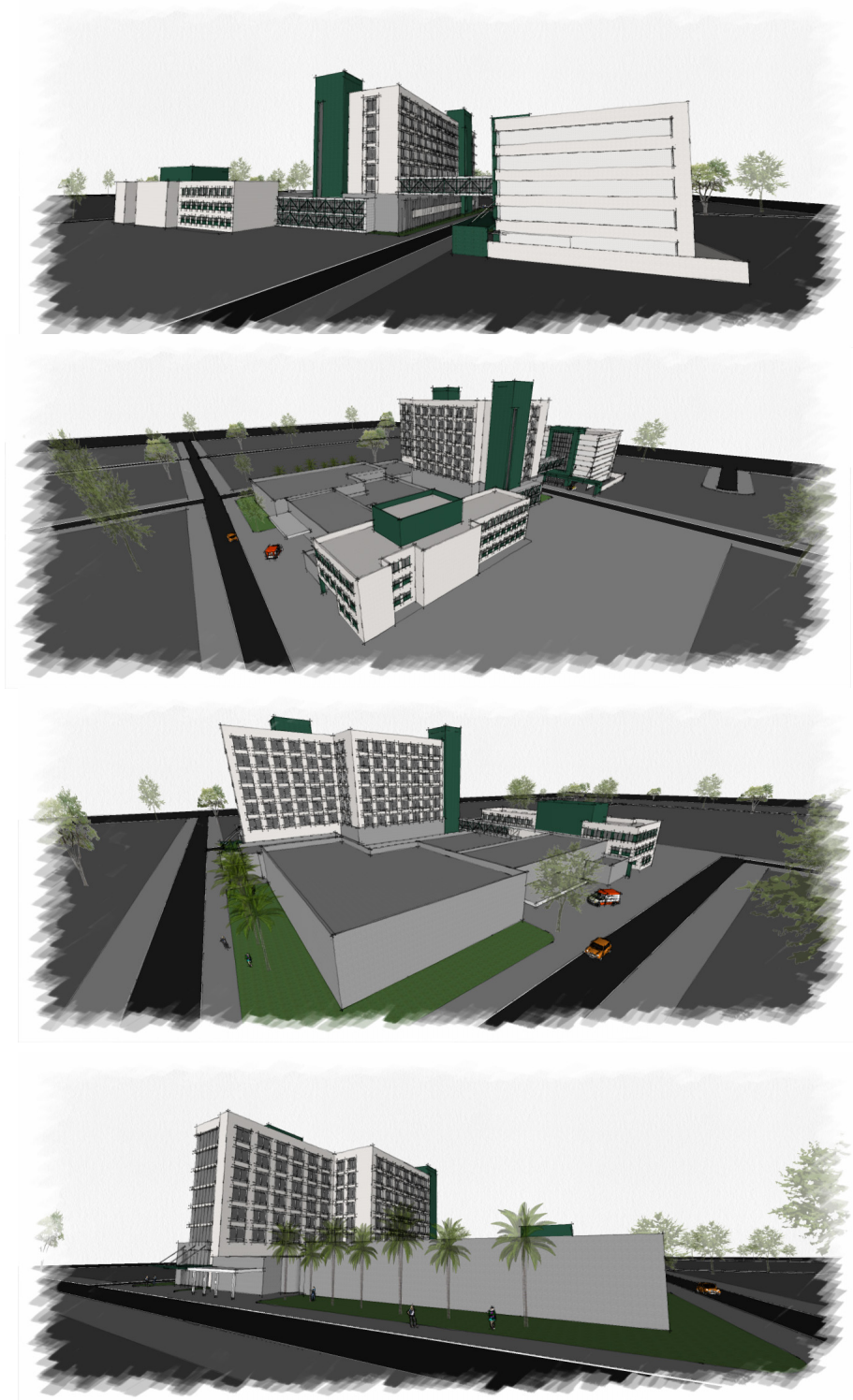
Picture 2 – Case 1 – Hospital Master Plan for an existing hospital – Summary of the Diagnosis / Prognosis. Source: Badermann Arquitetos, 2015.

Picture 3 – Case 1 – Hospital Master Plan for an existing hospital – Graphic Summary concerning the Diagnosis and Prognosis. Source: Badermann Arquitetos, 2015.



Picture 4 – Case 2 – Hospital Master Plan for an existing hospital - Summary of the Diagnosis / Prognosis. Source: Badermann Arquitetos, 2016.

Picture 5 – Case 2 – Hospital Master Plan for an existing hospital – Master Plan - Expansions. Source: Badermann Arquitetos, 2016.

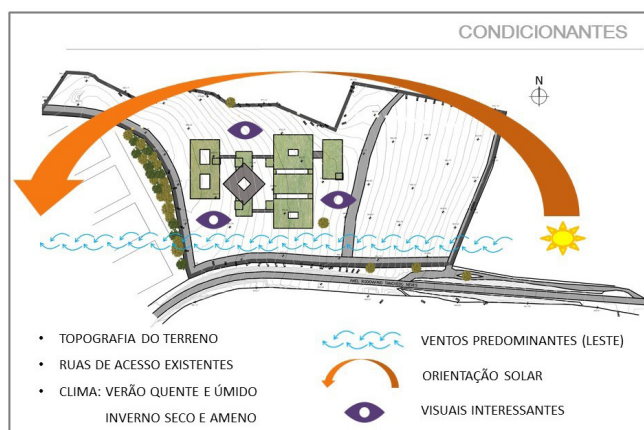


Picture 6 – Case 2 – Hospital Master Plan for an existing hospital – Schematic Volumetric Perspectives. Source: Badermann Arquitetos, 2016.

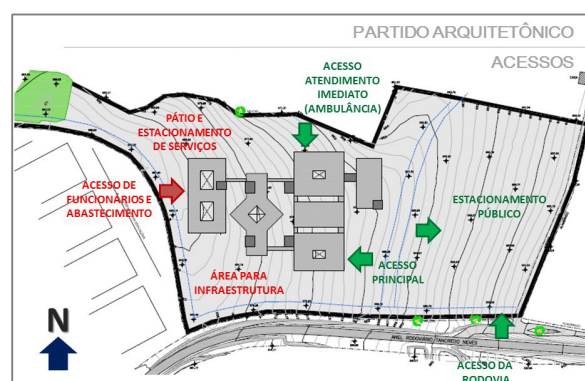
The beginning of project for a new hospital demands more cautious. Therefore, the necessary data that will guide the Hospital Master Planning must be previously collected, systematically analyzed and studied. The project must consider the land and its geographic and environmental surroundings, the population, the healthcare network, the local services and the demand for new services.

Designing a Hospital Master Planning for a new institution – Stages and Goals

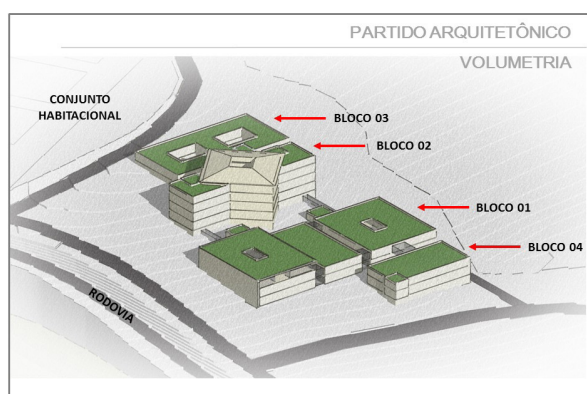
Stage	Equivalence	Goals
I. Analysis	Strategic Planning	To envision the mission of the hospital and the strategies concerning social and commercial interests.
	Locoregional Epidemiology	To study patients and their historical evolution. Their cultural and socio-economic aspects, morbid tendencies, demography, births and deaths. To study the estimation for the population and the ageing rates. To understand the situation of reference and counter-reference of patients.
	Locoregional healthcare structure	To study the healthcare network (basic, ambulatorial and hospital medical care), number of facilities, number of specialized professionals, equipment and financing. To observe technologies that are needed and the ones that could be added to the services in the future.
II. Prognosis	Development of the Functional Plan	To establish which are the required services to run a hospital and which should be included to the program of needs by projecting the demand according to the strategic planning. To verify the management style of healthcare facilities and the number of employees. To ascertain the assignments and list of activities for the healthcare facility according to the RDC # 50 and the processes carried out. To develop the Program of Needs and department board. To verify the Program for Biomedical Equipment and its spatial, installation and energetic consumption aspects. To contemplate the infrastructure and the standard for energetic efficiency.
III. Hospital Master Planning	Designing the Hospital Master Plan	To sum up the Functional Plan and use it for the architectonic solution for the organization through schematic two-dimensional or three-dimensional plans. To propose the zoning, considering an efficient architectural project the land, the access, the interdepartmental relationships, the circulatory organization and the energetic efficiency. To indicate the possibility of future expansions. To represent the final architectonic solution.



Picture 7 – Case 3 – Hospital Master Plan for a new hospital – Architectonic Project Constraints. Source: Badermann Arquitetos, 2016.



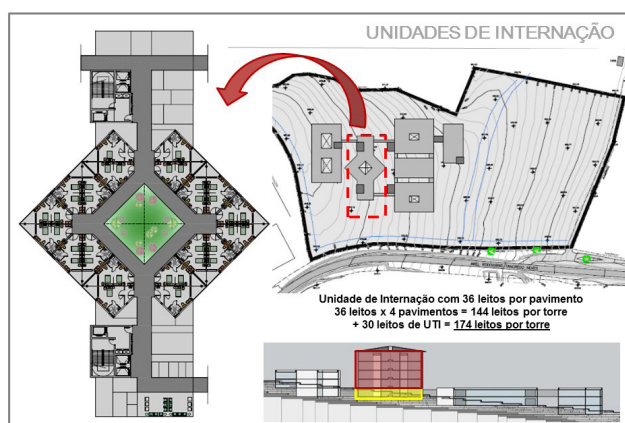
Picture 8 – Case 03 – Hospital Master Plan for a new hospital – Architectonic Project Accesses. Source: Badermann Arquitetos, 2016.



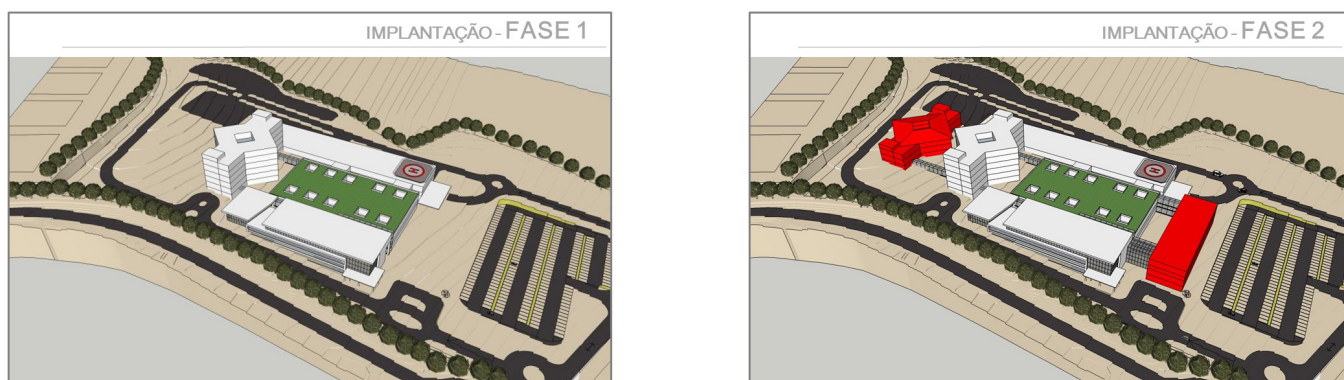
Picture 9 – Case 3 – Hospital Master Plan for a new hospital – Architectonic Project Volumetric Perspective. Source: Badermann Arquitetos, 2016.



Picture 10 – Case 3 – Hospital Master Plan for a new hospital – Architectonic Project Simplified Plan. Source: Badermann Arquitetos, 2016.



Picture 11 – Case 3 – Hospital Master Plan for a new hospital – Architectonic Project for Admission Unities. Source: Badermann Arquitetos, 2016.



Picture 12 – Case 3 – Hospital Master Plan for a new hospital – Implementation in stages.
Source: Badermann Arquitetos, 2016.

The architectonic project that results from the Master Planning is determinant for the efficiency of hospital management. It is recommended to minimize the distances that patients, employees and suppliers may go through, considering the functional relations and the connection among unities. Hospitals expand and change. Therefore, when deciding on and envisioning an architectonic project, it is fundamental to establish an efficient circulatory organization for the intramural flux of people and to think about a rational structural system, besides setting aside free areas for further expansions. A rational structural system is a network that allows services to be altered without the interference of beams and pillars. When estimating the program of needs and when suggesting the plan, despite the uncertainties of the future, it is important to consider a demand for, at least, ten years.

Nowadays, when we think about hospitals, we do not picture just a group of doctors and nurses gathering around the infirmary. We think about highly organized institutions that, besides recovering the physical conditions of patients, encourage coordinated actions to keep and preserve health. We think about centers that use high technology to diagnose and treat several pathologies, where there is the practice of teaching and continuing education is encouraged daily among the institution's professionals. We think about a place where the administration is relevant to manage and control several concentrated and autonomous activities. We think about the infrastructure available to hold the high technology of equipment, as well as to train the professionals responsible for it. This conception makes us realize that the spatial organization of a hospital is not a simple task and that implies a multiplicity of data, which cannot be obtained unless the various specialized professionals get involved. The Master Planning, therefore, to meet general expectations, must have a multidisciplinary formulation, since it is not just a compilation of architectonic concepts, but also includes administrative, healthcare and infrastructure aspects, among others. As a result, we propose assembling a task force with representatives from the general departments of the hospital, such as: target activities, patient management, administration, technical and logistic support, and, when necessary, teaching and specialized advisors.

The hospital has the moral responsibility to provide services of high standards, hence the need to purpose efficient planning strategies that include the Hospital Master Planning, which will guide the architectonic path for the institution, the stages of the construction, modernization of infrastructure and financing in accordance with the political and administrative decisions.

A thoughtful and well-conceived Hospital Master Planning will guarantee a harmonious environment for the hospital, both physically and functionally.

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Architecture Regulations for Healthcare Facilities in Brazil

Antonio Pedro Alves de Carvalho

Brazil has one of the most advanced regulations concerning Hospital Architecture, which should not be overlooked, since it can be perceived in the quality of the spaces within healthcare facilities.

Current regulations, however, result from a lengthy evolution that began in the 1940's with the hiring of architects by the Special Service for Public Health (*Serviço Especial de Saúde Pública – SESP*) – an agency created by the Ministry of Education and Health – that received American help to implement basic sanitation in areas that produced raw material that were essential for war, such as rubber, in the Amazon, and iron ore and mica in Vale do Rio Doce (RENOVATO; BAGNATO, 2010).

Unlike laws and decrees whose mainly attributes are punishment and behavioral orientation, regulations must stand up for their instructive and advisory role, they do not have the power to suppress. Considering this point of view, we cannot study the regulations concerning healthcare facilities without paying close attention to the initiatives that enable teaching and imparting the knowledge concerning the topic.

Writing and publishing regulations will not be enough. Additionally, it is necessary to publicize and update it, since the criteria adopted once may briefly become outdated or even wrong. The evolution of regulations concerning healthcare infrastructure clearly shows the important role of technical education, teaching and research as basic guidelines.

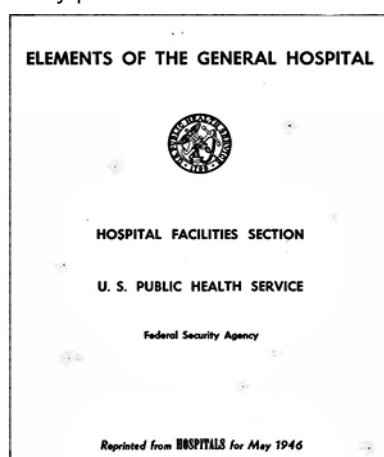
From the establishment of *Padrões Mínimos Hospitais*, by SESP (BRASIL, 194?), which was inspired by the American publication *Elements of the General Hospital* (USA, 1946), up to our current regulations, we can perceive the leading aspect that guides both creation and impartation of such regulations.

At present, there are discussions concerning changing such regulations; and we would not go too far to emphasize the need to debate the process of continuous maintenance of regulations that must be implemented, assuring the educative role of such document.

Elements of the General Hospital

We may consider the publication of *Elements of the General Hospital* (USA, 1946) (picture 01) – published by the American Health Department – as the great source of inspiration for architects that work with SESP to design the first guidelines concerning the topic.

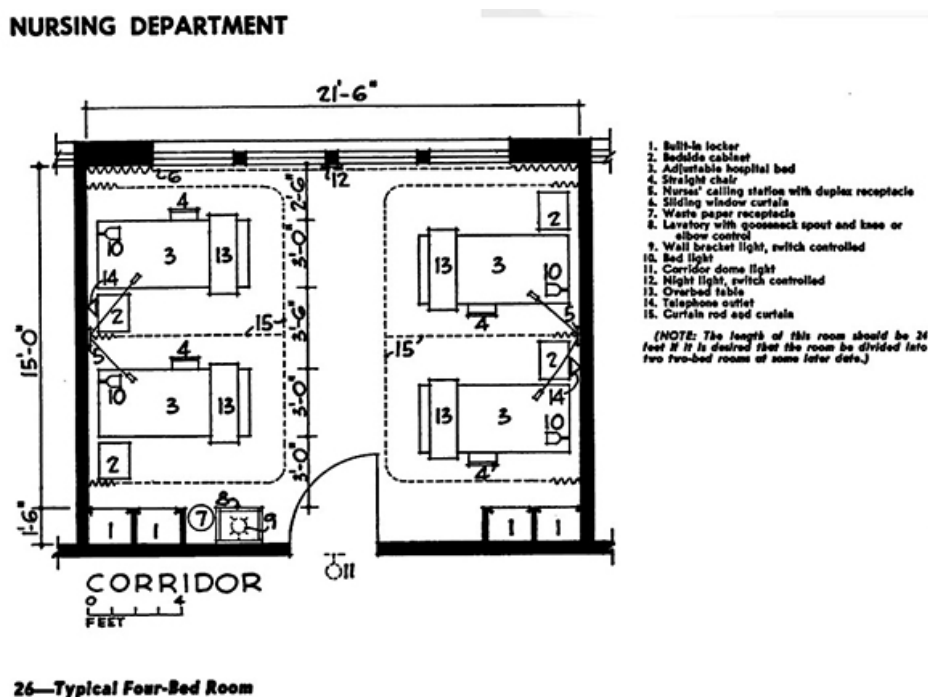
We can see that this book offers an illustrated guide of plans for hospital facilities with thorough dimensions, including a detailed list of furniture and equipment. They provide no other written orientation, suggesting that the book, in fact,



Picture 01: Cover sheet of *Elements of the General Hospital* (USA, 1946).

is a result of studies undertaken by architects specialized in hospital planning to provide other colleagues with the information necessary for each activity.

By providing detailed dimensions for every room, as well as the design of thorough plans for unities, their intention is to offer an instrument to guide those who would not have the time or support demanded to project and execute hospital unities (Picture 02).



Picture 02: Example of a plan found in *Elements of the General Hospital* (USA, 1946, p.20).

This brochure consists exclusively of drawings, which are architecture suggestions for ambulatory and diagnostic facilities, surgical department, admissions and general services; apparently considered the most important areas of a hospital.

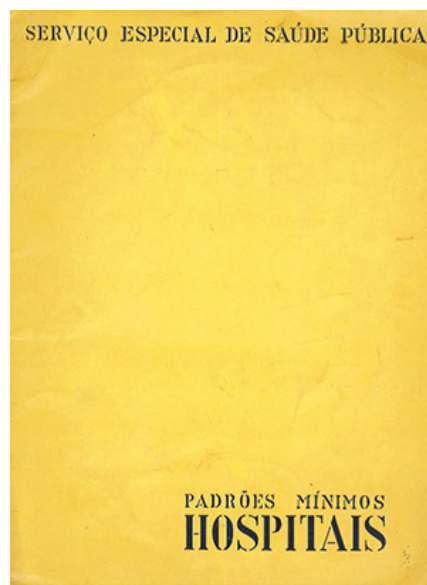
Padrões Mínimos Hospitais

SESP had acted upon several healthcare and rural sanitation programs until it was shut down in 1990. One of its greatest improvements, at the time, was sending professionals to the US for post-graduation courses. The field of architecture gained with the exchange of knowledge, which led to the creation of the hospital architecture sector.

Willing to guide the consultancy for the design of small hospitals, SESP published *Padrões Mínimos Hospitais* (BRASIL, 194?) (Picture 03), a 23-page book with models of architecture plans resembling the *Elements of the General Hospital* (USA, 1946).

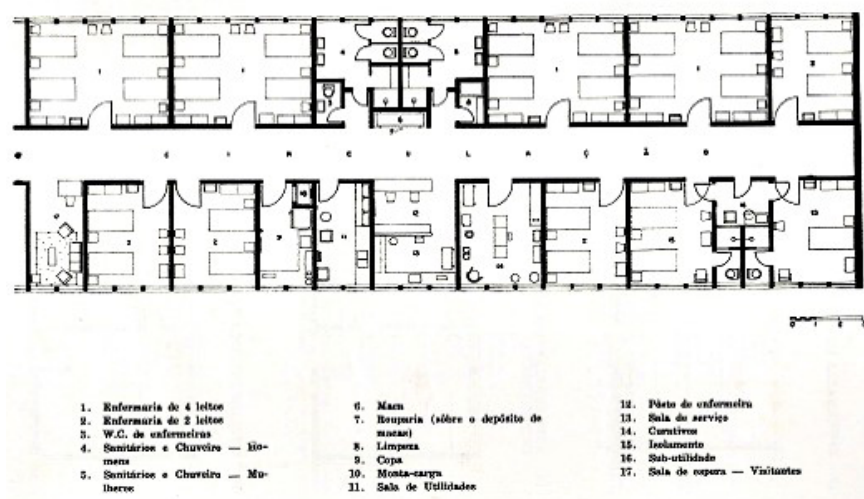
In the introduction of the book, the head of SESP at the time says:

Since the engineering department at SESP implemented an architecture department, we thought convenient to assemble, for our own use, a guide that brings the modern guidelines recommended for small-size hospitals. Therefore, making the method of planning, studying and conception of the project for the hospital unities that SESP would build in rural areas more comprehensible, and at the same time assuring the necessary uniformity regarding standards of construction and basic equipment of the facilities. (BRASIL, p.3).



Picture 03: Cover of *Padrões Mínimos Hospitais* (BRASIL, 194?)

The book presents architectonic solutions in graphic scale of several unities inside a hospital, apparently based on architectonic projects concerning 50 and 100-bed buildings. By thoroughly listing furniture and equipment that could be used for each space, the book presents them in a way that could set the example for technical solutions. (Picture 04).



Picture 04: Example of a plan from *Padrões Mínimos Hospitais* (BRASIL, 194?, p. 9)

The publication may be considered the foundation of all legislation concerning the architecture for healthcare facilities in Brazil and, graphically, it served as model for what was published afterwards.

We can see the resemblance between the Brazilian book and the way the *Elements of the General Hospital* (USA, 1946) presents schematic plans, aiming at guiding those who work with health infrastructure. We cannot overlook the fact that in the beginning of the 20th century, the doctor-manager was the main responsible for the projects in health unities. Up to the 1950's, the courses concerning infrastructure in health facilities were related to hospital ad-

ministration, and, most of the time, were attended by doctors. Some doctor-managers, like Odair Pacheco Pedroso (1909-1981) and Ernesto Souza Campos (1882-1970), were known for advising projects to build hospitals.

The first event aimed at training Brazilian architects to project healthcare buildings was the *I Curso de Planejamento de Hospitais* (First Course for Planning Hospitals), held by IAB-SP, in 1953.

First Course for Planning Hospitals, held by IAB-SP

This was a pioneer and intensive course held between the 13th and 17th of April 1953, by the *Instituto de Arquitetos do Brasil*, Department of São Paulo, and it was organized by the *Comissão de Planejamento de Hospitais*, IAB-SP, a commission for planning hospitals that had the architects Amador Cintra do Prado, Jarbas Karman and Rino Levi among its members.

It was an interdisciplinary event, attended by doctors, nurses, engineers, architects and managers. Some of the classes were fully recorded into a 528-page publication that became reference in the topic: *Planejamento de Hospitais* (IAB, 1954) (Picture 05).

The book was organized in twelve chapters representing the topics presented by specialists in their lectures: I) Planning and Administration; II) Nursery; III) Radiology; IV) Physical Therapy; V) Surgery; VI) Obstetrics; VII) Pharmacy; VIII) Ambulatory; IX) Laundry; X) Laundry and Kitchen; XI) Research concerning hospitals; XII) Wrap-up.



Picture 05: Cover of *Planejamento de Hospitais* (IAB, 1954).

It was during this course that the architect Jarbas Karman suggested the establishment of the *Instituto de Pesquisas Hospitalares* (IPH), which, up to these days, has the important role of encouraging researches and studies concerning hospital infrastructure. This course represented a milestone in the studies of hospital architecture in Brazil, by presenting to the community of health professionals a new specialty within architecture, pointing out to the need of specific knowledge that every professional working with architectonic projects for health facilities should have.

A great number of the lecturers presented in the course deserve special recognition. The architect Oscar Valdetaro, from SESP, talked about the functionality of the several unities within a hospital. The architect Jarbas Karman delive-

red a lecture on the surgical department and the material and sterilization unit. This text can still be considered one of the most important ones concerning this topic. (Picture 06).

The doctor Odair Pacheco Pedroso talked about the ambulatory unit, the professionals and technicians needed to design the project of a hospital and about planning a hospital under the administrator's point of view. The architect Rino Levi delivered a lecture on planning a hospital under the architect's point of view. The architect Jorge Machado Moreira shared a general viewpoint concerning hospital architecture. The architect Roberto Cerqueira César discussed the flow and means of communication inside hospitals. Therefore, we can notice that this course gathered a remarkable academic group that delivered content of great value, representing a milestone for Brazil's health infrastructure.



Picture 06: Jarbas Karman delivering his lecture on surgical department at the First Course for Planning Hospitals, held by IAB-SP, in 1953 (IAB, 1954, p. 175).

The publications we have mentioned so far were cutting-edge and inspired the first set of comprehensive regulations in the country: the *Projeto de Normas Disciplinadoras das Construções Hospitalares* (BRASIL, 1965).

Projeto de Normas Disciplinadoras das Construções Hospitalares

In 1965, the National Health Department of the Ministry of Health in Brazil published the *Projeto de Normas Disciplinadoras das Construções Hospitalares* (BRASIL, 1965) (Picture 07), written by the architects Oscar Valdetaro and Roberto Nadalutti, advised by the doctor Henrique Bandeira de Mello. In this publication, we can see more drawings of unities as well as theoretical explanations for the projects, therefore meaning a great evolution since SESP's book: *Padrões Mínimos Hospitais* (BRASIL, 194?).

IAB's chairman wrote the introduction for the book, drawing attention to its informative style and emphasizing that: "The current work represents an attempt to promote guidance for hospital constructions, although not imposing strict instructions." (BRASIL, 1965 [s.p.]).

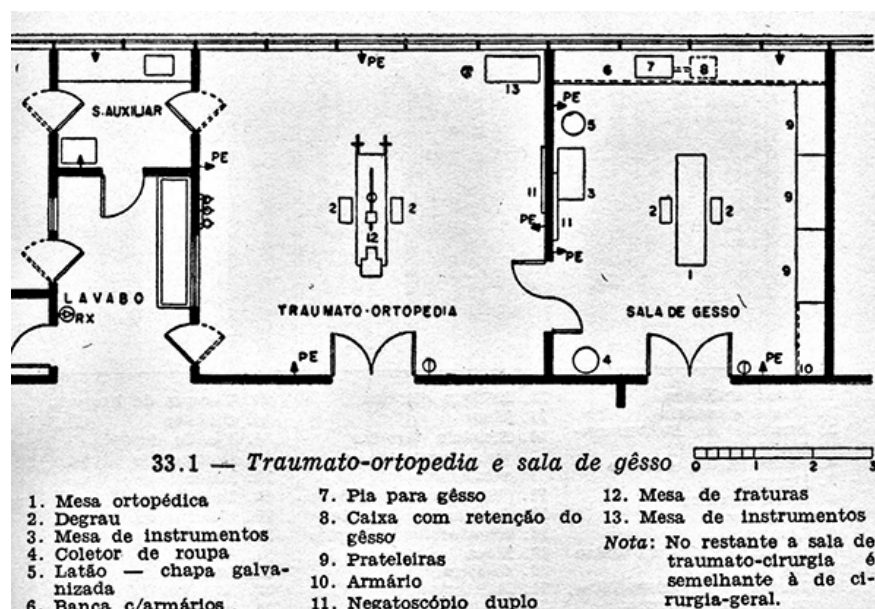
The book is divided into the following chapters: Hospital terminology; Hospital: concepts, definitions and classifications; Preliminary information for planning; Minimum Functional Programs; General guidelines for specialized hospitals.

The concept of Hospital Network is introduced by establishing a hierarchic matrix of service, as follows: Base Hospital, District Hospital and Integrated Health Unit.

Picture 07: Cover of *Projeto de Normas Disciplinadoras das Construções Hospitalares* (BRASIL, 1965)



The core of the book is item 4, Minimum Programs, where plans (Picture 08) and tables, concerning minimum space and area, and explanations of various types are displayed, such as: "Whenever there is an emergency department, it would be convenient to have a radiodiagnosis installation as near as possible." (BRASIL, 1965, p. 46).



Picture 08: Example of a common plan at *Projeto de Normas Disciplinadoras das Construções Hospitalares* (BRASIL, 1965, p. 93)

This book guided the construction of health facilities nationwide until 1974, when the *Normas do Hospital Geral* (BRASIL, 1974) were edited.

Normas do Hospital Geral

The first regulations for hospital infrastructure in Brazil – *Normas do Hospital Geral* (BRASIL, 1974) – were the result of decades of dedication and study of a group of architects and engineers who were truly interested in the topic (Picture 09). In the introduction, we find the following observations:

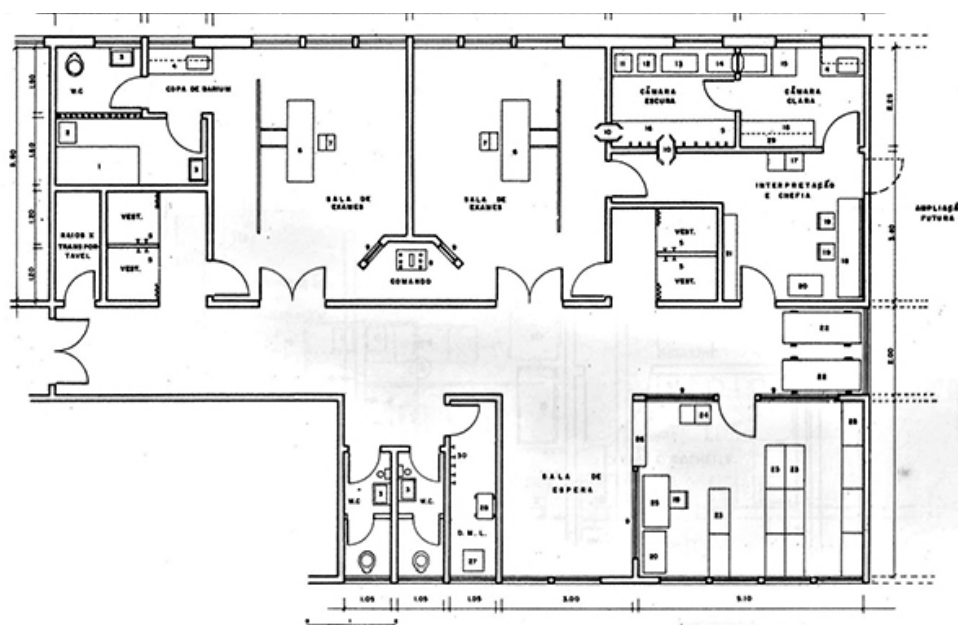


Picture 09: Cover of the book *Normas do Hospital Geral* (BRASIL, 1974).

The regulations in this book were established by the Coordination of Medical and Hospital Assistance of the Ministry of Health to ensure that proper plan, project, construction and installation may enable the General Hospital to provide an efficient, safe and economic service.

They aim at guiding architects, engineers and hospital advisors, however not imposing limits on architectonic innovation and building technic. These regulations provide, therefore, minimum requirements to plan, build, remodel or expand the General Hospital of any capacity and location within the national territory. (BRASIL, 1974 [s.p.])

Its structure was less oppressive than the one found in *Projeto de Normas Disciplinadoras das Construções Hospitalares* (BRASIL, 1965), since it did not present imposing tables. Minimum areas were established through an explanatory text and only for spaces of greater importance. The advising plans



Picture 10: Example of “graphic study” from the book *Normas do Hospital Geral* (BRASIL, 1974, E.G. 13).

The associates for this book were: Hélio Müller (Head of Architecture at the Division of Engineering and Environment Sciences of *Fundação SESP*, associate at the publication of *Padrões Mínimos Hospitais* (BRASIL, 194?)); Sylvia Caldas Ferreira Pinto (Head of Technical Orientation at the Healthcare and Hospital Coordination of the Ministry of Health); Maria Torres del Negro Lima (Head of SOT's Engineering and Architecture Department); and Léa Barbosa Baião (SOT's Architect). This publication did not prevail for long, since, in 1977, the Ordinance 400/1977 (BRASIL, 1979) was edited.

Ordinance 400/1977

The Ordinance 400/1977 (BRASIL, 1979) was a revised edition of the regulations that had been published in 1974. However, the Ordinance had a clear imposing style, presenting tables with minimum areas for each section and a graphic division with technical explanations and examples of projects – some of them that had already been used in previous regulations. The Ordinance was firstly edited in two volumes, the first one brought only the tables and the second one had detailed explanations about the hospital unities and sample plans (Picture11).

The Ordinance 400/1977 has guided inspections and projects of hospital unities for about seventeen years. It became a rigorous tool, therefore encouraging an extreme inspection system by the Health Surveillance Agency, which would not admit big variations concerning the established minimum areas. Obviously, there were several archetonic solutions reproduced nationwide. Replicating the same solutions from the Ordinance would guarantee that the project would be approved by the Health Surveillance Agency, which was what inspectors from financing agencies required.

The tables presented minimum areas with inflexible strategies for hospital unities that would be acceptable for small and medium-size hospitals. There were two sets of information: one valid for hospitals with up to 50 beds and the other for hospitals with up to 150 beds, besides some extra information. Hospitals with more than 150 beds were considered exceptional and would have to be specially analyzed.

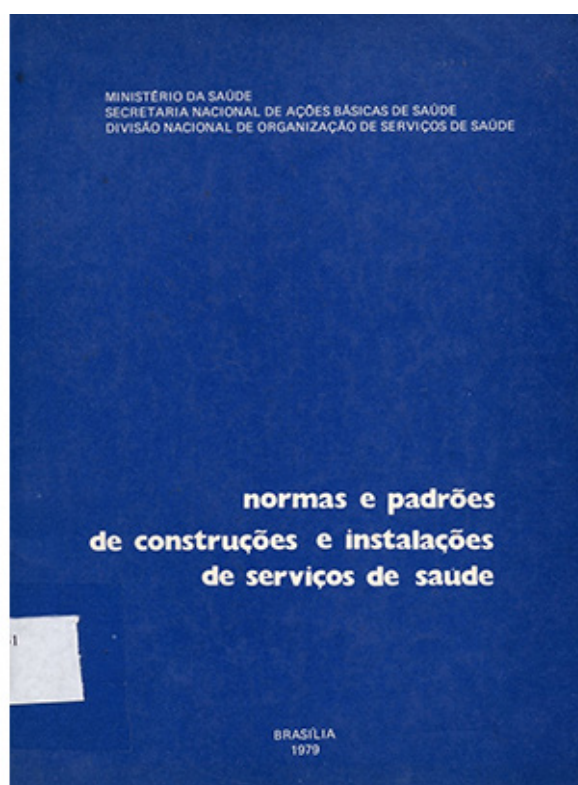


Fig. 11: Capa da primeira edição volume 1 da Portaria 400/1977 (BRASIL, 1979).

There was an introduction prior to the tables, which covered: I-Physical Terminology; II-Proper Location; III-Indoors and Outdoors Circulation Areas; IV-Built-up area. The second volume was more informative, hence explaining the administrative work of the hospital and providing project premises. It kept several technical orientations from the previously regulation, which were valuable to study projects of healthcare facilities, like the observations concerning location:

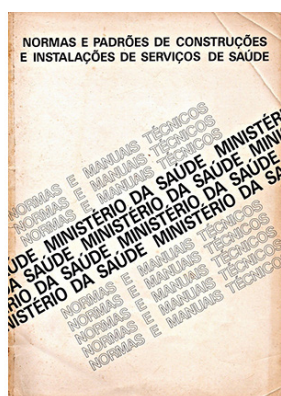
There must be a study concerning special conditions for the location of the hospital and choice of land, aiming at:

- a) Proper water supply in quality and quantity, at least 500 liters a day and by bed. Availability of sewerage and Rainwater harvesting systems, as well as electricity, telephone and gas systems.
- b) Proximity to the city center of the community at which the healthcare facility is aiming, there must be access roads and means of transportation.
- c) Only up to 50% of the land must be built on, considering further extensions [...] (BRASIL, 1987, p.13).

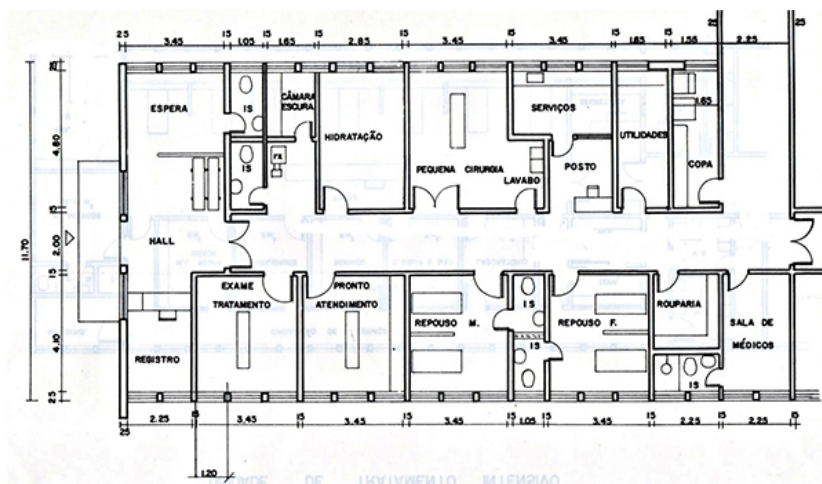
We cannot overlook the fact that, at the time, the study of healthcare facility infrastructure was at its initial stage, therefore, publications in Portuguese were rare to come across. In 1987, the Ordinance got a second edition, in just one volume (Picture 12).

The plans presented followed the 1,2x1,2m modulation and there was indication of basic furniture and equipment. The models presented were introduced by a set of information (Picture13). This regulation influenced a generation of hospital architects, besides being an excellent source to study the topic in Portuguese. We cannot leave unnoticed that many of its principles have endured in the regulations to come.

The Ordinance 400/1977 was an important tool for educational purposes and to assure the quality of healthcare facilities constructions until 1994, when the Ordinance1884/1994 (BRASIL, 1994) was edited. The new Ordinance represented a radical change in the structure of the regulations for healthcare infrastructure that had been previously established.



Picture 12: Cover of the second edition of the Ordinance 400/1977 (BRASIL, 1987).



Picture 13: Example of plans from the Ordinance 400/1977 (BRASIL, 1987, p. 92).

To properly explain the context in which the Ordinance 1884/1994 was conceived, we must understand the professional training process established for architects and engineers by the Ministry of Health in the 1980's, after organizing the Specialization Courses concerning Architecture in Health Systems (*Cursos de Especialização de Arquitetura em Sistemas de Saúde*) in the University of Brasília (UnB).

Specialization Courses concerning Architecture in Health Systems

In 1981, the Ministry of Health, in association with the University of Brasília (UnB), launched the first *Specialization Course concerning Architecture in Health Systems*. Its primary goal was to train architects and engineers from municipal and state health agencies to enable them to design, approve and inspect projects and constructions of healthcare facilities.

The content of this course, however, went beyond studying the official regulations. At the time, there was a Portuguese researcher at UnB, Professor Mário Júlio Krieger, who had just gotten his doctorate in England, where he studied the principles of Architectural Programming and its implementation in the English Healthcare System – still one of the most highly regarded ones. Such principles, which used concepts from topology, would be essential to write the regulations to come; many of the architects graduated at that time took part in this movement.

Additionally, we must mention that by getting financing for these courses from the Ministry of Health allowed UnB resources to hire some of the most distinguished hospital architects at the time to teach there, like Jarbas Karman and João Carlos Bross.

Among its students, we can list many professionals who are still giving important contributions to the future of architecture concerning healthcare in Brazil, like Flávio de Castro Bicalho and Regina Maria Gonçalves Barcellos, who planned and organized the Ordinance 1884/1994; Mariluz Gomez Esteves, who helped organizing the Ordinance 1884/1994 and was chairman of the Brazilian Association for the Development of the Hospital Building between 1998 and 2000; Frederico Flósculo Pinheiro Barreto, researcher of Architectural Programming and Antonio Pedro Alves de Carvalho, who came to organize seven editions of similar specialization courses in Salvador.

These courses, consequently, qualified the future conceivers of the Ordinance 1884/1994, which was a forthright regulation, functionally justified and with no strict demands concerning mandatory areas and spaces.

Ordinance 1884/1994



Picture 14: Cover of the book edition of Ordinance 1884/1994 (BRASIL, 1994).

The base for Ordinance 1884/1994 (BRASIL, 1994) (Picture 14) was the principles of Architectural Programming, which basically means the study of the quantification, relationships and dimensions of the spaces based on its functional characteristics. Every room that appears in the regulation was thoroughly studied for the activity to be held there, including the need for furniture, equipment, people, further installation and inside/outside flows.

To conceive it, not only the best consultants in the area were gathered, as they applied an open methodology, which allows easy updating and adaptation.

The architects Regina Maria Gonçalves Barcellos, Flávio de Castro Bicalho and Maurício Freire Santiago Malta were responsible for the general coordination and writing. As consultants, we may list: Antônio Carlos Azevedo (doctor), Carmen Vieira de Sousa Unglert (doctor), Domingos Marcos Flávio Fiorentini (architect and doctor), Eduardo Luiz Brito Neves (engineer and administrator), Frederico Flósculo Pinheiro Barreto (architect), Jarbas Karman (architect, administrator and engineering), Leni Helena Calixto de S. Dias (doctor), Manoel Altivo da Luz Neto (architect), Maria Elaine Kohlsdorf (architect), Maria Lúcia Ramalho Martins (nurse), Otto Toledo Ribas (architect), Oviomar Flores (sociologist), Sandra Suzana Prade (nurse), Salim Lamha Neto (engineer and administrator) and Tadeu Almeida de Oliveira (architect). Dozens of other associates, from the most distinguished areas, have had a timely participation.

There was no explanatory drawing in the regulation, whose primary goal was to develop a tool that would enable the understanding that the activities to be held in a certain space, as well the furniture and equipment necessary, would set the tone for the design of a space. On that account, there were lists of activities linked to each room specified in the overview table that identified the minimum areas and supplementary conditions for the project. We can read in the introduction:

[...] it replaces the current regulation (Ordinance MS nº 400/77), which was rigorous and slightly flexible, and considers the physical planning of health systems.

By adopting SUS's principles, including epidemiologic, environmental, cultural and geographic criteria, it replaces rigorous models for typologies that result from a collection of functional features when conceiving a building.

Moreover, it deepens existing criteria and adds new ones, as a result we have alternative and varied solutions.

[...] this document brings the technical foundation for conceiving and analyzing architectonic projects for healthcare facilities, being instrumental for the understanding of physical resources and for the quality of the healthcare service. (BRASIL, 1994, p. 6)

The first part of the regulation focuses on how to present projects to the Health Surveillance Agency – such part now belongs to the RDC 51/2011 (BRASIL, 2011b). The second part focuses on the Physical/Functional Program, which says:

The methodology used to conceive the functional programs is listing, as extensively as possible, the collection of attributions and activities of healthcare facilities, which, in this text, we see as generic, not committed to any standardized solutions [...] (BRASIL, 1994, p. 28)

It discussed two items:

- 1 - Attributions
- 2 - List of activities

For each attribution, there is a list of activities that are related to the spaces of each Functional Unity. For instance:

ATTRIBUTION #1: OFFER OF BASIC HEALTH SERVICES

1.1-To undertake preventive healthcare services for individuals or group of people, such as: immunization, first aid, control of communicable diseases, homecare, material collection for laboratory tests etc.;

1.2-To undertake epidemiologic surveillance through: gathering and analyzing data, epidemiologic investigation, information about diseases etc.;

1.3-To promote educational activities concerning health through lectures, demonstrations, in situ training, campaign etc. [...] (BRASIL, 1994, p. 32)

In chapter 3, there are tables by Functional Unity, which are not just quantitative, but, mainly, establish limits and conditions for the development of projects for healthcare buildings (Picture15).

UNIDADE FUNCIONAL: 5 - APOIO AO DIAGNÓSTICO E TERAPIA (cont.)				
Nº ATIV.	UNIDADE / AMBIENTE	DIMENSIONAMENTO		INSTALAÇÕES
		QUANTIFICAÇÃO (un.)	DIMENSÃO (un.)	
5.6	Centro Cirúrgico			
5.6.1	Área de recepção de paciente	1	Suficiente para o recebimento de uma maca	
5.6.2	Sala de guarda e preparo de anestésicos	1	4,0 m ²	HF,FAM
5.6.2	Sala de indução anestésica		Sala com 2 leitos no mínimo. 8,5m ² por leito, com distância entre estes e paredes, exceto cabeceira, de 1,0m. 6,5m ² quando houver mais de 2 leitos	HF,FN,FVC,FO, FAM,AC,EE,ED
5.6.3	Área de escovação	Até 2 salas cirúrgicas = 2 torneiras por cada sala Mais de 2 salas cirúrgicas = 2 torneiras a cada novo par de salas	1,10 m ² por torneira	HF,HQ
5.6.4.5.6.8	Sala pequena de Cirurgia (oftalmologia , endoscopia , otorrinolaringologia, etc)	2 salas. Para cada 50 leitos não especializados ou 15 leitos cirúrgicos, deve haver uma sala. Estabelecimentos especializados (cardiologia , cirurgia, etc) tem de fazer um cálculo específico	20,0 m ² com dimensão mínima= 4,0 m	FO,FN,FAM,FVC, AC,EE,ED,E,AE
5.6.4.5.6.8	Sala média de cirurgia (geral)		25,0 m ² com dim. mínima = 4,7 m	
5.6.4.5.6.8	Sala grande de cirurgia (ortopedia, neurologia, cardiologia, etc)		36,0 m ² com dim. mínima = 5,0 m	
5.6.4.5.6.8.	Sala de apoio às cirurgias especializadas		12,0 m ²	HF,CD,AC,EE,ED
5.6.5	Área para prescrição médica		2,0 m ²	EE
5.6.5	Posto de enfermagem e serviços	1 a cada 12 leitos de recuperação pós-anestésica	6,0 m ²	HF,AC,EE
5.6.6	Sala de recuperação pós-anestésica	1 sala. O n° de leitos depende dos tipos de cirurgias previstas. De um modo geral estima-se 2 leitos por sala cirúrgica	Sala com 2 leitos no mínimo. 8,5m ² por leito, com distância entre estes e paredes, exceto cabeceira, de 1,0m. 6,5m ² quando houver mais de 2 leitos	HF,FO,FAM,AC,EE, ED

AMBIENTES DE APOIO : -Sala de utilidades -Sanitários com vestiários para funcionários (barreira) *-Sanitários para acompanhantes (sala de espera) -Sala de espera para acompanhantes (anexo à unidade) -Sala de preparo de equipamentos / material	-Sala administrativa *-Laboratório para revelação de chapas ("in loco" ou não) -Copa -Depósito de material de limpeza *-Área para guarda de macas e cadeira de rodas
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Picture 15: Example of a table from Ordinance 1884/1994 (BRASIL, 1994, p. 67).

The concept of Functional Unity is truly important for the structure of the regulation. It means a collection of spaces regarding complementing activities, instead of constructive typologies. For an example: the spaces designed for first aid assistance must be consulted under Functional Unit for Immediate Assistance, which is valid for either small clinics or major hospitals.

There are some instructions to use the tables that are worth the mention:

The existence of a certain space depends on the execution of its correspondent activity. Nonetheless, the execution of certain activity does not guarantee the existence of the specific space for it, since the activity may eventually take place in more than one space or with another activity in another space. (BRASIL, 1994, p. 43)

In Part III of the regulation, there are additional information for healthcare facilities, such as: Indoors and outdoors circulation; Environmental conditions regarding comfort; Environmental requirements to control hospital infection; Ordinary and special building installations; and Safety requirements to prevent fire.

Resolution from the Collegial Board 50/2002 (RDC-50/2002)



Picture 16: Cover of the RDC-50/2002 in its 2004 edition. (BRASIL, 2004)

The RDC-50/2002 (BRASIL, 2004) might be considered an update of the Ordinance 1884/1994, thus not presenting changes concerning the methodologies for conceiving, presenting or advising. Only updates and small additions are noticeable, resulting in a document in which the Brazilian Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária – ANVISA*), created in 1999, takes on the attributions to inspect healthcare facilities infrastructures (Picture16).

In the presentation, it is stressed: “During the updating process, the Ministry of Health has published several ordinances on specific topics and the current work did not overlook the contents of those, aiming at consolidating all the legislation there is on the topic.” (BRASIL, 2004, p.3).

Such consolidation is the ideal path towards better imparting and applying the regulations for healthcare infrastructures.

There was an additional content that must be emphasized: the detailed grounding of the used methodology in a text with precise explanations of goals and reach of the regulations in item 3: Dimensioning, Quantification and Building Installations of Spaces:

The current regulation does not establish a typology for healthcare buildings, like health centers, hospitals etc., here we attempted to regard all these buildings generically as healthcare facilities that must adjust to the epidemiologic, populational and geographic uniqueness of the region where they are sited. There are, therefore, different healthcare facilities, even when it is a building of the type of a health center, for instance.

[...] by identifying in the list of attributions/activities from chapter 2 the number of the activity to be held, one must look for in the first column of each table the same number and thus the space correspondent to that activity.

It is worth emphasizing that the space will only be mandatory if, obviously, the healthcare facility is going to hold the correspondent activity. [Italics added]

Therefore, there are no pre-defined architectonic programs, yet, a list of spaces that must be used by the healthcare facility planning team as they are establishing the healthcare facility program or when the project is under assessment for approval.

Each program is specific and must be conceived by the team planning the healthcare facility, including the needs and specificities of the project, therefore decentralizing decisions, which will no longer be made under a pre-defined foundation of programs or plans. (BRASIL, 2004, p.41)

Any attempt to modify the RDC-50/2002, as a result, must take into consideration the methodology to do so and the use of the regulation.

Regulations after the RDC-50/2002

Regulations from the Ministry of Health are constantly being conceived by working groups. Several of them concern infrastructure, complementing, revoking or adding new demands, ignoring the RDC 50/2002 methodology. Currently, there is no coordination that centralize those changes, which are not only edited by ANVISA, but also by different agencies inside the Ministry of Health.

It is very common to change the basic regulations for projects and constructions of healthcare facilities, as we can see in the RDC 36/2008 (BRASIL, 2008):

The physical infrastructure of the Obstetrics and Neonatal Unity must comply with the requirements from the Supplement II from this Regulation, which alter the items concerning obstetric and neonatal services from the RDC/Anvisa n. 50, from 21 February 2002. (BRASIL, 2008 [s.p.])

The Ordinance 11/2015 MS/GM (BRASIL, 2015), concerning the Labor Unity, brings a table that only establishes minimum areas and dimensions, with no reference to the activities held in each space. We may observe that this table resembles the ones in the Ordinance 400/1977, i.e. imposing quantities and areas not allowing adaptations to best suit each case.

In the RDC 07/2010 (BRASIL, 2010), concerning the ICU, we read the following:

Section II: Physical Infrastructure

Article 10. The requirements established in the RDC/Anvisa n. 50, from 21 February 2002 must be followed.

Sole Paragraph. The infrastructure must contribute to enable the privacy of patient, although not interfering with his or her monitoring.

Article 11. The Adult, Pediatric and Neonatal ICUs must have their own and exclusive spaces.

Paragraph 1. If these unities are contiguous, the support rooms can be shared.

Paragraph 2. In hybrid Pediatric ICUs, there must be a physical separation between the Pediatric and the Neonatal ICU spaces. (BRASIL, 2010 [s.p.])

It is noticeable that, although referring to the RDC 50/2002, there are observations concerning infrastructure, which makes the work for those involved in projecting and building a healthcare facility very hard, since it implies a continuing study of all regulations, because each one of them can have something concerning the physical area.

In the RDC 67/2007 (BRASIL, 2007), concerning Compounding Pharmacies, there is no mention to the RDC 50/2002, establishing demands for spaces that seem to be taken from a specific project:

4. PHYSICAL INFRASTRUCTURE.

The pharmacy must be located, projected, built or adapted, with an infrastructure suitable to the activities to be developed, providing no less than:

- a) a space or room for administrative activities;
- b) a space or room for storage;
- c) a space or room for quality control;
- d) a space or room to weight raw material;
- e) room(s) to prepare the drugs;
- f) a space for distribution;
- g) locker room;
- h) changing room;
- i) toilettes;

- j) a place to clean utensils and packaging material;
- k) storage room for cleaning products. [...] (BRASIL, 2007 [s.p.])

There is no unity concerning the structure or any other standard in the observations about the physical area established in these regulations. The architects, engineers, administrators or employees of Health Surveillance Agencies who work with healthcare facilities projects must interpret the details and goals of every regulation, since reading cannot be considered a trivial task.

We must have a regulation for healthcare facility infrastructures that comprehends all the observations on the topic and that is constantly updated, preventing information from going astray, which makes it impossible to fully understanding and applying it.

The Support System to Conceive Financing Health Projects (SomaSUS)

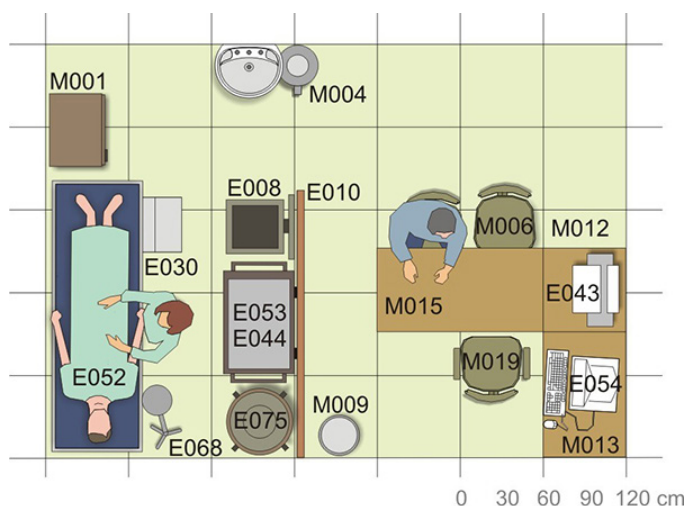
The SomaSUS project is of key importance to guide, impart and implement the RDC 50/2002. It is an initiative from the Ministry of Health to compensate gap in regulation concerning graphic information and architectonic programming.

The Executive Secretary from the Department of Health Economy, Investments and Development from the Ministry of Health used to have difficulties to guide architects and administrators through the projects presented that needed approval for federal financing. The RDC 50/2002, although a well-grounded regulation, fails to explain the essential information of architectonic programming for the elaboration of projects, such as: indoor flows, furniture, equipment, connection between activities and other regulations concerning each functional unity. The graphic information to make some of these data clear is lacking, especially for architects with no experience in the field.

To compensate for this blank, the Ministry of Health, the Federal University of Bahia (UFBA)/Studying Group in Hospital Architecture and Engineering (GEA-hosp) and the Federal University of Santa Catarina (UFSC)/Institute of Biomedics Engineering (IEB) teamed up to design an advisory guide for infrastructure projects.

The UFBA was responsible for developing the graphic material for architectonic guidance and the UFSC was responsible for equipment and furniture, especially technical specifications and estimated costs.

The major issue faced at the beginning of this workforce was not to make the same mistakes as in the Ordinance 400/1977 and before, which led to certain architectonic solutions, by including complete plans of specific typologies. It was decided that they would only explain the process of architectonic programming established by the RDC 50/2002, which was based on the pre-dimension of spaces, taking into consideration the activities developed, indoors and outdoors flows, furniture, equipment and staff.



The result was modular plans, with no walls, divisions or miters, which just explain the necessary spaces for each activity and suggested furniture and equipment, thus not inducing pre-established solutions. Along with the graphic schemes, there are tables that list furniture and equipment in the minimum amount for each situation. To help the conception of financing projects, they added estimated costs and technical specifications to that list. The didactic and advisory style of the guide was, therefore, ensured since it was completely based on the methodology used for the RDC 50/2002 (fig.17).

Picture 17: Example of a layout presented in SomaSUS, with equipment and furniture codes (BRASIL, 2017).

Initially, the work was made available through digital files recorded on compact discs, which were distributed in meetings, seminars, congresses and to the Health Surveillance Agencies. Later, the content was available on the internet. In addition, a four-volume book was edited with part of that content, to which case there were added scientific papers that better explain how the studied functional unities work and that also include practical examples with architectonic plans (Picture 18).



Picture 18: Cover of the volume 4 of SomaSUS (BRASIL, 2014)

SomaSUS is a valuable documentation for research and for professional guidance for those working with healthcare infrastructures and that need a material written in Portuguese and that is adapted to the Brazilian reality. This is an important and enriching initiative concerning the technical aspects that affect healthcare facility projects.

Further Initiatives

There are other initiatives of great importance that have been helping to impart the knowledge related to healthcare infrastructure. The groundbreaker was the establishment of the *Instituto de Pesquisas Hospitalares* (IPH), by the architect Jarbas Karman. The Institute have been carrying out an important work of imparting and providing technical information concerning healthcare infrastructure since the 1950's, by publishing books, magazines and launching graduation, post-graduation and specialization courses (IPH, 2017).

Another important initiative are the Hospital Engineering and Architecture Congresses that take place with the Hospital Equipment Fair (the *Hospitalar*), that happen every year in the city of São Paulo. These congresses were initially organized by the *Fundação São Camilo*, which owns an educational complex in administration of healthcare facilities. For many years, those were the only permanent events to impart knowledge in the fields of engineering and architecture concerning health (HOSPITALAR, 2017).

It is also worth mentioning the institution of the Brazilian Association for the Development of the Hospital Building (*Associação Brasileira para o Desenvolvimento do Edifício Hospitalar* – ABDEH) that, currently, has more than 600 members and is responsible for the edition of books and magazines, in addition to organizing biannual congresses that receive the presentation of scientific papers concerning healthcare infrastructures at international level. The ABDEH's web page provides extensive and free of charge material in this area of expertise for studying and researching purposes (ABDEH, 2017).

The Studying Group in Hospital Architecture and Engineering (GEA-hosp), from the Federal University of Bahia, Architecture Department, also has a relevant production concerning the topic. For instance, between 1997 and 2010, the group organized specialization courses in architecture and health, having published important books and, as it has already been said, took part in the conception of SomaSUS (GEA-hosp, 2017).

Adding to the academic community, there is the work undertaken by the *Espaço e Saúde* group, an assembly of professionals belonging to the Architecture post-graduation program from the Federal University of Rio de Janeiro, which has also been organizing specialization courses focused on architecture for health, as well as editing several

books and coordinating seminars (UFRJ, 2017). The Catholic University of Brasília maintains, until nowadays, specialization courses to study architecture and health (UCB, 2017). We cannot overlook the role of several educational entities from the State of Rio Grande Sul, which coordinate specialization courses of great importance that have been qualifying engineers and architects to work with healthcare infrastructures since the 1990's.

The initiatives must be comprehended within the wide context of helping regulating health infrastructures, since they represent highly qualified groups that must interact in this mission of enhancing the quality of health facilities.

Final Considerations

We are going through an important moment of applying changes to the current basic regulation concerning health-care infrastructure. If there are properly grounded technical arguments, it will be possible to continue with the discussions in a productive manner. However, without this knowledge, the negative impact will be inevitable, reflecting in the quality of the projects for healthcare facilities nationwide.

To accomplish a successful updating process of the RDC-50/2002, we must seek:

- The maintenance (or deepening) of its methodology;
- The addition of changes that are present in later regulations;
- The development, within ANVISA, of a Coordinator Nucleus to manage the infrastructure regulations and that will centralize all the further modifications of the new regulation, making updating more frequent.

Therefore, it will be possible to envision a process that points towards an evolution in regulation that keeps the openness and informative style of the current RDC 50/2002. We observe that the development of the legislation in health infrastructure must be accompanied by the interaction with research institutions as well as imparting and producing knowledge. This is a very specialized area, therefore, it is necessary to continue the work of training and qualifying professionals, as well as pursuing updates based on flexible premises and that are open to the possibility of constant adequacy.

In the current process to update the RDC 50/2002, we must highlight the participation of all these initiatives, which must be connected, to contribute effectively to the technical training of the professionals involved.

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Santa Casa de Misericórdia de São Paulo: a hospital architectural heritage

Evandro Pereira da Silva



Picture 01 – *Santa Casa de Misericórdia de São Paulo* Hospital - (2015).

The inception of mercy in São Paulo

The genesis of Santa Casa de Misericórdia in Brazil was in the path of the explorers who were piercing through the new continent, fulfilling their role of bringing aid to the sick and the forsaken. They soon reached and got established in São Paulo dos Campos de Piratininga around 1560 through the work of the Portuguese priests accompanying the expeditions, like Manuel da Nóbrega¹ and José de Anchieta², besides religious men from the Society of Jesus³.

According to some historians and paintings, like the ones from Benedicto Calixto⁴, once in São Paulo's territory, Santa Casa was located near the Pateo do Collegio, a place known today as Largo da Misericórdia.



Pictue 02 - "Santa Casa and the Pateo do Collegio" - Benedicto Calixto (1853 – 1927).



Picture 03 - "Ponte da Santa Efigênia – SP and the Misericórdia (1827)" Jean Baptiste Debret⁵.

As stated by Eudes Campos (2011), from the beginning, Santa Casa de Misericórdia dos Campos de Piratininga remained operating in buildings near the location where São Paulo was established. However, in the beginning of the 19th century, the development of the region caused another hospital institution to arrive: the military hospital. The government, therefore, evicted Santa Casa, which temporarily ceased its activities and transferred its patients to the new institution that was in charge.

New homes for Misericórdia

Nonetheless, in 1825 Misericórdia resumes its work of helping those in need after intervention of its new president and the province's Governor. The location is now the Chácara dos Ingleses' farmhouse, situated at one of the Southern entrance of the city and in the adjacencies of the road to the coast that belonged to João Rademaker⁶. Besides the new address, Misericórdia began to provide a new type of aid that did not use to: the foundling wheel⁷.



Picture 04 and 05 - Chácara dos Ingleses' farmhouse - Hospital da Santa Casa. Watercolor by Edmond Pink, 1823 and at right plan of São Paulo, Liberdade neighborhood in the detail, in 1847 - Aflitos Cemetery highlighted in green, current Rua da Glória.

Once more, in 1840, the hospital's facilities were transferred to a new building, still within Chácara dos Ingleses' limits. The new building, which Campos (2011) believes to be conceived by the Portuguese military engineer Daniel Pedro Müller⁸, had an improvement in comparison to the old one: it was built on a completely level ground, which made it easy to dislocate patients. However, there were criticisms regarding the architectural typology chosen to build the facilities for Misericórdia's new building, since it was compared to a *senzala*⁹.



Picture 06 – Chácara dos Ingleses' farmhouse - Santa Casa Hospital, 1840. Plan by Portuguese engineer Marechal Daniel Pedro Müller (1785-1841 c.). Quill by Augusto Esteves, 1943.

Campos (2011) also emphasizes that, due to the increase in demand resulting from the number of ailing people that came to them, Misericórdia hospital moved to a new address, still in Rua da Glória, with appraised facilities. However, Dr. Antônio Caetano de Campos¹⁰ wrote some reports, in 1875, that described the facilities as unsavory for a healing environment. Nevertheless, the number of sick people was still skyrocketing. At that point, in October 1876,

the administrative board realized they needed a new building that could expand their capacity to provide quality and more humane services to those in need.

Santa Casa and Pucci's neo-Gothic architecture

Campos (2011) states that, in the mid 1870s, on grounds of all the concerns voiced at the time, a land¹¹ sited within the Bexiga farm was chosen for the new healthcare building of the institution and, witnessed by the authorities of the time, they broke ground for the beginning of construction.

Yet, according to Silva (2010), in 1881, because of the pressure put by the community and the press, besides not being financial viable, a new location needed to be defined. To resolve such situation, José Pinto Antônio do Rego Freitas¹² proposed to exchange terrains, he owned a land in the Arouche neighborhood that would be sold to the Baron Rafael Tobias de Barros¹³ for half the price and the Baron would donate a land for the construction of the new hospital, which is currently located in Santa Cecilia neighborhood, precisely at Rua Dr. Cesário Mota Jr., in exchange for the land in Bexiga.

In August 1884, the new Santa Casa de Misericórdia de São Paulo Hospital construction is partially concluded when it is transferred again to its new and definite address in Santa Cecília neighborhood, where it remains.



Picture 07 –Santa Casa de Misericórdia de São Paulo Fraternity - 1884

At last, the magnificent building was concluded. Ramos de Azevedo's¹⁴ office conceived and built the hospital making use of neo-Gothic architecture through the skillful hands of the engineer Luiz Pucci¹⁵. The building presents vertical brickwork façade and its foundation was built with blocks of stone seated just by gravity, without mortar. The Misericórdia hospital was then able to shelter the community and continue its work in the city of São Paulo that was growing vertiginously, though with substantial lack of services for the less privileged population.

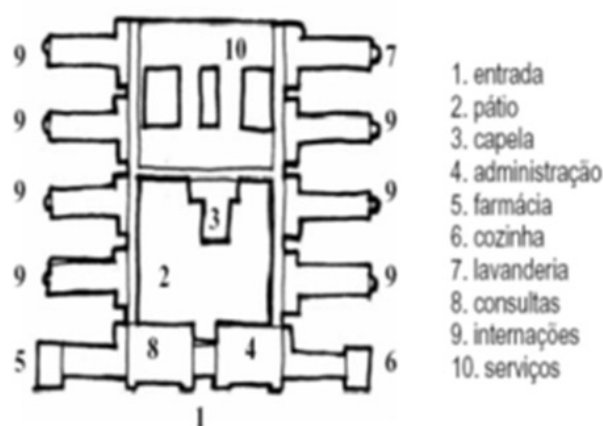
The Functionality of the Misericórdia's building

According to Ferreira (2015), the Misericórdia began its activities in the new building in 1884 with 200 beds. It was the biggest building in the city, which caused a change in the landscape of the time. It carried out the functions of hospital, dispensary, nursing home, shelter and further activities to help those in need.



Picture 08 – Children infirmary - Santa Casa de Misericórdia de São Paulo - (no date).

On that account, according to Campos (2011), when conceiving the project, the architect Pucci was highly influenced by the vertical hospital architecture that was taking place in Europe, specially by the concepts adopted for the Lariboisière hospital in Paris¹⁶, where the provision of fresh air was finely leveled between the project and the use of the building, since ventilation contributes a great deal for the healing process in a hospital facility. With that in mind, the Italian architect chosen by Ramos de Azevedo applied this technic for the healing building of São Paulo's Misericórdia.



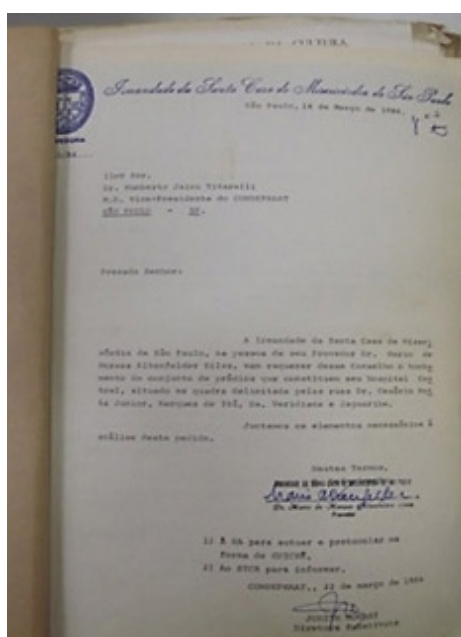
Picture 09 – Horizontal projection of Santa Casa de Misericórdia de São Paulo - (1992).

Mott et al (2011, p. 26) highlights that there was a concept of hospital building known as Tollet, developed in 1872 in France by the military French engineer Casimir Tollet, who used to advise that hospital buildings should be built afar from urban agglomeration and of great exposure to insolation. In addition, he would suggest that the location should enable the hospital's expansion, taking advantage of the surface of the terrain and the concept of parallel disposition between the buildings that would eventually be built as wings from the main one. Consequently, this type of health-care building is known for its vertical typology, in which it was also clear the concern regarding germ contamination due to the recent discoveries made by Louis Pasteur. Nonetheless, the pavilions had up to two floors and the ailing people were isolated inside them depending on what type of illness they were suffering from.

Moreover, according to Salmoni and Debenedetti (1981, p. 101) an Italian architect, Giulio Micheli, helped in the construction and expansion of the Misericórdia's complex, since Pucci appointed the young architect who had recently arrived from Florence as his business associate in the architecture firm.

Preservation of the hospital architectural heritage

Even not undergoing substantial changes in the architectonic anatomy and typology, the Santa Casa de Misericórdia de São Paulo's building was attempting to absorb and keep up with the improvements on hospital architecture around the world, however remaining its pioneering status as the first building of this type in Brazil and, nevertheless, making the effort to fulfill its role of giving support to hospital care in the city of São Paulo, where there was a lack of public investment to help the less privileged ones.



Picture 10 – Request for listing

Considering the facts here presented and its importance as a hospital architectural heritage, in 1984, it was requested that Misericórdia's building got listed by the National Heritage Council. To briefly list the facts of interest that guided the process of qualifying the historical building as cultural heritage within the Conselho de Defesa do Patrimônio Histórico, Arqueológico, Artístico e Turístico do Estado – (CONDEPHAAT), Dr. Mario de Moraes Altenfelder Silva, sponsor and chairman of Santa Casa de Misericórdia de São Paulo at the time, filed a suit, # 23046, in 15 August 1984, which was accepted by the director of the Council at the time, Judith Monari, that allowed the process to continue, submitting the request to the CONDEPHAAT'S analysis, as described in the following lines.

It is worth mentioning that the decision made by the hospital's chairman was influenced by a statement from Boito (1884, p. 22, 23), in one of his lectures in Turim, in which he warned everyone about the need to protect our cultural heritage (monuments or architecture) and how that was a responsibility that concerned the society as well as the government.

In the first pages of the writ filed by Drº Altenfelder (1984) to the CONDEPHAAT, there was a description of the location of Santa Casa's building, that had been already mentioned in this article, there were also the details concerning the competition to choose the best project, in which took part architects of the time, such as: José Gandolpho, Dentiliano H. Ribeiros, Paulo Hamelin, Ramos de Azevedo and the winner, Luiz Pucci, who proposed an English neo-Gothic vertical building, which was built between 1881 and 1884. It is also mentioned that, afterwards, new wings were built to the main building to answer to the needs of the hospital, resulting into a complex, but that, even so, they have kept the architectural style from the main building. Moreover, the maintenance of the building is conducted by a

specialized team that belongs to the institution and that makes the effort to maintain the architectonic characteristics untouched.

Altenfelder (1984) also presented a report stating the number of patients seen in the hospital, which were, at the time, approximately 2.000 people per day, and 1.000 beds available. In addition, he emphasized that the collection of buildings presented a valuable historical and architectural heritage for future generations.

However, the architect Carlos Lemos (1984), CONDEPHAAT's counsellor, proposed in his legal advice, on pages 21 and 22 of the process, from 3 September 1984, that only the first buildings conceived and built by Pucci should be listed by the Council, i.e. the initial nucleus, gardens and chapel. There would be no restraints on altering or even demolishing the rest of the buildings of the complex.

On the page 26 of the writ, in 18 July 1985, Santa Casa de Misericórdia de São Paulo presented plans and further documents that the CONDEPHAAT had requested. The Council's architect, Tania Martinho Veja, responsible for the department, submitted the document to the specialized director for assessment and appropriate decisions.

However, in 27 September 1994, i.e. a decade after filing the suit, the sponsor at the time, Prof. Dr. Waldemar de Carvalho Pinto Filho, signed a decision to discontinue the process of listing the hospital as cultural heritage, as recorded on the pages 144 and 145 of the writ, submitted by the Misericórdia to the CONDEPHAAT, since the institution was interested in expanding and modernizing the buildings, which would be difficult to do after the favorable decision towards listing the buildings.

Despite the request, the architect Tania Martinho Vega reiterated in her technical report, issued to the specialized director of the Council on pages the 222, 223 and 224, that the first buildings constituting the main nucleus, besides the front gardens, as well as the chapel and its gardens and galleries should be listed as cultural heritage; the remaining buildings could undergo remodeling and other adaptations as long as approved by the CONDEPHAAT.

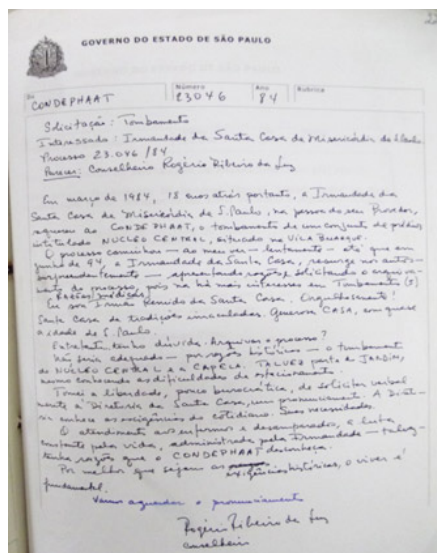


Figura 11 – Carta de Rogério Ribeiro da Luz

However, in a letter written in 2002, Rogério Ribeiro da Luz, CONDEPHAAT's counsellor at the time, expressed his doubts concerning whether he should approve or discontinue the listing requirement, since he was making the effort to understand the great difficulty that the fraternity was facing by not being able to adjust its facilities to the needs of those who came in the hope of being healed. The procedures of the process prevented Santa Casa from undergoing any change, unless consented by the CONDEPHAAT, and he highlighted: "Providing assistance to the ill and abandoned, the tenacious fight for life led by the fraternity, may have reasons unknown to the CONDEPHAAT and although the historical requirements are good, living is fundamental" and he finished his letter: "We shall wait for the announcement, i.e. the report from all the Council's professionals involved in this case."

Yet in another report, from 2003, the architect Tania Martinho Veja, from CONDEPHAAT, mentioned the works taking place inside the complex and suggested that the fraternity should be required to present a plan of occupation and construction to the complex for the Council to analyze; moreover, she restated the listing proposal previously mentioned on the pages 222 to 224 of the process.

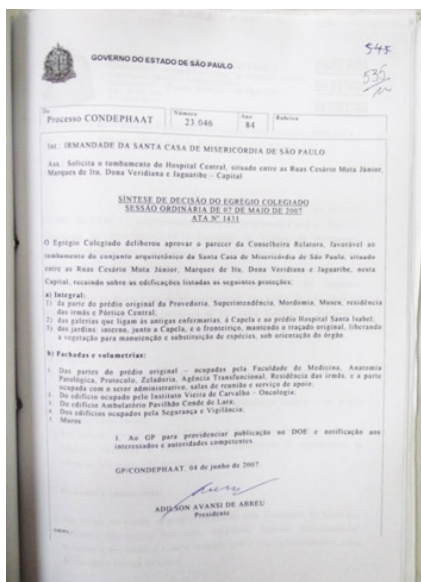


Figura 12 – Parecer final do CONDEPHAAT.

In the same year, CONDEPHAAT requested a thorough inspection in all of the buildings of the complex, respecting the uniqueness of each space. The inspection was allowed in 2004, and they found unauthorized constructions during the listing process and, consequently, the technical discussions persisted until mid-2007, when the collegial board of CONDEPHAAT, through its president, Mr. Adilson Avansi de Abreu, decided in favor of listing Misericórdia's buildings, as described on page 535 of the law suit. The protection would cover the buildings originally built by Pucci and Micheli, besides the gardens from the chapel.

Therefore, as recorded in the case file, on page 593, CONDEPHAAT concluded its work by publishing in the Official Journal of São Paulo, in 21 September 2010, on page 42, the acceptance of the architectonic complex of Santa Casa de Misericórdia de São Paulo as a cultural heritage, drawing attention to the social importance of the work undertaken by this institution and the importance of its buildings, which have become an architectonic and environmental landmark to the city and, finally, emphasizing the respect for those who were part of it.

Final considerations

Five hundred years have gone by and the Misericórdia remains at the population's disposal, providing relief from the suffering caused by illnesses that ravages the less fortunate ones. Although, in the past, the spaces were granted in unsuitable locations, with time, a place where the hospital could expand and continue with its work was determined, enabling those arriving in the eager of getting healed to envision a better future. Therefore, this institution conquered its space in São Paulo through a functional architecture.

Nonetheless, it is overwhelming to acknowledge the process that a patrimony of this magnitude needed to endure to become a cultural heritage, as it has been almost 32 years since the first step was taken towards preserving the history of hospital architecture in São Paulo. Probably, the first ones to envision it may have never imagined how long it would take and the obstacles they would have to overcome until the favorable decision.

Consequently, the architecture that took shape by the hands of Pucci and Micheli, in the end of the 19th century, through the bricks and mortar of their supporting arches, has finally earned its deserving place in history, allowing future generations to witness the beginning of São Paulo's hospital architecture, providing the real dimension of this type of healthcare building and its cultural and architectonic contribution.

Footnotes

1. Portuguese priest who arrived in Brazil in 1549 with the general governor Tomé de Souza, leading the first group of Jesuits. Available at: <http://escola.britannica.com.br/article/483409/padre-Manuel-da-Nobrega>
2. Spanish priest who started at the Society of Jesus in Portugal and was later sent to Brazil, where he helped to catechize Indians and to establish the village of São Paulo. Available at: http://www.prefeitura.sp.gov.br/cidade/secretarias/cultura/bibliotecas/bibliotecas_bairro/bibliotecas_m_z/padrejosedeanchieta/index.php?p=4942
3. The Society of Jesus came into being in 27 September 1540 after the approval of Pope Paulo III, aiming at serving in missions of evangelization. Available at: <http://www.asav.org.br/nosso-fundador/>
4. Benedito Calixto de Jesus was a painter, historian and professor who lived in São Paulo between 1853 and 1927. He captured several images from São Paulo's scenarios with his brushes and, later, even with a camera brought from Paris during the time he spent studying in the city of light. Available at: <http://enciclopedia.itaucultural.org.br/pessoa8777/benedito-calixto>
5. Jean-Baptiste Debret was born in Paris in 18 April 1768. He studied at the École des Beaux-Arts in Paris. He came to Brazil around 1816 to impart his knowledge on the neoclassic values. He was one of the founders of the School of Fine Arts of Rio de Janeiro and visited several cities recording their daily events. Available at: <http://enciclopedia.itaucultural.org.br/pessoa18749/debret>
6. João Rademaker had English citizenship, therefore his property was known as Chácara dos Ingleses. Available at: <http://www.arquiamigos.org.br/info/info29/i-estudos2.htm>
7. It was a device made of wood and that had a hollow cylinder that used to rotate around its own axis. It had opening that used to face the public highway. It aimed at receiving foundlings. The infant would be placed inside the cylinder, which would rotate 180 degrees until its opening reached the inside of the building. Such device was installed in July 1825 at the Misericórdia hospital (Chácara dos Ingleses) by Lucas A. Monteiro de Barros - the first Governor of São Paulo - and it was put out of action in 1949. Available at: <http://tremdahistoria.blogspot.com.br/2013/05/santa-casa-de-misericordia-historia-e.html>
8. Daniel Pedro Müller (1785-1841), military engineer, was responsible for São Paulo's first printing plan, the Mappa Chorographico da Provincia de São Paulo, drawn in 1837 and published in 1841, in Paris. Available at: <http://www.lsie.unb.br/rbc/index.php?journal=rbc&page=article&op=view&path%5B%5D=1264&path%5B%5D=828>
9. Type of accommodation used by the sugar mill owners to keep their slaves during the night. It was built with clay walls reinforced with wood and covered with roof tiles or straw. Available at: <http://www.historiabrasileira.com/escravacao-no-brasil/senzalas/>
10. Prof. Dr. Caetano de Campos (1867-1891), from São João da Barra, RJ, doctor graduated from Rio de Janeiro Medical School, he was a surgeon at Santa Casa in 1875 and, after that, the head doctor. He was also Secretary of Education of the State of São Paulo, position for which he was praised. Available at: http://www.santacasasp.org.br/upSrv01/up_publicacoes/4617/3454_MUSEU-HISTORICOS-OS-PRIMEIROS-DIRETORESCLINICOS.pdf
11. The original word in Portuguese was gleba, which means: free land within urban area or a portion of free land limited by urban highways with minimum structure. For taxation ends, it is considered the depth equivalent to the maximum dimension of a block, starting at its forefront facing the public highway. Available at: http://www.prefeitura.sp.gov.br/cidade/secretarias/desenvolvimento_urbano/legislacao/planos_regionais/index.php?p=822
12. He was a law bachelor and held several public offices, including the Presidency of São Paulo's City Town Hall in 1884, according to Moura (1999).
13. Rafael Tobias de Barros, the second Baron of Piracicaba, (1830 -1898), born in Itu -SP, he was a Brazilian farmer, son of Antônio Pais de Barros, the first Baron of Piracicaba, and of Gertrudes Eufrosina de Aguiar. Available at: <http://www.arquiamigos.org.br/info/info16/i-estudos.htm>
14. Francisco de Paula Ramos de Azevedo (1851 - 1928) worked as an architect in São Paulo in the end of the 19th century and the beginning of the 20th. He was also responsible for projecting the Mercado Municipal and the Palácio das Indústrias in SP. Available at: <http://www.poli.usp.br/pt/a-poli/historia/galeria-de-diretores/200-prof-dr-francisco-de-paula-ramos-de-azevedo-.html>
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16. A hospital built and concluded in 1846 in Paris that, according to MIQUELIN (1992), was designed based on two groups of five parallel pavilions, interlaced by gardens, connect by a gallery that circumvents an indoors yard. The pavilions shape an "L", being connected to the main circulation area by the smallest stem.

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How Architecture Has Influenced the Promotion of Hospital Hotel Services and Humanization

Ana Augusta Blumer Salotti

Hospital Hotel Services, Humanization and Quality: Putting the Current Scenario into Context

According to Frampton (2009), the aging of the generation whose behavior has been ruling the guidelines of economy for the past five decades, the baby boomers, is one of the factors that have directly influenced the soaring of the demand for health services and consequently the increased expectation of the consumer regarding his experience in health care.

Moreover, we have grown more aware of the importance of preventive medicine, encouraged by a longing for longevity, well-being and quality of life (Pilzer, 2002).

Frampton (2009) also states that unlimited access to health information enhanced by the internet has furthered more critical and demanding users. Therefore, the patient loses his submissiveness and resignation attitude in order to stand out for his rights, demanding a more outstanding course of treatment. Taraboulsi (2003) emphasizes the importance of hospital managers to see (and treat) patients as clients who want to be heard, respected and have their needs met. By stating that the health consumer is more aware and demanding than ever, Taraboulsi (2003) also highlights that the level of criticism and demands from them has skyrocketed.

From that assumption, every one attending a health facility is an opinion leader and henceforth a potential client. Therefore, the concept of client becomes wider, meaning not just the user of the service but also relatives, companions, friends and visitors; this new client has new identified needs and gaps to be filled.

Bigger the Offer, Bigger the Competition

If on one hand the demand has soared, as well as users' demands, on the other so has the competition.

According to Maia and Gil (2008), the most relevant changes in the health system began in the 1970s when the movement to introduce capitalism within health services began, which brought forth the medical-hospital complex.

This movement had its origin when health professionals and investors saw in the group of inhabitants who were not being taken care of by the government (up to the 1930s the public services were exclusively focused on serving underprivileged people) a very attractive market niche. It was the inadequacy of the public system to provide for this population, so far deprived from high-quality services, which made this movement possible thus opening space for the institutionalization of public health.

The rapid process of doctors' and other professionals' employment, the growth of profitable private establishments, the plummet of the importance of philanthropic and charitable institutions that were ruling then and the slowly constitution of an entrepreneurial ideology within the health industry were key in the institutionalization of health. (Panorama Setorial, 1999)

Maia and Gil (2008) also affirm that the segment has experienced fast expansion and euphoria due to private networks valorization and the beginning of group medicine, through health operators and insurances. The writers say that until 1983 Golden Cross owned 95% of insurance and health care national market. The company started in 1971 and was the market leader until 1985 when the major commercial banks launched their health insurances (Las Casas, 1993).

Naturally, for the Brazilian health institutions to survive they needed to provide the high-quality and excellent services people were searching for.

Difficulties that Enhance Opportunities

Due to a bigger demand from users and bigger competition for service providers, two major tendencies egress:

- Hospital Hotel Services: aiming to meet the needs of clients (including patients, relatives, companions, friends and visitors) through amiable and hospitable services, besides introducing support services traditionally offered by hotels adapted and applied to the hospital reality, adding value and contributing for a better perception concerning the experience of hospitalization.
- Search for Quality: aiming to correct and improve services and processes; more efficiency and safety; economy and intelligence when using resources; and, above all, increase client's satisfaction through ongoing improvement heading to excellence.

Hospital Services: Care that is Noticed

Changes in architecture, social agenda, hotel services with doorman and concierge duly dressed and equipped to host the health client, paintings hanging on the wall, music, restaurant, piano-bar and musicians performing (piano and violin) give the impression of having the wrong address. When entering the lobby of some private hospitals, one might have the feeling of being at a five-star hotel. Gurneys, mass of health clients waiting to be seen, wheel chairs lining up, cold environment smelling like ether are scenes from the past. By embracing this innovation some hospitals are looking less like a hospital. (Taraboulsi 2003)

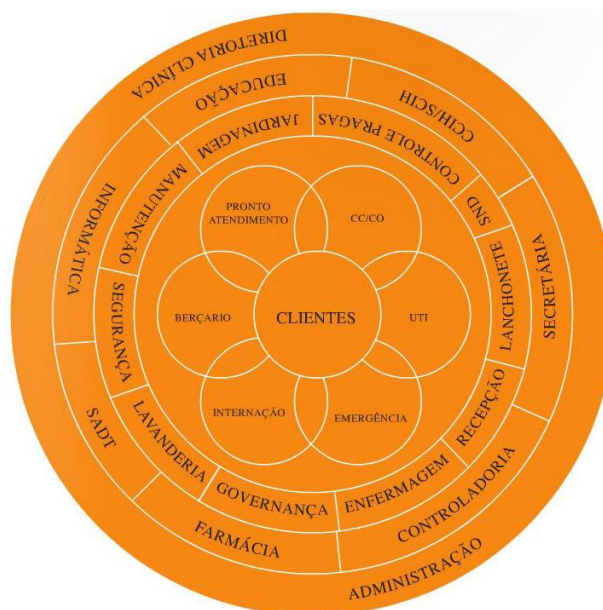
Detaching the hospital environment from a perception as cold, dark and hostile as the disease is one goal of hotel services in hospital. It has also been establishing as an irreversible tendency for hospital institutions that have realized that they must conquer loyal clients in order to survive.

According to Brandalise (2010), hotel services in hospitals are been used as a tool to strengthen the brand through attracting an outside public by promoting events and offering quality services to those living or working nearby.

At Hospital do Coração (HCor), in Paraíso, in the south of São Paulo, for instance, the dishes coming out of the kitchen are not at all jelly and unsalted rice soup. On the daily menu there are five types of salad, meat of every kind and even feijoada (pork, rice and black beans) in meals available not just to patients, companions and doctors but to anyone who wants. Brandalise (2010).

In the same article, Dr. Cláudio Lottenberg (doctor and president of the *Sociedade Beneficente Israelita Brasileira Albert Einstein*) highlights the importance of dissociate the hospital environment from the disease and when talking about the opening of the hospital's new auditorium he concludes his line of thought by stating that "Linking health and culture is something that must become ordinary. It is part of a wide understanding of what health means. (...) But it's certain that (the auditorium) will draw people to learn better about health-related issues and – why not? – to have fun". Brandalise (2010)

Boeger (2009) goes beyond when emphasizes the impact of hotel services in the experience of hospitalization. For patients and companions the way of treatment during the services provided are easier to notice than the investment made in high technology and in equipments and the outstanding technical performance of doctors.



Picture: Chart of Intensity in the Contact with the Client
Source: Boeger, 2009

Therefore, depending on how each institution is managed, the cluster of hotel services may include:

- Gastronomy: nutrition and diet service combined with the creativity of chefs; room service; possibility to choose from other restaurants.
- Governance: laundry, hygiene, maintenance and gardening services, interior design and plague control.
- Security: estate security, surveillance, parking lot and entrance hall.
- *Front Office and Hosting*: reception; admission; hospitality (including a concierge service) and customer service or ombudsman.

The implementation of these services within hospitals for the past decade has been groundbreaking; nonetheless, there is still a label that comes along the concept: hotels are usually associated with luxury, hospitality to well-being and Hospital Hotel Services to private hospitals.

However, when the concepts hotel services and hospitality are fully understood, the fastest association should be: sheltering, education, politeness and prone to serve. According to Boeger (2011), hospitality is connected to pre-established attitudes, which means: behaviors that depend on people rather than exclusively on resources to be implemented.

In order to better illustrate the concept of Hospital Hotel Services linked to hospitality, Gomes (apud Boeger, 2011) emphasizes that the core goal of the field is “to demonstrate to the client that he is in the center of everything, that he is the institution’s biggest concern, that the hospital is on his side to take care of his physical, mental and emotional well-being, helping him to overcome this detour in his life”.

This is the origin of the “hospital humanization” concept, enhancing the need to include actions that respect and value the health client as a human being as an institutional culture and not just as an implementation of isolated actions and individual effort.

As a result, we may conclude that hotel services in hospitals must have the behavioral interface profoundly connected to the institutions’ mission, vision and values. If not, the cluster forming this department ends up as a group of support and convenience services offered to patients and companions, not adding any value of uniqueness despite easiness.

Health Institution: Where Is your Focus?

During his lecture at the ExpoManagement 2007, Michael Porter forcefully warned the audience to the importance of patient-centered care: "Nowadays, we have a scenario in which hospitals want to offer everything, competing for nothing. As long as the focus is not on the patient, they will all keep on losing " (Source: <http://www.saudebusinessweb.com.br/noticias/index.asp?cod=43302> read in February 2011).

Still, to meet patients' and clients' needs it is necessary to know what they want and how they perceive the service received.

Therefore, all it takes is to listen to what they are saying.

Focus on the Patient = Security

The general manager of a multinational-chain hotel in São Paulo (2011) believes that the three success-leading factors according to clients are: consistency, quality and security.

According to the interviewee "(...) the same procedures are undertaken here, in the US or in Asia... so the guest is never taken by surprise with the quality of the company, which is worldwide standard". Hence, the services provided convey reliance, not only attracting clients, but making them loyal to your brand.

This is not a need just within lodging services: much more important than a safe place that provides services in a consistent manner and with quality to spend a certain amount of time for pleasure or work, is the place people trust to take care of their health and their lives.

A research undertaken by the Joint Commission Journal on Quality and Patient Safety indicates that patients see a defective service (or week, poor) as not safe: 22% from 193 patients recorded going through a "recent unsafe experience", among which only 3% concern medical incidents or near mistake. More than half of the events were classified as "incidents in the quality of services" such as:

- 30% concerning waiting and delays;
- 21% concerning lack of communication;
- 12% concerning environment issues.

We may understand, consequently, that "Patients may perceive these inconveniences as a warning against the whole treatment process". (Source: Patient Reported Safety and Quality of Care in Outpatient Oncology - Joint Commission Journal on Quality and Patient Safety; 33:2, 2007).

In an article published by the United States National Medicine Library, the hypothesis that patients who reportedly receive low quality services would be more prone to a higher risk of suffering medical mistake or adverse events was confirmed as shown in the conclusion: "Patients that report incidents in the quality of the services can help identifying risks to the patient's safety." (Source: "Do Medical Inpatients Who Report Poor Service Quality Experience More Adverse Events and Medical Errors?" Med Care. 2008 Feb; 46(2): 224-228 <http://www.ncbi.nlm.nih.gov/pub-med/18219252> read on March 25 2011).

"It is necessary a course of care that focuses on the patient and embraces effective communication as well as technical abilities to reach safety and quality assistance", so conclude the specialists from the Institute of Medicine. (Source: Institute of Medicine, Preventing Medication Errors: Planetree, Improving Patient Experience, Frampton 2010).

The writers Baker and Bank (2008) have broaden our understanding concerning clients' perception regarding services offered according to their dissatisfaction by reading true complaints resulting from hospital services, home care and clinics served by the Ombudsman or Customer Care. That was the starting point to select the "101 Most Common Complaints About Health Care", (sentence that gives the book its name).

Taking into account the reason for the complaints, the conclusion enhances the data aforementioned, which means, more than 60% of clients' dissatisfaction concern:

- Quality (of services, treatment, waiting time, lack of attention or communication);
- Ambiance (infrastructure, comfort and autonomy);
- Access (reception, accessibility and sheltering).

Brady and Conway (apud Frampton and Charmel 2009) emphasize the importance of considering patients as partners to succeed. "The efforts to engage patients as partners in their safety must be based on a patient-centered approach that:

- Sees the patient as a partner;
- Listens to and respects their opinion;
- Foresees and meets their needs;
- And, simultaneously, cares for the staff, so it can provide a more effective assistance."

The writers conclude explaining that safety against non-intentional risk is a basic need of all patients and that is not possible to be truly patient-centered without being safe. At the same time, it is not possible to be safe without being patient-centered.

Support Services: Moment of Truth

Hotel services, whether the traditional ones or in hospitals, have as the most important product offered its services, which means: intangible assets that are evaluated according to the user experience that is called "Moment of Truth".

According to Carlzon (1987), the term Moment of Truth covers the period of time during which the client interacts with the company, its employees and the physical environment, allowing them a perception of the quality of the service (Source: <http://www.cullencia.com.br/archives/206> read on March 21, 2011).

Therefore, these moments include the whole experience of the client with the service offered even prior to his arrival at the institution: from scheduling an appointment with the physician or a surgery over the phone; his arrival, admission up to the moment he is discharged and leaves the hospital.

During such moments, hostility, indifference, coldness or disrespect are as noticeable as hospitality and humanization, whether it is in the care and kindness of the nurse or in the attitude of the valet upon receiving or returning the patient's car. Thus it explains how important it is to consider the hospital staff as a whole as care takers, as praised by Planetree, a model of quality management. (Frampton and Charmel, 2009).

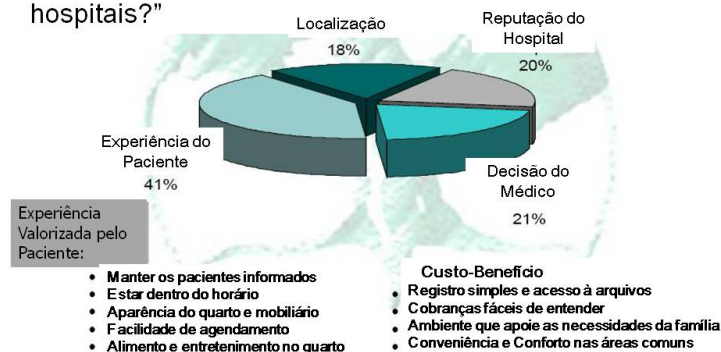
The services offered are not always valued by the client, which is a problem for the quality of the services offered and for the image of the institution. As said before, in a hospital, services are consumed and provided at the same time. How intense and deep the contact between staff and clients may be are relevant factors for the perception of these services. (Boeger, 2009)

Deepening the importance of support services provided for the construction of a favorable hospital experience, the results from a research undertaken by McKinsey (2007) show that when choosing a hospital 41% of the patients are influenced by their experiences.

Among the experiences valued there are: keeping patients informed, being on time, quality of bedroom and furniture, facility to schedule, food and entertainment in the bedroom, simple admission and access to files, easy-to-understand charges, an ambiance that support the family's needs, convenience and comfort in the common areas. These subjects are deeply linked to issues like respect, amicability and support services that are to be provided by the hotel services department.

As escolhas dos Pacientes são Baseadas em Experiência

"Quais fatores influenciam a sua escolha por hospitais?"



Fonte: McKinsey Survey Results (>2000 patients) reported in The McKinsey Quarterly, November 2007

"Planetree: Improving the Patient Experience" FRAMPTON (2010)

Graphic: "Factors that influence the patient's choice for a hospital"

Source: McKinsey (2007) extracted from the presentation "Planetree: Improving the Patient Experience" Frampton 2010 (free adaptation from the writer of this paper).

The medical assistance is as important as all the services that support both the patients' care and the patients' and their companions' comfort, therefore: it is key to be careful with focus on patient, safety, quality and support services are deeply connected.

Wherefore, the transformations concerning hospital architecture begin with queries regarding these priorities:

- How to provide more autonomy to the patient whenever possible?
- How to provide better opportunities of human interaction in every level (patients and relatives; patients and multidisciplinary team; relatives and team and so on).
- How to enhance privacy to internal and external clients?
- How to offer coziness and comfort within environments?

Quality Model Focused on Humanization

Unlike the other quality models, the Planetree is based on a course of treatment that focuses on the patient and considers his perspective. Since it is a philosophy based on institutional and behavioral cultural changes, rather than on processes and physical structure, the road to accomplish this recognition is called affiliation. After certification, the affiliate hospital becomes a "Designated Planetree Hospital".

When questioned about the major differences between Planetree and other accreditation organizations, Alff (2011), who was responsible for implementing the Joint Commission for about fifteen years, places Planetree as an organization that brings together its affiliates as partners and works to take the institutions from where they are to where they want to be. While the Joint Commission has very specific criteria to be met (thus developing a consultancy with judging character), Planetree is a more customized consultancy with a collaborative profile. Alff (2011) also says that the model recognizes that there are numerous ways of creating a positive environment for patients depending on what they wish for. For that, it is necessary to analyze and respect the uniqueness of each country, the profile of patients treated and the weak points that must be improved.

Planetree was founded by Mrs. Angelica Thieriot after she had experienced a traumatic period of hospitalization. During which the lack of information, impersonality, coldness and the darkness of the spaces enhanced her insecurity, anxiety and fear. After surviving this experience, she left the hospital strongly determined to change the way medical care is delivered, defending the rights and establishing herself as a spokesperson of all patients.

She then received the help of a multidisciplinary team formed by renowned and visionary professionals among doctors, nurses, educators, architects, interior designers, nutritionists and financial managers, committed to create a truly new care model in the hospital industry.

Founded in 1978, this non-profit organization is named after the Platanus tree (also known as Plane tree), under which Hippocrates used to teach. One of the guidelines upon which the philosophy of this model was based on was Hippocrates' lessons that emphasized the importance of listening to the patients.

The refocus of medical attention on the patient, considering the influence of his personal beliefs, wishes, fear and yearnings in the treatment as a whole is covered by the authors of the book "Planetree, Putting Patients First" as a key factor to generate contributions for the healing and recovering processes, being directly related to the concept of embracing hotel services in the hospitals, as well as the demystification of admission: a hospital that does not look and smell like a hospital is the goal of the model and is the reason why the whole team engaged and is committed to its creation.

According to Charmel and Frampton (2008), the patient-centered care may be defined as a health assistance scenario in which patients are encouraged to have autonomy through active involvement in their own treatment; it takes place in a pleasant space and makes available a dedicated team that meets the physical, emotional and spiritual needs of patients. For a model to be considered a patient-centered one, it must cover the following requirements:

- An organizational culture that encourages the team to be sensitive to the needs of the patient during his stay in the hospital;
- An architectonic and interior design that gives a homemade touch and encourages the patient's mobility, the involvement of the family in the process and a space addressed to both solitude and social activities;
- Emphasis on the education of patients and relatives;
- Recognizing nutrition as a whole part of health as well as a source of pleasure, comfort and familiarity;
- Supporting the involvement of family members in the treatment, care and assistance process.

(Source: "Building the Business Case for Patient-Centered Care", Charmel and Frampton, 2008)

Summing up, the designate institutions are encouraged to change the way hospitalization and hospitals are perceived by patients and their relatives.

The bases and pillars of this philosophy can be defined when three simple questions are answered by the patients: "have we helped you to live your life with dignity and reach ideal health?"; "Have we helped you to obtain the cure at the highest level possible?"; "Have we helped you grow in every significant aspect, whoever you are?"



Figura: What does Patient-Centered Care Mean to You?
 Fonte: Frampton, 2010
 (adaptada pela autora com tradução livre)

According to Charmel and Frampton (2008), "Nowadays, the patient-centered care have been embraced by the most influent health service providers, developers of new policies, regulatory agencies, researchers and founders". This remarkable progress may be due to a study from the Institute of Medicine from 2001 that identifies the focus on the patient-centered care as one of the six interrelated factors that constitute high quality assistance.

This has strengthened the approach of the concept not only as a mean to create a more attractive experience for the patient but also as a fundamental practice to provide high quality care.

This is how the model here presented combines the concept of hotel services and quality as one whole part of assistance, impacting not only the before, during and after admission that relates just to the perception of the treatment and the hospitalization experience, but also they also contribute, specially and effectively, to the development of an environment appropriate and favorable to the healing process and patient's recovery, patients that are now seen

and recognized as people (in the whole, and not considered only according to his disease or clinic condition). They are people who bring along beliefs, values and expectations, besides the fundamental power that can define the survival and health of organizations: the power to decide between this or that institution, depending on how certain needs and expectations are received and met.

Daring to go even further, Planetree defends, in one of its most important principles, the importance of environments as allies to allow the patient's healing and recovery.

Concluding, we may comprehend the influence of Hospital Architecture in promoting a safer assistance, more dignified and humane for patients, companions and relatives, as well as for the numerous professionals working in hospitals.

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<http://www.planetree.org/>

Marília Gabriela Entrevista Dra. Nise Yamaguchi, transmitida em 14 de novembro de 2010 (acesso em março de 2011)

<http://www.youtube.com/watch?v=kglue0FdTTM>

<http://www.youtube.com/watch?v=IFSRLfk1KXE>

<http://www.youtube.com/watch?v=j6z5hXgDPIM>

<http://www.youtube.com/watch?v=9pS7rBeoVmo>

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The healthcare hub

Erick Vicente

This work was a honorable mention at “2017 UIA-PHG International Student & Young Architect Competition - Smart, Green & Beyond: Healthcare Facility of the Future”

More information about the competition at: <https://www.uia-phg.org/2017-competition>

How would be the health units of the future?



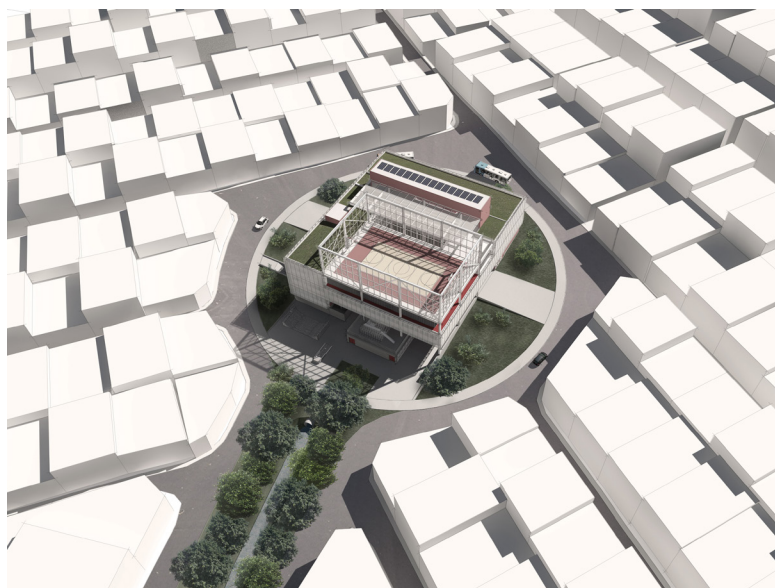
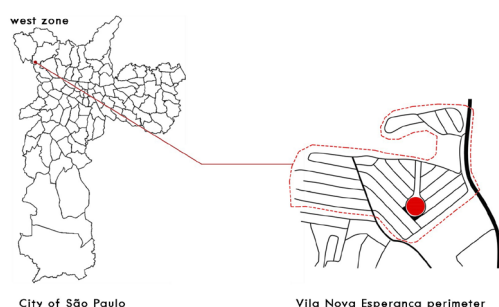
Thinking about the paths taken by today's public and private health institutions in Brazil -isolated from the urban context and less and less worried about improving social interaction -, the answer to the question above should suggest a quick paradigm shift. Therefore, this project aims to widen the horizons of São Paulo's basic health units, intending to create a social facility that offers the community areas of interaction, leisure, and sports, as well as taking care of the local people's health in a preventive and humanized way.

Thus, the Healthcare Hub comes up, a public health clinic that not only practices preventive medicine but also offers basic examination and simple outpatient treatment and is open to the community. Along with the mixed activities program, mixing community center and health care, this urban facility would be managed through a computerized digital system with access to the internet that would organize the medical care and the examination, as well as generating epidemiological data in real time in order to feed the public managing strategies.

The location

The location that was chosen to the implementation of this social facility is a peripheral neighborhood in São Paulo called Vila Nova Esperança, which is located on the city's northwestern region, a relatively new neighborhood that has no public health facility. Its residents need to cover long distances in order to get medical care, examination, and treatment.

Right in the middle of this neighborhood there is an unoccupied round area that was probably designed to be a public square with interaction areas. A multi-sport court, a small playground, and an outdoors gym were built in it, but they were all deteriorated by time, which shows the failure of the area's occupation due to a lack of adequate urban design.



This location was chosen with the intention to achieve two objectives at once: to offer health care to the neighborhood and to occupy the area in a more effective way, providing the civic character that was initially intended.

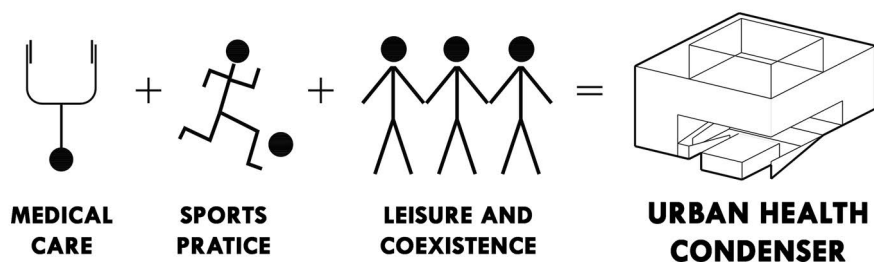
The type of health care unit

The idea is to create an urban condenser where health care is the primary activity: the motivation to occupy the area. Thus, the Healthcare Hub will offer a public basic health clinic and social interaction areas.

The clinic will have:

- a general practitioner (adult and geriatric care), gynecologist, pediatrician, and dental care;
- a unit for imaging examination (with x-ray, computerized tomography, densitometry, endoscopy, ultrasonography, mammography, echocardiogram, electrocardiogram, holter, and ergometry);
- a lab for clinic analysis capable of analyzing blood, urine and stool samples;
- a pharmacy for medicine distribution;
- a physical therapy unit;
- an occupational therapy unit.

The service is local, preventive, and it treats for motor and psychological recovery. This unit would not perform emergency care, invasive interventions, complex procedures, surgeries and hospitalizations. It would be the first stage of the public service, monitoring the health of the population, distributing the patients to other institutions in advance, and treating simple cases of motor and psychological recovery. Along with the health care and treatment program, the Healthcare Hub would offer a civic space, which currently does not exist in the neighborhood.



On the floors that relate directly to the city (ground floor with two different levels), there would be an auditorium (to establish a dialogue with the community and for plays and shows), an outdoor gym, a playground, and an area for skateboarding. All these areas could be used 24/7. On the rooftop, which can be accessed directly from the main entrance through the stairs and elevators, without going through any clinical unit, there would be a sports court that could be open for 15 hours a day, seven days a week. All these spaces would be constructed to have an intense relationship with the city, in order to improve the local urban interaction.

The technology

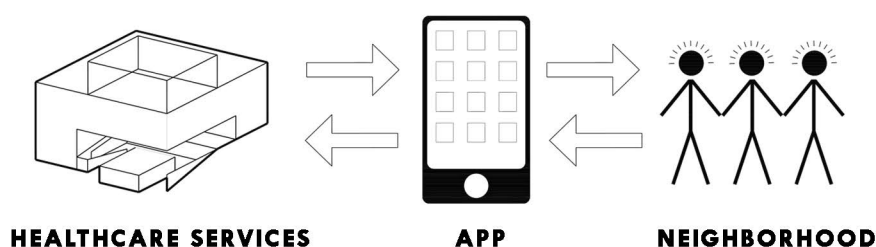
Because it is a social facility with a public management, we decided not to endow the building with technologies that would take too long to be affordable for the state. We chose technologies that are under development or already available. This social facility would be managed through an electronic system with an online interface that would perform two tasks: managing the relationship between the institution and the local residents through a smartphone app, and generating epidemiological data for a health care Big Data, providing strategic information for public management.



The app

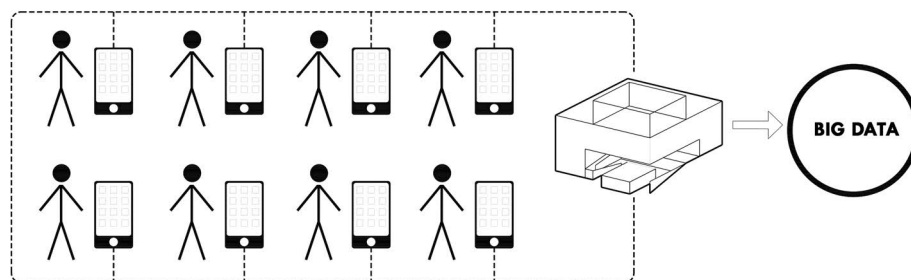
The Healthcare Hub would have an Information Technology team that would manage the electronic system, the community relationship app, and the entire database generated. Each local resident would install the app on their smartphone, register, and create a profile that would be linked to the members of their family who live in the same residence. This app would let their family members know about the dates of the consultations, exams, and other visits. This would be organized by the institution's electronic management system.

The real-time system-application interface could optimize processes, cancel appointments more quickly (through confirmation from residents and doctors), reschedule, and monitor people's attendance with their health commitments. Thus, it would be possible to know when someone has left the treatment or did not show up.



Big Data

With the app interface, this system would generate concrete data from the epidemiological profile of the region, offering valuable information and statistics for public authorities to better plan their investments. The institution's IT team would be responsible for the data security, preventing the residents' clinical history from becoming public. They would encode and compile the data according to the requests of the public health office.



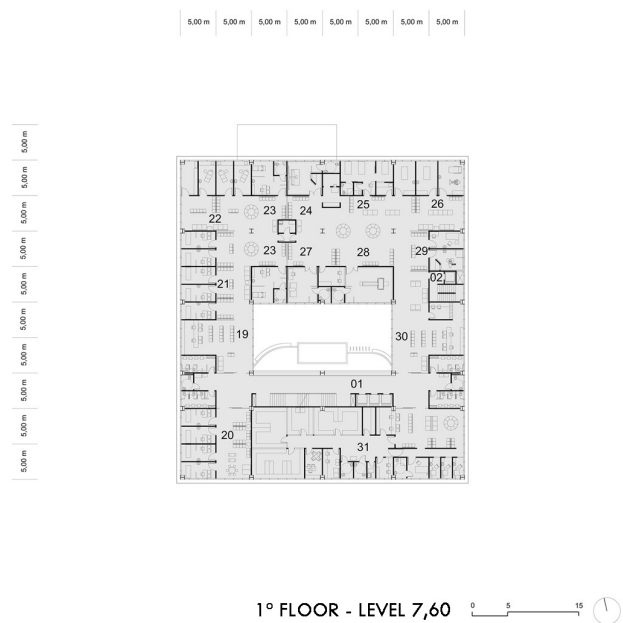
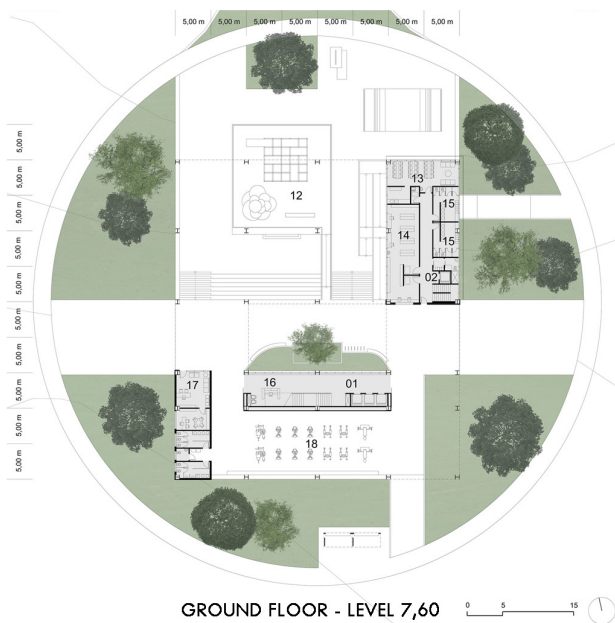
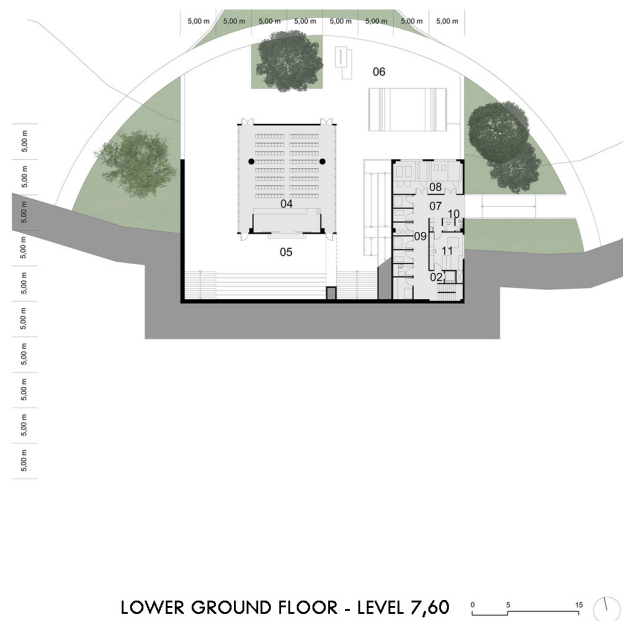
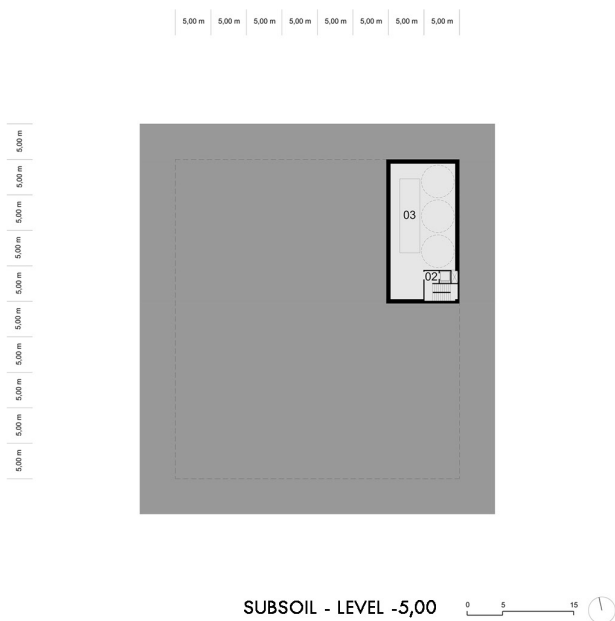
Physical infrastructure

The building would be made with prefabricated systems with mostly metallic components. The entire project respects a 1.25 m x 1.25 m modulation, which results in great flexibility for the production of components, the installation, and future amendments and replacements. The building was conceived in accordance with the health care buildings' constant need for updates in order to be flexible, which allows easier future works and changes in the facilities.

One of the elements that result in this flexibility is the technical room, dedicated to the most robust machines and located above the unit of imaging examinations and below the sports court. This space would be used for the installation of air-conditioning machines, rainwater tanks, water treatment equipment, meters, transformers, pumps, etc. Its size allows the technology development, as well as easy maintenance of the equipment.

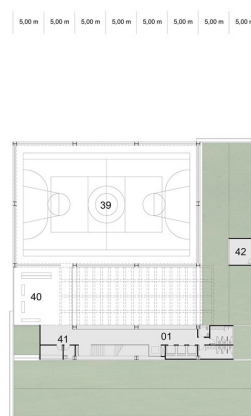
Legends:

- | | |
|---------------------------------|----------------------------------|
| 01- public vertical circulation | 23- gynecological outpatient |
| 02- staff vertical circulation | 24- RX |
| 03- lower machine room | 25- endoscopy |
| 04- auditorium | 26- cardiology exams |
| 05- public space | 27- densitometry |
| 06- skate area | 28- computed tomography |
| 07- supply access | 29- ultrasound and mammography |
| 08- power cabin | 30- exam delivery |
| 09- technical areas | 31- interstitial space |
| 10- security | 32- covered square |
| 11- warehouse | 33- occupational therapy |
| 12- playground | 34- physiotherapy |
| 13- staff confort area | 35- secretary |
| 14- pharmacy | 36- physical files |
| 15- locker rooms | 37- server |
| 16- information | 38- management |
| 17- social assistance | 39- sports court |
| 18- open air gym | 40- open air square |
| 19- waiting room | 41- support |
| 20- children's ambulatory | 42- machine room |
| 21- general ambulatory | 43- machine room and water tanks |
| 22- dental outpatient | |

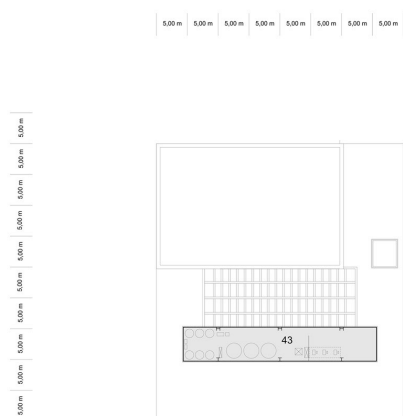




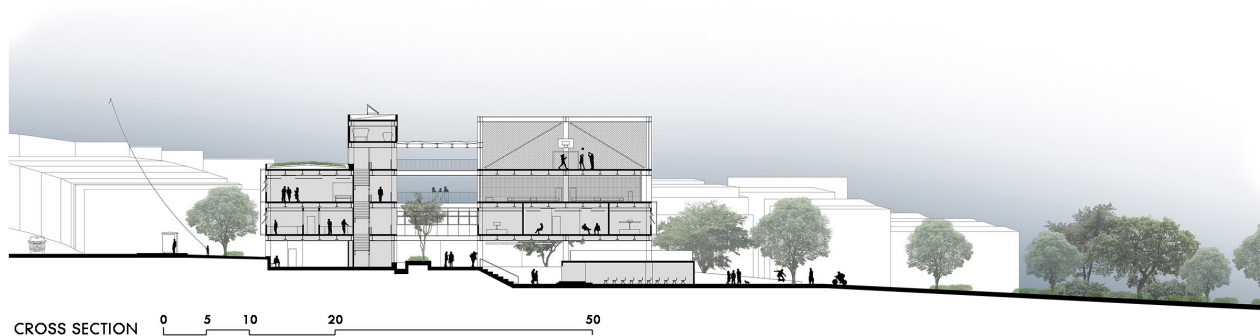
2° FLOOR - LEVEL 7,60



ROOF - LEVEL 11,40

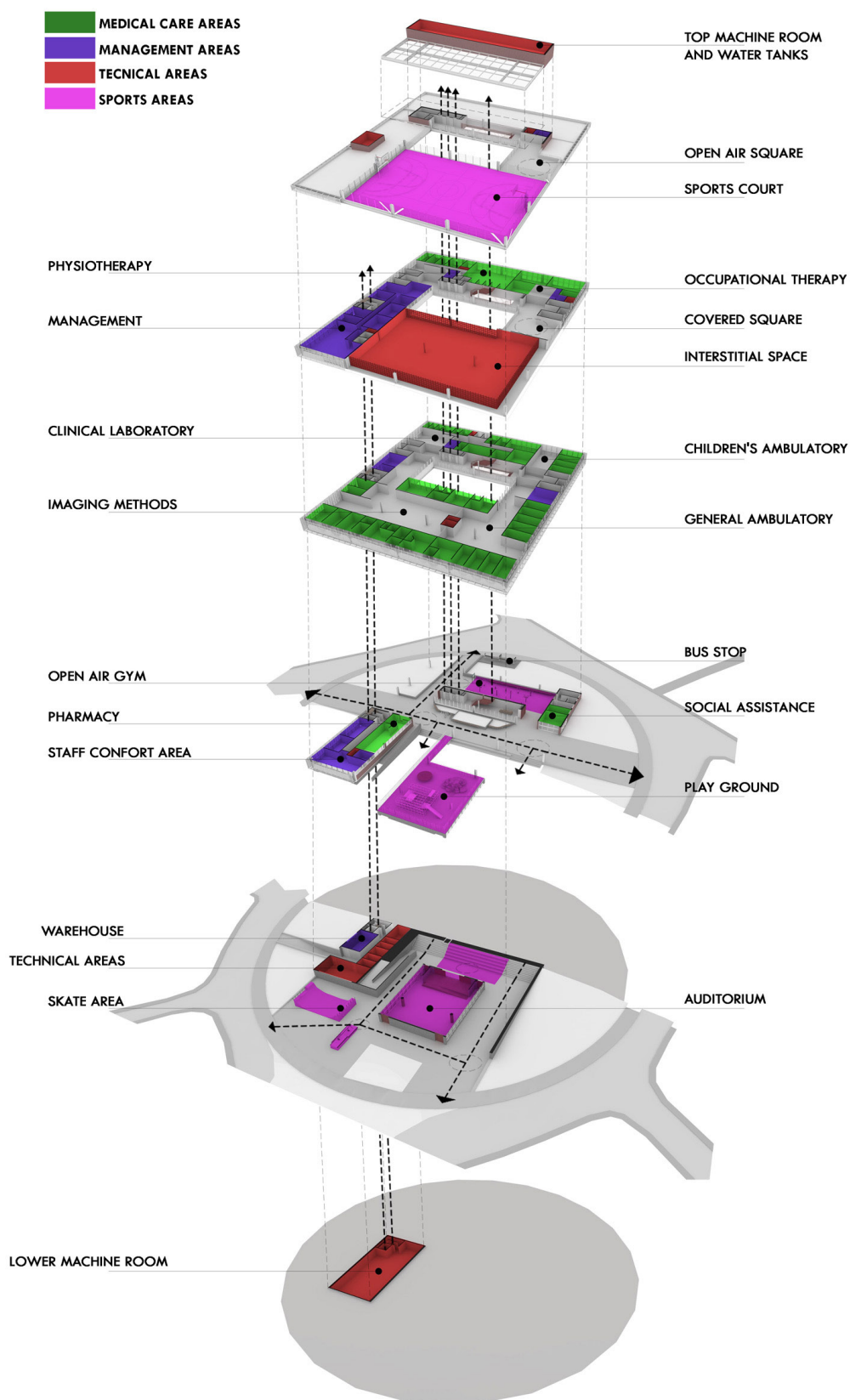


MACHINE ROOM - LEVEL 14,65



CROSS SECTION

PROGRAM NEEDS DISTRIBUTION



Sustainable systems

Some suggestions have been made in order to reduce the consumption of natural resources.

The electric energy would be generated by a system made with photovoltaic plates without storage by batteries.

The water consumption would count on a filtration system and reuse of rainwater and water from the local stream for toilet flushes, dump vats, irrigation of gardens, and washing of the external areas.

The sewage would be totally treated on site by a compact station formed by anaerobic and aerobic filters, pouring the clean water into the local stream.

Power generation

The power generation system would be a small solar plant, made of photovoltaic panels, generating energy in real time during the day and sending the extra energy to the local power grid. The system's generation capacity is twice the institution's daytime consumption, with the surplus of about 50% of the production being "lent" to the public provider. At night, when the energy consumption is lower (because the imaging unit and the laboratory would not be operating), a power supply exchange would take place and the institution would be powered by the energy provider, with the "return" of part of the borrowed energy. Therefore, there would be no cost other than the system's installation and maintenance and the investment would be returned in less than three years.

Water treatment and reuse

Rainwater would be collected and stored in tanks located on the second floor technical room, as well as treated by anaerobic filters, chlorinated (to be distinguished from drinking water), and pumped to specific tanks in the engine room on the roof. This water would feed the auxiliary system used in the toilets, the irrigation system, and the washing of the external areas. During dry seasons, this system would be fed with the local stream water, which would be collected in the underground technical area, pumped to the reuse tanks, treated, and distributed in the auxiliary system.

Sewage treatment

Sewage would not be dumped into the public system. It would be stored, treated, and dumped in the local stream when presenting adequate conditions for the environment. The treatment would be made by a compact, industrialized system, composed of anaerobic and aerobic biological filters that would be buried and accessible by the underground technical area.





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