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Meeting needs of today and tomorrow

Public buildings reflect political principles and public hospitals conceptually reflect the relationship between healthcare, patients and physical infrastructure.

The Clemente Álvarez Emergency Hospital, in Rosario, Sante Fe, Argentina, is the final result of such reflections but it is also a figurative synthesis of a social/architectural construction project, and of public policies that support a public health system which provides care through a participative, functional network accessible to all. At the same time, this building is a model in terms of new hospital management.

The decision to construct a new building to house such a representative hospital was made after a careful assessment of existing premises. The majority of buildings of the city health system date back to before 1940. They are, therefore, obsolete since they were never designed to house the medical and paramedical complexity currently needed.

The Clemente Álvarez Emergency Hospital.

Medicine is developing at a fast pace and medical infrastructure requires constant modifications.

The Clemente Álvarez Emergency Hospital was first conceived as a general hospital for acute care and its building was supposed to develop following the medicine model in force at the beginning of the 20th Century. Healthcare evolution determined the gradual and anarchic addition of different structures which also added high inefficiency levels and high operating and maintenance costs.

Making new investments in existing premises would only increase inefficiencies. Architectural complexity of the old hospital made restoration and space optimisation impractical.

Restoration was absolutely not cost-efficient and, therefore, the decision to build a new hospital was made in order to optimise investment. The following were the goals for a new building that resulted from a new model of health management:

- Build a new building to house the Clemente Álvarez Emergency Hospital

which would be equipped for emergency care and for treatment of acute pathologies in adult patients, and which would serve as a regional trauma centre.

- Redistribute health services that were provided by existing hospital across the municipal health network.
- Equip the new hospital with the technology required by the complexity of the care provided.
- Train professional and non-professional staff in a new healthcare management

‘Medicine is developing at a fast pace and medical infrastructure requires constant modifications.’



concept that focuses on citizens.

- Double the total front office area.
- Enhance the expansion and development of emergency, surgical and inpatient services areas.
- Expand training activity areas.

Choosing the location

There was a plan to find a piece of land located in the geographical centre of the city and easy to reach from the different access routes to the city – the new hospital would continue provision of care to a large region, not just to the city.

The chosen site was 1.5 hectares in a residential area and adjoining the rail tracks. This location softens the architectural impact of a building spanning over one hectare or block. The premises cover more than 10,000 m². The building to land ratio is 60% – that is 40% of the plot is for the supply of fresh air, sunlight and green areas.

Considering the area dimensions, the building could be projected in only two floors, allowing the horizontal to dominate over the vertical. The significant urban impact of the hospital building is mitigated by its height that perfectly matches with the remaining buildings in the area and respects the urban landscape around it.

The premises are located in the West District, on Pellegrini Avenue, a two-lane road and one of the most important access routes from the west. It is considered the east-to-west corridor since an elevated ramp connects it to the Rosario-Cordoba highway. The Rosario Master Plan states that Pellegrini Avenue's function is to provide access to Fisherton International Airport through an interchange hub.

Two important fast links southbound and northbound, Francia Avenue and Avellaneda Boulevard, intersect Pellegrini Avenue in the vicinity of the hospital premises.

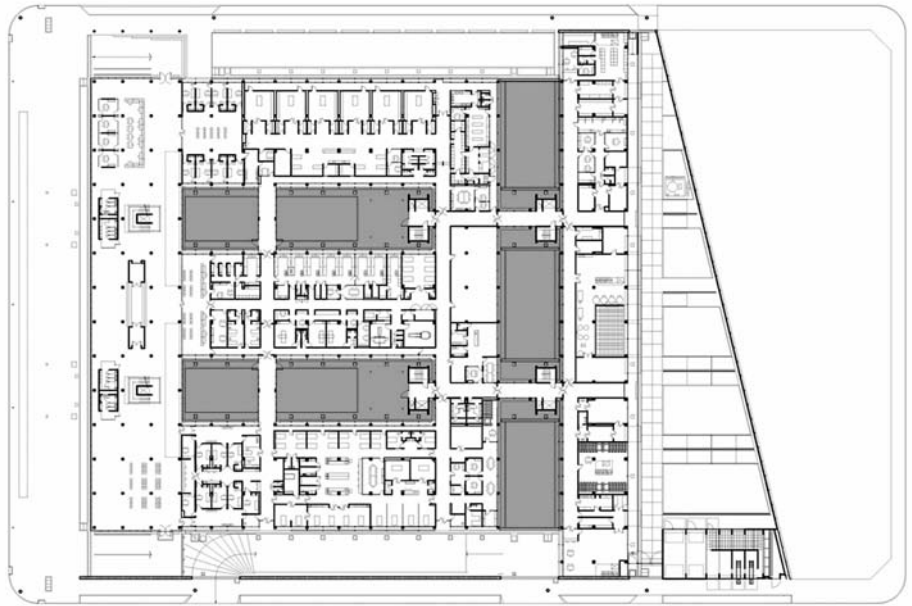
Only three blocks from the hospital premises, Presidente Peron Avenue, which runs along the old tracks of the Oeste Santafesino Railroad, goes across the city. The Rosario Master Plan considers this avenue, as well as Pellegrini Avenue, as significant – access is enabled to large industrial parcels of land where there are plots for different uses.

All the other streets in the area preserve the urban mesh and are paved, some in concrete and others in asphalt. It was seen that automatically controlled traffic lights could be installed along the main avenues around the hospital to assist ambulance journeys.

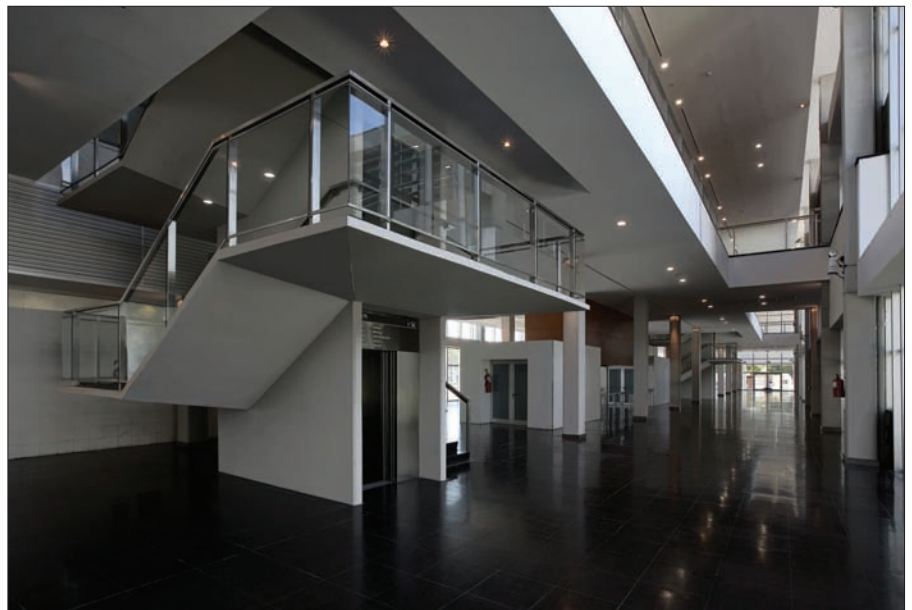
Organising different functions

It is understood that an architectural project derives from its location specific characteristics. By location it is meant the social, cultural, urban, geometric and topographic complexity involved in the project.

It is also believed that a horizontal hospital is more efficient than a vertical



Ground floor.



One view of interior space.

hospital. A vertical hospital depends on vertical circulation mechanical means, with idle times that make hospital operation and overall performance more difficult.

Circulation becomes worse at peak times and adversely affects outpatient and emergency service provision.

The new hospital was also conceived as a building with the capacity to adapt to functional and technological changes. Designing a public hospital amid the so-

called scientific-technical revolution means there must be focus on certain principles. It is necessary to consider that this revolution has introduced many technological breakthroughs in medical treatment, such as those relating to diagnostic imaging and minimally invasive surgery, which impact on how a hospital is operated.

The scientific-technical revolution has completely changed medicine and healthcare. The impact was especially

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Aerial view of hospital (towards left of picture) and surrounding area.

significant on diagnostic tools, surgery procedures and post-surgery protocols. The dominant trend is to reduce hospital stays so as to provide care to more patients with a limited number of hospital beds. This resulted in an increased demand for outpatient and rehabilitation services.

This trend requires constant updating of technological equipment and architecture must meet new demands. The design of a major hospital building can be approached from the perspective of a support system based on an open, intercommunicating mesh, similar to an urban mesh, that must match and meet any potential need. The hospital would be “a city within the city”.

New therapies and technologies are occurring so fast that architects are forced to think of an open, permeable hospital facility.

Therefore, the building should feature architecture able to meet both current demands and future needs. This architecture translates into the determination of fixed points, compatible with a geometrical, structural and spatial system that, from a basic module, can create a mesh capable of absorbing and adapting to different programmes.

The new hospital building was designed as an open system, mainly horizontal, that integrates the structure, the flow of services, the circulation of people and materials, and the incorporation of equipment and support and service areas. The volume of the hospital has made it sensible to develop the building in two levels.

Building in flexibility

The architectural design presents a physical structure that accepts the challenge of the medical transformation the world is currently witnessing. The structure is not determined by the hospital organisation and functions as conceived so far. On the contrary, it contains and supports the physical capacity to house new functions, a new management system and future developments at minimum costs and as smoothly as possible.

The crucial relationship established between the city and the community with the hospital architectural design is interpreted by a crystal façade, 100 m of transparency on Pellegrini Avenue.

The hospital has the following functional areas:

- Front office.
- Accident and emergency.
- Surgical.
- Hospital admittance.
- Diagnostics and treatment.
- Administration and technical service.
- General services and maintenance.
- Teaching and research.
- Technical.

The new hospital features twice the area of the old hospital: 18,000 m² of useful space (the total increases to 22,000 m² if the technical floors are added). The building has two floors, with a technical floor in between. The technical floor houses equipment and machinery and there is easy access for maintenance and repairs.

The hospital has 156 beds:

- 40 beds for polyvalent critical care.
- There are 24 beds in an intensive care

unit (18 for general care and six for special care), 10 beds in a coronary care unit, and six beds in a unit for treating burns.

- 56 beds for intermediate care.
- 60 beds for general care. All rooms are double rooms with private bathroom.

The inpatient services sector is on the second floor, with excellent connection to every other area in the hospital.

The surgical area (six operating rooms) follows dirty/clean traffic differentiation criteria. Filters are within the sector perimeter, basically along the technical circulation path.

There is a larger and more comfortable area for teaching and administrative tasks.

Special attention has been given to the emergency care area with considerable focus on critical care and surgical areas; on hospitalisation in double rooms, or in single rooms for isolated patients; and on support services for diagnosis and treatment.

The intensive care unit is on the second floor, above the reception area for accident and emergency casualties. The circulation plan allows patients to be admitted in one large functional unit that includes diagnostic and surgical facilities.

Isolated patients occupy rooms away from ordinary medical circulation. These rooms also feature graded care to facilitate the prevention of cross-infection.

The first floor arrangement allows secondary vertical circulation of both general public and supplies, though it is mainly for medical and technical materials.

The architectural design has focused on defining the potential future development and expansion of the hospital. The idea was not to consider endless expansions since more than 25% of expansion of the initial construction would distort the original plan and concept. Once the potential expansions were limited to 25% of the total area, the design team created a sector at each end of each specific area for future expansion of emergency, diagnostic and operating facilities. Such expansion would follow initial circulation criteria.

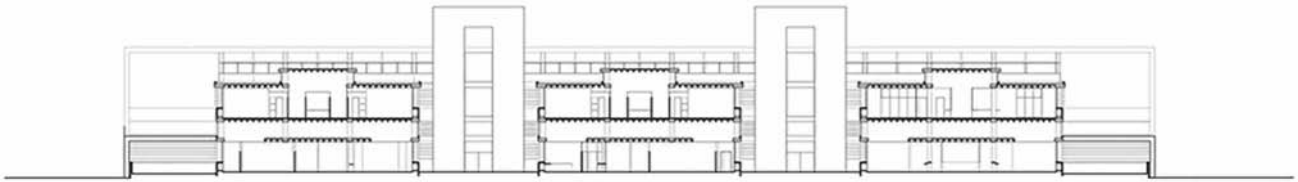
Accessibility and progressiveness

The hospital plan is based on two criteria: *accessibility* to the building and *progressiveness* of care.

North-south accessibility is the solution to the applicable restrictions on public, medical and service areas.

West-east progressiveness on the first floor

‘Isolated patients occupy rooms away from ordinary medical circulation.’



Side elevation.

shows the progression from programmed care to the spontaneous demands of the emergency room, the diagnostic area, and the operating rooms. On the second floor, the same progressiveness organises care levels, from the intensive care unit through intermediate care to a low level of care.

Therefore, in the north-south direction, the building features three different areas that follow restriction level criteria: general public spaces (waiting rooms, cafeteria, outpatient rooms) intensive medical spaces, and technical service spaces.

Main access to the building is at both ends. One access is for programmed, outpatient care and visitors. The other access, completely independent from the first one

and clearly and easily identifiable, is for emergencies.

The north-south direction increases restriction to the public, medical and technical areas. The west-east direction organises patients' treatment approaches: emergencies are received in the first area, on the west; diagnostic procedures are conducted in an area directly connected to the emergency room by technical circulation criteria. Patients are evaluated in the emergency room and can immediately be transferred to the diagnostic area and to the operating rooms. The west-east direction organises patients' care following their specific needs.

The second floor follows the same

criteria to organise other levels of care. Most services are concentrated in the intensive care unit, immediately above the emergency area of the first floor. Inside vertical circulations connect the emergency room to the intensive care unit, which is frequently required. The same level-wise organisation connects the intensive care unit to the intermediate care unit and to the general care ward.

There are three main circulation systems in the building:

- General public circulation: the general public can freely circulate on the first floor. The first floor also houses the emergency rooms, the outpatients' rooms, the diagnostic laboratory, the X-ray room and six operating rooms.
- Technical circulation: this refers to doctors, and to patients who, for example, have been admitted and are being referred to the diagnostic area.
- Supplies' and general services' circulation.

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