

Several Health Design projects adapted to different climatic, social and economical environments in Argentina

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Introduction

Argentina is a diverse country, where we can see large contrasts:

- Geographic and climatic: its territory is very extended, especially from north to south, from hot tropical latitudes in the north to the frigid climate of the southernmost inhabited point in the country; from mountainous areas in the west to the extended plains in the east, and from large humid areas in the northeast and central east to very dry areas in the central west and Patagonia in the south.

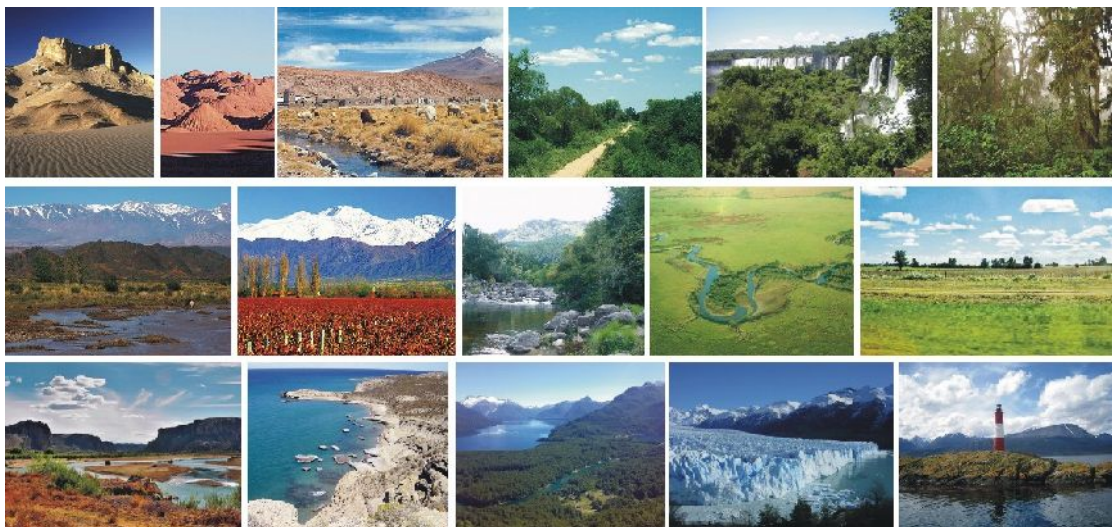


Image 1 – Climatic and geographic diversity in Argentina

- Social and cultural: Argentineans descend from mainly Spaniards and Italians, as well as other European countries, but we can also see—mainly in the north—a mixed-ascendancy population that

combines European with aboriginal blood, as well as immigrants from neighboring Latin-American countries. Furthermore, in the last quarter century we have witnessed a growth of the immigration from Asian countries.

- Economic and technological: the geographic and demographic differences resulted, in turn, in large differences in the generation and availability of resources. The result was a large concentration of resources in the central area around Buenos Aires city (the most fertile and most densely populated area of the country) and an impoverished development of the rest of the country.

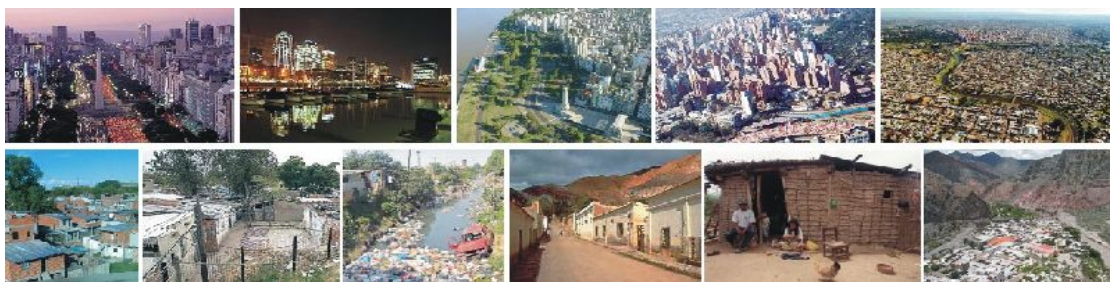


Image 2 – Resources and economic differences

These basic characteristics affect directly the configuration of the health care system. Presently three different but overlapping systems coexist in the country:

- A public system, which is free and universal, offered by provincial and municipal governments through hospitals and health care centers (of different degrees of complexity).
- A social system, or “solidary” system, maintained by the contributions of employers and employees to the organizations run by the unions.
- A private, pre-paid system, maintained by the subscribers’ direct contributions.

The public sector addresses approximately 40% of all the medical needs, mainly of the lower income population, the solidary sector almost 50%, and the private sector the remaining 10%, concentrating the higher income population.

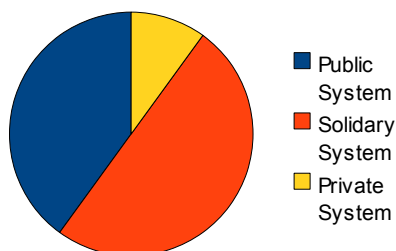


Image 3 – Composition of Healthcare system in Argentina

The greater concentration of population and resources in the central area (Buenos Aires, Cordoba, and Rosario) generates a higher development of the private system, and the opposite is true for less densely populated areas and more impoverished areas, where the public system can be the only available option.

Each region exhibits highly different needs and the three systems can be quite disconnected from each other, which results in the inefficient use of resources and high costs.



*Image 4 – Some examples of Public Hospitals in use.
From old obsolete buildings to new horizontal schemes.*

As an architectural firm specialized in healthcare design, we have worked in diverse areas of the country, for clients in all three sectors. Consequently, we have experienced these differences and we have had to adapt our proposals to the specifics of the particular situation.

In what follows we will present a series of architectural works and projects and will detail the variety of approaches used in each case.

Small clinics in peripheral regions - extreme climate adaptation

In two cities of practically opposite climates, but with a similar scale and resources, we conceived two essentially different projects:

First, a private clinic, with an extension of 2,900 sqm, in the city of Ushuaia, Tierra del Fuego province, known as the southernmost city in the world, with a tough climate, very windy and cold. The building is essentially a single compact volume, designed to optimize the envelope thermal insulation, in a North-South orientation to take advantage of the scarce sunlight and partially open to the excellent Southeastern views. On the first floor are located the exam rooms with windows opening to the North, and the emergency and the imagining

area in the south. On the second floor are located the surgery and delivery areas, ICU and cardiac intensive care, and neonatology to the south and inpatient rooms to the north. On the upper level, taking advantage of the attic-type space generated by the roof slope, are located the services and deposits and a cafeteria.

The north – south section of the project favors sun penetration, and window size was regulated to diminish heat loss through the south façade, with the exception of the points from which the best views of the bay can be accessed.

The project expects future growth through lineal additions towards the back side of the volume, in all three levels.



Image 5 – ex Clínica Islas Malvinas - Project layout and construction photos

Second, another private clinic of 4,500 sqm, located in the city of Oberá, Misiones province, in the northeastern end of the country, with a hot and humid climate.

The building consists of three blocks, interconnected with narrow corridors, that features exterior space as an essential part of the project, generating gardens and patios of public or restricted use.

It is mainly a one level building, with separate blocks for exam rooms, inpatient (40 beds), and diagnostic and treatment ward (3 Surgery rooms, ICU, Neonathology, TC, RNM, RX & ECO). The administrative space is placed in a mezzanine near the main access, and some service, engine rooms and parking in a basement.

The main blocks are oriented north – south, adapting to the site's natural slope in order to reduce soil disruption. Galleries, gazebos and sunshades are used, and more than 10cm of insulation material is used for roofs, in order to obtain total sun protection almost all year round.

The section of the building blocks favors natural ventilation of those rooms that don't require air conditioning and/or air filtration, thus reducing energy use. Additionally, a solar heat water system is used, for sanitary and space heating use.

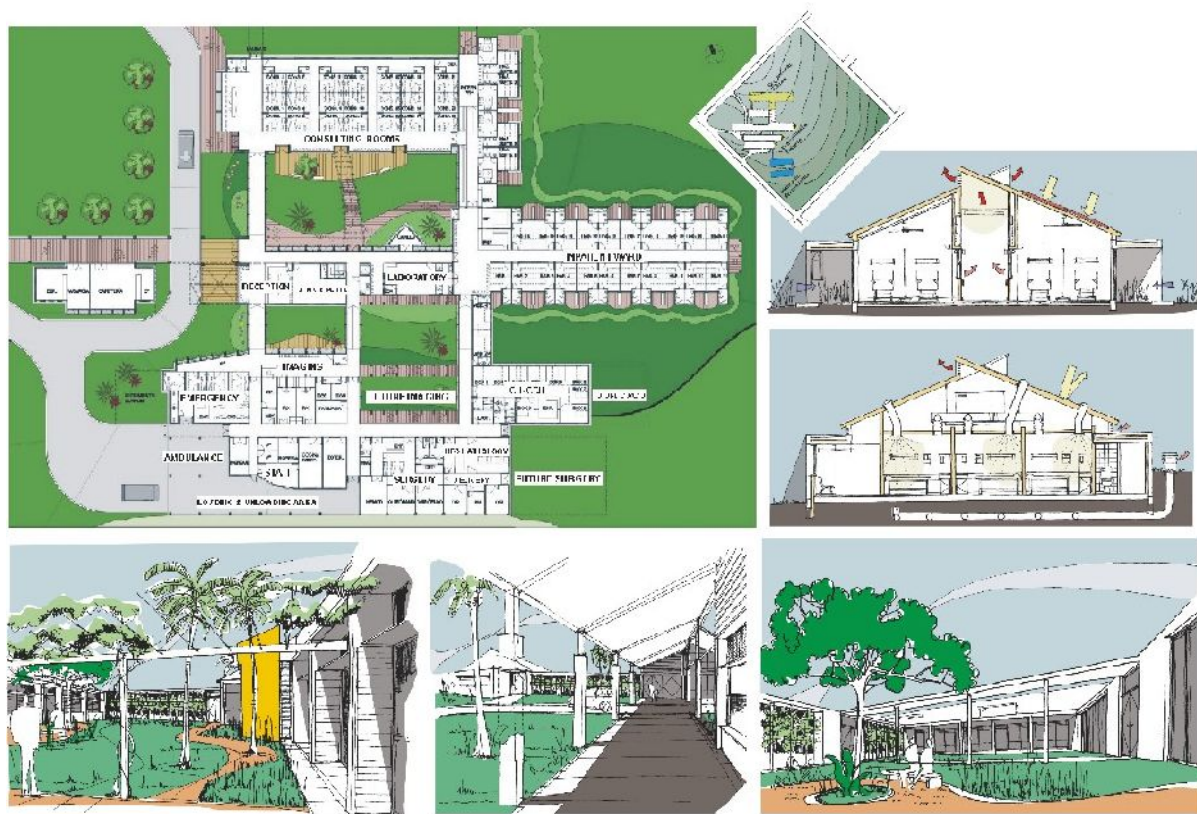


Image 6 – Oberá Clinic. Main floor layout, typical sections and exterior spaces.

Both projects are completely new buildings from private investment, conceived to meet the growing deficit in health care for medium and high sectors of the population, complementing the public system. They are small projects, adapted to the scale and demand of these small cities and their surroundings, distant and disconnected from major urban centers with bigger health care availability.

The construction of the Ushuaia project was started, but it never got the necessary financing. It was then bought by local government, who transformed it into an administrative building.

The Oberá project is still in its preliminaries, and its execution is uncertain.

Public Hospitals – bigger scale, low resources

Public Hospitals in Argentina usually present a high degree of

obsolescence due to lack of investment, which was especially experienced during the second half of the 20th century. During the 90's, some upgrades and remodeling plans were developed, and we had the opportunity to work on the following three projects:

First, the extension and remodeling of the "Hospital Regional de Río Grande", Tierra del Fuego province, in a very windy and cold climate, totaling 14.000 sqm and 200 beds.

The existent Hospital occupied one block, and there was another empty neighboring block available.

In this opportunity, we decided to study different alternatives. The first one was conceived as a whole new building in two levels plus basement, located in the empty lot, so the construction would not affect Hospital operation. The second one was a one-story layout, and proposed the use of some existing building, the street between the two blocks, and half of the vacant lands.



Image 7 – Nuevo Hospital de Río Grande. Two story alternative occupying one block.



Image 8 – Nuevo Hospital de Río Grande. One story alternative under construction.

The first compact alternative had clear advantages involving land-use, bioclimatic adaptation because of less envelope surface and functional characteristics like shorter horizontal circulations, among others. But it required a bigger initial investment and it could not be constructed in stages. Finally, economic evaluation forced the decision towards the second alternative.

This project respected the existing building's very simple formal conception, becoming a unit with it, and ensured minimum construction costs within acceptable standards.

A very well insulated envelope, including roofs, walls and floors, and controlled window size and quality were the main climatic adaptation measures adopted in order to counterbalance the low compactness of the building.

Additionally the main design effort to compensate for the rough exterior climate was a central public space in double height, hosting the public reception and admission, the cafeteria, a small chapel, and some vegetated spaces with glass roofs.

The construction started in 1995, it was developed in successive stages and it is not yet completed. This showed that the alternative selection was right, given the recurrent economic difficulties of the government.



Image 9 – Nuevo Hospital de Rio Grande. Main public access.

Second, the extension and partial remodeling of "Hospital SantoJanni", located in the city of Buenos Aires, with a total intervention of 7,000 sqm. The existent Hospital was a multi-story block from the 40's, with a single-story extension.

The project posed an additional level over the existent single-story block and the complete remodeling of its first floor, in order to locate there all ambulatory and complex areas, leaving the original building basically for inpatient wards.

The lower floor accommodates the exam rooms, imaging and emergency and trauma center, whereas the upper floor houses Surgery, Cardiac Practices, Sterilization, Intensive Care units and Neonatology.

The new construction consists of a big metallic structure and cover, similar to an industrial ward, mounted over the existing reinforced

concrete structure.

Beneath the sloping roof are located the high complexity installations, taking advantage of the structure height and accessible through metal walkways.

The interiors were made in plasterboard partitions. Finishes were porcellanatto tiles and painting for general areas, and local rubber floor and wall coverings for critical or aseptic areas. All these features ensured an acceptable performance while maintaining low construction costs.

The project and construction was afforded by a World Bank loan, ensuring its completion in a timely manner.



Image 10 – Hospital SantoJanni. 1st and 2nd floor layouts, main access and interiors.

Third, the design of a new medium complexity Hospital of approximately 14,000 sqm and 140 beds, to be built in the city of Tucumán, in a very hot and humid climate.

We developed this project for a project and price competition that was awarded to another group. It is interesting, though, to highlight the adoption of several bioclimatic design criteria in a low cost, austere design.

The contest predefined a functional layout of two levels, with exam rooms, imaging, administration, kitchen, emergency, surgery and delivery rooms in the lower floor, and inpatient and intensive care in the upper floor. There was a big public space -a kind of mall- that connected all the building blocks along the north – south direction, with a huge west façade.

Maintaining a low cost design, our project embodied some bioclimatic strategies like total solar protection on north, west and south orientations, especially on the west façade through the installation of a microperforated metallic screen. The use of double roofs with ventilated attics in almost all of the building, together with the natural ventilation of some public spaces largely eliminated the use of air conditioning.

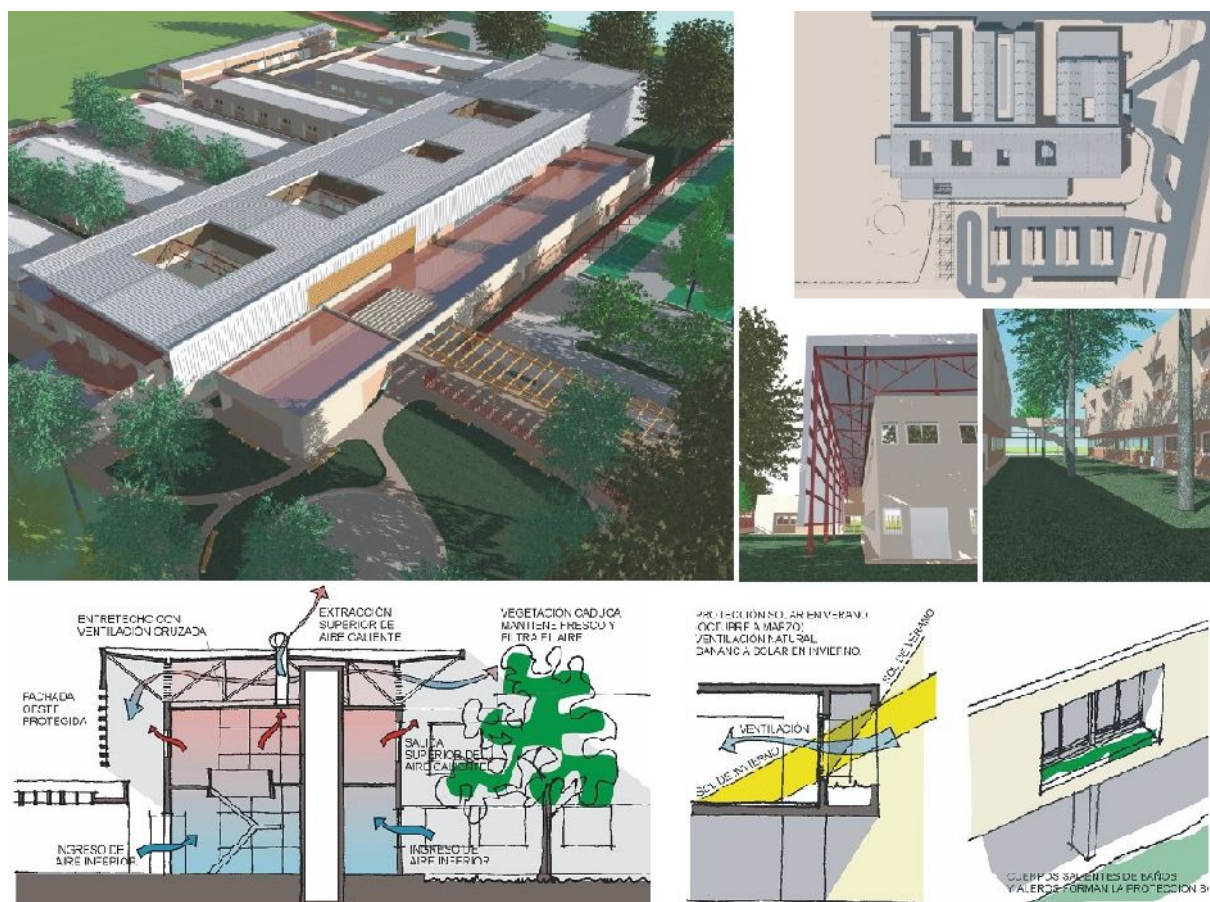


Image 11 – Hospital del Este, Tucumán. Competition project.

All of these projects are based on a great austerity and a resource economy, with simple construction methods and, as far as possible, easy maintenance. Installations meet the basic standards, but it was never possible for us to introduce improvements that even with a low extra cost could have been profitable during building operation.

For some years, some provinces or municipalities have been developing

projects and constructions that are more ambitious than usual for the public sector, but they were generally designed and constructed by their respective technical offices.

Recycling of obsolete buildings

Given the usual economic constraints and restrictions of our country, we have had several opportunities to work on integral recycling projects, even if these structures usually pose serious limitations to house modern medicine rooms.

In general, we have achieved very positive results taking advantage in the best possible way of very old structures that otherwise would have been demolished.

The first and second cases are two buildings with historical value from the 19th century:

The “Instituto de Cardiología del Hospital Español” was placed in a three story building belonging to the Hospital Español, in Buenos Aires city. Taking advantage of the tall ceilings, we were able to accommodate all necessary installations. Maintaining the original structure of interior patios, and reconditioning them with sunlight and vegetation, we were able to create an optimal environment for the recovering patients. With minimum structural reinforcements we managed to recover the original building and reduce the initial investment considerably.



Image 12 – Instituto de Cardiología del Hospital Español (ICHE).

To create the “Instituto Quirúrgico del Callao”, an Ambulatory Surgery Center of 5,500 sqm, the Social Organization named UPCN decided to recycle an administrative building of their own, originally a residential building, placed in a typical high density corner of Buenos Aires. In this case, the project had to struggle with a very thin plan and a very vertical building. The existing structure was deeply studied, making all the necessary reinforcements, and introducing new and bigger elevators. Special effort was placed in maintaining and recovering the original façade, including the high dome, which was used as a library and doctors’ lounge, with a nearby conference room.

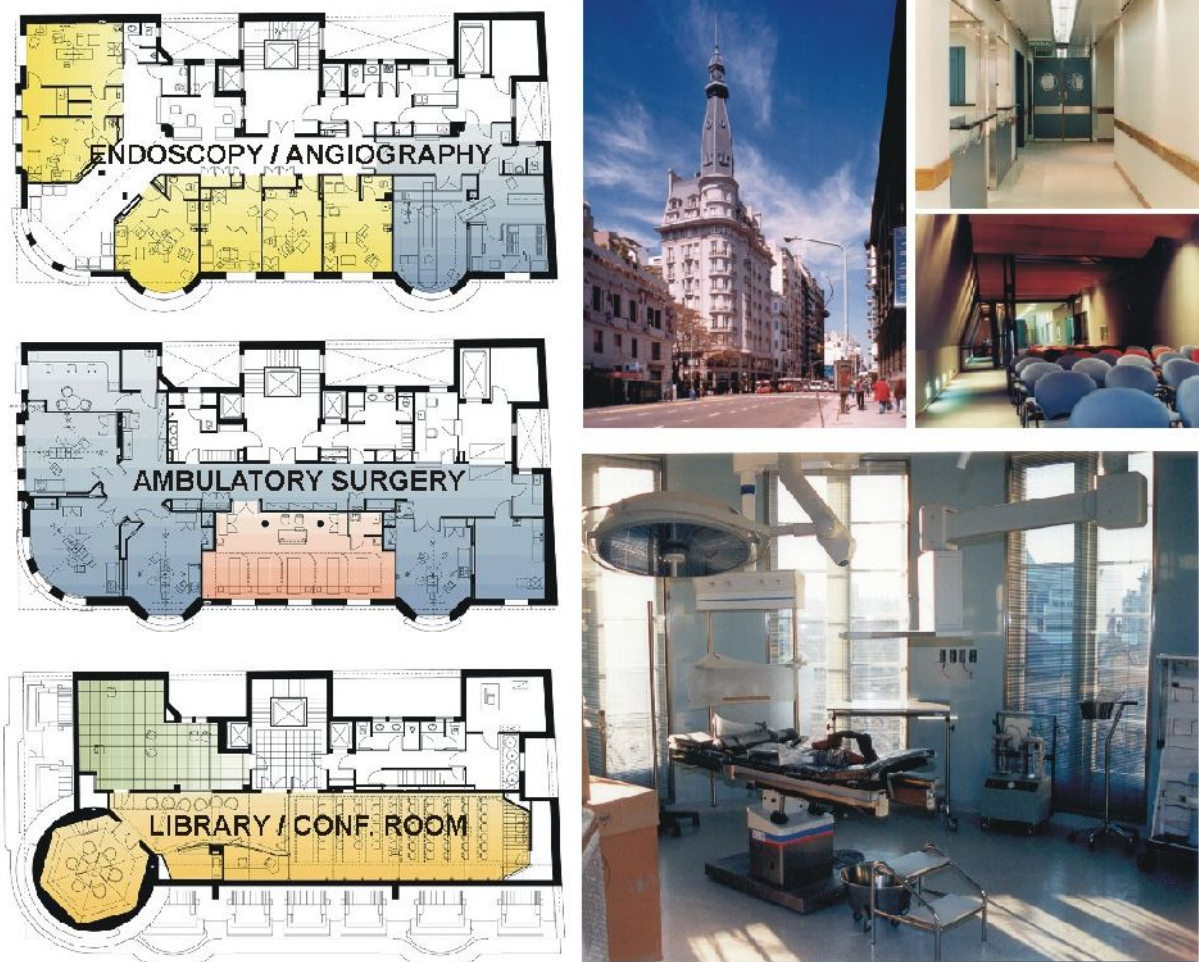


Image 13 – Instituto Quirúrgico del Callao (IQC).

The third case is the “Hospital Alemán”, a 20,000 sqm, 120 beds, a Hospital complex, also located in the city of Buenos Aires. This Hospital was founded during the 19th century, and it now comprises several building blocks from different times, somehow brought together in a totality.

Starting in 2003, our firm designed partial interventions in the areas of

emergency, exam rooms, imagining, laboratory, inpatient, and others. All these were recycling projects of existing structures, where all installations were replaced. The interior public space quality was notably improved, introducing color and sunlight and reinforcing the relationship with the exterior spaces of patios and gardens.

In this case too, the client opted for the remodeling rather than replacement because of economic and functional reasons.



Image 14 – Hospital Alemán. Main accesses, public waiting rooms and ICU and endoscopy boxes.

The issue of recycling obsolete buildings is also a concern in the public area, because many of the main Hospitals were constructed at the end of the 19th century.

Recently, a couple of competitions have taken place in Buenos Aires to upgrade two old pavilional buildings still in operation. The contest pointed towards the conservation of architectural patrimony, severely limiting intervention possibilities, and so generating expensive projects to build and maintain. Our firm developed one proposal for the “Hospital Oncológico Ángel Roffo”, which poses similar challenges.

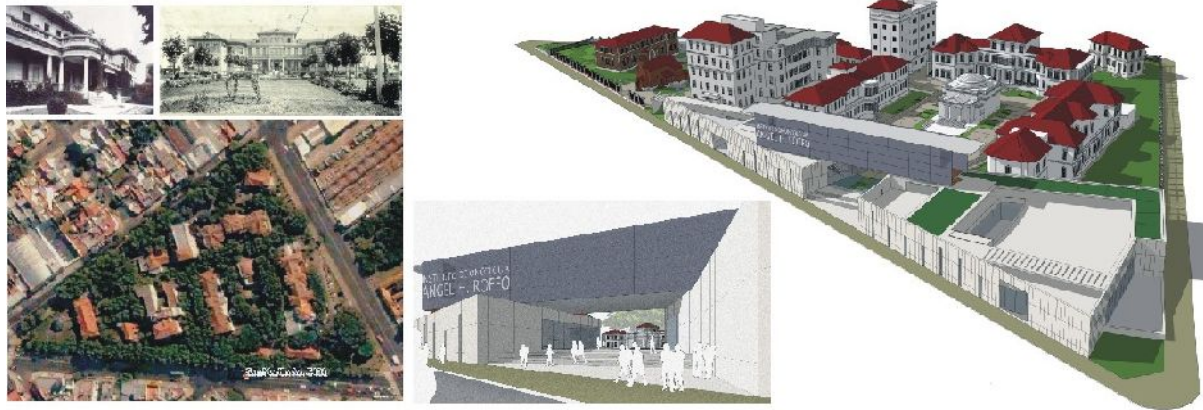


Image 15 - AFS project for the extension and refurbishment of Hospital A. Roffo.

High complexity private Sanatoriums

Large part of our firm's work was produced for the private sector and concentrated in the city of Buenos Aires, where the most affluent part of the population resides. We find within these cases some common characteristics that we detail in what follows:

The first case is the Sanatorio Mitre, a high-complexity private sanatorium for which we developed the Master Plan and all remodeling and upgrades during a twenty-year period. To date the whole project covers 30.000 sqm. and has 320 beds.

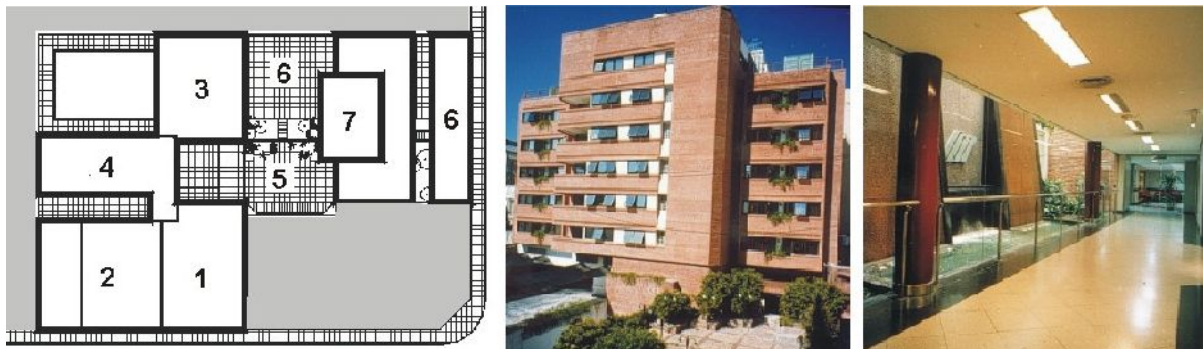


Image 16 - Ex Sanatorio Mitre. Different extension stages along 20 years.

The second case is the Sanatorio Santa Isabel, a sanatorium acquired in 1998 by the Spanish firm ADESLAS, which hired us to provide the integral upgrade and remodeling project. The sanatorium had two existent buildings from different eras facing a street, and an empty lot facing a perpendicular avenue. Within the available lot a ten-story and two-basement structure was built while the whole existent surface was remodeled, all the while keeping the sanatorium working. The final structure covers 14.000 sq. meters and has 200 beds.

In this case we counted with a strong investment to transform the original clinic into a first-grade health center, and so high-quality materials were used for the interior details and advanced technology was used for the equipment. Basic criteria of efficiency and climatic adaptation were introduced when possible, especially in the design of the facades of the new building, improving insulation levels and adapting them to the different orientations. To date, the last two levels need to be completed in their interior, and adaptations and modifications to the original project have already been made in different sectors.



Image 17 – Sanatorio Santa Isabel. Extension and recycling.

One last case with similar characteristics is the Corporación Médica de San Martín, a private group owning a sanatorium and a pre-pay firm in the city of San Martín, within the metropolitan area of the Gran Buenos

Aires.

This sanatorium was founded in the 40's, and it started out with a small 1.500 sq. meters building in a corner lot. The neighboring lots were acquired throughout the years and previous constructions were demolished to incorporate new buildings in a manner which mirrors several other examples in the country. Our firm started working for the corporation in 1986, and has continued doing so to date, with some interruptions. A Master Plan was developed as well as the project and construction supervision for the buildings 3, 4, 6 and 7, this last one being at the moment under construction.

This organization caters in general to the middle-class solidary and pre-paid systems, and the availability of resources is diminished, resulting in a lower standard for the technological level of installations and equipment as well as for the use of materials. Nevertheless, buildings 6 and 7 incorporate summertime solar protection criteria and better thermal insulation for the envelope, generating as well some green expansions that improve the user's comfort, resulting in simple but efficient buildings.



Image 18 – Corporación Médica de San Martín.

CONCLUSION

After more than 40 years of practice we can identify the following guidelines that have oriented the work of our office focused on the health care field in our country:

Argentina is a country of contrasts, and in such a context we have always sought to **adapt our architectural proposals to the special demographic, geographical and economical characteristics of each site**, aimed at the most efficient response to its health care demands. The great differences in scale and resources existing between the major cities, especially Buenos Aires, and the rest of the country, are many times forgotten and solutions elaborated in Buenos Aires are wrongly considered as prototypes to be universally imitated without taking into consideration the particular requirements of each region. We are always committed to adapt our projects to the geography and climate of its site, as an essential strategy to reduce energy consumption and achieve environmental friendliness. As a consequence it has been necessary to reconsider the viability of the most severe standards originated in the central areas, such as globally designed electrical and fire regulations.

The lack of financial resources, and the recursive political and economical setbacks, has contributed to force the slow and partial expansion of private medical institutions, in most cases not led by a rational and systematical plan. Economically profitable services are often privileged independently of the general development of the institution, generating future problems in the global layout. In these cases, our office has always insisted, as a main priority, on the design of a **periodically updated Master Plan** focused on the correct connection of the main vertical and horizontal flow of supplies, materials, staff, patients and visitors, and the actual and future allocation of medical and services areas and their predictable expansions.

As a distinctive characteristic of our work, we have in many cases had to participate in the decision whether to **refurbish or recycle an existing facility or to demolish and rebuild it on the same or different site**. In most cases the first option proved to be successful, and resulted more realistic and flexible in terms of economical feasibility and reasonable adaptability to changes in scope or technology. Nevertheless, the renovation and upgrading of obsolete buildings, such as some of our traditional public hospitals, are not always the best choice, due to the impossibility of achieving the necessary efficiency at a reasonable rate of investment.