

# A Short History of the Beginnings of Hospital Information Systems in Argentina

V. Yáclubsohn

IMIA Honorary Fellow, Buenos Aires, Argentina

## Summary:

**Objectives:** To describe the development of early health information systems in Argentina and their impact on the development of professional societies in the discipline

**Methods:** The first hospital information systems and health surveillance systems in Argentina are described and related to the rise of professional organizations for health informatics.

**Results:** The early health information systems in Argentina are related to precursor developments in medical informatics.

**Conclusions:** Argentina saw a number of hospital information systems developed starting in 1977, which had an important influence on the practice and experience in medical informatics in the country, and the participation of Argentine professionals in national, regional, and international activities in the field

## Keywords

Hospital information systems, Argentina, history, 1980s, professional associations, health informatics

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## 1 Development of the First Hospital Computer System in Argentina (1977)

The first Hospital Information System (HIS) in Argentina was developed by a team directed by Roberto Julio Schteingart at the Sanatorio Güemes. This was a private clinic with 800 beds and 50 doctors' offices performing 2000 daily consultations, and the HIS project was started in 1977 [1, 2, 3].

The strategic objective was to develop an electronic medical record for ambulatory patients. The design was based on Lawrence Weed's problem-oriented medical record, and the general model followed was that of the Harvard Community Health Plan of Boston, a version of the Costar (Computer-Stored Ambulatory Record) System.

Pediatrics was the first medical specialty where the system was implemented in a paperless way, with 30 physicians working with it.

The technology used included:

- PDP (DEC=Digital Equipment Corporation) minicomputers, initially PDP 11-34 with 256 K memory and 40 Mb hard disks.
- 100 workstations.
- MUMPS (Massachusetts General Hospital Utility Multi-Programming System) operating system and programming language, which was specifically adapted to medical information processing.

Initial deployment of the system started in 1978. Two years later it was neces-

sary to buy more equipment, two PDP 11/70 with 80 Mb hard disks.

The entire system was deployed over a five year period. A couple of years later, the Board of Health modified the overall strategic plan, with patient medical care becoming decentralized, and because a communication network was lacking, the system had to be discontinued. It was eventually officially cancelled in 1986.

A frequently asked question was: what was the cost of this first HIS system? An accountant could seek a specific figure, but, from a strategic point of view, one might pose different questions:

- What was the cost of providing adequate communications?
- What was the cost of taking decisions without good information?
- From a medical perspective, what was the cost of treating patients without adequate information?
- At the healthcare level, what was the cost of failing to detect, or to disregard the most prevalent chronic conditions of patients?

These questions still await good answers.

## 2 The CIPEC Project (1980)

In 1980, the Municipality of Buenos Aires City decided to build and implement an automated system for the Permanent Information Centre for Emergencies and Catastrophes (CIPEC). The main goals were to provide more efficient services like: ambulances dispatch

and control, message reception, control of duplicated calls, and connections with all municipal hospitals (22), using on-line information about their emergency rooms and available beds, tracking follow-up of injured people and the relevant critical medical supplies [4, 5].

At this time a military government was in power in Argentina, and the Mayor of the Municipality, who was a brigadier in the Air Force, made a contract with a software engineering enterprise, with a working team staffed by 25 high-level professionals. The equipment selected was:

- For the central station:
  - 1 Texas Instruments computer model TI 990/30, with 1 MB RAM + 1 MB of external expansion
  - 14 terminals for inputs and outputs
  - 2 hard disks of 170 MB
  - High speed printer
- For each one of the 22 hospitals:
  - 1 Texas Instruments computer model TI 990/8, 128 Kb RAM
  - 4 terminals
  - 2 hard disks of 44.6 MB
  - High speed printer
- Communications processors:
  - Motorola MODAT Communications Processor, speed 900 bauds, simultaneous control of audio and digital messages
- Mobile terminals:
  - Motorola MODAT with 240 characters screen
- Communication devices:
  - CIPEC with hospitals: microwaves and network 4 wires as backup
  - CIPEC with ambulances: VHF

The system faced several challenges in implementation. It involved new technology (minicomputers) - the TI 990/30 was the first in the country and there was inadequate technical support by the provider. The Operating Systems, initially DX10 (multitasking) and later DNOS (Distributed Network Operating Systems), did not have access to TCP/IP protocols, and the links between the TI 990 and Motorola's MODAT had not undergone real-world testing.

The team used many new systems analysis techniques, such as modular design, HIPO (Hierarchy Input Process Output) diagrams, structured analysis, programming language Pascal (structured programming), relational data bases (this was six years before ANSI SQL appeared) and independent testing. The principal reference used in this was "Software Reliability-Principles and Practices" by Glenford J. Myers (1976), and others by the same author.

The first version of the system was completed in a year, and the various subsystems worked well in several demonstrations with all the desired functionalities. However, the entire system could not be deployed, because the Municipality never installed the transmission equipment and never made offices available to house the computers.

The benefits of the project remain unclear, which does not detract from the pioneering nature of the effort with software development processes, and the learning of new techniques, tools and procedures for the professional medical IT community.

### 3 San Isidro County Hospital (1982)

In 1980, the Director of the San Fernando County Hospital, Dr. Emilio Etchegaray, invited me to carry out a feasibility study of HIS implementation. It took several months to complete the study, working daily within the hospital and discussing the problems and requirements of different clinical departments. In 1981, I used this work as the basis for a first lecture on HIS during the Latin American Congress "PANEL'81/Expodata/12 JAIIO" [6]. One year later, the Secretary of Public Health of San Isidro Municipality invited me to propose a HIS model for implementing in the county hospital.

Implementation was approved for two critical areas: Inpatients in the hos-

pital undergoing medical and surgical treatment, and for the Laboratory of Clinical Analysis -a network of peripheral laboratories belonging to the Primary Healthcare offices, connected with the central laboratory.

Both systems came into operation with an old Honeywell-Bull computer that was transferred to the hospital. Nevertheless, the system worked for ten years, until it was replaced by a new one, with modern computers and a real communications network.

## 4 The Rise of Professional Associations in Argentina Related to Health Informatics

**The Argentine Society of Informatics and Operational Research (SADIO)**, which brought together many of the professionals working in what was to become medical informatics, was founded on March 30, 1960.

**The Biomedical Informatics Society of Argentina (SIB)** was established on October 11, 1980, as the first Division of SADIO, according to the rules of its new Statute, approved in the year 1977. Its principal goal was to promote the use of computers as powerful tools for supporting health and healthcare. Dr. Carlos Delbue, Medical Director of the Posadas Hospital, was its first President.

In pursuing its goals, the SIB carried out its activities both nationally and internationally.

Within Argentina, the SIB organized symposia on Medical Informatics as part of the Argentine National Meetings on Informatics and Operational Research (JAIIO) within SADIO in 1981, 1983 and 1984, and as part of several congresses of USUARIA, the Argentine Association of Informatics and Communications Users (founded on April 1982). One of these (Infotelecom IV, May 21, 1986) saw the Past President of IMIA, David Shires, invited to give the keynote

plenary speech. SIB also gave courses and conferences on medical informatics within conferences organized by the Argentine societies in the specialties of Surgery, Pediatrics and Cardiology.

Another important professional milestone was the first conference specifically devoted to Health Informatics, which took place from the 20th to the 22nd November of 1985 at the Argentine Scientific Society with over 150 participants. It was organized and sponsored by the Favalaro Foundation and the Institute of Computational Neurophysiology in addition to the SIB.

A priority of SIB was Argentine participation in international academic activities in medical informatics. From an institutional point of view, SIB in 1982 became the national member representing Argentina within the International Medical Informatics Association (IMIA) [7], and played this role until 1996. During the World Congress on „Medical Informatics and Developing Countries“ (1982) the Society was one of the „Acuerdo de México“ subscribers [8]. This agreement led to the foundation of IMIA-LAC, the Regional Federation of Health Informatics for Latin America and the Caribbean, which was recognized by the 1983 IMIA General Assembly [9] as the second Regional Federation of IMIA (after EFMI for Europe). Since then, SIB has been an active member of IMIA and IMIA-LAC, participat-

ing in all the MEDINFOs since 1983, as well in the Annual Assemblies and Board Meetings, and in several Working Groups.

In October 17 – 18, 1987, SIB hosted the IMIA Annual General Meeting for the first time in Latin America, with representatives of thirteen countries and the World Health Organization (WHO) participating. Julio Viau, then vicepresident of IBM Argentina, made available the facilities of the company for holding the meeting.

In the year 1996, SIB decided to stop its activity as a Division of SADIO, in order to give place to a new society specifically devoted to Health Informatics. In 1997 a new organization, the Argentine Association of Medical Informatics, was founded and took over the role of Argentine representative to IMIA.

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## Correspondence to:

Valerio Yácutsohn  
E-mail: valerio.yacubsohn@gmail.com