:: IMSS EHR & VistA Implementation ::

VistA Community Meeting

Robert Morris University

Pittsburgh, PA

June 29th, 2006

INSTITUTO MEXICANO DEL SEGURO SOCIAL
SEGURIDAD Y SOLIDARIDAD SOCIAL

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:: Mexico & IMSS Facts ::

Mexico

- 1,964,375 km² total territory
- 31 States, 1 Federal District
- (Capital: México, Distrito Federal)
- Total population (2000): 97,483,412
- Annual population growth rate (1990-2000): 1.85%
- Urban population (2000): 74.6%
- Population density (2003): 53.0 Hab/Km2
- Life expectancy: 68.5, males; 74.7, females
- Ethnic groups: 60% mestizos (Amerindian-Spanish) ; 30% amerindian; 9% white; 1% other

Source: Secretaría de Relaciones Exteriores http://www.sre.gob.mx

IMSS is a unique Social Security institution...

- It employs 380,000 workers and has a seventeen Billion USD annual operating budget.
- Aside from providing disability and retirement pensions to 3 million people, similar to those provided by the Social Security Administration in the United States, it also offers medical services for around half of all Mexicans, that is, over forty five million people.
- In addition, IMSS provides day care centers for working women and cultural and sports facilities for affiliated workers.
- Lastly, the IMSS is Mexico's second largest Tax Authority, after the Finance Ministry, collecting annually over ten billion dollars in Social Security contributions.

IMSS' quick facts

Quick Facts

- Daycare centers with a population of over 150,000 children.
- 1 out of every 3 children in Mexico is born at IMSS.
- 25% of all medical research country-wide.
- 37% of all hospital beds.
- 74% of all Kidney Transplants.
- 76% of all Heart Transplants.
- 65% of all Pancreas Transplants.
- 2nd largest collection authority (Approx. 9.5 BUSD).

Medical Units

– 1st Level (primary care)	1,200
– 2nd Level (community hospitals)	223
– 3rd Level (tertiary/educational)	40

Covered Population

• Workers	15,130,640
• Beneficiaries (relatives)	27,098,612
• Pensioned and Relatives	3,643,151
• ***Total***	***45,872,403***

:: Electronic Health Record ::

EHR in MEXICO

IN MEXICO THERE ARE SEVERAL INDEPENDANT EFFORTS TOWARDS AND ELECTRONIC HEALTH RECORD. THE CURRENT TREND IS THE INTEGRATION OF STANDARDS SUCH AS HL7, CDA AND DICOM .

Ministry of Health

- Disperse efforts in several Medical Facilities in the country.
- Currently analyzing a standardization process.

Private Medical Centers

- Clínica Lomas Altas: Ambulatory Patient Care + PACS
- Clínica Londres: EHR System
- Hospital Ingles: PACS
- Hospital ABC: EHR + PACS

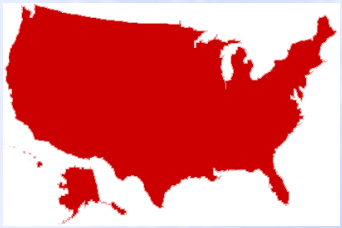
ISSSTE

- Tele-medicine services being developed.
- Deploying an appointment control system.

IMSS

- HL7, CDA and DICOM standards are adopted.
- State of the art technological infrastructure being used: Unisys ES7000 Orion as central repository, BEA WebLogic 8.1
- 1000+ Medical Units online by end of 2006.
- Medical Imaging Centralization project currently under development to be tied into the EHR.

Similar Scenarios



United States of America

Served population: 295,000,000[1]
Impl. due date: 2014[2]
Est. investment: 600 BUSD[3]

United Kingdom: NHS

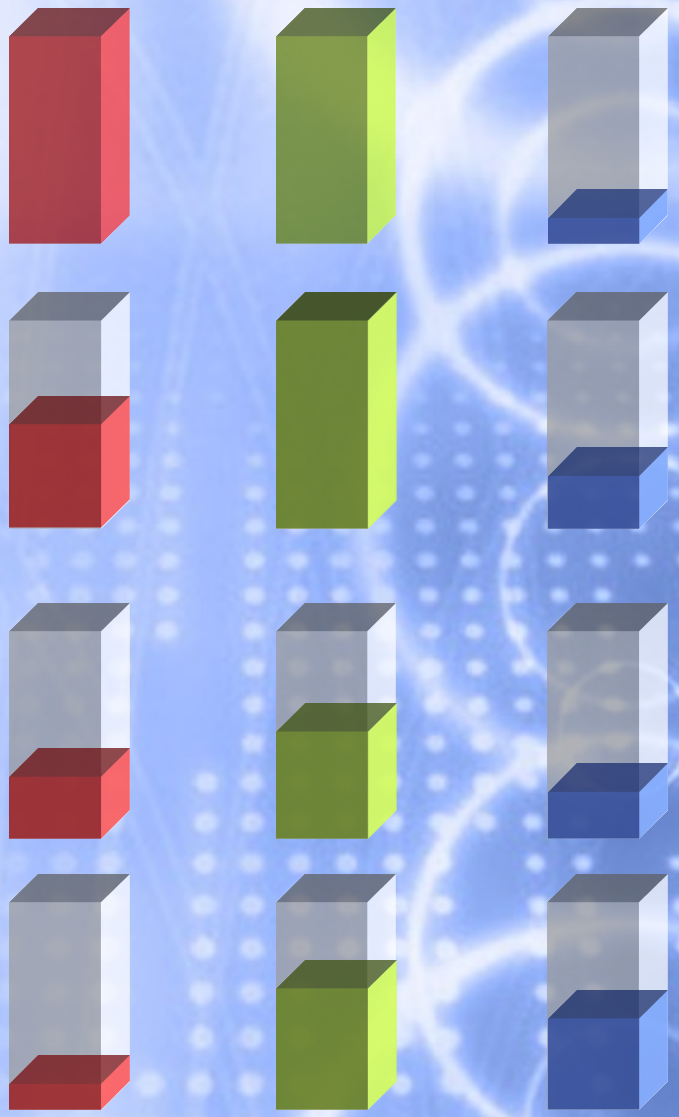
Served population: 60,400,000[1]
Impl. Due date: 2010[4]
Est. investment: 20 BUSD[5]

Canada: Canada Health Infoway Inc.

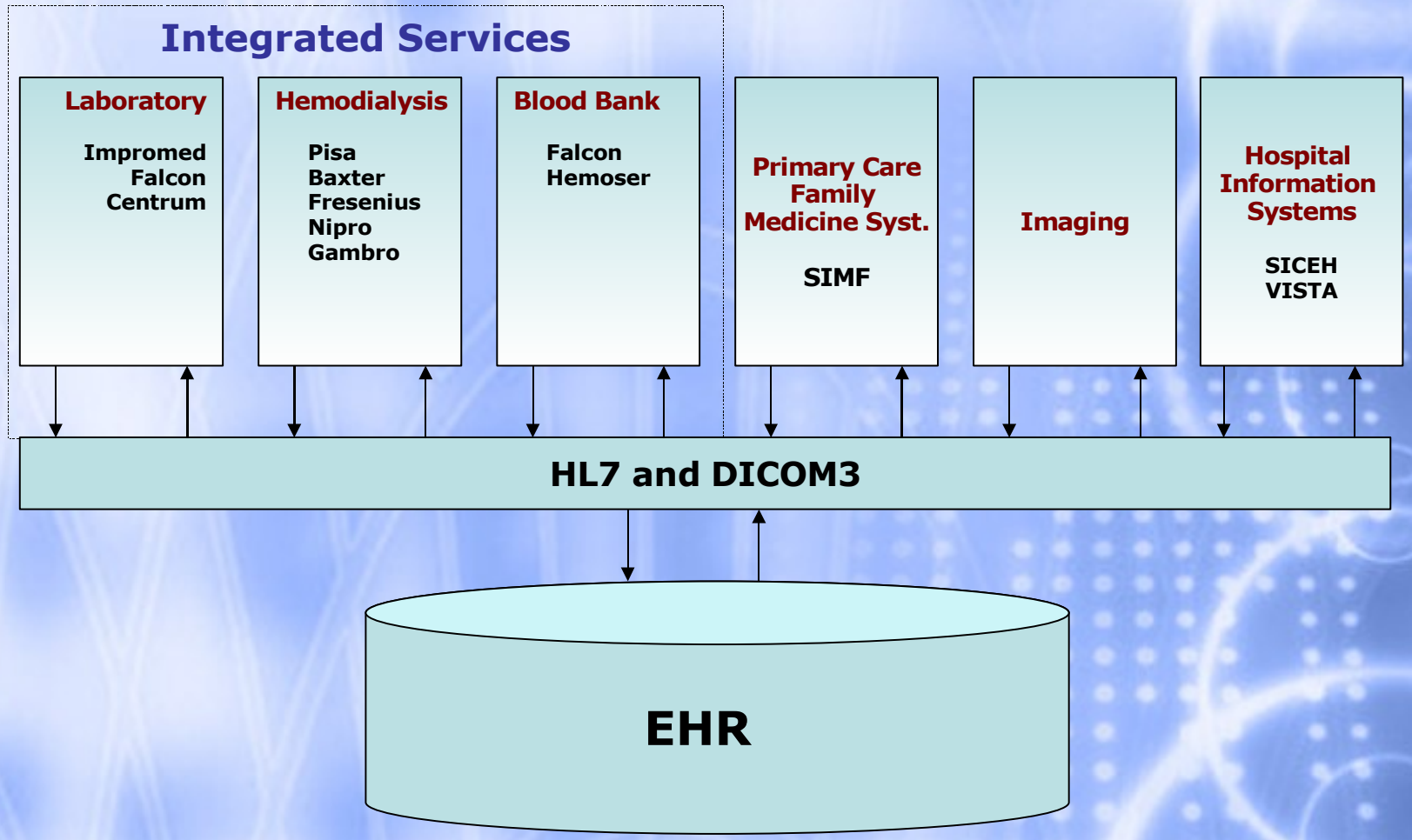
Served population: 16,400,000[1 & 6]
Impl. due date: 2009[6]
Est. investment: 1.3 BUSD[7]

IMSS

Served population: 45,872,403
Impl. due date: 2006
Est. investment: 102 MUSD

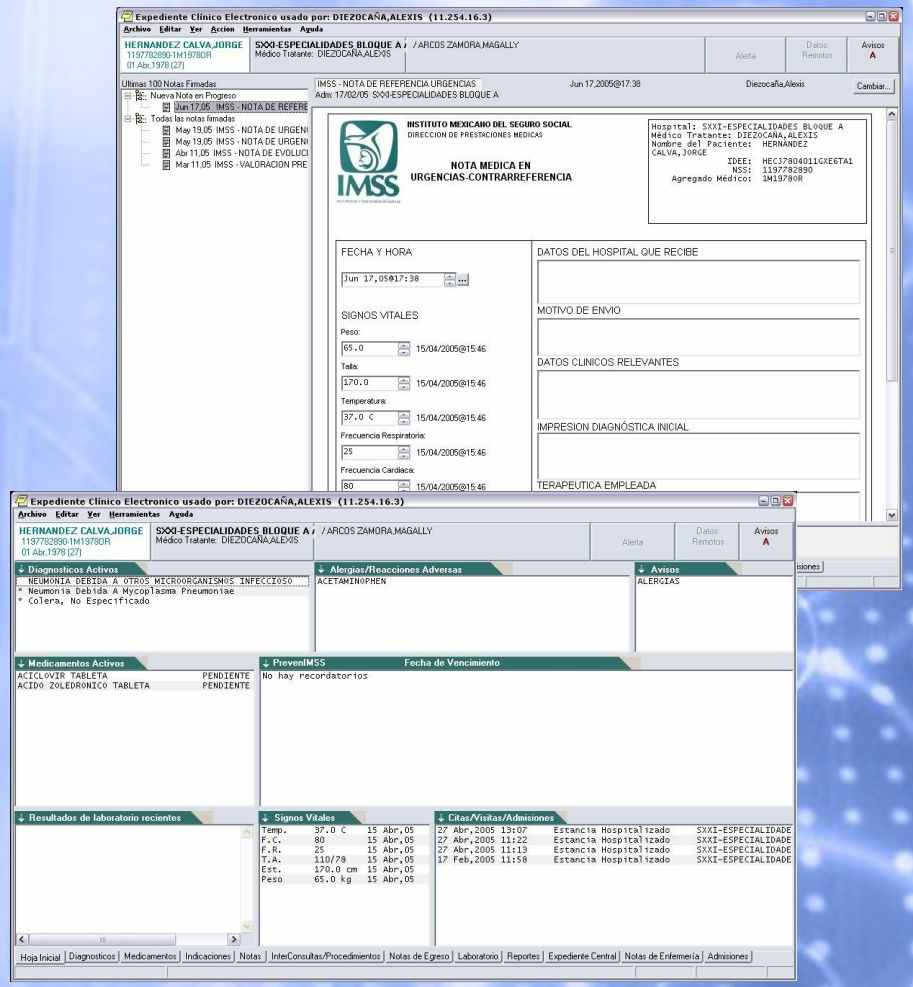


Integration



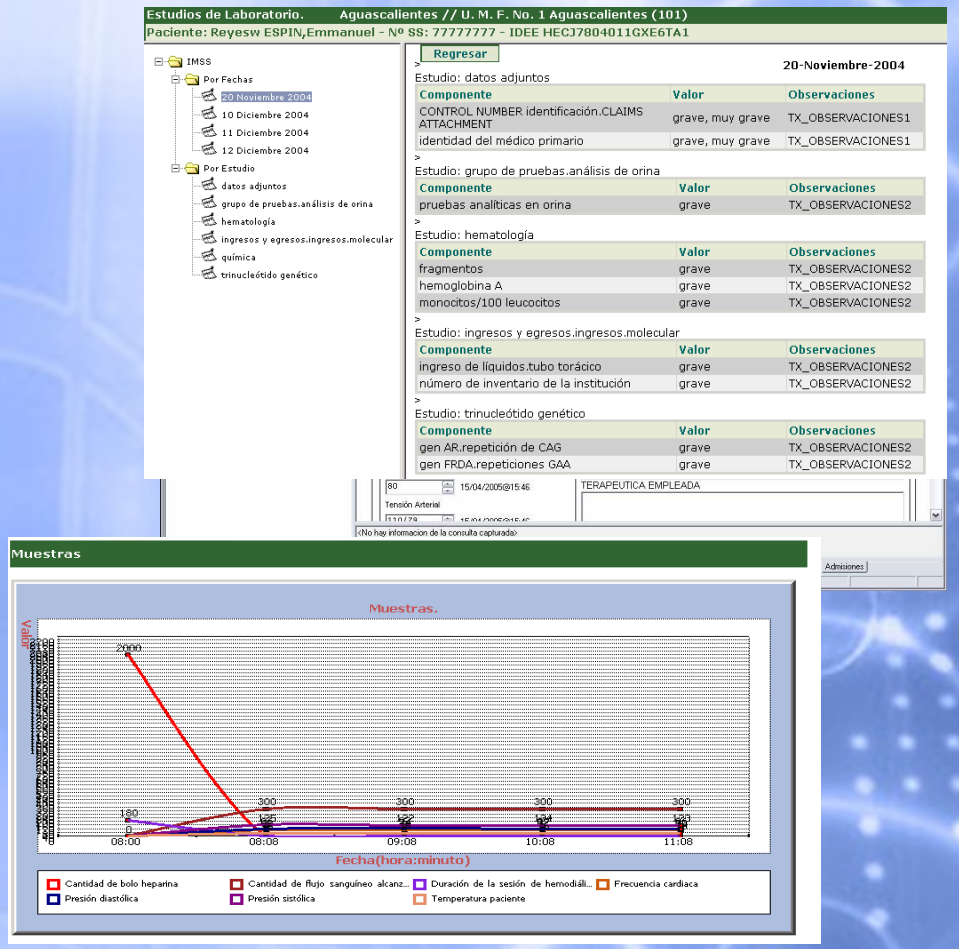
IMSS Electronic Health Record

- The electronic health record project will centrally host the clinical information generated by all services provided by IMSS:
  - **1st Level** – Family Medicine Units (1,200+)
  - **2nd Level** – General and Regional Hospitals (223)
  - **3rd Level** – Highly Specialized Medical Units (40)
- The objective is to have a **unique** EHR for every IMSS user that will last for their whole life time.
- It will be **available** in any time and place connected to the IMSS network.
- IMSS EHR will **enhance** and **expedite** the healthcare services provided by the Institute.



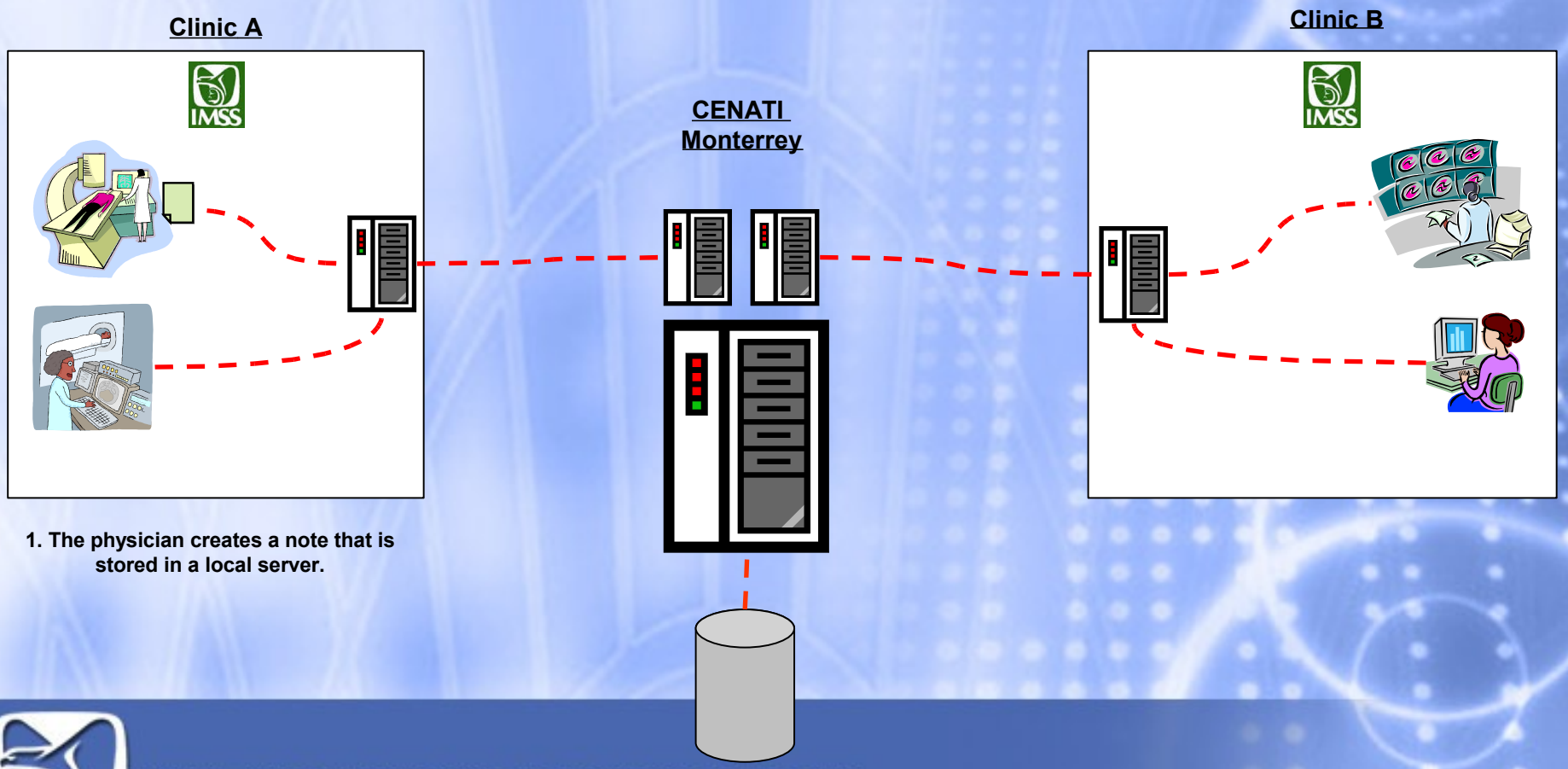
IMSS Electronic Health Record

- IMSS EHR will also consolidate a tremendous **knowledge database** that will support research, education and administrative activities.
- Data will be consolidated from the different clinical applications that IMSS uses such as:
  - The Family Medicine System (**SIMF**)
  - The Ambulatory Appointment System (**SICEH**)
  - The Hospital Information System (**IMSS-VistA**)
  - The different treatment and diagnostic auxiliary services systems.
- Starting operation date: **April 2004**.
- Approximate investment: **102 MUSD**.



IMSS Electronic Health Record

IMSS EHR ALLOWS THE INFORMATION INTERCHANGE BETWEEN CLINICS AND HOSPITALS NO MATTER THEIR SIZE OF GEOGRAPHIC LOCATION.



1. The physician creates a note that is stored in a local server.

IMSS Electronic Health Record

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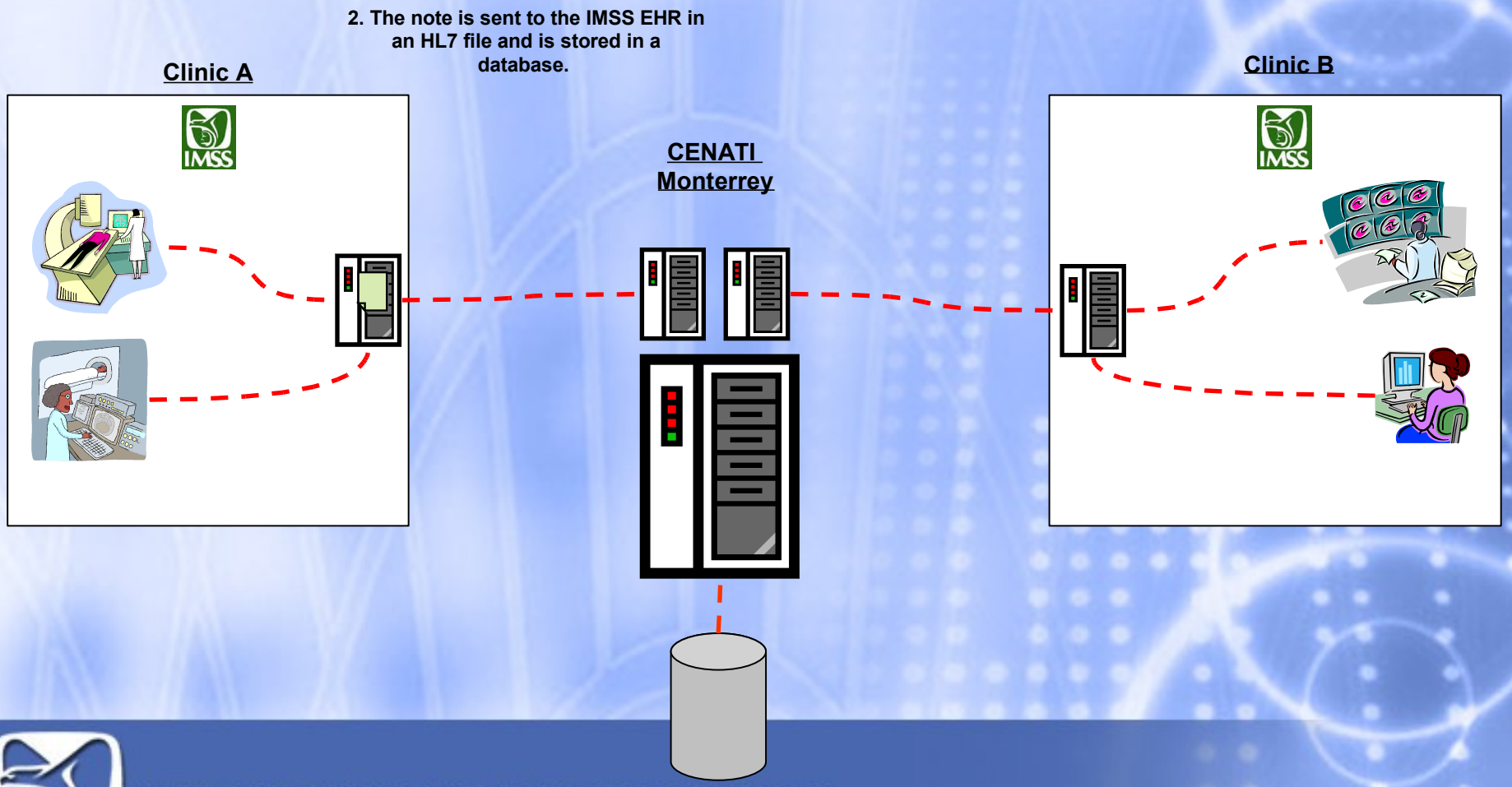

IMSS Electronic Health Record

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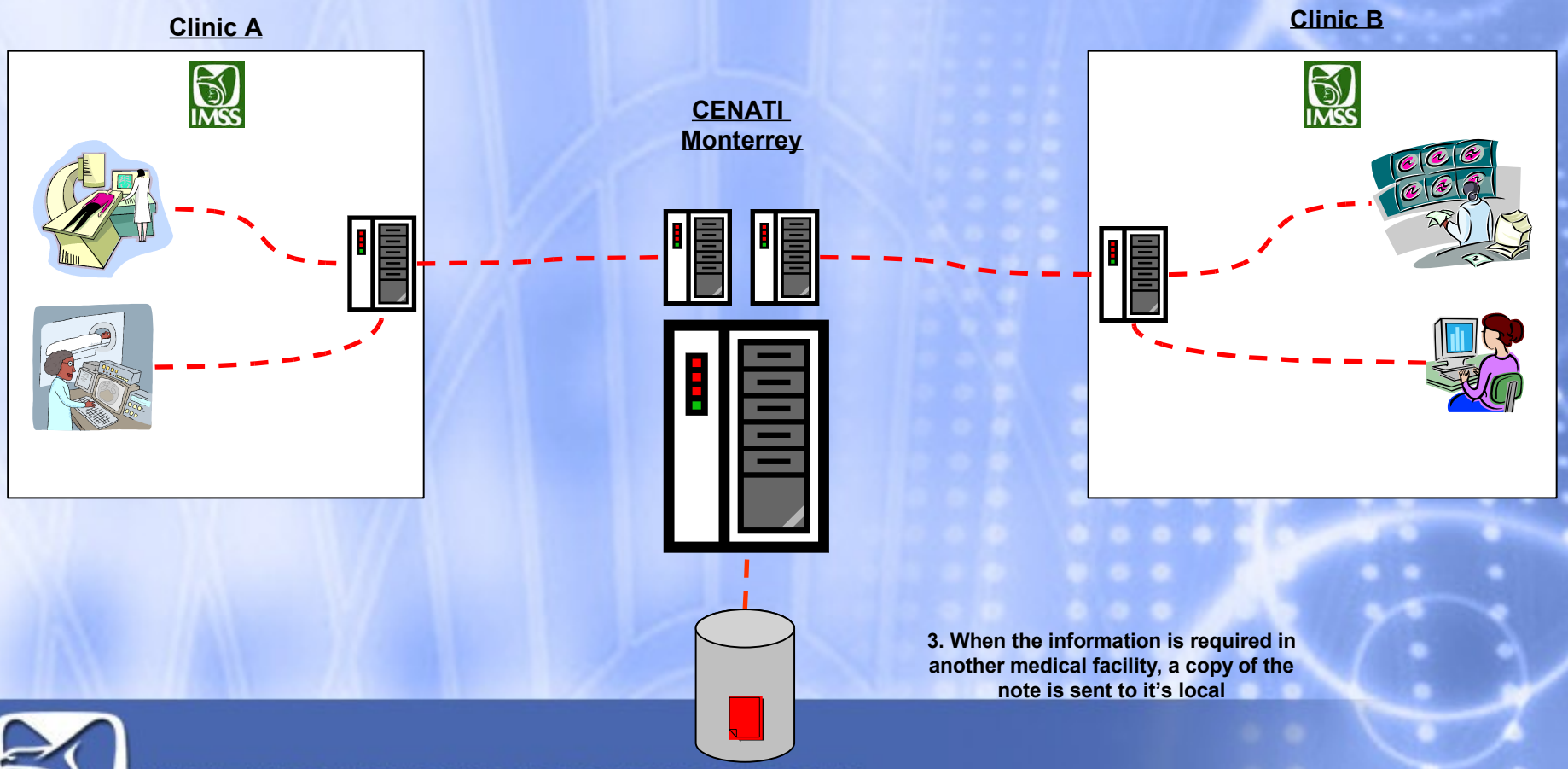
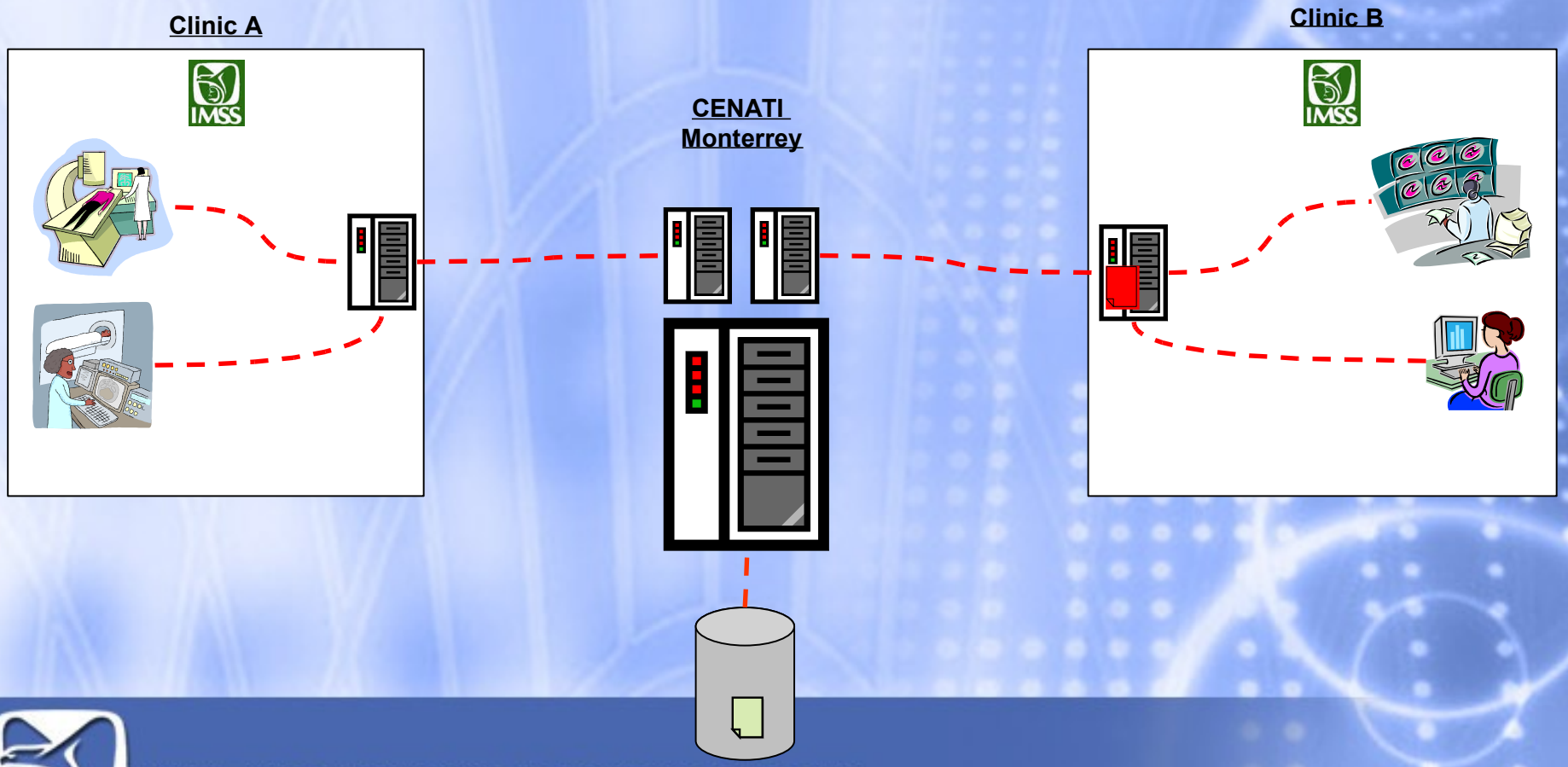


3. When the information is required in another medical facility, a copy of the note is sent to it's local

IMSS Electronic Health Record

IMSS EHR ALLOWS THE INFORMATION INTERCHANGE BETWEEN CLINICS AND HOSPITALS NO MATTER THEIR SIZE OF GEOGRAPHIC LOCATION.

4. The note is then seen by the personnel that requested it.



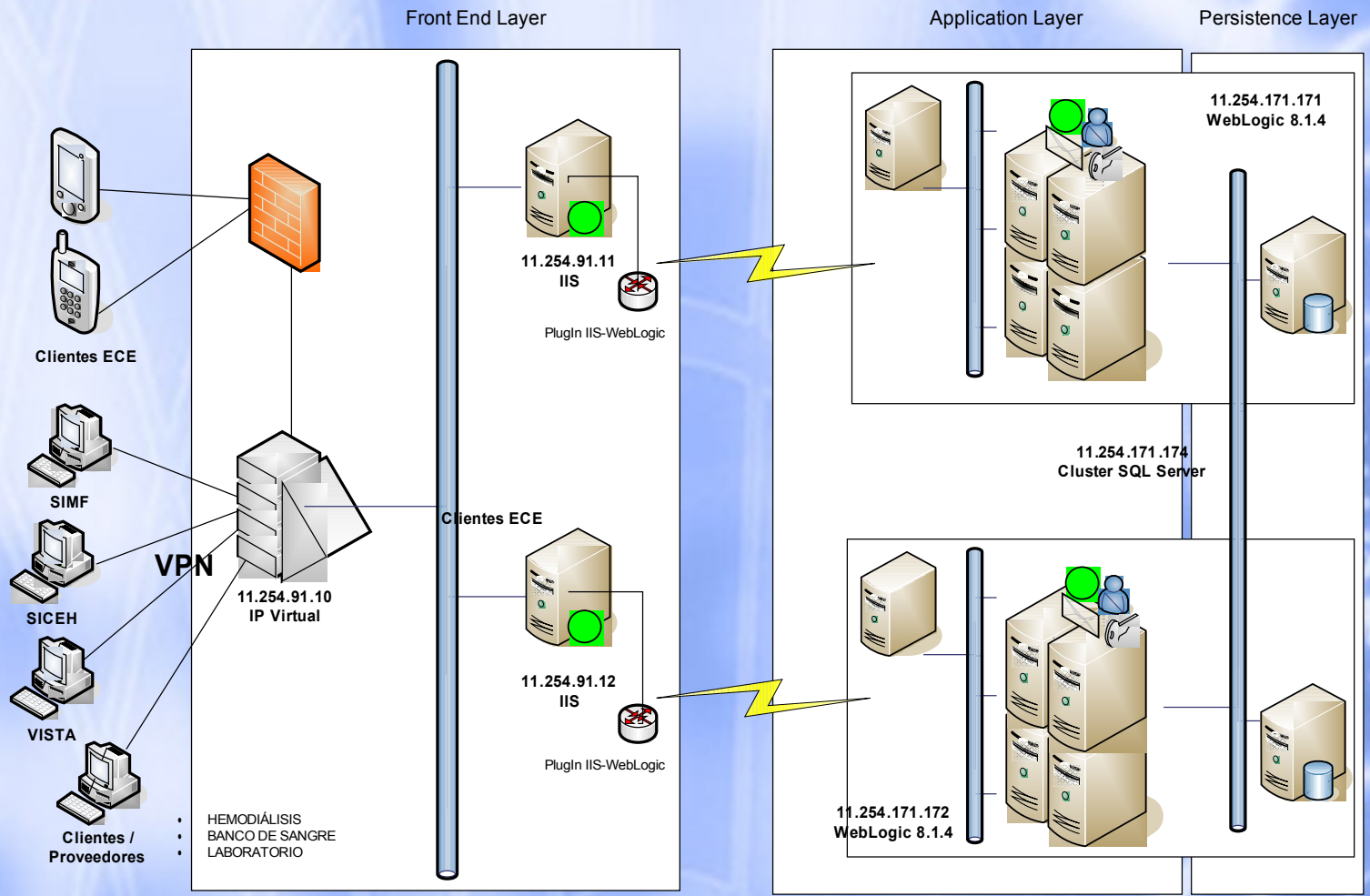
Use of standards by the EHR project

- **HL7**
  - Health Level 7 is a standard used to provide a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services. Specifically, to create flexible, cost effective standards, guidelines, and methodologies to enable healthcare information system interoperability ***and sharing of electronic health records***.

- **CDA**
  - Clinical Document Architecture is a defined complete document which can include text, images, sounds and any other multimedia information.

- **DICOM**
  - Digital Communications in Medicine (DICOM) for interoperability the distribution and view of medical images.
  - Describes the structure, file formats and specification of information of an image and the header required, describing a common language to different medical systems.

Architecture



Architecture

- The Design of the technical platform was based on six main concepts to achieve full functionality:
  - Security
  - Interoperability
  - Completeness
  - Portability
  - Durability
  - Policy Compliance (NOM 168A, IMSS 111A)
- Context
  - To capture faithfully the original meaning of information and preserve the medical-legal integrity: containers, content and context.

Facts on the EHR technological platform

- Level of availability of 99.5%.
- Interoperability platform implemented in a UNISYS ES7000 Orion enterprise server.
- RAID Architecture to warranty availability of data.
- IMSS EHR front-end is using Network Load Balancing.
- Disaster Recovery Plan designed to work in an alternate location.
- Implementation of industry security standards such as WS Security, WS Addressing and WS RM.
- Platform is able to process up to 180 TPS with a normal operation scheme of 80 TPS.
- ISO 9001:2000 Quality System implemented and certified in December 2005.

Microsoft

bea Think liquid.

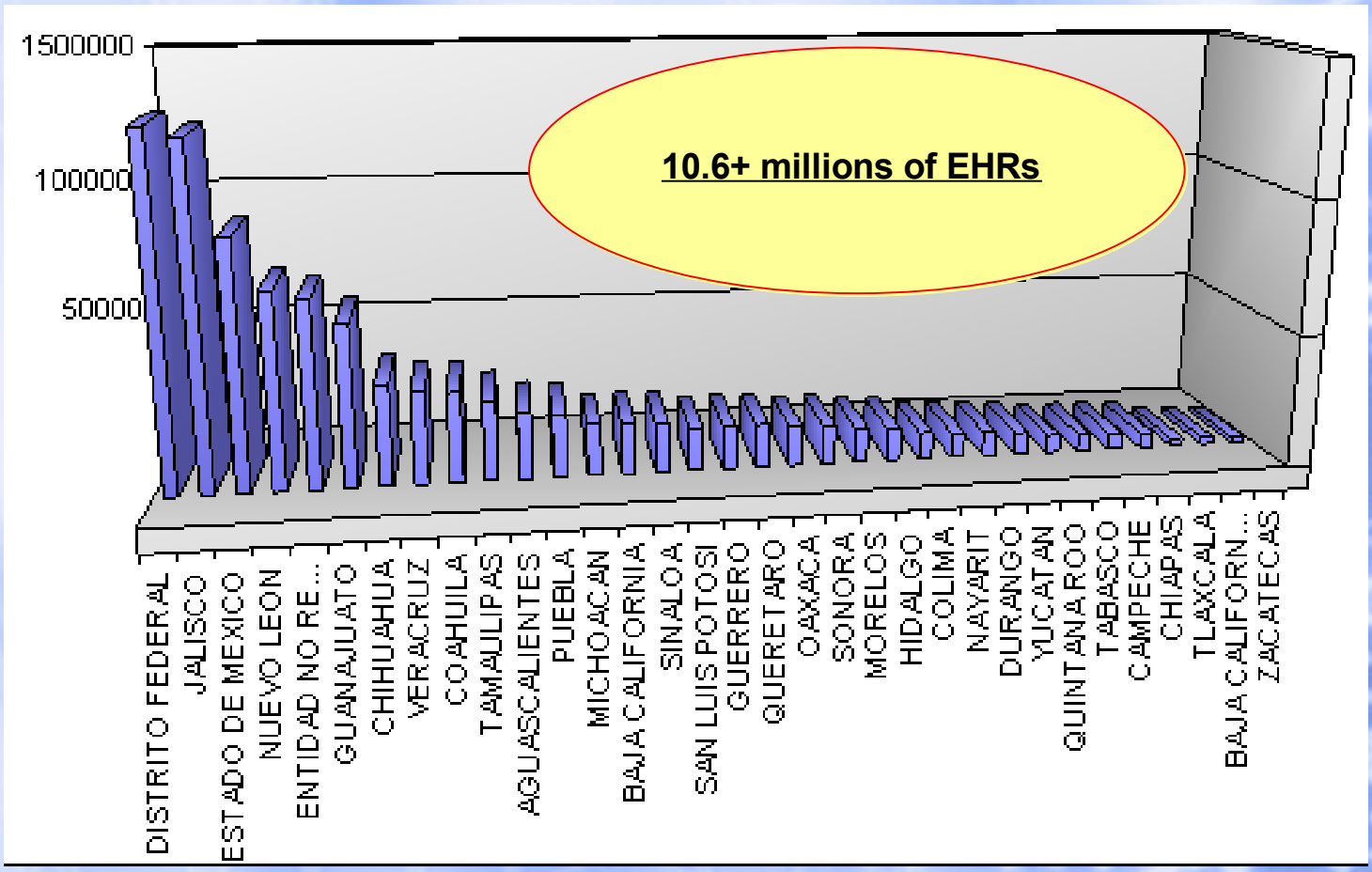
ISO

Achievements

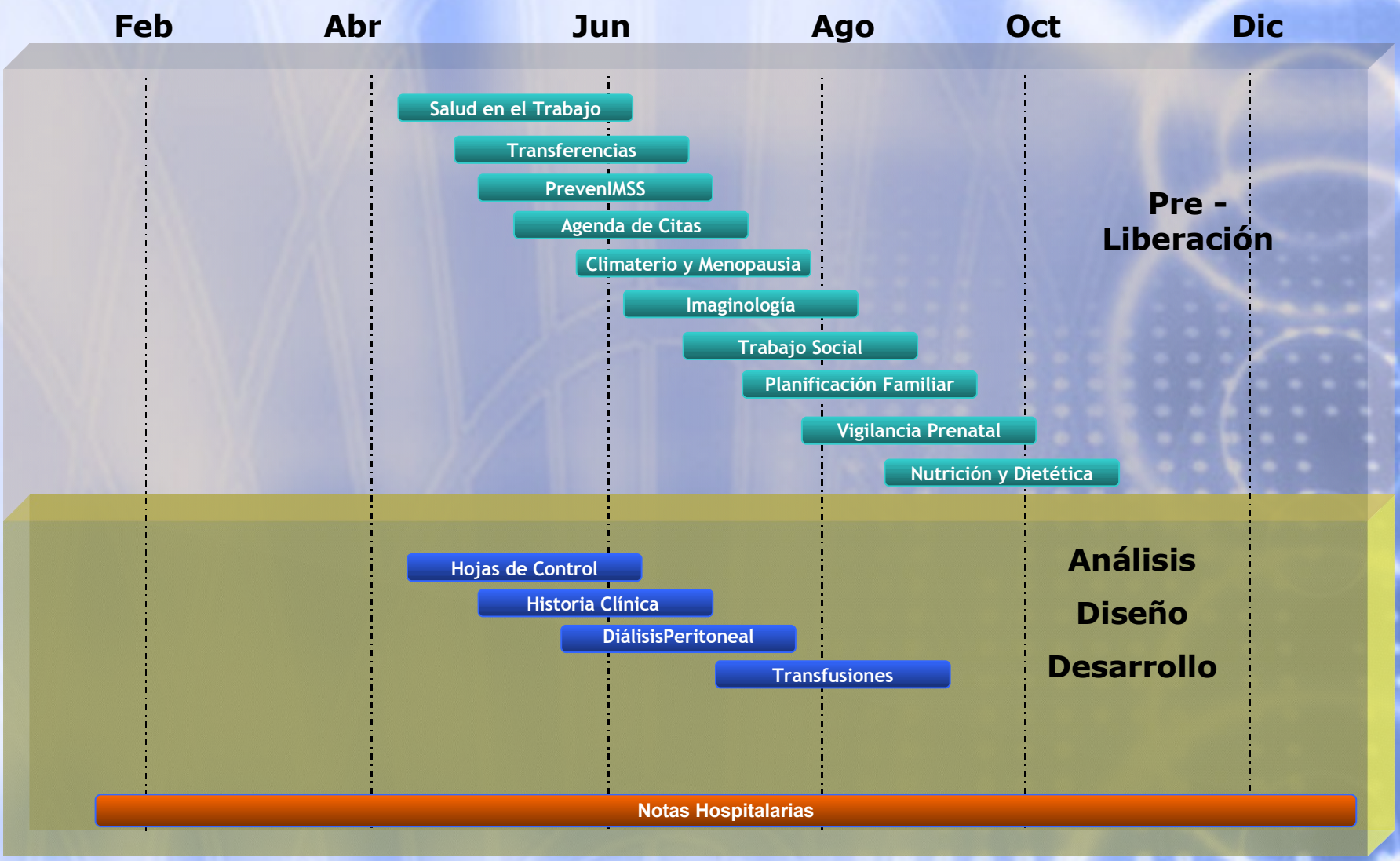
- IMSS EHR has registered the following information:

• Hemodialysis	(320,000 sessions)
• Laboratory	(10.4 million studies)
• Blood Bank	(65,000 orders)
• Medical Notes	(30 million – *clinical notes only*)
• Incapacities	(52,300 + 570 cancellations)
• Stomathology	(8,336 studies)
• Pharmacy	(160,000 prescriptions)

Achievements



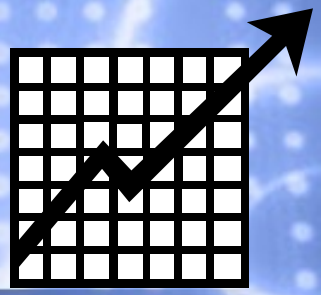
Achievements



2006 Goals

IMSS EHR PROJECT HAS SET THE FOLOWING GOALS FOR 2006

- Centralization of information of more than 1,000 Family Medicine Units, 70 Secondary Level Hospitals and 25 Highly Specialization Medical Units.
- Complementing the high availability scheme of the architecture by implementing a geo-cluster.
- Platform modification in order to support messaging transactions via SSL.
- Integration of digital signatures in the HL7 messaging operations.
- CMM Level 3 certification for the messaging development process.



:: IMSS-VistA
Hospital Information System ::

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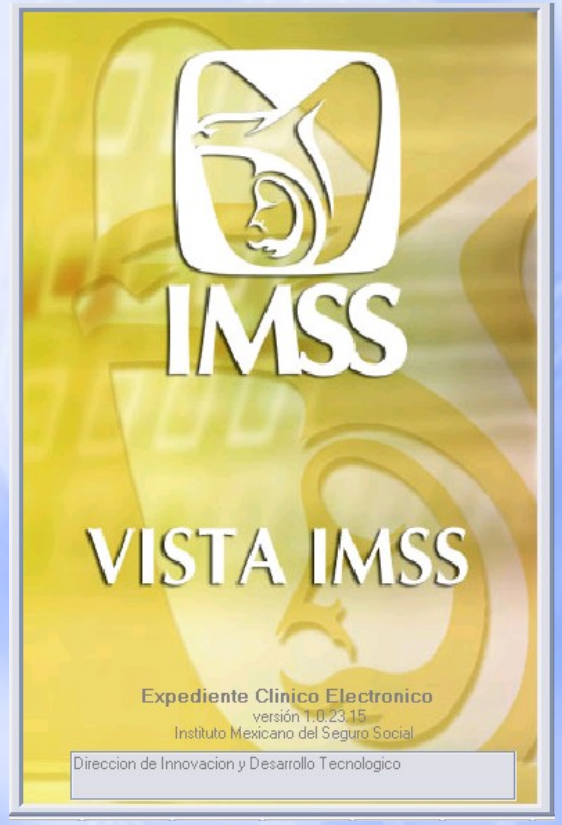
•Description



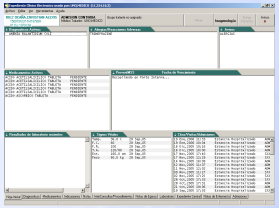
SPLASH SREEN OF THE LOCALIZED VERSION OF CPRS

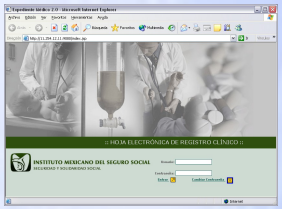
IMSS HAS ADOPTED THE WORLD-WIDE RECOGNIZED US VETERAN AFFAIRES' VISTA SYSTEM AS THE HOSPITAL INFORMATION SYSTEM TO BE USED AT IMSS HOSPITALS.

IMSS HAVE LOCALIZED AND MODIFIED VISTA's FUNCTIONALITY TO MEET HOSPITAL REQUIREMENTS, ALSO HAVE ADDED NEW FUNCTIONALITY, FOR EXAMPLE:

- **Web-interfaces for modules that originally were text-based.**
- **Integration to the existent IMSS systems like: Central EHR, Pharmacy and Lab results.**

•Architecture (Vista & EHR)





Legacy Architecture - VistA

RPC's

GT.M / VistA

Web Application

bea

telnet & HL7v2

Telnet - general.uoguelph.ca
Connect Edit Terminal Help
Use restricted to students, faculty
login: youruserid
Password:

Web Services

WAN

Web Services (HL7v3)

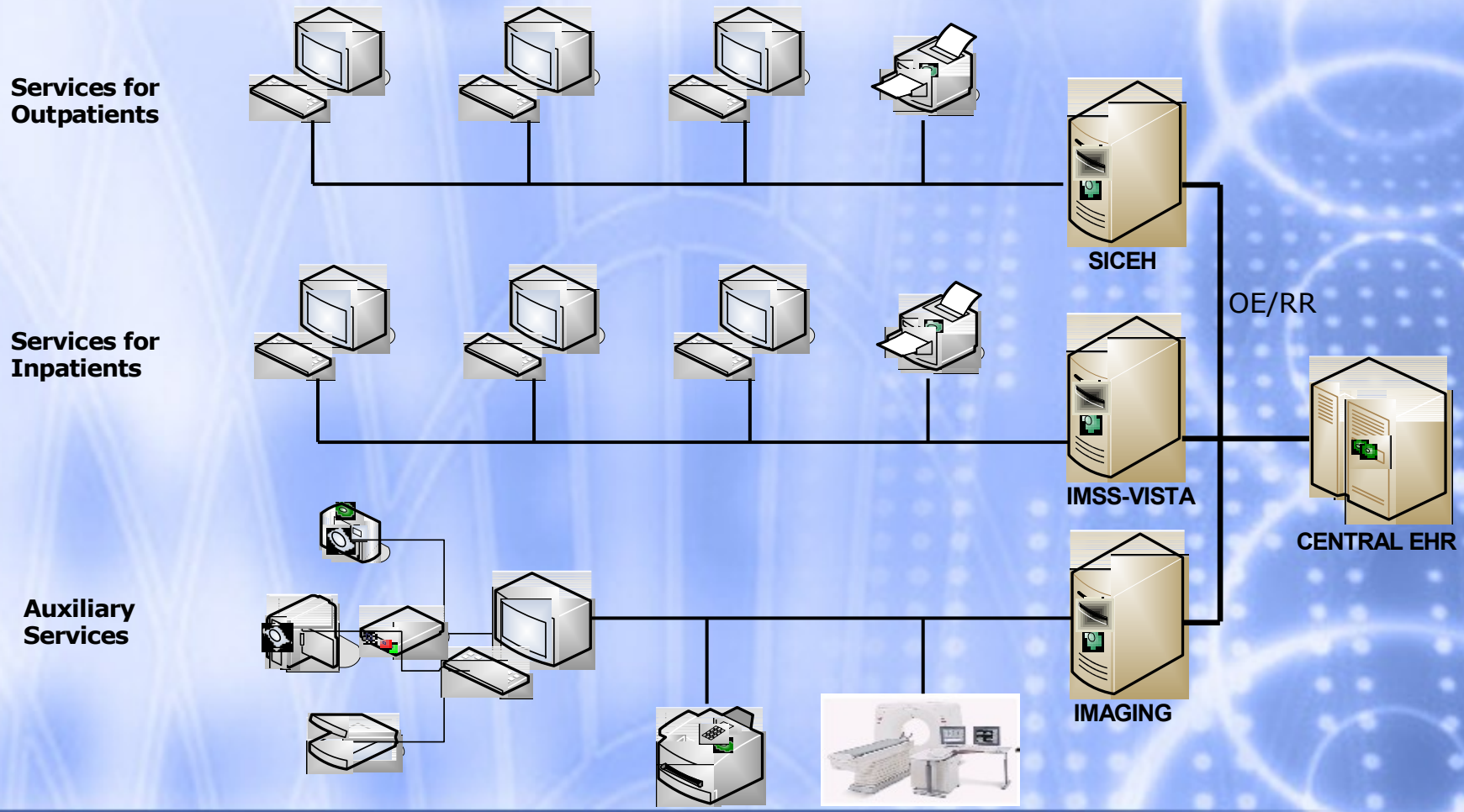
AcceDer

Central Eligibility Module & Master Patient Index

EHR

Central EHR

•Architecture (HISes & RIS)

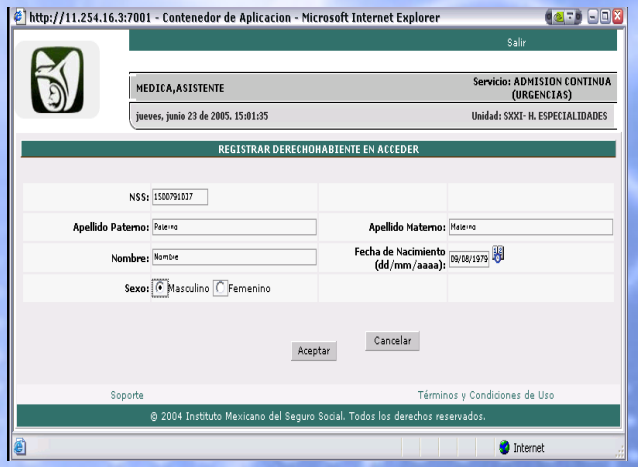


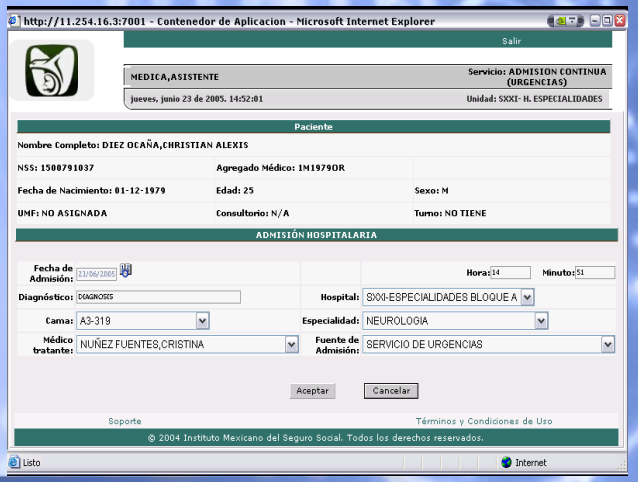
•New web interfaces

- **PATIENT REGISTRATION.**
  - A completely new web user interface for patient registration, uses web services to check eligibility and demographics if patient already has EHR.

- **ADMISSION/TRANSFER/DISCHARGE**
  - A completely new web user interface for bed control (Vista's ADT module), uses web services to check eligibility and demographics if patient already has HER, and to receive Admission Orders from SICEH.

- **EMERGENCIES (ADT)**
  - A completely new web user interface for patient admission into Urgency Service, similar to ADT but with enhancements to match IMSS business model.





•New CPRS modules

- **CENTRAL EHR INQUIRY**

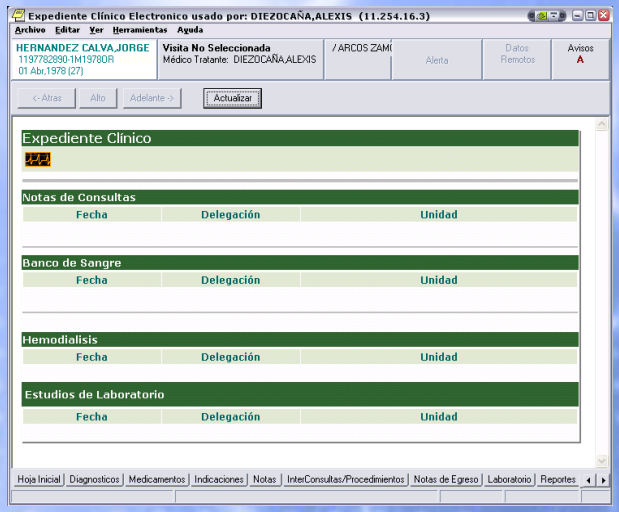
  •Provider can consult patient's central EHR and see all clinical notes, lab results, haemodialysis sessions and blood transfers made at other IMSS facilities.

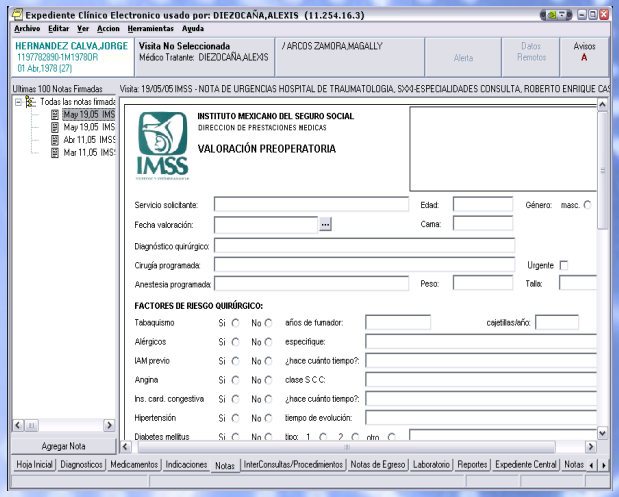
- **CLINICAL NOTES**

  •Clinical notes with rich format and coded fields (no just free text). Also we developed a graphic environment to design additional clinical notes in a easily and quickly fashion, as soon as the new design is saved it is available within CPRS.

- **EMERGENCIES (CPRS)**

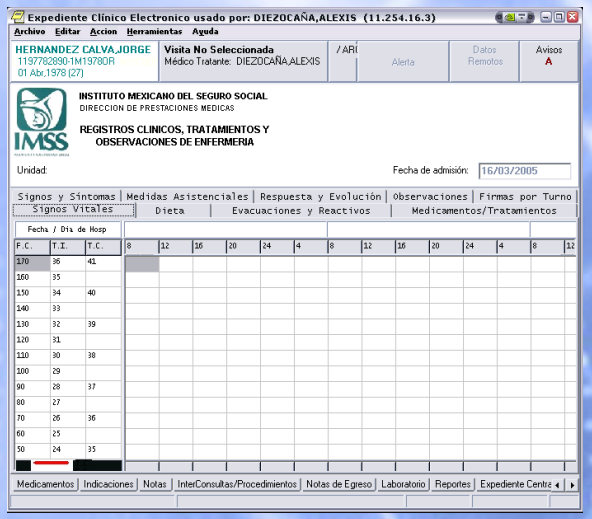
  •A completely new module (accessible through a CPRS tab). Providers at Emergency Rooms have an interactive screen that permits the capture patient's information like: Glasgow scale, ISS, RTS, TRISS, AO code (in case of fractures), a body/skeleton map to locate burns/fractures. This information is reported within a clinical note called "HOJA FRONTAL DEL SERVICIO DE URGENCIAS".

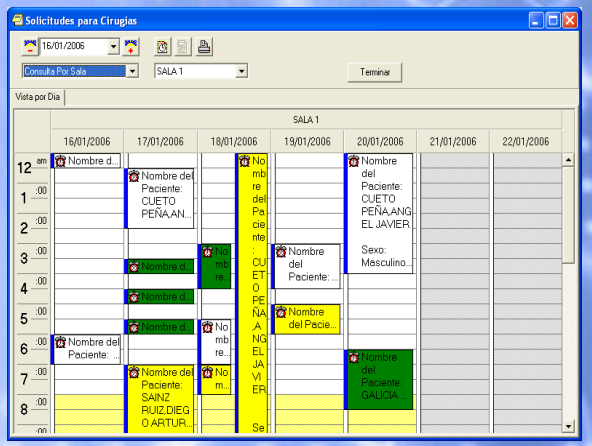




•New CPRS modules

- **NURSERY**
  - A completely new module (accessible through a CPRS tab). Has been designed to meet IMSS Nurses needs. Nurses can receive provider's orders and follow up clinical attention within CPRS.
- **SURGERY**
  - A completely new module (accessible through a CPRS tab). Has been designed to meet IMSS Surgery needs: Scheduling, Surgery Clinical Note and automatic reports to a central IS.
- **DIRECT COMMUNICATION TO LEGACY HIS**
  - A completely new CPRS tab used to retrieve information from a legacy HIS that has been used for the last 10 years (necessary for patients with chronic diseases).





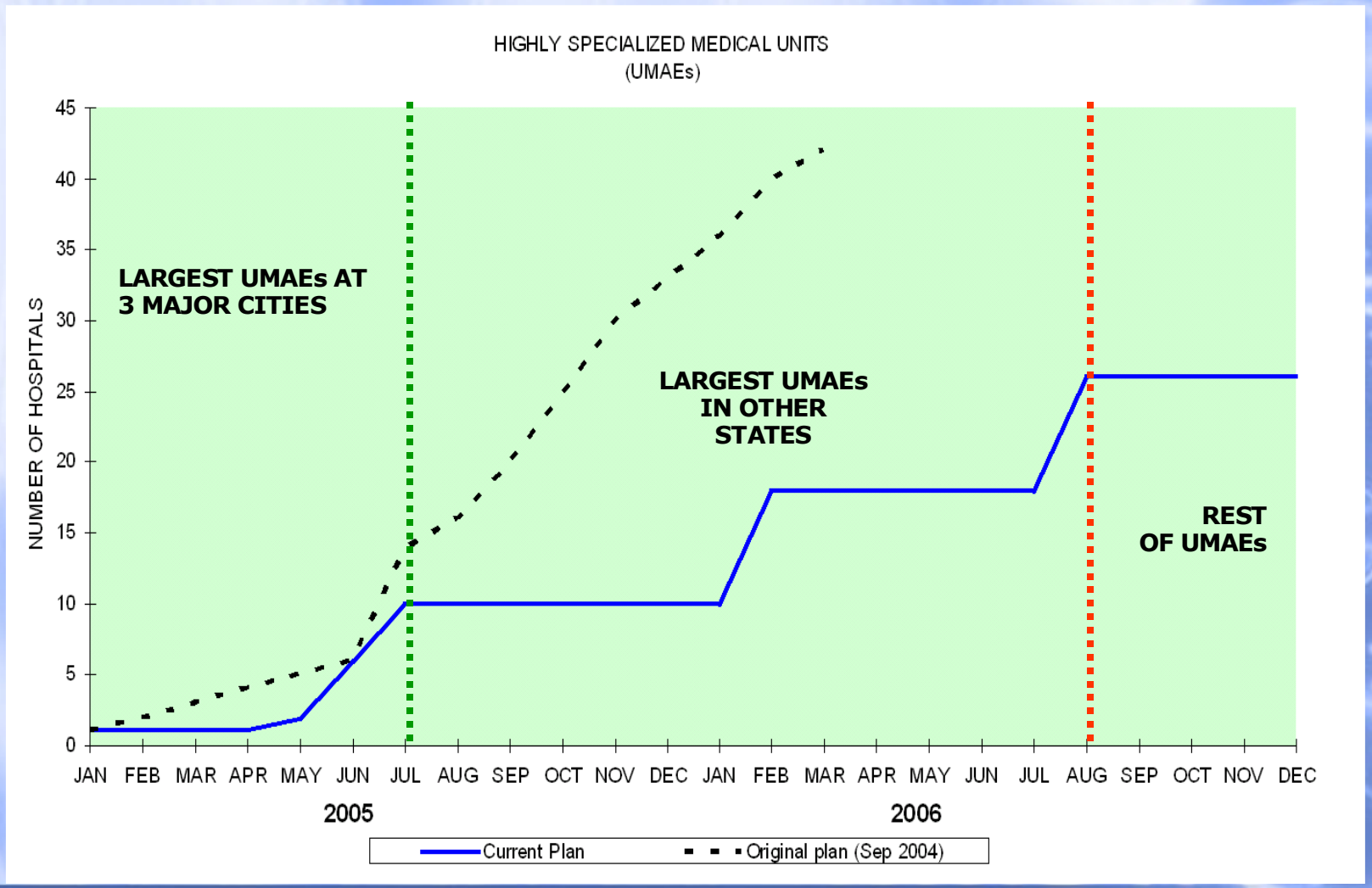
•Challenges (Development)

- **LEARNING CURVE**
  - MUMPS.
  - VISTA code (heterogeneous styles of coding).
  - GTM.
- **INSTALATION & INITIAL CONFIGURATION**
  - VA's documentation assumes previous knowledge of VISTA and there's no guide to install and bring VISTA up and running.
  - Developers community documentation is based on particular distributions with particular pre-configuration.
- **TRANSLATION**
  - Translate into Spanish text embedded in the MUMPS code.
  - Understand effects of replace VA's catalogs with IMSS catalogs.
- **CUSTOMIZATION**
  - Understand required configuration and pre-loaded information for each VISTA process (Registration, Admission, etc.) in order to adjust it to IMSS process.

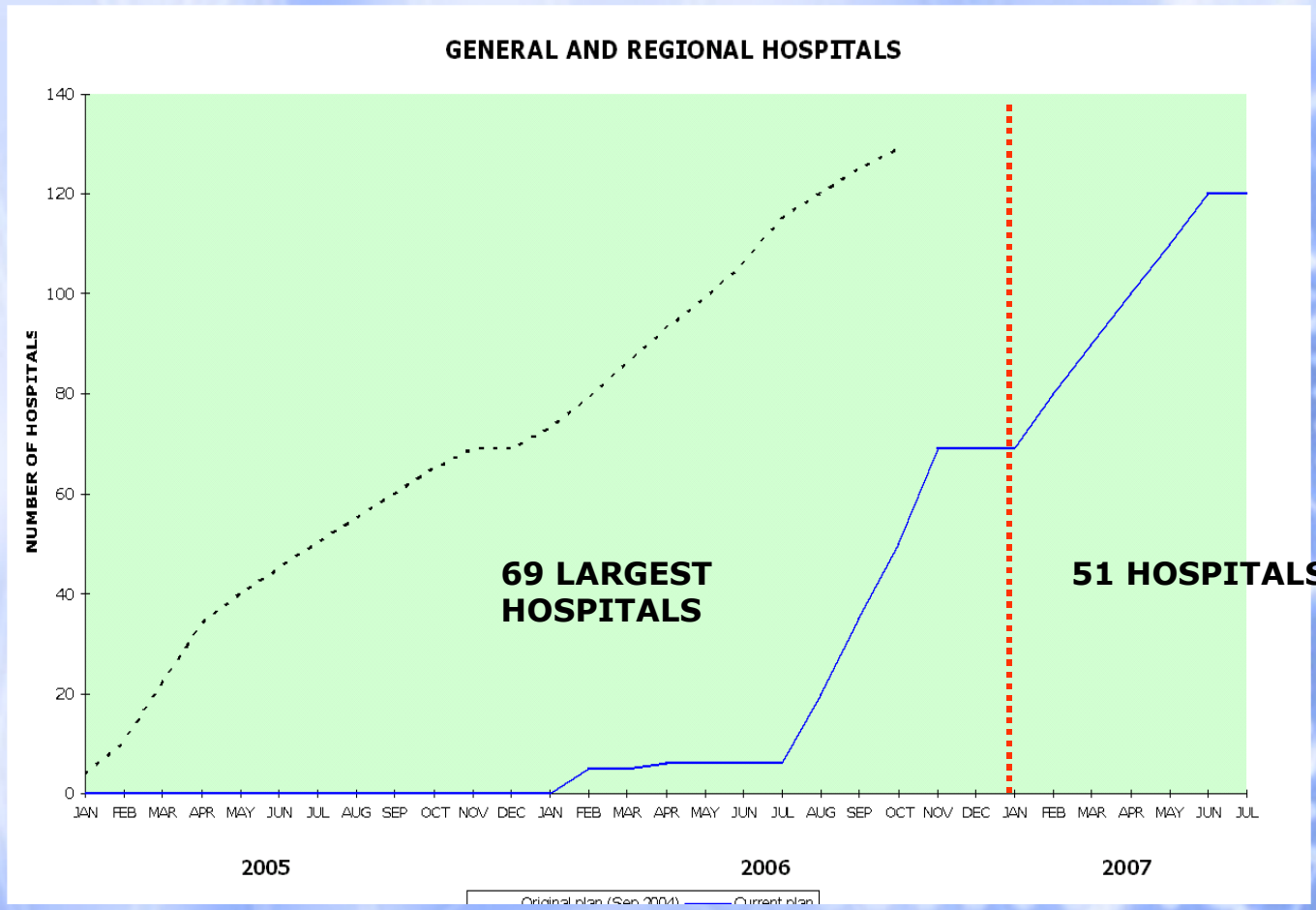
•Challenges (Deployment)

- **AUTHORIZATION**
  - Assign/Exercise budget to deploy the system.
- **INFRASTRUCTURE**
  - Cabling (power & network).
  - Remodelling working areas.
- **EQUIPMENT**
  - Acquire and install PC and printers.
- **ACCEPTANCE AND PARTICIPATION**
  - Get Hospital Board committed with the project.
- **TRAINNING AND ON-SITE SUPPORT**
  - Train personnel (administrators and users).
  - Support users on-site during early stage of adoption.

•Deployment


HIGHLY SPECIALIZED MEDICAL UNITS
(UMAEs)
NUMBER OF HOSPITALS
45
40
35
30
25
20
15
10
5
0
LARGEST UMAEs AT
3 MAJOR CITIES
LARGEST UMAEs
IN OTHER
STATES
REST
OF UMAEs
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
2005
2006
Current Plan
Original plan (Sep 2004)

- **Deployment**


GENERAL AND REGIONAL HOSPITALS
NUMBER OF HOSPITALS
140
120
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL
2005
2006
2007
69 LARGEST HOSPITALS
51 HOSPITALS

Thank you

Sources:

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3- Middleton B.; “The Value of Healthcare Information Exchange and Interoperability; 2004.

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