



Regional Electronic Health Record: An Example Of An Integrated Information System From Ib-Salut (Excerpt from IDC # HIOH07P)

INSIGHT

#HIOH07PE

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IN THIS EXCERPT

This IDC Health Industry Insights excerpt is taken from the Regional Electronic Health Records: An Example of an Integrated Information System From Ib-Salut (IDC #HIOH07P, December 2007), by Silvia C. Piai. All or part of the following sections are included in this excerpt: IDC Opinion, Situation Overview, The Approach, Selecting the Solution, Implementing the Solution: Barriers, Business Value: Main Achievements and Lessons Learned.

EXECUTIVE SUMMARY

Oracle Corporation was selected to be the lead solution provider for this large regional electronic health record system due to its flexible solutions architecture and participatory implementation methodology. The Oracle solution is standards based and helped software developers build new clinical applications and share information between numerous existing systems with different data schemas. Oracle's solution mediates and translates data into a single source of truth thereby enabling the realization of reliable and complete patient records. It is providing a smooth transformation in the entire regional health information system as well as allowing for the adoption of new technologies in the future. Just one year after implementation the business value of the system is being recognized in three areas: 1) clinicians have the updated clinical picture of the patient at their disposal, 2) patients are benefiting from an improved quality of care, and 3) the organization has achieved considerable costs reduction.

HEALTH INDUSTRY INSIGHTS OPINION

Health Industry Insight believes that the medical information system implemented by the regional health agency of the Balearic Islands can set an important example for other health organizations throughout Europe.

Ib-Salut has embarked on a modernization program for enabling its infrastructures to deal with a new concept of healthcare centered on

patients. Providing services "just in time" and no more "just in case", Ib-Salut can better allocate resources and can be more efficient. Such a model requires access to, and availability of, patients' health information from any place. An electronic health record (EHR) accessible to all clinicians is therefore the cornerstone of this new way of delivering healthcare. With its long-term strategic look, Ib-Salut sets a best practice to be followed for its project management and its ability to drive standardization and integration.

- **Ib-Salut gives universal, but personalized access to medical records.** All regional healthcare entities have a role based access to health information assuring the continuity and the consistency of services across the entire path of care.
- **Healthcare organizations have to implement flexible infrastructure.** Open and flexible platforms allow the integration of existing information systems and advanced tools and the development of new functionalities.
- **Project managers have to balance the needs of all entities within the healthcare organization.** A system must be easily extendible to the whole healthcare value chain including the private sector and social services

SITUATION OVERVIEW

The Background

The Balearic region is an archipelago of 4 islands (Menorca, Mallorca, Ibiza and Formentera) located in the east of Spain. It is an autonomous community and a province of Spain; the capital city is Palma de Mallorca. In the economy of the region tourism is fundamental: around 10 million people visit the Balearic region every year. The resident population is 1.2 million people distributed in 8 municipalities but with a high concentration in Palma. This unbalanced distribution of the population marks the region with a sort of double insularity that makes difficult an equal delivery of public services, such as healthcare. Since 2002, the regional government has responsibilities on the healthcare services. The regional health and consumer protection ministry manages healthcare through the "Ib-Salut" agency. Healthcare sector employs in the region more than 12,000 people: 2,488 of them are clinicians. There are 8 hospitals with more than 3,000 acute care beds and 2500 medical staff.

As in other European regions, the healthcare provision in the Balearic Islands is quite fragmented and depends on several organizations such as primary care, ambulances, hospital and long-term assistance. An effective healthcare service delivery requires that critical information about the patient is made available and accessible for any health

professional that will take care of that patient. But in the Balearic Islands, information was not always available, as it was stored in local HIS (Hospital Information System) and local electronic medical record. In some cases, care centers were even entirely paper-based. Ib-Salut has embarked on a long-term modernization program to deal with the risk of mistake and the inefficient allocation of resources that this lack of information caused. The program focused on implementation of a modern and reliable health information system across the entire regional health network. The program aimed to tackle both patient related and employees related issues.

- On the patient side the modernization program aims to guarantee high quality standard, equal access to health services regardless of the place of residence, in a suitable timescale, and guaranteeing continuity of healthcare through coordination between different level of care beyond the hospital environment. Therefore the healthcare system should guarantee effective communication channels with citizens and should ensure information security and confidentiality.
- On the professional side, the modernization program aims to provide greater security in diagnosis and therapeutic prescriptions. The computerization of manual processes should lead to a more streamlined management of surgery, doctors' orders and diagnostic test waiting list.

Ib-Salut has specifically developed a Strategic Information Plan (Plan Estrategico de Sistemas de information- PESI) for the period between 2004 and 2010. One of the projects included in the PESI is the electronic health record. It includes all basic clinical and administrative information on the patient, accessible to clinicians from all levels of care.

The Ib-Salut Medical History Project

The development of a regional health information platform and of the electronic health record project in the Balearic region started in 2005. A summarized care record stored on a clinical data repository has been provided to the clinicians (in GP's offices, hospitals, ambulances) that need to take care of the patient through a clinical portal strategy and EMPI (Enterprise Master Patient Index) system technology. The solution provides a clinical framework that acts as medical desktop

The region allocated €9 million budget to the electronic health record project. The project was articulated in three phases.

Phase One

Phase one, the architecture building stage, went live in January 2007. The objective of this first stage was to define main components and technology architecture of the regional health information platform:

- The full integration of the population database through an EMPI, developed locally in Balearics in collaboration with IBIT Foundation (and with the University of Madrid as regards the solution used at Son Dureta), to ensure unique identification of patients.
- A Security identity management system to identify professionals and roles. Oracle and Imprivata technologies were used for this purpose.
- The definition of the Corporate Integration bus and integration competence center through the deployment of Rhapsody technology from OrionHealth and the adoption of HL7 as reference standards.
- The adoption of a Clinical Portal strategy to unify clinical data access from several sources of information. Concerto from OrionHealth is the selected corporative Clinical Portal.
- The introduction of a Clinical Data Repository to provide a unique and scalable health information repository with standardized information. The solution chosen was the Oracle HTB (Healthcare Transaction Base) platform.

Phase Two

The following phase entails the definition and the implementation of a critical care record to be shared across all regional health facilities. The task was to define which data have to be included: a workgroup with 30 reference clinicians was created for this purpose. The provisional content should entail personal details, clinical alerts, relevant health problems (e.g. chronic diseases) active pharmacological, and medical treatments and pending and actives contacts. Information is extracted using Enterprise Application Integration and Clinical Portal built and deployed to all professionals and health centers (Primary Care, Hospitals, ambulances systems, social care, etc).

Also, Telemedicine solutions are being deployed in the islands. An interoperable telemedicine platform has been integrated into the framework to allow referral processes of clinical cases between hospitals. The adopted solution has been MIO (Medical Images Organiser) from C2C Consultoria TSIS. MIO has been integrated as a Dicomizer and Dicom gateway and allows the exchange of multimodalities medical images (ophthalmology, radiology, dermatology, ECG, cardiology, etc.) between hospitals and performs PACS interoperability with Clinical Portal and HTB Repository for a teleconsultation process.

Phase Three

The third phase will entail the inclusion of new clinical processes on the regional health information platform and architecture. Advanced functions will be included such as CPOE, new clinical protocols and pathways, ePrescription and patient clinical portal through a personal health record system.

THE APPROACH

Business Drivers

Ib-Salut has embarked on a long-term modernization program for enabling its infrastructures to deal with a new concept of healthcare centered on patients. A patient centered healthcare aims to provide care services tailored on the patient needs. Providing services "just in time" and no more "just in case", healthcare providers can better allocate their resources and can be more efficient. Just in time vision must be supported across the entire path of care. Such a model requires access to, and availability of, patients' health information from any place. Information sharing between providers is the key element to enable this change. An electronic health record (EHR) accessible to all clinician is therefore the cornerstone of this new way of delivering healthcare. In essence, Ib-Salut has decided to implement an EHR system driven by the following needs:

- Ensuring the continuity of care between specialized care and primary care facilities
- Ensuring equal access to healthcare services and homogenous quality of service delivered
- Reducing accident and adverse events

Solution Description

The Balearic electronic health record project finds its fundamental pillars in the EMPI technology, the clinical data repository, the clinical portal and the secure identity management system that allow access to patient health information. These technologies build an electronic medical history with an open but secure structure, advanced search capabilities and a high flexibility in presenting patient information. This flexibility allow to personalize the medical record according to user needs by adapting profiles, giving chronological overview, filtering information and establishing relevant criteria, etc. The opportunity to personalize the record allows to include every healthcare provider in the region (both public and private) and to balance between primary and specialized care services needs.

Selecting the Solution

According to Ib-Salut, they selected Oracle Healthcare SOA Infrastructure because:

- It is a flexible architecture that supports the integration, development, and operation of a full spectrum of healthcare applications.
- It gives a general and standardized framework that can be customized according the peculiarities of already existing information tools
- It can further develop integrating new functions and elements in the future.

HTB is a standards-based information system based on the HL7 v3 RIM (Reference Information Model), which integrates critical data from different applications enabling the realization of reliable and complete patient records. Tools provided by the HTB help software developers to build new clinical applications and share information between existing systems on a data storage platform. Being able to standardize data coming from different sources the HTB is expected to allow a smooth transformation in the whole regional health information system and adoption of new technologies in the future. Old technology can be replaced slowly allowing professional to get more and more confident with new tools. Oracle is integrating the electronic health record with RFID sensors and home- and telemedicine tools that are envisaged in next steps of the Balearic project.

Oracle proposed a solution able to provide first results in shorter terms (three years compared to ten in some of the other proposals) and training service for health professionals involved, which is an important issue given that the acceptance and the awareness of system functionalities is one of the key success factors in health information system projects

Implementing the Solution

The implementation of a wide-ranging solution as a regional health record is not a simple process: problems of technical and organizational legacy can hinder the realization of the project. In the case of Ib-Salut the main barriers were related to unambiguously identify patient data and establishing a health terminology and contents to be used for the health record.

The health information system framework in the Balearic Islands was highly fragmented making data integration difficult. As sources were not normalized it was difficult to integrate patient data in the platform.

There are also some cultural factors that compromise the identification of patient data. The Balearic Island is a bilingual region where

Castellan and Catalan are both currently spoken, allowing different transcription of the name of a patient and therefore making difficult correlation of data to a single patient. Furthermore the correct attribution of data was also hindered by the fact that in Spain people have often double-surname but it is not always reported completely increasing homonymy problems.

Business Value

The EHR in the Balearic Islands just a year after implementation has already improved the quality and the consistency of healthcare practices. Clinicians, patients and the whole health organizations have achieved benefits from the implementation.

- Clinicians have the updated clinical picture of the patient at their disposal.
 - Historical care related information is obtained from any clinic, rehab, or health entity in the region without rebuilding from scratch each local information system and without upsetting doctors work processes. 30% of patient has already been included in the system and 300,000 patients matching have been performed.
 - The health portal strategy has encouraged the usage of the EHR and the success of the project. Leveraging on the clinical portal for accessing the health data extended the benefits of EHR to those health providers, which had not already implemented an electronic patient record solution. The medical history is being used by approximately 450 users, professionals of the hospitals of Inca, Menorca and Son Llatzer. 91% of physicians are satisfied of the solution.
 - Time for routine processes, such as patient research and anamnesis was reduced from hours to minutes. Ambulatory consultation for medication has been reduced 20% because of automated ePrescribing process inside the regional health information system.
- Patient can benefit from an improved quality of care
 - The health record ensures appropriateness of medications (right patient, right time, right route, right dosage, right duration, right interval), surgeries, tests and therapies, thus avoiding adverse events.
 - The health record reduces the likelihood of wrong diagnosis, since doctors are able to rapidly review shared sets of information.
- The regional health organization had considerable costs reduction:
 - Avoiding repeated tests (laboratory and radiology)

- Enabling an effective workflow through a better coordination between health professionals
- Reducing iatrogenic accidents.
- Planning more effectively resources using the EHR system database to aggregate information and spotlighting health related trends and medical best practices.

Lessons Learned

A participative working methodology and a flexible supporting architecture were the key factors of the success of the Ib-Salut project.

- The active participation and commitment of key people in the organizations and their direct involvement in the project definition lead to a solution tailored to medical staff workflow and perceived as a necessary support tool for decision making and administration. Workshops, brainstorming, and nominal group technique (NGT) included primary and secondary care staff, Ib-Salut managers and Oracle consultants. Since healthcare sector is one of the most reluctant when introducing new way of delivering services and adopting technology to change the workflow, the acceptance of new solutions by the clinical staff is fundamental. Ib-Salut and Oracle project managers were involved from the beginning the health record planning. 91% of clinician have declared they are satisfied with the status of the project because:
 - Realistic definition: the EHR objectives were simple and achievable not trying to be too ambitious.
 - Presenting results: the clinical portal tool allowed to present results frequently which empowers users since they “see evolution”. Doctors have concrete results after one year
- The flexibility of the platform enabled a smooth transformation of the entire regional health information system. The HTB enables information from existing clinical systems to be harmonized, enabling an interoperable health information environment. A flexible environment allows the system to evolve with time: in the next phases of the project new tools and functionalities, as laboratory information and imagery systems, will be included and old technology will be gradually replaced. This would not be possible with a structured and solution-dependent infrastructure. The adoption of the clinical portal is in line with this "integration strategy", information from different health information system are gradually included and profiling user access is possible to extend the project to a wider group of healthcare and social services providers.

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