HEALTHCARE IT MANAGEMENT

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THE OFFICIAL JOURNAL OF THE EUROPEAN ASSOCIATION OF HEALTHCARE IT MANAGERS

PROTECTING PATIENT INFORMATION

DATA STORAGE AND BACKUP SOLUTIONS

DEVELOPING AN INTEGRATION COMPETENCE CENTRE

USER EXPERIENCE GUIDELINES FOR TELECARE SERVICES

COUNTRY FOCUS: SPAIN

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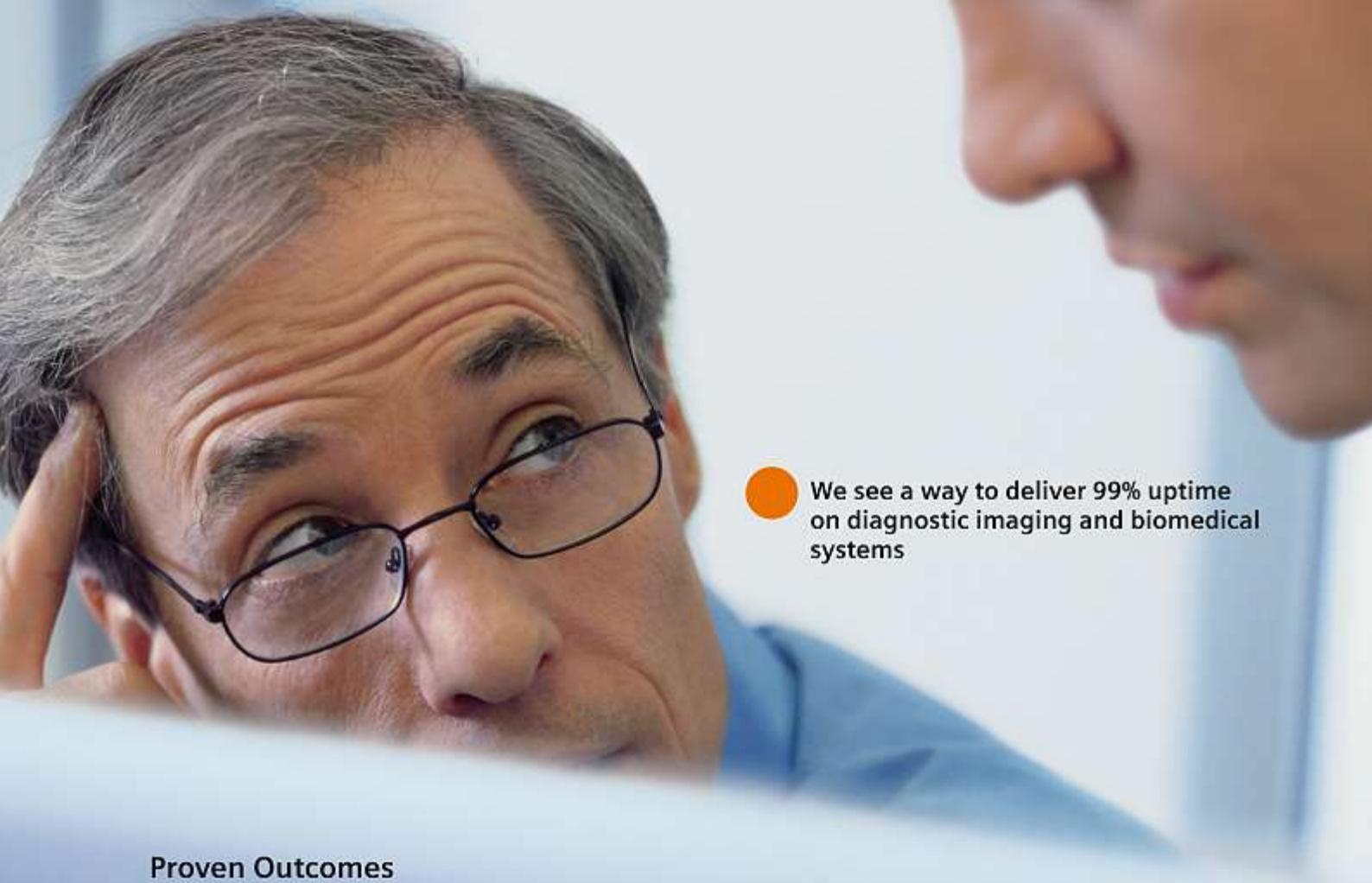

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Healthcare IT Management is the official voice of the European Association of Healthcare IT Managers

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HEALTHCARE IT MANAGEMENT

Letter from the Publisher

Dear Reader,

While healthcare organisations continuously move towards integrating their healthcare information systems and adopting electronic health records, prescription, laboratory and scheduling systems (amongst others), the scrutiny placed on medical errors increases. As healthcare organisations grapple with these challenges, many questions arise, such as:

• Who within the healthcare organisation has the responsibility for ensuring that patient data is protected and secure?
• What role does the patient have in this process, if any?
• As data is shared across organisations and networks, what methods should be used to protect patient information from internal and external threats?

As these issues are debated at an international level, we explore empowering patients and what responsibilities they could have in the protection of their own information. Continuing with the discussion, we present guidelines for ensuring the security of radiological networks and transmission devices.

Closely tied in with our Features section, we cover data storage and disaster preparedness and recovery. We also continue the discussions from Issue 3 on standards and interoperability with an article on new methods for consolidating, storing and reusing data across different entities in healthcare organisations.

Our EU section features the conclusion of our four-part series on the EU institutions with an overview of the European Court of Justice. We also highlight the Baltic eHealth Project.

Our Healthcare IT Sector Interview this month is with Dr. Karl A. Stroetmann and Alexander Dobrev, from empirica Communication and Technology Research in Germany, about their work on the eHealth IMPACT Study. Funded by the European Commission, the report presents a benefits analysis from ten eHealth projects across Europe.

Our country focus this month highlights Spain, with an interview with María Jesús Montero, Regional Minister of Health, Andalucía, about the frequently profiled eHealth developments in the Andalusian healthcare system. In our Best Practices section, we present the development of user experience guidelines for telecare services. Finally, our Management section contains a discussion on the development of an integration competence centre as a tool for helping organisations achieve success with their eHealth projects and strategies.

Last but certainly not least, be sure to check out the latest news from the **European Association of Healthcare IT Managers** on page 5! While you're there, be sure to fill out and send in your membership application.

Your opinions and suggestions are always important to us. If you have an article you would like to publish with us, an idea for a topic you'd like to see covered in a future issue - we invite you to send a message to k.r@hitm.eu and let us know what you think!

Yours faithfully,

Christian Marolt
Publisher

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As healthcare facilities across Europe become increasingly integrated, the need to safeguard patient information and ensure the security of healthcare information networks has never been more paramount. In our Cover Story section, we will explore some of the issues and challenges associated with managing the security of these networks and what level of responsibility patients should have in the protection of their own information.

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Did you know

that the European Association of Healthcare IT Managers (HITM) is the only pan-European association dedicated solely to healthcare IT management? Uniting healthcare CIOs and IT Managers across Europe, HITM is a unique organisation that is committed to increasing the professional authority and responsibility of healthcare IT management. With the first Annual General Assembly being planned for 2007, there's never been a better time to take a leadership role in transforming healthcare IT across Europe by becoming a founding member of HITM!

Features

Management

Best Practices

Country Focus: Spain

Movers & Shakers: Healthcate IT Sector Interview

Industry Events

In recent years, Spain has been heralded as an example of effective eHealth development for the rest of Europe to follow. In 2003, all 17 regional health services that make up the Spanish National Health System began to be integrated through the use of web services and standard XML messages, enabling the exchange of information from electronic health records and independent platforms, applications and systems that exist in the different autonomous communities. In our Country Focus section, we discuss some of the developments that have transformed the Spanish healthcare system and speak with María Jesús Montero, Regional Minister of Health in Andalucía, about the approach the government used in developing a universal health system that seeks to enable social equity amongst the region's eight million residents.

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Titled "eHealth Is Worth It", the published results of the eHealth IMPACT study were recently presented by Viviane Reading, European Commissioner, Information Society and Media, to some of the key stakeholders involved in eHealth deployments across European regions. Undertaken in response to the EU eHealth Action Plan (2004), the eHealth IMPACT study states that the project was a targeted effort to "assess the quantitative, including economic, and qualitative impacts of eHealth". In this issue's Healthcare Sector IT Interview, we spoke with Dr. Karl A. Stroetmann and Alexander Dobrev, from empirica Communication and Technology Research, about the lessons learned from the study, the implications of the study concerning future IT investment and how transferable the methods are to other eHealth activities across the EU.

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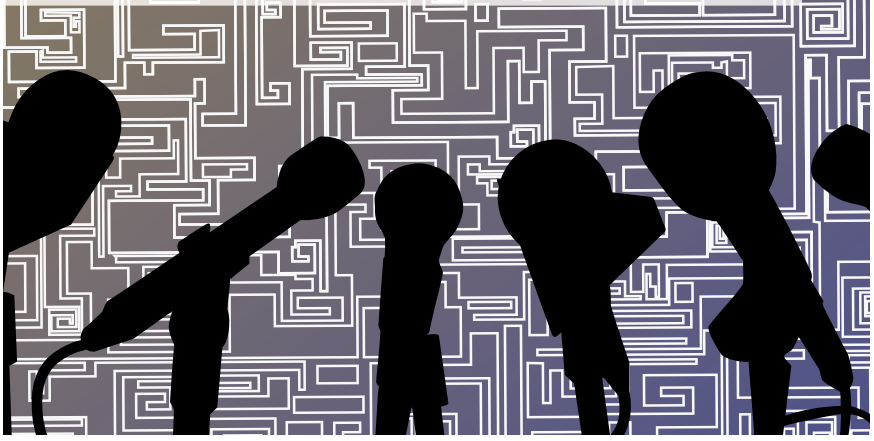
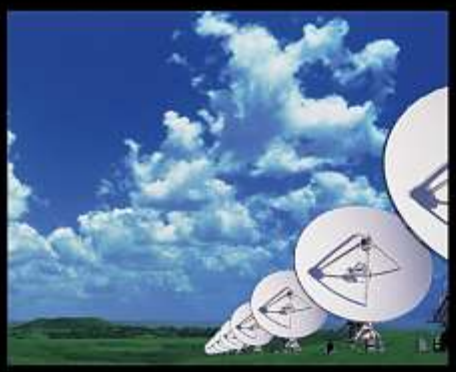


EUTELSAT. COMMUNICATIONS VIA SATELLITE FOR MEDICINE WITHOUT FRONTIERS



Sending the results of cardiology or radiology examinations in real time, carrying out initial diagnostic tests at the site of an accident, guaranteeing remote medical care at the patient's home, restoring telecommunications in emergencies and providing emergency services even when terrestrial connections fail or are non-existent, ensuring videoconference connections between different medical units located at great distances from one another.

These are just some of the telemedicine applications that are now possible thanks to the satellite. And Eutelsat – European leader and one of the leading satellite operators worldwide – together with Skylogic, its fully-owned Italian subsidiary, is in the front line with 23 satellites that are available to cutting edge technologies and at everyone's service. Without frontiers.

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The European Association of Healthcare IT Managers (HITM)

HITM News

HITM recently exhibited at the World of Health IT Conference and Exhibition, held 10-13 October in Geneva, Switzerland. The event proved to be a success, providing an opportunity to raise the awareness of HITM and forge new relationships with other healthcare IT-related organisations in Europe and beyond. In addition to this, we also signed up several new individual members to HITM and received many requests for subscriptions to *Healthcare IT Management*.

On the communications front, we would like to welcome the addition of a new correspondent to *Healthcare IT Management* – Tom Jones, Director of TanJent Consultancy in the UK. Tom brings a wealth of expertise and knowledge about the healthcare IT sector in Europe and excellent experience working on many notable eHealth projects, including the e-Health Impact Project, which was funded by the European Commission and recently published. More information on the e-Health IMPACT Project is available online at www.ehealth-impact.org.

If you haven't seen previous issues of *Healthcare IT Management* or the HITM website, we encourage you to download a copy and find out more about us at www.hitm.eu. While you're there, don't forget to download a membership application!

1 | 2 | 3

1 H. Stephen Lieber, President / Chief Executive Officer of HIMSS US, in an interview with *Healthcare IT Management* at the World of Health IT Conference and Exhibition.

2 The HITM booth at the World of Health IT Conference and Exhibition, held 10 – 13 October in Geneva, Switzerland.

1 HITM Secretariat at the World of Health IT
From L-R: Stefania Onorati, Director of Communications, *Healthcare IT Management*; Karmin Ruocco, Managing Editor, *Healthcare IT Management*; Dr. Octavian Purcarea, Scientific Officer, ICT for Health, European Commission, Information Society and Media Directorate-General; Dr. Brenda K. Wiederhold, Executive Director of the Virtual Reality Medical Center; Dr. Ilias Iakovidis, Deputy Head of Unit, ICT for Health, European Commission, Information Society and Media Directorate-General; Rana Ersgard, Business Manager, Profdoc; Christian Marolt, Executive Director, HITM; Bénédicte Vasseur, ICT for Health, European Commission, Information Society and Media Directorate-General.

About the Association

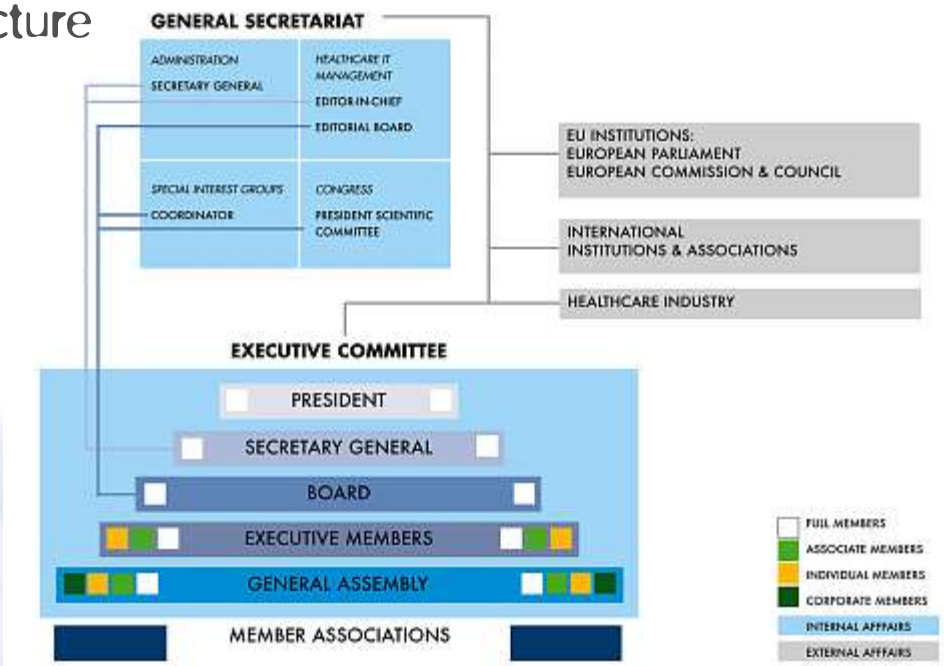
HITM is a non-profit organisation outlined as the pan-European umbrella association of all relevant national healthcare IT associations in Europe. Believing in the fundamental importance of unifying healthcare IT professionals at European and global levels, HITM is committed to increasing the professional authority and responsibility of healthcare IT managers and representing their interests to international institutions and associations. With membership in HITM steadily growing, the first annual General Assembly is being planned for 2007.

Mission

The mission of HITM is:

+ To establish common healthcare IT standards, policies and strategies at EU and international levels;
+ To increase the visibility, importance and role of IT management in healthcare facilities;
+ To educate key policy-makers, industry players and the general public of the benefits of healthcare IT; and
+ to promote cross-collaboration of various healthcare sectors.

Organisational Structure



Membership

As the only pan-European association dedicated to healthcare IT management, HITM offers its members unique opportunities to:

+ Participate in advocacy groups that impact EU healthcare IT legislation;
+ Share your knowledge with and learn from the experiences of your peers;
+ Learn industry best practices and standards; and
+ Attend the HITM Annual General Assembly, congress and other special events.

Membership in HITM consists of four levels:

Full Members

Full members are comprised of national healthcare IT management associations, who can nominate one representative to the HITM Annual General Assembly. This representative will have the power to speak and vote on HITM priorities and organisational objectives, fundamental advocacy efforts, election of the Executive Members and the Board, and much more.

Associate Members

Associate members are representatives from healthcare organisations, who have the opportunity to speak, but not vote, at the HITM Annual General Assembly. Associate members will also have the privilege of electing one member to represent them in the Executive Members group.

Individual Members

Individual members are directly involved with healthcare IT management, with the opportunity to elect one member with the power to speak, and vote, at the HITM Annual General Assembly. Individual members will also have the privilege of electing one member to represent them in the Executive Members group.

Corporate Members

Corporate members are representatives from corporations engaged in supplying products and services to the healthcare IT sector. While corporate members may attend the Annual General Assembly, they do not have the power to speak or vote. However, corporate members may elect one member from amongst the Diamond Founding Supporters to represent them in the Executive Members group.

European Association of Healthcare IT Managers (HITM) Membership Application

❑ **Yes,** I would like to apply for an organisational membership with HITM.

❑ **Yes,** I would like to apply for an individual membership with HITM.

Organisation Information

Organisation Name:

Street Address:

City/Town:

Postal Code:

Country:

Website:

Personal Information **(representative of the association above or an individual applicant)**

Preferred Title:

Gender:

First Name:

Surname:

Position:

Department/Division:

Email Address:

Telephone:

Fax:

Mobile:

Membership categories per year:

(In the start-up process, all memberships are valid until December 2007)

Full Members: (those directly involved in healthcare IT management)

❑ Cat. A - Associations with more than 2,500 members (€2,500)

❑ Cat. B - Associations with more than 1,000 members (€1,800)

❑ Cat. C - Associations with less than 1,000 members (€1,000)

❑ I would like to apply for an initial reduction of my membership fee of 50%, valid until 31 March 2007

Associate Members (those indirectly involved in healthcare IT management)

❑ Cat. A - Associations with more than 1,000 members (€1,500)

❑ Cat. B - Associations with less than 1,000 members (€1,000)

As part of their membership benefits, Full and Associate Members will receive a subscription to *Healthcare IT Management* for all of its members.

Individual Membership: (those directly involved in healthcare IT management)

❑ Yearly membership, including a one-year subscription to *Healthcare IT Management* (€ 40)

Corporate Membership (companies working in the IT field)

❑ *Please send me an offer.*

For more information on joining the European Association of Healthcare IT Managers, please contact Catalina Ciolan at c.c@hitm.eu

Subscription form

HEALTHCARE IT MANAGEMENT

Ways to subscribe:

❑ Send an email with your name and address to: support@hitm.eu

❑ Complete this form and post it to:
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❑ Complete this form and fax it to: +32 2 286 8508

Subscription form

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Country:
Telephone:
Email:

❑ Two-year subscription ❑ One-year subscription

Subscription rates

One year:	Europe:	80€
	Overseas:	120€
Two years:	Europe:	140€
	Overseas:	180€

Valencia speeds healthcare with connected imaging solution over a Cisco Medical-Grade Network

Cisco, worldwide leader in networking solutions, is helping healthcare organizations to harness advanced information and communication technologies to achieve a vision of Connected Health—where the individual, whether an actual or potential patient, is the virtual centre of an intricate matrix connecting people, resources, and information across the entire healthcare landscape.

Business Challenge

The Health Ministry for the region of Valencia, on Spain's Mediterranean coast, runs a busy healthcare system serving five million people. It embraces 22 health departments, 27 general hospitals, 25 specialist units and 900 primary care centers.
The aims range from increasing backbone capacity to providing higher bandwidth in some centers and connecting others and improved Internet security. The path defined:

- Provide wide-area access to radiological and other specialized medical imaging types;
- Create electronic patient records (EPR) with access to diagnostic images and medical history;
- Ensure conformity with EU regulatory requirements on patient confidentiality.

Connected Imaging Solution

The foundation for this wide-ranging transformation, integrating hospital care with primary, outpatient and emergency services, and also with central services and public health, is a high-speed, Cisco network known as Arterias. Launched in 1986 to provide basic IP networking services, the network has evolved into what Cisco terms a Cisco Medical-Grade Network – a converged, IP-based foundation designed to provide the scalable, reliable, secure and high-performance infrastructure needed to deliver 'connected health' across the entire healthcare community.
Three solutions have been considered:

- SISAN – an end-to-end network covering entire Valencia healthcare region, using the Cisco Medical-Grade Network (MGN) framework;
- High-speed links between local clinics and reference hospitals with image repository;
- Innovative imaging platform combining radiology with other diagnostic modalities.

Business Results:

- Expanded clinical services by extension of digital imaging services;
- Enable location-independent image access for authorised users;
- Waiting lists cut by easing radiology bottlenecks in public hospitals;
- Forecast cost saving of €1 million on departmental imaging license fees;
- Secure image access without expense for dedicated security product;
- Elimination of film costs;
- Access to patient images independent of PACS system vendor.

Valencia agiliza su atención sanitaria con la solución conectada de diagnóstico por imagen digital de Cisco

La Consejería de Sanidad valenciana, un organismo sanitario regional español, es pionera en diagnóstico por imagen a través de una *Medical-Grade Network* de Cisco.

Cisco, líder mundial en soluciones de red e infraestructuras para Internet, ayuda a organizaciones sanitarias a mejorar la información y las comunicaciones tecnológicas para conseguir una "Sanidad Conectada" - donde el paciente, se convierte en el centro virtual de una matriz que conecta recursos, información y gente a lo largo de todo el sistema sanitario.

Desafío

La Consejería de Sanidad Valenciana, administra un sistema sanitario que atiende a cinco millones de personas, con 22 departamentos sanitarios, 27 hospitales generales, 25 unidades de especialización y 900 centros de atención primaria. Los objetivos de esta modernización van desde el aumento de la capacidad del nodo central hasta la provisión de mayor ancho de banda y conexión en algunos centros, y la mejora de seguridad en la red. Objetivos:

- Ofrecer a toda el área de acceso diagnóstico por imagen digital;
- Crear registros electrónicos de pacientes (REP) con acceso a diagnóstico por imagen y a historiales médicos;
- Garantizar el cumplimiento de la normativa de la UE relativa a la confidencialidad de información sobre pacientes.

Solución conectada de diagnóstico por imagen digital

El núcleo de esta transformación a gran escala, que integra la atención hospitalaria con servicios de atención primaria, atención de centros de salud y urgencias, y también con servicios centrales y sanidad pública, es una red de alta velocidad de Cisco llamada ARTERIAS. Lanzada en 1986 para ofrecer servicios de conexión en red IP básicos, la red ha evolucionado para convertirse en lo que Cisco denomina "Medical-Grade Network", un núcleo convergente basado en IP diseñado para ofrecer infraestructura de red ampliable, segura y de alto rendimiento necesaria para ofrecer "Sanidad Conectada" a toda la comunidad sanitaria.
Tres acciones principales:

- SISAN – una red de extremo a extremo que cubre toda la comunidad autónoma valenciana utilizando el marco de trabajo de la "Medical-Grade Network";
- Vínculos de alta velocidad entre clínicas locales y hospitales con almacenamiento de imágenes;
- Innovadora plataforma de diagnóstico por imagen que combina la radiología con otras modalidades de diagnóstico.

Beneficios

- Ampliación de los servicios clínicos mediante el desarrollo de los servicios de diagnóstico por imagen digital;
- Provisión de acceso a imágenes con independencia de su ubicación a usuarios autorizados;
- Reducción de listas de espera mediante la optimización de recursos del área de radiología;
- Ahorro previsto en costes de 1 millón de euros en licencias de diagnóstico por imagen;
- Acceso seguro a imágenes sin gasto adicional;
- Eliminación de costes en radiologías físicas;
- Acceso a imágenes de pacientes con independencia del distribuidor del sistema PACS.

More information / Más información: Anna Closas • Account Manager • Cisco Healthcare Spain • aclosasp@cisco.com

iSOFT wins Spanish regional health IT project

The Ministry of Health and Social Services for the Spanish region of Cantabria has awarded iSOFT a major contract for software solutions designed to manage requests for diagnostic hospital tests at all centres within the region's health service.

The project, to be conducted in collaboration with local companies Indesis Consultoría Sanitaria and Loarco Sistemas, is one of a series that will collectively pave the way for the introduction of Electronic Health Records (EHRs) in Cantabria.

iSOFT solutions are to be introduced at three hospitals – Marques de Valdecilla University Hospital, Sierrallana Hospital and Laredo Hospital – and in the region's primary healthcare centres. This will mean that most of the region's healthcare sector will have the benefit of a system aimed at improving the quality of primary healthcare for a population of around 500,000.

The software will enable users to respond to and monitor all requests for tests from medical professionals, regardless of whether they originate from hospital departments or primary healthcare centres. It will also control the distribution of responses to those requests, and will be integrated into existing healthcare IT systems.

C2C presented Medical Images Organiser (MIO™) at the World of Health IT 2006

C2C presented MIO™in collaboration with Cisco Systems, Inc., at Cisco's booth at the recent World of Health IT Conference and Exhibition (10-13 October, Geneva). MIO™ is a software integration tool that acts as a DICOM Gateway allowing the storage of several types of images in one single repository. MIO™ is flexible, easy to implement, cost effective, and is compatible with any PACS providers currently on the market.

MIO´s high-tech imaging capabilities provide multiple functionalities and innovative eHealth solutions. This has been evident in several projects where the implementation of MIO™ has optimised overall clinical workflow; tele-dermatology, tele-prisons, regional tele-stroke project, tele-mammography and ophthalmology. MIO™ has also been used in regional Integrated Enterprise Imaging and Hospital Global Images Repository projects.

At World of Health IT 2006, Cisco Systems Inc. and C2C presented MIO™ and a common project case study titled "Valencia Speeds healthcare with Connected Imaging Solution". Valencia's Conselleria de Sanitat, a Spanish regional health authority, has pioneered connected imaging over a Cisco Medical-Grade Network by using MIO™ as a DICOM Gateway. This case study presents the benefits (clinical, economical and managerial) of the project, where Cisco MGN and MIO™ are used to connect five different PACS providers and ensure security and reliability of image routing.

More information is available online at: www.c2ctsis.com

HEALTHCARE INFORMATION AND MANAGEMENT SYSTEMS SOCIETY (HIMSS) OPENS OFFICE IN BRUSSELS, BELGIUM

The new office of HIMSS Europe Middle East & Africa (EMEA) officially opened in Brussels on 1st September 2006, with Michael Strübin named as HIMSS EMEA Executive Director. HIMSS Chief Operating Officer Norris Orms, CAE, will work with Mr. Strübin as the HIMSS North America liaison and contact.

The new HIMSS initiative is focused on bringing together healthcare IT professionals in EMEA, who share the common goal of improving the delivery of healthcare through information technology and management systems.

Mr. Strübin said "The new office in Brussels will act as a hub to better connect health IT professionals throughout the region in order to advance the field and the delivery of healthcare together. Working with our counterparts at HIMSS North America, our staff will customize HIMSS' services for the EMEA region and develop new ones specifically for the region, with education and networking at the core."

HIMSS has been working with a number of partners and other organisations on the World of Health IT (WHIT) Conference & Exhibition.

Following this inaugural WHIT event, planning is already underway for the 2007 World of Health IT, which will be held in Vienna, Austria.

OMNILAB PRESENTS "PRODUCT ROADMAP" FOR LABONLINE

Omnilab is an Italian company that offers a comprehensive middleware system for managing clinical laboratory operations including pre-analytical, analytical, and post-analytical sample processing.

LABONLINE, the company's flagship middleware product for clinical laboratories, has been designed to address weaknesses of legacy Laboratory Information Systems (LIS) such as the lack of flexibility and functionality gaps, especially in the areas of the production process and workflow with, for example, the management of a specimen and its traceability.

Omnilab recently presented a "product roadmap" for LABONLINE, announcing new features to boost its competitive advantage and positioning on the market.

The new developments are mainly related to improve turnaround time management, quality control management, "compliance" management, advanced sample tracking and analyser maintenance management.

This year Omnilab will obtain better financial results in terms of revenues and profits. The increase of international market revenues (now around 20%) is one of the company's focuses for 2007. In fact, part of these profits will be invested, as stated by the CEO Giuseppe Oricci, to enhance the company's international presence through important agreements with Value-Added Resellers (VARs) in North America and Australia / New Zealand.

UPMC partners with dbMotion to improve patient care with seamless data sharing

The University of Pittsburgh Medical Center (UPMC), a leading integrated healthcare enterprise, and dbMotion, provider of web-based data-sharing and integration technology, announced on October 19th an $84 million initiative to create one of the largest models of true interoperability in healthcare.

dbMotion's technology will provide a flexible platform for UPMC's clinicians to securely access integrated patient information across its 19 hospitals and 400 outpatient sites and doctors' offices, without replacing existing systems. The result will be a model of interoperability for regional and national health information networks. To facilitate this initiative, UPMC and dbMotion will also create a joint development effort in Pittsburgh.

"Semantic interoperability – which integrates clinical information from disparate systems – is quintessential for attaining excellence in patient safety and quality of care," said UPMC Chief Information Officer, Dan Drawbaugh. "With dbMotion's best-in-class solution, UPMC will achieve a new level of integration, allowing our physicians to have current, relevant patient information and advanced decision support tools at the point of care. Many healthcare organisations have been promised advanced interoperability, but in reality, few solutions are available today. The dbMotion partnership is poised to deliver these solutions nationally and internationally."

"By investing in a SOA-based, healthcare-specific infrastructure, UPMC is tackling head-on the biggest challenge to large healthcare organisations: providing fine-grained interoperability that extends beyond simply sharing data to integrating the data into business processes," said Wes Rishel, Vice President and Research Director at Gartner.

More information about UPMC and dbMotion can be found online at: www.upmc.com and www.dbmotion.com.

IHE Europe 2007 Connect-a-thon

The 2007 IHE Europe Connect-a-thon will take place in Berlin at Messe Berlin, hall 6.2, from Sunday, 15 April until Friday, 20 April. Assembling and configuration will occur on Saturday, 14 April.

Please note that in difference to the previous years event, this Connect-a-thon will last six days. This will allow more time to be spent on workflow testing.

Registration for the 2007 Connect-a-thon will open on 6 November and will close on 7 January. As in previous years, online registration is available at:
http://www.ihe-europe.org/ europe 2007.

The two-day participants' workshop will be held in Berlin on 7 - 8 February.

IHE Technical Frameworks describing the Integration Profiles to be tested in Berlin are freely available online at:
http://www.ihe-europe.org/TF or
http://www.ihe.net/Technical_Framework/index.cfm.

Vendors who would like to test their equipment are welcome to get more information about the upcoming Connect-a-thon from their national IHE-initiative or from Eric Poiseau (eric.poiseau@inria.fr), the IHE Europe Technical Project Manager.

European Institutions Series

By: Sonja Planitzer

Series on the EU Institutions:

Spring 2006:	*The European Commission*
Summer 2006:	*The European Parliament*
Autumn 2006:	*The Council of the European Union*
This Issue:	***The European Court of Justice***
Next Issue:	*The Committee of the Regions*

THE COURT OF JUSTICE OF THE EUROPEAN COMMUNITIES

The Court of Justice of the European Communities (ECJ) is the judicial institution of the European Union. It was set up under the European Coal and Steel Community in 1952, is based in Luxembourg and deals with disputes as well as upholding the Treaties of the European Union.

THE COURT'S MAIN ROLE

The ECJ ensures that the legislation of the European Union is interpreted and applied in the same way in all EU countries, so that the law is equal for everybody. It ensures, for example, that national courts do not give different rulings on the same issues.

The Court also makes sure that EU Member States and institutions do what the law requires. The Court has the power to settle legal disputes between EU Member States, EU institutions, businesses and individuals.

In summary, the ECJ's jurisdiction includes:

- Ruling on references from national courts on how to interpret Community law;
- Reviews of the legality of the actions of the Council, the European Parliament and the Commission;
- Infringement proceedings brought by the Commission against Member States, when they have failed to uphold Community law;
- The submission of legal opinions on whether or not agreements between the Community and other states and international organisations are compatible with EC treaties; and
- Individual citizens can bring proceedings against EU institutions before the European Court.

COURT OFFICIALS

The court is composed of one judge per Member State, so that all 25 of the EU's national legal systems are represented. For the sake of efficiency, however, the Court rarely sits as the full court. It usually sits as a 'Grand Chamber' of just 13 judges or in chambers of five or three judges.

In addition, there are eight Advocate Generals whose role is to present publicly and impartially reasoned opinions on cases brought before the Court. France, Germany, Italy, Spain and the United Kingdom each appoint one Advocate General, the others being appointed on a rotation basis from the rest of the Member States.

Judges and Advocate Generals on the ECJ must have the qualifications to be appointed to the highest national courts in their Member States or they may be jurisconsults (academic lawyers). Their independence must be beyond doubt. This means that once they are appointed, the may not hold any other office of an administrative or political nature and they may not engage in any occupation, paid or unpaid. Judges and Advocate Generals are appointed by joint agreement of the Governments to the Member States. They have a renewable term of six years.

COURT WORKLOAD

Since its creation in 1952, right at the start of European integration with the creation of the European Coal and Steel Community, the ECJ has had many thousands of cases brought before it. It sits and hears cases throughout the year. In 2004, the Court concluded 665 cases, a significant increase on the 494 cases brought to a close the previous year.

Before 1989, it dealt with cases referred to it by the Commission, Member States or national courts, which needed a ruling on the applications of EU law. But in that year, it also became a "Court of First Instance" – in other words, it was empowered to hear certain categories of cases such as those on competition law, breach of commercial policy or social policy or disputes concerning EU staff regulations. The Court of First Instance helps the Court of Justice to cope with the large number of cases and it offers citizens a better legal protection. Decisions of the Court of First Instance may be

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appealed to the ECJ. The Court of Justice and the Court of First Instance each have a President chosen by their fellow judges to serve for a renewable term of three years.

A relatively new judicial body, the European Civil Service Tribunal has been set up to adjudicate in disputes between the European Union and its civil service. This tribunal is composed of seven judges and is attached to the Court of First Instance.

LEGAL ACTIONS

The European Court of Justice upholds the Treaties and ensures that European law is interpreted and applied in the same way across the EU through various forms of legal action. The four most common types of case are:

- References for a preliminary ruling;
- Actions for failure to fulfil an obligation;
- Actions for annulment; and
- Actions for failure to act.

Procedures for Preliminary Ruling

To avoid differences of interpretation of EU law by national courts, the preliminary ruling procedure allows cooperation between national courts and the EJC. If a case comes before a national court that involves an interpretation of an EU law and there is a doubt, it must refer the question to the ECJ. The ECJ will then make a decision as to how the law should be interpreted or applied and will send that decision to the national court who must then apply that decision to the case before it.

Procedures for Failure to Fulfil an Obligation

The Commission or a Member State may commence proceedings at the ECJ to force a Member State to comply with EU law. If the ECJ decides that the Member State in question is at fault, the Member State must rectify the situation without delay.

Proceedings for Annulment

A Member State, the Commission, the Council of the European Union or the European Parliament may request the annullment or cancellation of an EU law. This may happen if an EU institution enacts a law that conflicts with EU Treaties. If the ECJ agrees that the disputed law is contrary to the Treaties, it will declare the law null and void. Private individuals may also bring proceedings for annulment to the court – see more below.

Actions for Failure to Act

The Treaty requires the European Parliament, the Council and the Commission to make certain decisions under certain circumstances. If they fail to do so, Member States, other Community institutions and (under certain conditions) individuals or companies can lodge a complaint with the Court so as to have this failure to act officially recorded.

ORGANISATION OF THE COURT'S WORK

Cases are submitted to the registry and a specific Judge and Advocate General are assigned to each case. The procedure that follows is in two stages: first a written and then an oral phase. At the first stage, all the parties involved submit written statements and the judge assigned to the case draws up a report summarising these statements and the legal background to the case.

Then comes the second stage – the public hearing. Depending on the importance and complexity of the case, this hearing can take place before a chamber of three, five or thirteen Judges, or before the full Court. At the hearing, the parties' lawyers put their case before the Judges and the Advocate General, who can question

RULE OF LAW

The European Union is based on the rule of law. This means that everything that it does is derived from treaties, which are agreed on voluntarily and democratically by all Member States. The most important treaties are:

- Treaty of Nice – signed on 26 February 2001, entered into force on 1 February 2003. It dealt mostly with reforming the institutions so that the Union could function efficiently after its enlargement to 25 Member States;
- Treaty of Amsterdam – signed on 2 October 1997, entered into force on 1 May 1999. It amended and renumbered the EU and EC Treaties. Consolidated Versions of the EU and EC Treaties are attached to it. The Treaty of Amsterdam changed the articles of the Treaty of the European Union;
- Treaty of the European Union – which was signed in Maastricht on 7 February 1992, entered into force on 1 November 1993. The so-called "Maastricht Treaty" changed the name of the European Economic Community to simply "the European Community". It also introduced new forms of cooperation between Member State governments – for example on defence, and in the area of Justice and Home Affairs;
- Treaty of Rome – established the European Economic Community (EEC), signed in Rome on 25 March 1957, and entered into force on 1 January 1958. The Treaty establishing the European Atomic Energy Community (Euratom) was signed at the same time and the two are therefore jointly known as the Treaties of Rome; and
- Treaty establishing the European Coal and Steel Community – was signed on the 18 April 1951 in Paris and entered into force on 23 July 1952. It expired on 23 July 2002.

them. The Advocate General then gives his or her opinion, after which the judges deliberate and deliver their judgement.

Since 2003, Advocate Generals are required to give an opinion on a case only if the Court considers that this particular case raises a new point of law. Nor does the Court necessarily follow the Advocate General's opinion.

PRIVATE INDIVIDUALS AND THE ECJ

Perhaps surprisingly, private individuals are also allowed to bring proceedings to the Court to have an EU law annulled if it affects them directly and individually. This can't be done lightly or frivolously and the individual needs to have legal representation. They do not need to go through their national courts first to bring proceedings to the ECJ. However, there's a stiff penalty if the court decides against the complainant. If they lose the case, they may be liable to pay the costs of both sides. On the other hand, if they win, the EU pays costs and the law will be declared null and void throughout the European Union.

INFORMATION ON ECJ JUDGMENTS

Judgements of the Court are decided by a majority and pronounced at a public hearing. Dissenting opinions are not expressed. Decisions are published on the day of delivery. Judgments of the ECJ are available online at:
http://europa.eu.int/cj/de/content/juris/index.htm

NOT TO BE MIXED UP!

Sometimes, the many expressions at the European level are confusing. Important to note is that the European Court or the Court of the European Union have nothing to do with the European Court of Human Rights (ECHR). The ECHR is situated in Strasbourg, France and is therefore often called 'Strasbourg Court'. This Court has nothing to do with the EU. The ECHR is an institution of the Council of Europe and was created to systematise the hearing of human rights complaints from Council of Europe Member States. The Court's mission is to enforce the Conventions for the protection of human rights and fundamental freedom.

Josep Borrel Fontelles, President of the EP, on the left, and Vassilios Skouris, President of the Court of Justice of the EC

Did you know:

That the European Court of Justice can invalidate the laws of EU Member States when they conflict with EU law?

That the European Court of Justice is one of the most powerful institutions in the European Union?

From these treaties (or the EU´s primary law) derive what we call 'secondary law'. This includes three types of legislation:

• Regulations - these become directly part of the national law of the Member States, with no further legal act being required by the Member States;

• Directives - these have to be implemented by national laws; and

• Decisions - these address a specific problem and can apply only to specified states.

FIGHT FOR SIMPLIFIED EU LAW

In October last year, the European Commission took steps to modernise EU legislation and cut unnecessary red tape and over-regulation. It presented a three-year programme to simplify the thousands of existing pages of EU legislation (the "acquis communautaire", which is translated in all EU languages) adopted since 1957. The Commission will repeal, codify, recast or modify 222 basic legislations (all in all more than 1,400 related legal acts) in the next three years. It kicks off with the most heavily regulated sectors, such as cars, waste and construction – and other sectors as foodstuffs (including the notorious EU directive on bananas and cucumbers), cosmetics, pharmaceuticals or services will follow soon. Commission President Josè Manuel Barroso said: "Simpler EU legislation is one of the main elements of our better regulation programme. It will boost the competitiveness of our companies."

Implementation of a regional information system for Primary Care: Two regional projects of reference in Spain

SESCAM Primary Care data: [1]

- Population: 1,894,667 inhabitants
- Total PC centres: 191 basic zones, 189 health centres and 1,138 local surgeries
- Information system data: Daily information management:
  - It manages the information of 90% of Castile-La Mancha's population on a daily basis
  - 3,571 schedules programmed per day
  - 80,697 appointments/day
  - 70,746 visits/day
  - 103,874 prescriptions/day
  - 1,166 TD (temporary disability) certificates/day
  - 3,025 referrals/day
- Project progress: Under development, regional system for prescribing drugs.

IB-Salut Primary Care data: [2]

- Population: 983,131 inhabitants
- Total PC centres: 49 basic zones, 49 health centres and 103 local surgeries
- Information system data: Daily information management:
  - It manages the information of 100% of the PC health centres on the Balearic Islands on a daily basis
  - 3,000 concurrent users and approximately 5,100 potential users
  - 2008 schedules programmed per day
  - 35.000 appointments/day
  - 30.500 visits/day
  - 41.000 prescriptions/day
  - 550 processes / day
  - 1600 referrals/day

1 Sources: Spanish National Institute of Statistics (www.ine.es) and SESCAM.

2 Sources: Spanish National Institute of Statistics (www.ine.es) and IB-Salut.

iSOFT has developed and set up the information system for primary care, which is currently used by all health centres and clinical professionals in the Spanish Autonomous Communities of Castile-La Mancha and the Balearic Islands. Both are reference sites in Spain.

Starting Situation

The regional healthcare services in Castile-La Mancha (SESCAM) and the Balearic Islands (IB-Salut) required information systems, which enable the patients' clinical data to be centralised and which establish permanent communication between all the centres and medical experts involved in primary care in each region.
The problems experienced by each region when trying to computerise the area of primary care were:

- Limited time spent by the doctor on each patient's visit due to the high number of patients to be seen
- Medical professionals were under the impression that the information system was a tool that had a detrimental effect on the patient care ratio
- Geographical distribution of the health centres and surgeries
- Patient mobility
- Repetition of tests, requests, etc
- Poor structuring of clinical records.

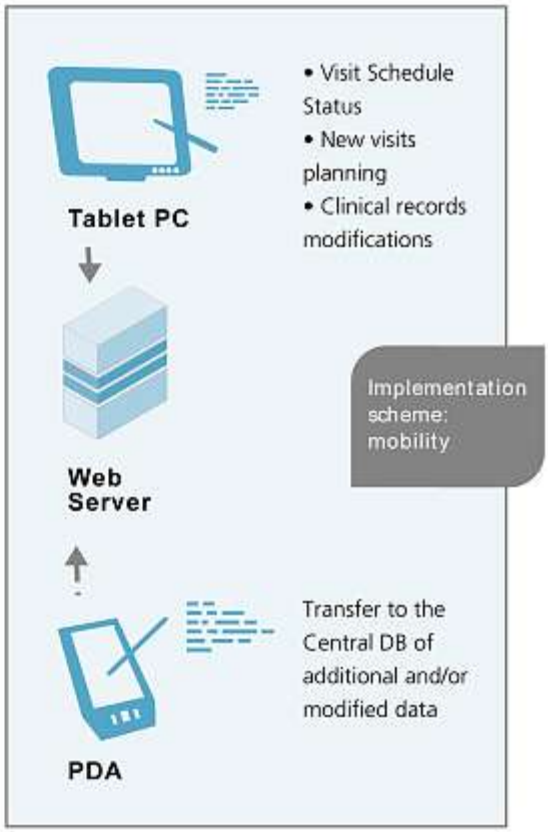
The information system implemented: characteristics

iSOFT's vast experience primary care, and the collaboration framework established with our technological partners SESCAM and IB-Salut, made it possible to draw up the requirements for the information system and its progress.
From the user's point of view, the information system set up is characterised by the following:

- Agile, with quick response times
- User-friendly
- Broader definition of Clinical Records thanks to the functional capacity of the software
- Agile and highly intuitive graphic interface
- Increased mobility of clinical staff thanks to the use of PDAs, Tablet PCs, etc.

The following is worth highlighting from a system architecture point of view:

- Data centralisation
- Integration with other information systems in such a way that it is possible to integrate primary care information with administration areas, specialisation centres, reference hospitals and other bodies as desired, while ensuring that exclusive and complete clinical records are kept throughout the patient's life
- Maximum software security thanks to the use of secure communication protocols
- Reading of the health insurance card of each Autonomous Community
- High degree of system scalability
- The IT system can be expanded and used from a multitude of mechanisms and platforms.



Baltic eHealth –

With the introduction of eHealth services to the Baltic Sea Region, the Baltic eHealth project aims to provide for more equal treatment opportunities and thereby counteract the tendency for rural migration. Baltic eHealth provides one solution for achieving the aim with the establishment of the Baltic Health Network that enables point-to-point remote reporting. In the future, a pan-European eMarketplace can take over and allow the same opportunities across all of Europe.

CURRENT SITUATION

One of the great challenges facing healthcare delivery in Europe today is the lack of medical specialists, particularly in Europe's rural regions. As with other countries, Denmark also experiences great challenges in this respect. The Danish profile shows a country with a high proportion of outskirts and isolated areas, a predisposition among the population to seek urban centres and a general lack of specialists and doctors. The Danish situation is therefore a perfect illustration of the tendencies and problems in demographics and healthcare delivery to citizens in many European countries.

SHORTAGE OF SPECIALISTS

Three out of four permanent specialist doctor positions are vacant in the rural regions of Denmark. As a result, many small local hospitals have been closed down and further hospital closures may be forthcoming for those that do not possess specialised competences and treatment methods. Keeping a hospital running that can only offer simple consultations and procedures is not cost-effective and resources are perceived as being better spent elsewhere. This is highly unpopular amongst the rural population, who feel that by closing local hospitals, their easy and fast accessibility to treatment will be removed.

An increasingly aging population and a general rise in chronic diseases, combined with a smaller percentage of people of working age, inevitably causes a shortage of doctors throughout Denmark. One attempt to overcome this has been to attract specialists from other countries. In some cases, the situation is so serious that regional hospitals would be forced to close down wards, were it not for foreign specialist doctors.

However, the Danish situation is not unique and the rest of Europe is experiencing similar problems. Wooing foreign doctors to Denmark simply exports the problem and causes a brain drain - especially in the new EU Member States, where doctors see a chance for earning a better living by working in the older EU countries.

THE SOLUTION: CROSS-BORDER eHEALTH

Cross-border eHealth allows for medical resources to be distributed and can be an aid in avoiding the brain drain from other hospitals or countries. As an example, an Estonian specialist can perform his work at a hospital in Estonia and, as a supplement, perform expert consultations through an eHealth tool to other countries against payment. This solution removes his financial incentive for moving abroad and the negative circle has then been broken.

eHealth solutions may also function as an incentive for professionals in seeking employment in the outskirts. The immediate access to specialist help and second opinion, when needed, is a positive incentive for employment and attracts professional resources as opposed to having them abandon the area.

BALTIC eHEALTH

Baltic eHealth, a project part financed by the European Union under the BSR INTERREG IIIB programme, was initiated in 2004 and brings together five partners from the Baltic Sea Region: Denmark, Norway, Sweden, Estonia and Lithuania. Each partner has their own core area of expertise; some are clinical partners that are familiar with digital healthcare communication, while others are knowledge centres or experts in eHealth or regional development.

The overall aim of the Baltic eHealth project is to facilitate cross-border eHealth and thereby contribute to the prevention of rural migration without brain drain in some countries. The project comprehensively examines the obstacles to cross-border eHealth. Infrastructure, legal issues, economy, organisational matters, cultural and linguistic barriers are addressed and solutions on how to overcome the barriers are found and also – at least when it comes to some of the major technical barriers - implemented on a large scale.

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THE BALTIC HEALTH NETWORK

The main objective of Baltic eHealth is the establishment of the

From Point-to-point Pilots to a Pan-European eMarketplace

By: Henning Voss and Jane Rasmussen

Baltic Health Network. The network is built on top of already-established national networks in Denmark, Norway and Sweden, where visionary national health strategies have resulted in a national health network in each country that connects all hospitals – and in addition, a wide range of other stakeholders in the health sector such as: general practitioners, laboratories, homecare services, etc. Two regional networks at hospitals in Vilnius, Lithuania and Tallinn, Estonia have also been connected to the Baltic Health Network. The goal is to create an association which can continue the operation and further development of the Baltic Health Network after the project phase is completed and any new hospital that wishes to connect to the network, provided that it adheres to the security rules of the network, is welcome to join.

eHEALTH IN PRACTICE

The Baltic Health Network has been running since September 2005 and field trials are currently testing the infrastructure of the network in the fields of radiology and ultrasound.

eRADIOLOGY

eRadiology enables a hospital to have an easy and fast transfer of digital images for reporting to another hospital, regardless of the regional or national location of the sending or receiving hospital. In Baltic eHealth, eRadiology is being tested between a small rural Danish hospital and University clinics in Lithuania or Estonia.

eULTRASOUND

The eUltrasound pilot ensures the same expertise in the assessment of pregnancy scans performed on women living in rural areas of Västerbotten, Sweden as those living close to larger hospitals with obstetrics and ultrasound specialists. If a doctor is uncertain about the result of a scan and needs to consult a colleague for a second opinion, the scan can be transferred digitally to a specialist at the Norwegian National Centre for Foetal Medicine in Trondheim, Norway. As such, eUltrasound promotes transnational co-operation in terms of obtaining specialist second opinions.

BARRIERS TO eHEALTH

The trans-national Baltic Health Network has removed one important technical barrier to cross-border eHealth – security. This has been achieved by establishing a secure IT infrastructure for more than 200 hospitals in Denmark, Norway and Sweden and two hospitals in Vilnius and Tallinn. Another barrier that has been solved is linguistics. A Structured Reporting Tool (SRT) has been developed and now provides a concrete solution for multilingual secretaries to fast, structured and successfully managed cross-border image reporting.

Nevertheless, the introduction of eHealth has other challenges and barriers in addition to technology and language. The legal issues of privacy, confidentiality and information security are vital in healthcare. Cross-border eHealth also naturally presents the question of doctors' licences to treat outside national borders.

Organisational changes are another issue to take into account. A change in normal workflows by the introduction of new tools must be thoroughly approached. From an economic side, eHealth creates a problem in terms of reimbursement for cross-border services. If they are not publicly reimbursed, who will pay the costs? Baltic eHealth has identified the non-technical barriers to cross-border eHealth and developed comprehensive guidelines for overcoming these challenges. The guidelines document is available to anyone interested on the Baltic eHealth website at: www.baltic-ehealth.org.

eHEALTH AS THE HEALTHCARE DELIVERY OF TODAY AND TOMORROW

While the Baltic eHealth project runs until August 2007, in May 2007 the results of the project will be presented at the "Cross-border eHealth in the Baltic Sea Region" conference in Stockholm, Sweden. However, it can already be concluded that Baltic eHealth has successfully implemented a cross-border IT infrastructure for eHealth - the Baltic Health Network.

More information on the Baltic eHealth project is available online at: www.baltic-ehealth.org.

Until now, the solution has enabled point-to-point remote reporting in the Baltic Sea Region, but the possibilities and advantages are much larger and exceed the region. A virtual marketplace for the buying and selling of imaging-related eHealth services over a trusted and secure framework that is not limited by national borders or distance is the next step.

Pan-European dissemination of remote reporting opens many opportunities for fast and equal healthcare delivery. An eMarketplace can help prevent the emigration of the population from European rural areas by supplying entire regions with the same qualified and specialised medical support that citizens in urban areas have access to. In doing so, it will help turn around the negative tendency of the outward migration of doctors that most EU Member States experience and instead transfer resources in to the region rather than out of it. In conclusion, the Baltic eHealth project and the eMarketplace seek the solution for healthcare delivery for the European patients of today and tomorrow.

product comparison chart

Radiology Information Systems (RIS)

ECRI (formerly the Emergency Care Research Institute) is a non-profit health services research agency and a Collaborating Centre of the World Health Organisation (WHO). Such organisations are appointed to contribute to the WHO's public health mission by providing specialise knowledge, expertise and support in the health field to the WHO and its member nations. ECRI's mission is to improve the safety, quality, and cost-effectiveness of healthcare. It is widely recognised as one of the world's leading independent organisations committed to advancing the quality of healthcare.

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ECRI's focus is healthcare technology, healthcare risk and quality management, patient safety improvement and healthcare environmental management. It provides information services and technical assistance to more than 5,000 hospitals, healthcare organisations, ministries of health, government and planning agencies, voluntary sector organisations, associations, and accrediting agencies worldwide. Its more than 30 databases, publications, information services, and technical assistance services set the standard for the healthcare community.

ECRI is pleased to provide the readers of *Healthcare IT Management* with sample information on products for Radiology Information Systems (RIS) from its Healthcare Product Comparison System (HPCS), which contains over 280 reports. This Product Comparison covers information systems designed for use in radiology departments and imaging centres.

This extract from the ECRI database contains model by model specifications for easy assessment and review and also includes ECRI's 'Recommended Specifications' (generic templates) which can be used for comparison and tendering purposes.

The data presented are extracted from ECRI's 2005 database and have additionally been reviewed and updated, where possible, by the respective manufacturers. Publication of all submitted data is not possible: for further information please contact ECRI or k.r@hitm.eu.

Footnotes

1: IHE Scheduled Workflow Profile tested in Barcelona Connethaton.
2: List of performed exams to HIS for billing-HL7 compliant.
3: Possible to evaluate and weight the exams performed by each operator.
4: HPC readers for login and digital signature.
5: Web-enabled ordering process with combined report and image access for referring physicians, fax, email, automatic report routing, voice commands report generation, report and image export to burning station, statistical/ management reports, ad hoc reporting, electronic signature, mammography module, voice recognition, digital dictation rule-based conflict management supporting billing and medical decisions, advanced patient data security, emergency department workflow.
6: HL7-compatible PACS, Desktop integration to Kodak and 3rd Party PACS workstation.
7: For end-customer hardware as well, i.e. server hardware Speech mikes, transcription sets, card reader, etc.

MODEL
WHERE MARKETED
SYSTEM TYPE
HARDWARE+ SOFTWARE OR SOFTWARE ONLY
HOSPITAL SIZE
Number of beds
SYSTEM CONFIGURATION
Hardware platform
Operating systems
Program languages
Database management system
Terminals supported
Peripheral devices
STORAGE
Maximum capacity
NETWORKING
Architecture
Communications protocols used
Operating system
Cable type
PACS COMPATIBLE
DICOM 3.0 COMPLIANT
HL7 COMPLIANT
INTERFACES AVAILABLE
BAR-CODE READER
DATABASE INTEGRITY
Transaction logging
Backup system
UPS
SYSTEM SECURITY
SOFTWARE FUNCTIONS
Scheduling
Patient tracking
Results reporting
Film library mgmt
ADT
Case retrieval
Word processing
Teaching files
E-mail
Order entry/ stats
Quality control
Billing/ accounting
Inventory control
Productivity reporting
Digital dictation/ voice recognition
Other functions
POWER REQUIREMENTS
SERVICE PROVIDER
Hardware
Software

ECRI-RECOMMENDED SPECIFICATIONS	AGFA	CERNER	FERRANIA S.P.A
RADIOLOGY INFORMATION SYSTEMS	**Impax RIS**	**RadNet Radiology Information System**	**LifeWeb RIS**
	Worldwide	Worldwide	Worldwide
	RIS	All diagnostic imaging modalities; hospitals, imaging centres, clinics	System web-based or ASP
	Both models can be offered	Hardware and software	Hardware and software
	Scalable from outpatient to state wide installations	Unlimited; IHOs	From small hospitals to multi-site enterprises
Facility dependent	Multiple platforms	Alpha, AlphaServer, IBM RISC System 6000C, Compaq, VAX	Facility dependent
Facility dependent	All Windows operating systems	UNIX Solaris, HP/UX, AIX, IRIX, DECUNIX, VMS	Windows 2003, Windows 2000
		C, C++, COBOL, VB, Java	C#,javascript,ActionScript, AJAX, ASP,VB
Relational, nonproprietary	Oracle	Oracle/DB2	Relational, nonproprietary (SQL2005, SQL2000)
Unlimited	Unlimited	Any Windows PC	Unlimited
Any standard	Any device supported by Windows	Zebra, HP, DEC printers, bar-code readers	Any standard
	Unlimited	Unlimited	SLQ server 2005 limits. Maximum size of DB installed, actually: 30 Gb
Client/ Server	Client/ server and Web	4, N-tier distributed, client/server	Web-based, platform independent
TCP/ IP	TCP/ IP	Ethernet, Token Ring, TCP/IP, FDDI, ATM	HTTP
	Windows	AIX, Open VMS, Windows 95/NT/2000	Windows
Any standard	Any standard	10BaseT, 100BaseT, fiber, thin, thick, AUI, SCSI2	Any standard
Yes	Yes	Yes	Yes
Yes	Yes (RIS related)	Yes	Yes (WorkList, MPPS)
Yes	Yes	Yes	Yes (see footnote 1)
HIS, PACS, billing, dictation	HIS, PACS, billing, dictation, reporting, scheduling, EPR, IHE, MPI	HIS, PACS, digital dictation, transcription, voice recognition, mammography	HIS, PACS, billing, dictation
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Hospital preference	All standard systems	Tape or disk	Hospital preference
Yes	Yes	Optional	Yes
	Role-based, LDAP, single sign-on, Auditing	User ID and password	System failover and / or cluster network load balance
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	No
Yes	Yes	Yes	Yes
Yes	Yes	No	Yes for patient report
Yes/ yes	Yes / yes	Yes / yes	Yes / yes
Yes	Yes	Yes	Yes
Yes/ yes	Yes / yes	Yes / yes	No (see footnote 2) / yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes (see footnote 3)
Yes/ yes	Yes / yes	Yes / yes	Yes / yes
	Scanning, priority handling, Web based order placer, Web based result distribution (images and reports), CD burning, Patient consent, Embedded speech recognition, Advanced scheduling module, Radiation tracking	Autofax, Expert Knowledge system, report writer, database conversions, mammography reporting, management reporting repository, clinical outcomes benchmarking	Trace of User Actions; Obstetric Ultrasound graphs; Nuclear Medicine; Statistics Tools; Patient Merge; Imaging Structured Report; Clinical Report Mailing; PIR/SWF; Automatic Check-In; WorkList
		110 / 220 VAC, 30 A	
	Can be Agfa	Cerner	Minimum requirements: P IV, 2 Gb RAM, 2x160 Gb HDD
	Agfa	Cerner	Data Base & Operating System Microsoft platform

	ECRI-RECOMMENDED SPECIFICATIONS	GE Healthcare	*IMPAC MEDICAL SYSTEMS an Elekta Company*
MODEL	**RADIOLOGY INFORMATION SYSTEMS**	**Centricity RIS**	**MOSAIQ™ Image-enabled Oncology EMR**
WHERE MARKETED		EMEA, Asia, South America	Worldwide
SYSTEM TYPE		RIS	Integrated oncology management software
HARDWARE+ SOFTWARE OR SOFTWARE ONLY		Software only or turnkey-solution software and hardware	Software only
HOSPITAL SIZE			
Number of beds		Scalable, no limits	Not specified
SYSTEM CONFIGURATION			
Hardware platform	Facility dependent	Open for several platforms	PC-based systems
Operating systems	Facility dependent	Windows	Win 2000/ XP/ 2003
Program languages		Java	Not specified
Database management system	Relational, nonproprietary	Oracle	Microsoft SQL
Terminals supported	Unlimited	Unlimited	Depends on configuration
Peripheral devices	Any standard	Networked and label printers, bar-code reader, scanner, fax, microphones, transcriptionist's headset/footpedal, insurance card readers, (see footnote 4)	Printer; optional bar-code scanner
STORAGE			
Maximum capacity		Unlimited	Depends on configuration
NETWORKING			
Architecture	Client/ Server	3-tiered client/server design and Web	Depends on configuration
Communications protocols used	TCP/ IP	TCP/ IP	Depends on configuration
Operating system		Windows	Depends on configuration
Cable type	Any standard	Any standard	Depends on configuration
PACS COMPATIBLE	Yes	Yes	Yes
DICOM 3.0 COMPLIANT	Yes	All RIS related DICOM services	Yes
HL7 COMPLIANT	Yes	Yes	Yes
INTERFACES AVAILABLE	HIS, PACS, billing, dictation	HIS, PACS, IHE compliant, HL7 compliant, DICOM compliant	Yes, depends on configuration
BAR-CODE READER	Yes	Yes	Optional
DATABASE INTEGRITY			
Transaction logging	Yes	Yes	Full audit trail
Backup system	Hospital preference	All common backup solutions	Hospital preference
UPS	Yes	Yes	Recommended
SYSTEM SECURITY		ID / PW login, function level PW access, 3rd party integration, Smartcard, HPC, LDAP support, single sign on w/ GE PACS	User ID, password
SOFTWARE FUNCTIONS			
Scheduling	Yes	Yes	Yes, depends on configuration
Patient tracking	Yes	Yes	Yes, depends on configuration
Results reporting	Yes	Yes	Yes, depends on configuration
Film library mgmt	Yes	Yes	Yes, depends on configuration
ADT	Yes	Yes	Yes, depends on configuration
Case retrieval	Yes	Yes	Yes, depends on configuration
Word processing	Yes	Yes	Yes, depends on configuration
Teaching files	Yes	Yes	Web based
E-mail	Yes	Yes	Yes, closed system
Order entry/ stats	Yes / yes	Yes / yes	Yes, depends on configuration
Quality control	Yes	Yes	Yes
Billing/ accounting	Yes / yes	Yes / yes	Yes, depends on configuration
Inventory control	Yes	Yes	Yes, depends on configuration
Productivity reporting	Yes	Yes	Yes, depends on configuration
Digital dictation/ voice recognition	Yes / yes	Yes / yes	No / yes
Other functions		Numerous functions (see footnote 5)	Practice management, image management, decision support, electronic medical record
POWER REQUIREMENTS			Depends on configuration
SERVICE PROVIDER			
Hardware		GE Healthcare	Depends on configuration
Software		GE Healthcare	IMPAC Medical Systems

Kodak	Nucletron	PHILIPS	SIEMENS
RIS 2010	**Oncentra Information Management (OIM)**	**EasyRIS**	***Syngo* Workflow MLR**
Worldwide	Europe, UK, USA	Worldwide, except USA	Worldwide, except US
General radiography	Radiation oncology, medical oncology	Workflow management for radiology	General radiology information system for with integration in PACS and HIS
Software only or hardware and software	Software and optional hardware	Software only (see footnote 7) or hardware and software	Hardware and software
Unlimited	Unlimited	Unlimited	50-1000+
IBM, Dell, Sun, HP-Compaq	Facility dependent	Intel based	FSC TX300 series, IBM x346 series
Windows 2000/2003, Solaris (server); Win 2000/XP, Pocket PC V-3 (client)	Windows 2000 / XP/ 2003	Windows XP, Windows 2000 Pro	Server: Linux Client: Windows 2000, Windows XP
C++, Java, Visual Basic	Jscript, Vbasic, Visual C, Oracle PL / SQL	C#,Visual C++, Visual Basic, .NET, SQL	C / C++, Java, XML
Oracle	Oracle	4th-generation relational (Oracle 10g)	Sybase Adaptive Server Enterprise
Unlimited	Unlimited	Unlimited	
Printer, Speechmike, multi feel scanner, bio ID mouse, barcode scanners, barbar-code printers, headset, footpedals	Windows-compatible devices such as printers, speech-enabled devices, document / flatbed / film / barcode scanners	All printers (include bar-code) with Windows 2000	Various Options
Depends on hardware platform	Unlimited; depends on configuration	Not specified	Local, SAN
Client/server, Web module and Citrix thin client components	Client/ Server	Multitier	Client - Server
TCP / IP	TCP / IP	Ethernet, TCP / IP	Ethernet
Sun Solaris (server), Windows	Various	Not specified	TCP / IP
Twisted pair, fiberoptic	Any standard	Not specified	
(see footnote 6)	Optional	Philips PACS, any HL7 & CCOW compliant	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Billing, HIS, EMR, CIS, voice, PACS, docu-ment scanning, HI7, XML, DICOM, IHE framework, EDIFACT	Standard ASCII, HIS, PACS, HL7, charge capture	HL7, ADT, DFT (incl. P01 and P05), ORU, ORM, DICOM modality worklist, DICOM MPPS	PACS, HIS, digital dictation, billing
Optional	Optional	Yes	Yes
Yes	Yes	Standard Oracle	Yes
Yes	Internal SDLT, other based on local IT	Standard Oracle	Tape, SAN
Optional	Yes	Optional	Yes
Active directory authentication, SSL, 128-bit encryption, application level security, HIPPA Compliance enhancements	User ID and password (double authenti-cation at Windows and application soft-ware levels)	User ID/password, access to functionality limited, specified privilege	User ID and password, dedicated user rights
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	No	Yes
Yes	Yes	No	Optional
Yes / yes	Yes / yes	Yes / yes	Yes / yes
Optional	Yes	Yes	Yes
Yes / yes	Yes / yes	Yes / no (only tariff number generation)	Yes / yes
Yes	No	No	Yes
Yes	Yes	Yes	Yes
Yes / optional	Optional / optional	Yes / Speech Magic	Yes / yes
Voice recognition, PDA access, Webbased order entry/scheduling, document scanning, mammography	Custom reports; form letters	Crystal Reports, integrated image viewer (Philips iSite workstation), Multilanguage support for user interface and base data in system, Audit Trail, Advance system configurability (including GUI customisa-tion)	FAX, ICD coding
Dependent on hardware selected	110/220 VAC, 50/60 Hz, 5 A, 400 W	Determined by selected hardware	Varies
Kodak, third party	Nucletron or representative	Recommended hardware from IBM, Dell, HP	Siemens AG, HW Supplier
Kodak	Nucletron	Philips	Siemens AG

THE EMPOWERED PATIENT AND RESPONSIBILITY FOR THE PROTECTION OF PATIENT INFORMATION

By: Ellen K. Christiansen

THE EMPOWERED PATIENT

The emergence of the "empowered patient" raises the issue of whether this should influence legislation concerning the responsibility for processing patient information. According to Norwegian legislation, patients are entitled to participate in choosing medical treatment on the basis of information from health personnel. Perhaps patients are also capable of taking part, to a greater extent, in the responsibility for the processing of their health information.

THE EVOLUTION OF THE PATIENT ROLE DURING RECENT YEARS

The position and role of patients in healthcare services has changed over the years. This applies to the position and role of health personnel as well, as both roles are formed in the interaction between patients and health personnel. The mere existence of Patients' Rights Acts in several countries, including Norway, has contributed to making these changes visible[1]. The Act may even have strengthened the process by giving patients more self-confidence, thus making them more aware of their legal rights. Issues encompassed by the Act include the need for patients' consent to medical care as well as patients' rights to necessary care, to participation and information, to access their own medical records and to protection against the distribution of their medical information.

There are several possible ways to illustrate the new patient role by approaching it through the development of the physician's role. One obvious starting point is the paternalistic doctor of yesterday with his (!) medical journals, to which the patient had no or very limited access. One way to describe the changes that have occurred since then is to imagine the physician's journey from the divine doctor to the confident and informative doctor and recently to the co-operative one, who is more like a consultant or advisor for the patient. A more colourful description originated from the Norwegian Medical Association as early as 1998, when the doctor was referred to as "the patient's pilot on the great and perilous ocean of [medical] information"[2]. Today, it might be more appropriate to describe the doctor as a partner and facilitator for the patient on a more equal basis.

In more recent descriptions of what is frequently called the empowered patient, he or she has been referred to as "a decision-maker" (Norwegian Federation of Organisations of Disabled People), "a participating decision-maker"[3], a "more demanding consumer", "the impatient patient" and "partners for providers"[4]. It has also been pointed out that the patients of the future will be entitled to customised healthcare because "one size does not fit all"[5].

REGULATIONS CONCERNING CONFIDENTIALITY

The Norwegian Health Personnel Act states: "Health personnel shall prevent others from gaining access to or knowledge of information relating to people's health or medical condition or other personal information that they get to know in their capacity as health personnel" (The Norwegian Health Personnel Act, Section 21)[6]. However, this Act also states that patients can exempt health personnel from their professional secrecy. If patients give their consent, health personnel can communicate defined information about the patient to others. In this case, it is up to the patient to define what is meant by the term "others". They are not necessarily identified people; "others" may refer to one or more people or to "everybody",

for example via newspapers or in a discussion on television. This means that patients, albeit with some exceptions, can to a great extent decide that their health information can be communicated to the general public according to Norwegian health legislation.

When it comes to information security, however, the processing of personal data is not governed by health legislation. The Norwegian legislation in the field[7] is based on the Human Rights Act 1998 (Article 8 of the European Convention on Human Rights), Directive 95/46 EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data[8]. But even though a patient can exempt health personnel from their professional secrecy, the patient's consent does not affect the professional duty of health personnel to ensure confidentiality and the right to privacy according to the legislation governing the protection of personal information. The security level must be maintained, even if the patient does not care whether others are given access to that particular information or not. The justification for this is that the right to privacy is a fundamental human right that cannot be left to individuals to maintain.

One could ask whether the changing patient role should also influence the division of responsibility for the processing of patient information. Is it conceivable that patients should have an influence on the security level for the processing of their medical data?

AN EXAMPLE: USE OF E-MAIL

The use of ordinary unsecured e-mail for transmitting health information by health personnel is illegal according to the Norwegian Data Inspectorate and the Norwegian Board of Health. It is not considered secure enough. E-mails can go astray, it is difficult to explore the true identity of the sender and it is impossible to guarantee that the message is not being altered or read on its way. E-mails encompassing confidential patient information should therefore be rigorously secured and encrypted before they are transmitted. This applies independent of the patient's wishes.

It could be of interest to look further into what the risks are and how patients may be affected if everything goes wrong. The legal situation is that if an e-mail goes astray, it might be considered as a breach of professional secrecy by health personnel according to the health legislation. The same applies to e-mails being read on their way or transmitted to another recipient than intended. This is related to health personnel's duty of confidentiality, which entails not only keeping silent, but also actively preventing others from obtaining access to patient information.

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Under certain circumstances, a breach of security measures involves the risk of inflicting damage on someone else. It is possible to imagine that an e-mail from a doctor to a patient could be intentionally altered by someone to harm the patient, even though the risk might be considered small. The same risk applies when recipients falsely pass themselves off as someone else. This could give reasons to ask whether the use of e-mail is consistent with the requirements for responsible conduct among health personnel according to the health legislation.

PROCESSING OF PATIENT INFORMATION IN THE FUTURE

We know that many patients want to communicate with their physicians via e-mail[9]. In the future, this will unquestionably be the case for the use of other electronic means that can help to make life easier for patients, too. There is reason to expect that the use of e-mail will be a matter of course in the years to come.

According to the legislation in force the situation is that, on one hand, patients are deemed competent to exempt health personnel from the duty of professional secrecy. The health legislation presupposes an informed, participating and contributing patient with extensive legal rights to influence the choice of medical treatment. On the other hand, patients have no influence over the security level demanded to protect their health information, whether they themselves consider the information sensitive or not.

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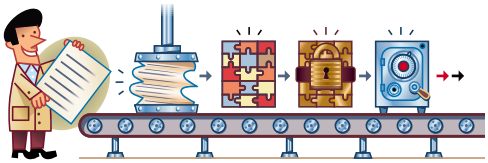
ENSURING THE SECURITY OF RADIOLOGICAL NETWORKS AND TRANSMISSION DEVICES

By: Giacomo Luccichenti, Nhan Ngo Dinh, Giulio Evangelisti, Filippo Cademartiri & Stefano Bastianello

Over the past decade, the development of networking systems has dramatically improved the management of patient information and, as a consequence, the radiological workflow. On the other hand, the accessibility to a patient's data and images puts confidential information at risk. Every person in a hospital is somehow involved in safekeeping this information: from the system architect during the building and planning stage, to the medical and non-medical personnel inputting the information after implementation.



Clearly, the in-depth knowledge of security criteria cannot be required from all of these people. However, it may be useful for them to be aware of general protection strategies, management and security issues involved in the access to patient information.

INFORMATION SECURITY ISSUES

Information security encompasses the safety measures for preserving information from damage, resulting from unsuitable, unwanted and illegal use. For the purpose of this article, we have identified three categories of security issues and what measures should be taken to protect information in each:

Physical issues

- Areas where information is present must be protected from physical and chemical damage; and
- Access to places where information is produced, managed and stored must be restricted and recorded.

Behavioural issues

- Personnel working in a hospital should be periodically trained on general concepts of security issues; and
- Standard Operating Procedures (SOPs) should be developed in order to avoid omissions, reduce errors and protect information from unwanted or illegal access.

Network and software issues

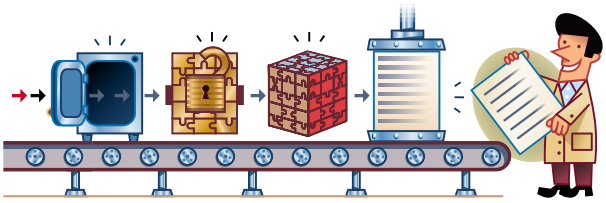
- Access to computers where information is produced, managed and stored must be restricted and recorded;
- SOPs for accessing information should be present; and
- The network (and the computers) must be controlled.

This list of topics may also be useful in verifying information security in a radiological department.

NETWORK SECURITY ISSUES

Because the structure of TCP/IP networks allows for the exchange of data between IP nodes that are interconnected, data can be carried not only directly, but also through other nodes. Therefore, the structure of TCP/IP networks exposes this information to several security problems:

- **Sniffing:** other people can see transmitted data that is flowing through the node they can have access to;
- **IP hijacking:** the Internet is a distributed network. In particular cases, this can allow a node to get the "IP identity" of another node;
- **Denial of Service:** software applications that are used to provide network services can be crashed if they receive a particular sequence of data. When such software crashes, the service can have problems or can even stop; and
- **Hacking:** with the same technique used for Denial of Service, the partial or the complete control of the device can be taken from the outside.



SECURITY SOLUTIONS

Protect the ordinary PC LAN

The ordinary PC network should be protected through the implementation of an appropriate firewall to protect the LAN from the WAN. However, a firewall isn't sufficient without the proper configuration appropriate to meet the security requirements and the accessibility of the network it is installed on.

Create a separate radiological LAN

Mission critical devices such as scanners, printers and radiological workstations may be positioned on a network that is physically separated from the network of the ordinary PCs, thus increasing performance and avoiding data sniffing from ordinary PCs. A firewall should control the interaction between the "radiological network" and the ordinary PC network to provide, if needed, accessibility to inner services.

TELERADIOLOGY ISSUES

Teleradiology systems are much more difficult to protect. As a general rule, any connection to the exterior of the LAN should be encrypted and access should be granted only after proper authentication has occurred.

If there is the need to share the services between the two distant LANs, a Virtual Private Network (VPN) can be established through the creation of an "encrypted tunnel". The most common encryption protocols used in such transmissions are Secure Socket Layer (SSL) or Transport Layer Security (TLS).

GUIDELINES

In implementing network and information security measures in a radiological network, the following guidelines should be employed:

1. Identify a computer specialist proficient in network security and legal issues;

2. Check the security (physical, behavioural, and network / software issues) with the computer specialist, following established security standards;

3. Define the radiological devices that will be used and the staff who need to access the network (and their corresponding access level);

4. Train people accessing the network on the organisation's standard security procedures; and

5. Plan a periodical security audit and a subsequent activity report.

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THE **EMPOWERED** PATIENT AND RESPONSIBILITY FOR THE PROTECTION OF PATIENT INFORMATION

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As long as patients are aware of the risks associated with different security levels for the processing of their health information, it could be asked whether or not they should be allowed to take the responsibility, or at least part of the responsibility, for mishaps that might occur. Is it possible to imagine that the patient and the health service share the responsibility for the processing of the patient's personal data in the future? Could it be an alternative for the patient to assume the sole responsibility by contract? Another possible future scenario would be the establishing of a double tracked system consisting of one source of information maintained by the health professionals and another managed by the patient herself (himself), such as the patient's own health record, a summary or extract of the patient's health record or a patient's diary managed by the patient.

Empowered patients have undoubtedly come to stay, demanding the right to self-determination. According to this, the interesting discussion is not only how the legislation affects people's behaviour, but also how people's behaviour should affect the legislation in the years to come.

MANAGING SECURITY ACCESS IN TODAY'S HEALTHCARE INSTITUTIONS

By: Chris Sullivan

With aging populations, healthcare continues to expand into one of the largest industries across the European Union. Along with this have come vast changes in both organisational structures and supporting technologies. This, in turn, has driven tremendous complexity into the way access is granted, controlled, and revoked for both patients and those who care for them.

While patient privacy, safety and care have become the mantra for most institutions, this cannot be achieved unless access to the thousands of supporting information systems is provided quickly, accurately and securely. Against that backdrop, security professionals toil to manage risk when most of them don't even know who has access to what, much less whether that access is appropriate. To make matters worse, their raison d'être is to enable patient care and improve safety - which means that there is a very low tolerance for risk.

Put simply, in an environment of increasing complexity, staff must have access only to what they need, exactly when they need it and without hiring an army of highly paid security administrators.

THE TASK SEEMS DAUNTING BUT THE SOLUTION IS NOT

The good news is that these problems can now be solved. Automated provisioning and compliance solutions are enterprise-ready and there's a growing body of best practices that can be applied to yield real benefits. As we explore these approaches, keep in mind that the benefits of effectively managing access come in three measurable forms – speed, sustained efficiency and transparent control.

Speed means that we can accelerate the way care is provided by giving individual clinicians what they need more quickly, or by enabling an acquiring organisation to integrate a new facility in less time.

Sustained efficiency means achieving operational savings without the solution being worse than the cure. Done correctly, dramatic savings can be pumped back into care. Done incorrectly, the provisioning system itself can become a white elephant that consumes more time and energy than it is worth.

Finally, ***transparent control*** means embedding preventative and detective controls into day-to-day processes in a way that reduces risk without imposing additional burden on the clinicians.

BEST PRACTICES FOR MANAGING ACCESS

(1) Crawl Before You Walk

Let's get started with best practice area number one. Do not try to implement a comprehensive Identity and Access Management (IAM) programme as one massive project. I've seen no evidence that this has ever succeeded. What you are really about to automate are detailed processes for staff on-boarding, change, termination, and periodic review. These processes are dependent on security and operations policies that will vary by type of care, location and even management level. This can't be done in one monolithic effort for two simple reasons:

- Most organisations don't understand their own policies well enough to spec-out a solution; and
- Even if they could define things in sufficient detail to coordinate an army of offshore .NET and Java developers, it would take years to complete – by then, the problem will have changed.

A more natural approach is to define a programme around a vision for efficiency and control and then begin with concrete projects that support specific goals. Each of these projects should be measured in business terms (to garner support), be simple and bounded (to minimise risk) and extensible towards the longer term goals.

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Delivering value quickly and consistently will build support and momentum.

The latest Advances in Spanish Healthcare IT: Telvent's role

The Spanish sector of healthcare information technologies has encountered a rapid transformation in recent years, passing from institution-oriented systems to patient-oriented systems. As a result, an increase in quality, combined with a high level of assistance, has been achieved in the Spanish healthcare sector.

Companies working in this sector offer a wide range of technological solutions. Telvent has its own vision and responds to the technological demands of the healthcare sector with global and integrated solutions that allow the technological integration required in the market. TiCares is that global solution covering the entire healthcare cycle.

With the TiCares product strategy, Telvent has become not only a software supplier for medical centers, but also a global IT supplier. Thanks to its research and development philosophy, the company is committing itself not only to improving and upgrading their systems technologically, but also to promoting the market presence of products and systems such as electronic prescription, patient monitoring and traceability, electronic patient card, systems offering the population their healthcare data via digital television and collecting the population biometrical data.
The Electronic Prescription System enables interaction amongst doctors, the school of pharmacists, retailers (pharmacies) and the population. This solution increases the quality of healthcare, integrating the dispensary service, normally carried out by the pharmacies, within the healthcare system. The implementation of Electronic Prescriptions in the healthcare system closes the complete cycle: it begins with the patient when he attends the doctor's surgery, continues with the doctor's prescription, carries on with the dispensing of the prescribed drugs by the pharmacy and ends when the patient picks up his prescriptions.

The Patient Monitoring and Traceability System shows real-time flow of patients in healthcare centers, which, in turn, facilitates the optimisation and administration of the workflow. The application immediately provides information about patients that arrive to the medical center, as well as real-time knowledge about their locations in the emergencies rooms, who is undergoing external consultations and who is in the waiting rooms awaiting their diagnostics, etc. To obtain these complex real-time functionalities, Telvent uses varieties of Remote Frequency Identification (RFID) technologies.

An innovative advance in this field is related to the transmission via digital television to the population of information about campaigns promoted by the healthcare sector (e.g. information about the health status of the hospital's patient can be visualised by using the television in the patient's own home). In Spain, analog transmissions to homes will be finished soon; therefore, the whole population is expected to use digital television.

The transmission of digital television can be interactive. All levels of health information that are considered worthwhile can therefore be included. Details related to the patient are also accessible in a higher level, eliminating the risk of jeopardizing the principles of confidentiality. The Electronic Card is a necessary instrument for the correct administration in eHealth environments. Based on huge patient databases, the development, administration and maintenance of these applications become the pillars of this kind of solution. As well as the administration of patient cards, the latest technologies in the market are also available - magnetic band cards, cards with incorporated chips, etc.

Finally, Telvent is the first IT supplier in Spain capable of unifying the patient's biometric data in an information system. Telvent is therefore able to manage a wide range of data, from the collection of samples to their complex analysis and to archive the patient's biometric data. As an outstanding example, these systems are able to store unique identification data of patients by means of the analysis of the patients' DNA.

Antonio Alonso Martín, MD
Sales Manager, Health Division
Telvent

TELVENT

(2) Always Move the Ball Forward

As you consider initiatives, evaluate their impact on speed, efficiency and transparent control. You should always be advancing one of these things and it will be common to advance all three. Deploying an account request process with more formal approvals will only decrease risk if the staff actually uses it. If it's harder for end-users, they will find a way to circumvent the process and there will be less control. If you are creative, you will find a way to reduce risk and hassle.

Remember, incremental progress is better than delayed or unattainable perfection!

(3) Know What People Have

Any business school will tell you that you can't manage what you can't see and this holds true for identities.

If you don't have a current map of who has access to what, then how do you know if people are over-credentialed? How do you disable their access when they leave? How do you even help them when they call the service desk?

Building this map can be difficult because most legacy environments are not very consistent, but there are effective tools that can help:

1. Establish a unique ID for all users;
2. Pull accounts and attribute information from core systems;
3. Map those account names to the unique ID:
   - Consider policies that were in place when the accounts were created;
   - Balance accuracy against the risk of making the wrong association;
4. Claim accounts that you cannot automatically map. If I am the only *Sullivan* at Courion then it's probably safe to assume that the AD account *csullivan* belongs to me, but if there's also a *Clarice*, you might have us identify and authenticate these against our accounts to claim them; and
5. Keep these mappings current with maintenance scripts.

Congratulations, you've just implemented some important controls and you are well positioned to automate disables completely!

(4) There is a Role for Roles

I've seen many successful role implementations and many unsuccessful ones. Roles are hard because you must work out what each person should get access to and then you must validate that with application owners to validate that access. However, since you should be figuring this out EVERY time you change someone's access anyway, why not do it once?

Start small and build an approach that will both scale and accommodate change. For your first foray into roles:

1. Select a modest population, perhaps *legal*;
2. Work with them to define a representative set of job functions;
3. Assign appropriate access rights to them. In practice no one will know just what to assign, so ask them for representative users and consider what they have;
4. Scrutinise roles against security policies.

Now you can redirect *legal* requestors to a simpler workflow that simply asks them to choose a pre-approved role and access can be securely granted without additional approval.

Going forward, you'll have to scale what you learned. As your approach matures, you'll want to be thinking about the following:

- Keep the number of roles manageable. Perhaps 200-300 for a 40,000 person organisation;
- Roles should be dynamic and rights assigned based on policies. In this way, when the policies change, you don't need to re-engineer the roles;
- Select tools that can automate provisioning and compliance with or without roles and be sure that they support role lifecycle management (developing, creating, changing, periodic review, governance and change control);
- Implement a governance process; and
- Avoid temptation. Under and over-credentialing are simple, but the former doesn't add much value and the latter creates risk.

ADVANCED TECHNIQUES

I have friends and colleagues who have implemented robust identity management programmes that are doing everything that we've discussed here. They have deployed enterprise roles for 80%+ of their users with only 200 roles. They have provisioned 5,000 new users from an acquired institution over a single weekend. They have reduced security administration staff by >70% and cut millions in operating costs. They've cut service levels from weeks to minutes, all while reducing the effort expended for internal and external audits to a fraction of what it had been.

Today, they are leveraging their infrastructures in ways that you might not have imagined. Since they've automated the employee on-boarding process, why not add in physical security and manage access badges to the floor and door level? Now that you have decided what rights a specific type of user should be granted, why not go back and track what they actually use? I have one customer who found that they provisioned 17,000 accounts in the last year for an application that was only used by a few people – that's a lot of labour and unnecessary risk.

BACK TO BASICS

Remember, it is better to have incremental progress before delayed perfection. In this case, progress is defined in terms of speed, efficiency and transparent controls. Make sure you know the clinical and technical context that you're dealing with and execute short, successful projects that will build on each other to advance your goals.

If you are just getting started:

- Build and maintain an identity map. It will help you in more ways than you can imagine;
- Scrutinise orphaned accounts. If you can't map them, they probably shouldn't be there;
- Automate the disable function. Granting new rights quickly and efficiently can be challenging because you need to understand how policies translate to system attributes. If you have an identity map, disabling is pretty easy – set the revoke attribute; and
- Get started with roles.

Finally, measure results! Institutions value patient safety and care and will support those who can show how they enable it.

NEW GENERATION STORAGE SOLUTIONS: A HOLISTIC APPROACH TO DATA MANAGEMENT

By: Dr. Hanna Pohjonen and Professor Hans Blickman

There is no doubt that the installation of a Picture Archiving and Communications System (PACS), designed for image and data storage and accessibility, necessitates that the system includes a well-planned disaster recovery and data management structure. New generation storage solutions are proving to be more efficient than their conventional PACS archive predecessors in achieving this, with an increased level of interoperability that will allow disaster recovery, data management and accessibility, to become better organised and more efficient.

First generation PACS archives were dedicated solutions aimed at the long-term preservation of DICOM-based information. There was a single interface to the local imaging modalities and data was accessed quite rarely because of the pre-fetching of relevant priors. Information from other clinical systems, such as cardiology and laboratory data, were stored in separate dedicated solutions, resulting in multiple archiving islands inside one enterprise. In fact, despite the benefits brought by the first PACS archives, their lack of integration meant that there was a long way to go before the potential for this technology could be fully realised.

Future Challenges for Healthcare Networks

At the same time, the rising trend in Europe for the consolidation of small practices into larger institutions which are then integrated into expansive healthcare networks capable of exchanging data and expertise, is creating a challenge in utilising the data stored in a set of archiving islands using different solutions from different vendors.

There is a clear need for healthcare providers to efficiently manage these disparate storage systems and, at the same time, to meet the disaster recovery requirements of the EU and HIPAA regulations.

There are a number of factors that are driving healthcare organisations to view a holistic approach to the sharing of data and resources across a heterogeneous mix of hardware platforms and software systems as the way forward. Such interoperability is needed to support electronic patient records, which in many European nations are being designed or implemented at a national level. In the United States, many healthcare organisations are consolidating operations, especially regarding ambulatory services, which also require data and resource sharing across enterprises.

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Furthermore, as the healthcare sector begins adopting new practices and technologies, such as evidence-based medicine and genomics, the need to link together and analyse the different sources of patient data will become even more paramount. Therefore, it is clear that a comprehensive, holistic approach to data storage and management is the best answer to this problem.

> "Consolidation of patient-centric data in a common archiving solution is a growing trend in healthcare IT markets"

Optimal Data Storage Solutions Today

Consolidation of patient-centric data in a common archiving solution is a growing trend in healthcare IT markets. New start-up companies like Bycast and NDMA are emerging in the US, to join established heavyweights such as IBM, Hewlett Packard, and Kodak. The new solutions allow any type of fixed content data including images, laboratory results, video files, etc. to be stored in one system. New generation enterprise archives are configured

as network-attached systems and they allow a set of standard interfaces and protocols – not just DICOM.

In new generation solutions, management of data, like the healthcare process itself, is patient-centric, enabling medical data coming from various sources to be consolidated into a patient record and managed as a single object. This allows global functions to be applied to the whole patient record, for example, keeping the patient record on one single media. This object-oriented approach is also a key factor in keeping massive archives efficient and scalable.

> "An integral part of a modern, streamlined storage solution is a meta-data (index) layer enabling efficient searching and retrieval of patient data"

An integral part of a modern, streamlined storage solution is a meta-data (index) layer enabling efficient searching and retrieval of patient data. Archived information is by no means dead and has to be retrievable fast and reliably when relevant.

Planning Ahead: How to Avoid Losing Information

An optimal storage solution creates one large virtual system – a grid, but not necessarily one physical storage site. A computing grid is a 'standards-based application/resource sharing architecture that makes it possible for heterogeneous systems and applications to share computing and storage resources transparently'. The advantages of grid computing are, that various systems can interoperate, and computing resources can be distributed throughout an enterprise. As the amount of patient data grows, and analyses become more complex, grid-computing can provide a scalable and efficient technique for meeting the increasing computational needs.

Grid-computing for medical data is being enabled by the adoption of standards for interoperability, and by the use of meta-data techniques for integrating disparate systems and sources of data. The service-oriented architecture (SOA) provides the structures and standards that allow disparate computing resources and services, and data sources, to be integrated into a computing grid.

Technically, a software module is placed above various archives containing meta-data indexes to the full contents of each separate archive. Hierarchies keep track of which meta-data indexes are available at which module instance. Thus searches of large, complex and diverse repositories of data can be completed locally and extremely rapidly. All the meta-data are kept updated and synchronised across instances via various database features. The storage grids also support encryption and compression.

Obsolescence management

In the new generation storage grid solution, the seamless removal and addition of servers and storage slots is possible. This is critical in obsolescence management: storage obsolescence has a three to four year cycle, while patient data have to be stored sometimes for decades. In a grid-based architecture we can build a resilient, self-repairing architecture with no single points of failure. Data can be replicated in real time and it is also possible to determine the number of replicas (including archive indexes) to gain the desired level of redundancy.

In case of a disaster, image storage and retrieval are automatically re-routed to other resources and generation of new replicas starts immediately. Recovery can be completed easily, when the remote archive is directly in use. In conventional settings recovery from a secondary storage device is not allowed because of the hierarchical structure of storage media.

In conventional PACS archives, disaster recovery has been highly reactive and complex or even impossible to achieve in clinical practice, resulting in extended service disruptions. In addition, moving to a data grid rather than relying on traditional long-term archival back-up can provide considerable cost savings.

The required retention period for stored information varies country by country and also differs for images and other patient data. New generation storage solutions allow intelligent information lifecycle management to automate and optimise storing of data, taking different national legislations into account. The storage rules can be based on the DICOM meta-data or even diagnosis or other data in the meta-data layer.

Final Thoughts

In conclusion, next-generation storage solutions deliver fast access to information, comprehensive security and service continuity, simplify storage management and disaster recovery and, notably, lower storage costs. Besides storing individual patient data, the storage grid could also help researchers to identify health-related trends. In this way, they provide direct benefits in a holistic, institution-wide sense, maximising the applications of PACS technology while at the same time making them more efficient and user-friendly.

Digital image-based diagnosis system for 2 million citizens

The Digital Medical Imaging System (Ykonos project), implemented in Spain's Castilla-La Mancha regional healthcare service (SESCAM), equips physicians with a powerful tool to improve diagnosis.

The Spanish region of Castilla-La Mancha offers a region-wide digital imaging and information system, enabling access to diagnostic tests and reports from anywhere in the SESCAM healthcare network, including Specialized Care and Primary Care. The main advantages of the system comprise: avoiding the duplication of tests and facilitating access to all the documentation available on an individual patient from anywhere and at anytime, regardless of where such information has been generated.

Castilla-La Mancha has a population of nearly 2 million inhabitants and covers 80,000 km2. The region has 17 hospitals, 188 primary health centers and 1,086 local health practices. In areas where the population density is very low the latter fails to reach 1 inhab/km2. The average distance to a hospital is 70Km. This means that x-rays are often repeated when it is not possible to access them, such as radiological images taken in emergency departments.

The best solution to this problem of distance and the dearth of radiologists in the region is to implement a digital imaging network which means that **the documentation travels not the patient**. Hence all documentation (images and records) are **available at anytime and anywhere region-wide**, regardless of where such information has been generated, which is a major benefit for physicians.

Each health center has been equipped with a RIS (Radiological Information System) and a PACS (Picture Archiving and Communication System). The regional system is based on a RIS-PACS network, connected through its own WAN. Each RIS-PACS functions independently while it can also communicate with the other RIS-PACS installed in the remaining hospitals, enabling a comprehensive search for all the information available on an individual patient distributed throughout the network. A database containing all the links, located at SESCAM's head office, is used for this purpose. Moreover, there is a PACS containing a copy of all the information generated across all centers which serves as a support system.

The Ykonos project is supported over hardware platforms based on Intel technology. At each center, the RIS-PACS is deployed using a cluster of two high fault tolerance tetraprocessor servers based on dual core **Intel® Xeon™ processors**. The WAN connecting up all the centers is a Gigabit Ethernet transmitting at speeds of 1Gb/s, 155Mb/s or 34 Mb/s, depending on the area.

The system described above has been rolled out completely for Radiology and specialists have been equipped with work stations based on **Intel** processors.

In addition, all sanitary professionals authorized, can handle to the medical images from their jobs taking advantage of the performance the **PCs based on Intel® Core™ 2 Duo processors**.

Recently new lines have been opened to implement the Ykonos initiative in other disciplines where images play a key role, such as Pathological Anatomy, Dermatology and Cardiology. The inclusion of these new specialist areas is a major challenge as in many instances there are no commercial solutions available to ensure the interoperability of the systems.

This system **reduces the waiting time**. The average waiting time from the moment the x-ray is requested to the information being received used to be a month, but this new system has managed to get this down to a week.

The benefits, in economical terms, include the **major savings** made in hospitals using this application. The network centers implementing Ykonos have managed to save an average of 360,000 euros per year.

Another of the advantages this initiative has delivered is that it enables health workers to consult a patient's radiological records from any center in the network. Moreover, before this application was deployed, x-rays taken by the emergency services were not stored, whereas now they go directly to the patient's clinical records, which proves a great help for specialists who simply have to go to the application in order to consult the patient's full radiological records.

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Introducing a Redundant Mini-PACS as a Backup and Migration Tool in an Existing Large-Scale PACS Environment

By: Uwe Fronz

RIS / PACS specifications

Since 1999, the University Clinic Essen has been using Medora from Innomed, Germany, as its Radiology Information System (RIS). In December 2001, the decision was made to introduce a Picture Archiving and Communication System (PACS) into the Radiology Department and the product chosen was Centricity from GE Medical Systems, USA. Subsequently, in March 2004, a collaboration between the Radiology Department of the University Clinic Essen and GE Healthcare was undertaken, resulting in the introduction of a second, smaller PACS system for backup and upgrade purposes into the original PACS environment.

This smaller PACS (called a mini-PACS) consists of a disk-based storage system on an EMC CX200 computer, equipped with 9 disks in a Redundant Array of Independent Disks (RAID) 5 configuration, plus one disk serving as hot spare - resulting in 1.2 terabytes (TB) of storage capacity using RAID technology. In this system, all images from the past 90 days are stored in their original DICOM format with a 2 to 1 compression rate (jpeg lossless). The computer controlling the storage system is a standard DELL 2650 system with two 36 gigabyte (GB) system disks configured in a RAID 1 configuration with 2 GB random access memory (RAM) storage. The EMC disk storage system is connected with two Emulex 982 Bus Host Adapter cards, running under Navisphere CLI and Powerpath (both from EMC). On the DELL computer, Centricity 2.0 Enterprise Archive runs on a standard Windows 2000 Server with Service Pack 4. All images from the previous 90 days are stored and access to the images is done via a Centricity 2.0 Web Server.

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Integration of the mini-PACS into the department workflow

The system is completely integrated within the normal PACS workflow. All exams with a verified status are immediately sent into the mini-PACS, and all modalities can store images via DICOM and also send them to the mini-PACS. In case of a PACS failure or a planned system update, all users inside the radiology department can use their normal PACS workstations with the web software (Centricity Web) to generate reports in the still-running RIS (in these systems RIS and PACS are, on the server side, two completely independent systems). Outside the Radiology Department, users only use Centricity Web to access images and, in the case of errors or updates, all requests are automatically re-routed to the mini-PACS. One benefit of using a mini-PACS is that reports can be generated and a web-based distribution of all images and reports from the last 90 days is possible.

The Department of Radiology at the University Clinic Essen has already used this system for three migration steps to upgrade the normal PACS system. It was also used in two system failures with a downtime of three and one hours, respectively (both network failures - one because of error in a gigabit switch in the large hospital network, and the other because of an error in the network controller card installed on the PACS server). The biggest update in the system was the change of the uninterruptible power supply (UPS), which resulted in a complete shutdown of all computers in one of two server rooms. This was necessary because of weather conditions (snow blizzard) at end of November 2005, that created a high voltage burning down of the UPS in one server room. The mini-PACS running in the other server room proved to be fully functional under all of these conditions and allowed the Radiology Department to examine patients, generate reports and distribute the images and reports in the same way as with the normal PACS system. During one planned update, the workload in the department with the mini-PACS was measured and compared with the normal PACS and it was found that it was possible to archive 80% of the normal workload using the mini-PACS.

Advantages and disadvantages of the mini-PACS

Using the redundant mini-PACS in a large-scale environment proved to be feasible and immediately useful in the case of errors or upgrades within the normal PACS system. In our opinion, a filmless hospital like our large university clinic needs to maintain a backup and migration system. Under special circumstances, a mini-PACS may also be a viable solution (for example, using a different PACS pool for industrial studies, etc.).

One of the two disadvantages of the system was the price. This was €150,000, in total, for our mini-PACS, but compared to the total costs of the RIS / PACS installation (€ 3 Million) - this 5% add-on investment has been worth the cost. The other disadvantage is the lost direct integration between the mini-PACS and RIS, so inside the Radiology Department patients must be manually selected in the RIS and PACS software for generating reports and users have to be very careful not to write the reports under an incorrect patient name. That was also the reason for the reduced workload inside the department when using the mini-PACS, but efforts are still ongoing between GE and the University Clinic Essen to find a solution for this integration problem.

CONNECTING HEALTHCARE, RESEARCH AND SURVEILLANCE

By: Anita Walden, Brian McCourt, Kimberly Booher & Renee Pridgen

Healthcare, research and surveillance entities currently operate independently, with costly and time-consuming redundant data collection. Considering the rising cost of healthcare, the complexities of research, and the threat of widespread disease, it is critical to identify common needs and bridge the gap between systems. One way to address the gap is to develop a methodology to exchange, consolidate and reuse data across entities. A system that streamlines the sharing and re-use of data will produce efficiencies that will ultimately impact the timeline to translate research knowledge into patient care.

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ILLUSTRATION OF A PROBLEM

Collecting the same data multiple times for different purposes is the current practice in many countries. For example, when a healthcare provider receives a patient's test results and determines a diagnosis, they may enter the information into a phone or web system for the patient to retrieve. If a reportable disease is suspected, the information will be recorded on additional forms and entered into a surveillance system. Concurrently, the test results and diagnosis are written in the patient's paper medical record or entered into an electronic medical record. This same information is also recorded by another individual to code for billing and reimbursement. It is also often recorded on other forms to report to regulatory or monitoring agencies. If the patient is participating in a clinical research study, the study coordinator may retrieve the information from the medical record and enter it on a case report form or in an electronic data capture database. In this scenario, these data are recorded multiple times but could be entered electronically once and shared with the various users.

SOLUTION

Using healthcare information technology will create effective and efficient interoperability between healthcare, research and surveillance organisations. Interoperability is defined as the ability of two or more systems to exchange information and to use the information that has been exchanged without customisation[1]. To take advantage of modern information technology, a common understanding has to be developed. This can be achieved by developing standardisation in terminology and data transfer methods that is supported and used by all communities involved. Using data standards at the point of initial data collection reduces ambiguity and misinterpretation when data are exchanged among the industry and aggregated for research.

OBSTACLES

Standardisation of terminology is essential to interoperability. A clinical term may have different meanings to various groups or individuals. For instance, consider the term "site". In healthcare it can mean a point or location on a body; in research the definition of "site" may refer to a clinic or hospital that is participating in a clinical research study. Depending on the context, it may be challenging to determine which definition to apply - but dialogue between individuals clarifies the meaning and context. Computers have no ability to interpret meaning, therefore structured rules must be developed.

CURRENT INITIATIVES

There are various organisations that have developed data standards or have come to a consensus on terminologies for use across communities. Two of these groups have been created to participate in the data standards arena to develop therapeutic area standards for cardiology and tuberculosis. The Clinical Trials Network Best Practices (CTNBP) and the Tuberculosis Trials Network (TBTN) are two of twelve Roadmap contracts awarded by the National Institute of Health (NIH) in the United States[2] to improve interoperability among clinical research networks, with a focus on using informatics to promote and translate research knowledge into practice. The two groups are working within other

standardisation development organisations for data interchange and terminology - Health Level 7 (HL7) and Clinical Data Interchange Standards Consortium (CDISC) are facilitating the work. While HL7 has been recognised world-wide for its use in hospitals, clinics and country medical record systems, CDISC has been working internationally with the pharmaceutical industry and the Food and Drug Administration (FDA) in the US to develop clinical research standards for regulatory submission.

CARDIOVASCULAR STANDARDS

A specific aim of the CTNBP is to develop and pilot the infrastructure supporting cardiovascular data standards development. This initiative has successfully engaged stakeholders from over 30 organisations, including professional societies, pharmaceutical companies, government agencies and standards development organisations (www.ctnbestpractices.org).

The first step to achieving this aim was to create semantic interoperability and then functional interoperability by:

1. Gathering cardiovascular data elements from various professional societies, pharmaceutical companies and other agencies to create a master set of data elements;

2. Meeting with key stakeholders to identify a manageable amount of data elements related to ischemic heart disease and create definitions based on use-case criteria;

3. Involving the stakeholders in coming to a consensus on standard terminology that will be used by the professional societies, regulatory agencies and pharmaceutical companies; and

4. Storing the data in the National Cancer Institute's Enterprise Vocabulary Server and Cancer Data Standards Repository[3], that is open and free to all users.

The second step is to develop a method for exchanging data for reporting by developing a HL7 Version 3 message or Clinical Document Architecture (CDA), to be carried out in two phases:

1. A Cardiology Special Interest Group (SIG) has been established in HL7 in conjunction with CDISC to develop a standard method of representing cardiology data in the HL7 and CDISC models; and

2. Conduct a pilot to test using data collected electronically from healthcare facilities for multiple purposes, such as a clinical trial, quality improvement registry, and clinical performance measures.

TUBERCULOSIS STANDARDS

The primary objective of the TBTN project is to expand and enhance the capabilities of the public health system to engage in clinical research. The majority of patients with tuberculosis (TB) are treated in the public health system. IT systems supporting the public health system are therefore a key resource for identifying potential research participants.

The initial use-case of the project is to create a system whereby researchers can identify potential patients from hospital medical records and surveillance databases, thereby reducing the time to identify patients from weeks or months to hours. TBTN is collaborating with CTNBP in developing the same methodology to develop data standards for TB.

Thousands of data elements have been collected from various forms and databases, such as the World Health Organisation (WHO), Directly Observed Treatment (DOTS), the National Electronic Disease Surveillance System (NEDSS) and other TB research projects. From this master set of data elements, a subset of critical data elements based on set criteria for identifying and diagnosing TB will be defined first (www.tbtrialsnetwork.org).

The following group of International TB professionals meets regularly to decide on common terminology for TB:

+ National Institute of Health – (Current funder of the TB Data Standards Project);
+ National Heart, Lung & Blood Institute;
+ National Cancer Institute;
+ US Food & Drug Administration;
+ Global Alliance for TB Drug Development;
+ Center for Disease Control and Prevention (CDC);
+ National TB Controller Association;
+ Royal Dutch Chemical Association / Koninklijke Nederlandse Chemische Vereniging (KNCV);
+ Clinical Data Interchange Standards Consortium (CDISC);
+ Health Level 7 (HL7);
+ Duke University Medical Center;
+ TB Professional Societies; and
+ TB Industry and Researchers.

The TB group is also working with HL7 as a project in the Public Health and Emergency Response Special Interest Group to facilitate the development of TB-specific standards to accomplish the Study Participant Notification use-case.

Creating terminology standards using controlled terminology and data transfer standards specifically for TB will also enable industry and researchers to have the ability to combine data from various databases as they search for treatment of Multi-Drug Resistance TB (MDR-TB), with less cost and less ambiguity in understanding terminology across datasets.

Moving forward, both projects will continue to work with other groups that have existing standards and will develop new standards when one does not already exist. The hope is that this will continue to facilitate the use of standards across organisations. Regulatory groups are starting to endorse the use of standard terminologies in research grants requests and data submissions.

If you have knowledge of standards in the cardiovascular or tuberculosis therapeutic areas or want to participate in current efforts, please contact one of the authors.

For a list of references contained in this article, please contact k.r@hitm.eu.

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The eHealth Transformation Key: the Integration Competence Centre

By: Miguel Cabrer González

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The integration question

Over the past 10 years, computer-based patient record systems have been increasingly used in hospitals[1], more as a result of the new technological era we are living in than in response to a clear request on the part of physicians, or due to the obvious benefits that such a system is able to offer[2-4]. The installation of these systems has often proven to be incomplete; departmental systems have only included some of the areas and display different objectives (patient management, data acquisition, exams, prescriptions, etc.)[5].

The idea of a "global solution" or of a single application that will work for everything is simply not feasible in organisations that have a number of functional levels with their own specific technological solutions. Suppliers are not currently capable of offering the range of solutions required by a complex organisation and acknowledge the crucial importance of the integration question[6].

This evolution takes on similar features in hospital computer systems that are made up of various hospital computer departmental applications. Interoperability and integration represent the key to success for eHealth processes. To this end, the implementation of an integration engine and the use of a standard and universal language represent equally important requirements for a hospital computerisation project. As part of a memorandum drawn up in 2002, Gartner stated that organisations employing the professional services of independent integrators may obtain direct benefits, in terms of reduced development costs and improved integration stability[7].

The organisation's competence in terms of application integration therefore appears crucial for the purposes of developing a real-time enterprise[6].

Creation of an Integration Competence Centre (ICC)

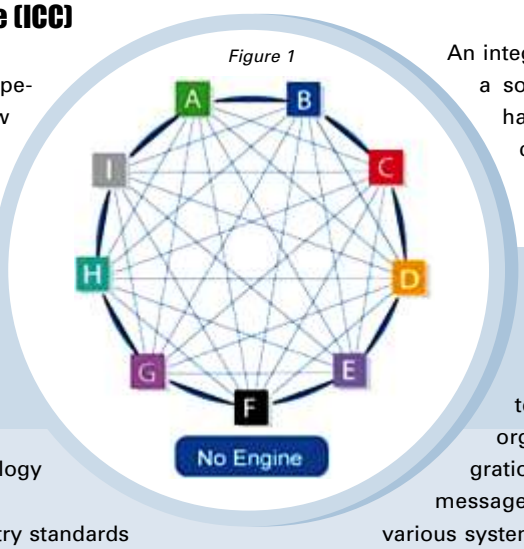
An Integration Competence Centre is a new concept of an independent organisational technical-functional group from the IT department, with advanced capabilities and tools such as:

- Clinical workflow understanding;
- Integration methodology and skills;
- Knowledge of industry standards (HL7, DICOM, IHE) and terminologies (SNOMED, LOINC); and
- An independent Enterprise Application Interface (EAI).

While the hospital or corporate ICC can consist of an organisation's own technicians or be outsourced to an external company, certain requirements have to be met. First, it must be an independent organisation, not linked to any involved information system - the ICC task is only to integrate. Secondly, there must be deep expertise in the EAI tool to ensure the maximum profit. General consulting companies do not normally provide deep expertise in the EAI.

The Integration Engine (EAI)

Figure 1



An integration engine is a software tool that has been specifically conceived to simplify the creation and management of interfaces between single applications and systems within an organisation. Integration engines share messages amongst the various systems and allow for the management, mapping, translation and modification of data between separate computer systems in order to guarantee an actual data exchange within the organisation,as illustrated in Figure 1.

The employment of an independent integration engine into the ICC guarantees, to the end user, complete transparency in connection with each individual application. Message conversion, transformation, or mapping is graphically and visually duplicated in the EAI tool. This, in turn, makes it possible to monitor and evaluate said processes, thus ensuring a clear vision as to the role played by the various applications involved and making it possible to see which of these roles needs to adapt to the final process. The employment of an independent EAI allows the final customer to make an advised assessment, monitor the problems and reach a final opinion.

There are several integration engine tools on the market. Before starting up an ICC in the Health Organisation, a deep evaluation about integration engine tools has to be done, taking in consideration objective market analysis (looking to objective industry-recognised evaluations in selecting products) and specific requirements from each organisation that are only known by the organisation.

Gartner have issued reports about Integration Competence Centres functionalities and roles. One important key factor that market studies note is that an integration engine for an ICC in Healthcare should ideally be an independent and specialised integration engine.

Klas, market intelligence leaders (www.healthcomputing.com), produces a well-known yearly market analysis report about EAI. It is a product market evaluation of different EAI providers, reviewing more than 20 indicators. The last evaluation, presented in March 2006, "INTERFACE ENGINE MARKET REVIEW 2006"[8], selected Rhapsody™ from Orion Health as best integration engine available in the healthcare market.

Benefits of ICC

One of the benefits of using an ICC is savings, in terms of technological unit development and maintenance costs. Market analysts state that organisations usually invest between 40% and 60% of the funds budgeted for technology on integration, and attribute most of these expenses to the maintenance of existing interfaces. EAI reduces new interface creation costs by 50% and can contribute to a reduction of pre-existing interface maintenance costs by 80%.

Based on a study conducted by Forrester Research in the field of cost savings, it was found that "by investing in integration architecture and work planning, companies can reduce EAI project costs by $710,000 (€ 500,000) in five years". This statement gives an idea of the return on investment that can be achieved by an integration architecture strategy compared to the development of point-to-point interfaces (see Figure 2).

In addition to cost savings, there are also many strategic benefits that can be realised from developing an ICC:

- Systems integration and simplified development: computer system development taking place in a non-destructive manner, by automatically adapting the process to the development timing for each element (HIS, Laboratory, RIS, PACS, etc.) and connecting all the data to the integration bus;
- Citizens' accessibility and continuity of the healthcare service: the adoption of standard interoperability platforms and of standard languages for healthcare data communications (HL7, CEN/TC-251, DICOM, IHE) significantly simplifies communication amongst the various health care centres (First Aid – Specialists, Public Sector – Private Nursing Homes), as well as among the various independent communities and towns, with the resulting consequence that healthcare assistance can be extended to citizens wherever they are, also ensuring the necessary healthcare information and activity control (cohesion funds, European patients' movements, etc.);
- Independence of suppliers and system management;
- Absolute flexibility in identifying any software solution, with the only aim of meeting the standards set by the organisation in order to establish a connection with the integration bus;

Continued on page 47

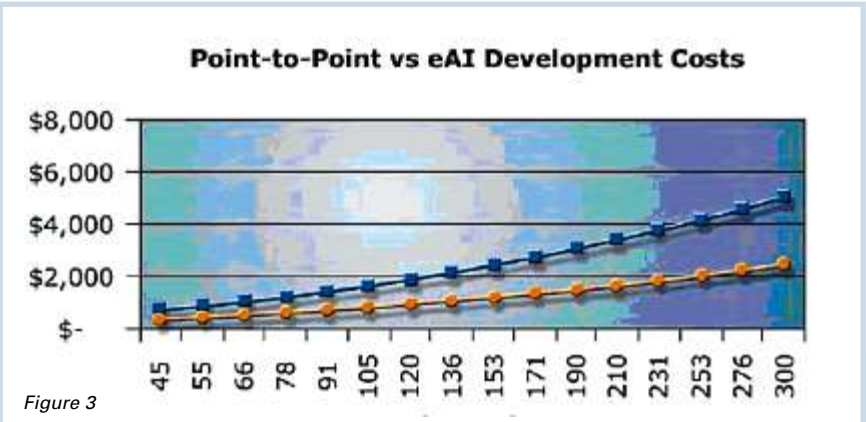


Figure 3

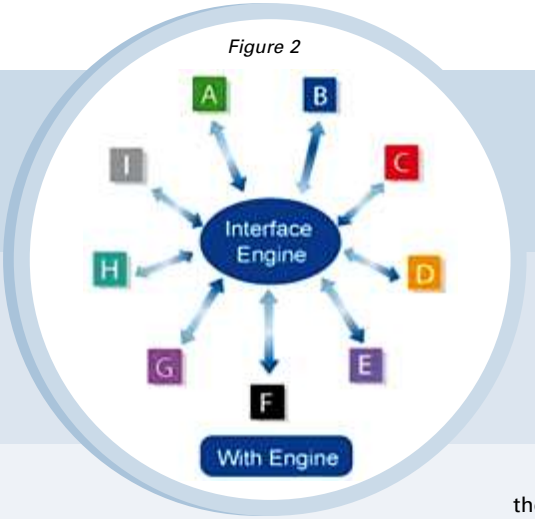


Figure 2

User-centric Design of Telecare Services

By: Steve Brown, Alejandro Rodriguez-Ascaso, Torbjørn Sund & Bruno von Niman

A mass market for telecare?

Telecare has the potential to resolve many of the challenges faced by today's health and social care services[1]. It can reduce institutionalisation of dependent people, giving them the freedom to move, more self-reliance, decreased anxiety and easier access to personal attention when needed. It can also be used to automate mundane, impersonal and repetitive tasks, thereby freeing up access to human resources. However, telecare systems are too often conceived and designed with a purely technical approach, whereas the end users may not be technologically adept or may have physical or mental impairments that make the use of ICT more difficult. As a consequence, people are still reluctant to use telecare. A recent study by Forrester[2] showed that 74% of those asked were unsure or unlikely to deploy a wearable device transmitting data about the well-being of a disabled or ill family member if it cost US $100 (€70) or more per year, and 80% were unsure or unwilling to pay the same amount for home monitoring.

To remedy this situation and make telecare more acceptable, consideration of human factors should be an integral part of the process of telecare service delivery - from service conception, research, design and development, to installation and deployment. The European Tele-communications Standards Institute (ETSI) has, in-house and through its members, extensive and detailed know-how and experience in human factors that can be applied to telecommunications and ICT. This experience has been drawn upon in the current work of developing Guidelines for Human Factors in Telecare Systems[3], reported here.

Structuring telecare design guidelines

Different approaches for structuring design guidelines are possible. The first is the lifecycle approach, based on the development and deployment of a telecare system, addressing successively the stages of conception: research, design and development, manufacturing, installation and service deployment. The advantage of this approach is that specific stakeholder groups can easily locate the guidelines relevant to them. The disadvantage is considerable repetition, since one guideline may be applicable to many lifecycles and stakeholders.

The second approach is the human factors approach, addressing issues such as interaction with equipment, operational issues, reliability, privacy and service. The advantage of this approach is that human factor issues are central and highly visible. A disadvantage is that it may be cumbersome for a specific stakeholder to identify its most relevant guidelines.

A hybrid approach, and the one we have chosen for structuring the guidelines, uses a combination of the human factors and the lifecycle approach. At the top level, the guide is divided into sections covering different human factors aspects. Each section starts with a short discussion of the issue addressed, leading up to high-level generic guidelines that must be considered by all stakeholders. Detailed guidelines are then grouped according to research, design & development or service provisioning.

This structure emphasises the human factor and keeps redundancy to a minimum, while at the same time making it easy for the stakeholders to locate those guidelines most relevant to themselves.

Overview of guidelines

Privacy and confidentiality

We define privacy as the rights of an individual or group to keep their lives and personal affairs out of public view, and to control the flow of information about themselves. Confidentiality is the duty of a service provider to ensure this privacy. Within the telecare domain, privacy can be achieved by the service provider adhering to a set of protocols agreed beforehand with the client and / or the client's representatives. These protocols should describe who may have access to the client's information and how detailed that information should be.

Ethics

Within the domains of health and social care, ethics revolve around two basic principles: the duty of good care to protect the well-being of patients / clients, and the duty to respect their autonomy. Health and social care professionals sometimes find that these two principles conflict, especially in situations where the patient is suffering from a mild cognitive impairment or early signs of dementia. The ethics section provides advice for helping stakeholders to address these and other ethical questions.

Legal aspects

The legal aspects considered fall into one of three classes:

1. Respecting European and national laws;
2. Understanding the liabilities associated with telecare services; and
3. Contractual bindings.

Although the guidelines by themselves are not compulsory, they are based on current legislation and it may therefore be unwise to consider them as 'optional'.

Availability and reliability

Availability describes the degree to which a system can be expected to function when it is required to be set into operation. The reliability of a system is its ability to continue to function, both in routine use and in case of unexpected, adverse circumstances. The guidelines address these two factors with a focus on those aspects that relate to human factors. Risk assessment is also addressed.

Integrity

Integrity is related to the confidence that data is not tampered with or accidentally changed during storage, transfer or retrieval. This is, again, related to the following properties: data consistency, repeatability of measurements and security of data against errors or attacks. The integrity guidelines are applicable not only to the technical parts of the system, but also to its human counterparts insofar as they have an influence on system behaviour and data.

Safety

In the guidelines document, safety is restricted to mean "non-harmfulness". The guidelines are directed towards making the equipment safe both in routine use (by minimising the chances of user error or minimising its adverse consequences) and during emergency situations (by helping the user make the right decisions and take the right corrective actions under stress).

Installation, setup, configuration and maintenance

Guidelines for installation, setup, configuration and maintenance are also provided, although ideally, users should not have to deal with this. These processes should rather be addressed by service providers through either manual or automatic procedures.

User interaction

The degree of interaction the end users have with the system will depend partly on their role as a patient / client, carer or coordinating agent, and partly on whether the telecare system monitors the patient / client, provides information/ assistance, or both. Particular emphasis is placed on the fact that the end users may have limited knowledge of information technology in general, as well as limited physical, cognitive or sensory abilities.

Normally, users must be able to perceive the information presented, operate the equipment efficiently and understand the purpose and functioning of the equipment. Because of the possible restraints and impairments of the user, multimodal input and output techniques should be available, and it must be possible to use assistive technologies in conjunction with the telecare equipment.

Miscellaneous human factor issues

Localisation refers to the provision of product and user-guide variants for different markets, taking into account market specific, local linguistic and cultural differences. Organisational aspects address procedures for the handling of care service provisioning. User education contains a set of guidelines on how user instructions for telecare services ought to be provided, taking into account the requirements and abilities of different user groups. Interoperability between different telecare equipment, services and the Internet offers considerable potential for improving the services; however it also presents new and challenging user interaction and human factor issues.

Conclusion

The Guidelines for Human Factors in Telecare Systems is currently (Nov. 2006) in development. Briefly summarised here, it builds upon ETSI experience within human factors design in general and telecare in particular[4]. It will be useful as a checklist for researchers, designers, developers, suppliers and telecare service providers in order to ensure that telecare systems are easy and safe to use and can be trusted in terms of confidentiality, security and reliability. This will contribute towards making the services more readily accepted by the end users, and telecare more widespread.

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For a complete list of references contained in this article, please contact k.r@hitm.eu.

Rectification

In the previous issue of *Healthcare IT Management*, the image in Figure 1 on page 41 (Start of the Test Phase for the Health Card in Germany) was incorrect. The correct image is available in the online version at: www.hitm.eu

Facts and Figures: The Spanish Healthcare System

By: Karmin Ruocco

Healthcare System & Administration

Spain has a public healthcare system, mainly financed by taxes. As a result, healthcare in Spain is either free or low cost for residents (and their dependents) paying social security. The national healthcare system covers 99.7% of the Spanish population. The remaining 0.3% only has access to private medical care. In addition to this, voluntary private health insurance has been contracted by 13.5% of the population.

Public hospitals in Spain are generally managed by the health departments of the Autonomous Communities. The regulation of hospital activities is also the responsibility of these Autonomous Communities. While certain hospitals have independent management (foundations), there are other management models in the different Autonomous Communities.

Healthcare Facilities, Services & Staff

Throughout Spain, there are public hospitals, private non-profit hospitals and private for-profit hospitals. Of these, two categories of acute care public hospitals exists: provincial hospitals and general hospitals. Public hospitals and private hospitals are financed by the Autonomous Communities, while private for-profit hospitals are partly or entirely financed by the Autonomous Communities when they are under contract. Otherwise, they must fund their own activities.

Each Autonomous Community has the freedom to decide how its hospital financing should be managed. Public hospitals are generally financed through a contract programme that identifies objectives and is based on an estimate of care "units". Financing of private hospitals is a little more complicated, depending on how care was contracted. When private hospitals are used to make up for the inadequacies of the national healthcare system, financing is based on ordinary contracts (i.e., day rate, payment per service, per pathology, etc.). However, when private hospitals are utilised as a member of the network of national healthcare system hospitals, financing is arranged by special contracts.

The Role of IT

Significant advances have been made in developing advanced IT infrastructures and services throughout the Spanish healthcare system. Some notable examples of this are:

- In 2003, the La Palma General Hospital digitised radiological images and implemented an electronic clinical records computerised system;
- The Son Llátzer Hospital (Mallorca) is considered one of the most innovative in Europe – electronic medical records combined with the use of mobile devices has resulted in the design of a mobility project consisting of equipping nursing staff with Tablet PCs and doctors with PDAs;
- In 2004, the Doctor Preset Hospital (Valencia) inaugurated an operating theatre equipped with the latest medical and communications technology for the purpose of carrying out laparoscopic surgery;
- A tele-appointment system was introduced in the Community of Madrid that provides networked access for patients to their appointment information; and
- The Andalucía Health Service (Servicio Andaluz de Salud – SAS) and the Andalusia Board of Pharmacists have created a Virtual Private Network (VPN) that enables the electronic prescriptions from pharmacies (see the preceding interview with María Jesús Montero, page 42).

Spain at a Glance

Population:	41.6 million
Live births:	10.0%
Death rate:	8.8%
Life expectancy:	76 years for men and 83 years for women
GDP:	745 billion
GDP per capita:	18,000
Total healthcare expenditure:	7.6% of GDP
Healthcare expenditure per capita:	1,630 PPP
Inpatient care expenditure per capita:	750 (28% of healthcare expenditure)
% of healthcare system financed by public funds:	71%
Number of equipment & scanners per million population:	5.7 MRI 3.8 Radiology equipment 12.5 Scanners
Number of hospitals:	799 hospitals, 359 public, 296 private non-profit, 144 private for-profit
Number of beds:	122,000 acute care beds (public beds 67%, private beds 33% of all beds)
Number of beds per 1,000 population:	2.5%
Rate of occupancy:	76%
Length of stay:	7.5 days
Number of acute care hospital admissions:	114 admissions, % population
Waiting list:	Significant

Computerisation of the Emergency Department:

Towards the Electronic Patient Record of the **Son Dureta University Hospital** and the Balearic Islands

The first steps towards an electronic patient record are being taken at Son Dureta University Hospital, where the Emergency Department is undergoing a process of computerisation in which existing systems are being connected through the installation of an electronic whiteboard and orders system. This pilot trial will test the combination of Oracle HTB, Rhapsody and Concerto. The initiative will then be expanded to the rest of the health sector throughout the Balearic region.

The Son Dureta University Hospital, situated in Palma de Mallorca, is the largest hospital complex in the Balearic Islands. The public hospital was founded in 1955, and employs over 4,000 people. The computerisation of the Emergency Department, which used to rely solely on paper-based files, is the starting point for a project which aims to create an electronic patient record for the entire hospital. "We began with the Emergency Department, which treats 300 patients every day, because it's a department where all medical specialities come together. It's also a way to bring the hospital into the digital age", explains Joan Marquès Faner, Head of IT Services at the Son Dureta University Hospital.

The computerisation of the Emergency Department, which has been carried out by Orion Health, Oracle and Fujitsu Spain, required the use of three interrelated tools: a clinical web portal, a clinical data repository and an eWhiteboard for patient tracking, medical referral management and online access to test results and radiology reports. Fujitsu Spain, leader of the consortium, coordinated the project and provided the necessary hardware.

Interrelated Projects

Via the clinical web portal, which is based on the Orion Health Concerto Medical Applications Portal, doctors can search for and see relevant information. Using the Orion web orders module, doctors can also request clinical tests from the laboratory, as well as radiological and pathological investigations.

In order to deal with the multiple formats in which clinical data is stored, information is inputted into the Oracle Healthcare Transaction Base (HTB), an Oracle tool which stores and manages clinical data in HL7 version 3 format, via the Orion Health Rhapsody Integration Engine, a middleware application designed for the health sector which extracts clinical data and converts it to a standard HL7v3 format for storage in HTB. A permanent central repository full of normalised data is created. This means that unique electronic records can be created for each patient. As Marquès points out, "the information stored in HTB - clinical orders, lab results and patient statistics – is instantly available and can be consulted by authorised medical personnel via the web portal."

Keeping Staff Up-To-Date

The eWhiteboard solution makes patient management in the Emergency Department easier. This tool shows up-to-date information about patients in the Emergency Department at any given moment. The information shown includes the location of patients, the doctors assigned to them, requests made and available laboratory results. Details of the time taken for each part of the process are also shown. These solutions mean that by looking at just one screen the emergency doctor can see details of all the patients who have entered the department, the length of time they have been waiting and all the processes which are still pending. "This information is also available to any family members present in the waiting room. This means that they know where their relative is at all times and their worries are not compounded by a lack of information" says Marques. The system also includes a feature which manages requests for laboratory and emergency tests as well as pathological and radiological investigations.

Challenges Overcome

"Any change which takes place in a hospital that has previously relied on paper-based systems will be a challenge, and the essential, unavoidable task of computerisation is certainly not free of difficulties" states Jordi Puiguriguer, Head of the Emergency Department at the San Dureta Hospital. "However, the Orion/Oracle project definitely offers us the chance to take on these challenges with guaranteed results. We are creating an innovative and flexible web application for our Emergency Department and its design will be applicable to other emergency frameworks."

For Marquès, one of the main challenges overcome was the integration of the laboratory system, which was made complicated by the use of multiple suppliers and software types, but was satisfactorily dealt with using the Orion Health Rhapsody Integration Engine and Oracle HTB. The medical staff, made up of a total of more than 500 doctors of all specialities who pass through the Emergency Department, have taken well to the new system. "I thought that there would be much more resistance to the change but the doctors are adapting really well. One notable success has been the method of working closely with them, coordinating ourselves and trying to meet their needs", he says.

Future Projects

Joan Marquès also mentions future projects, such as the computerisation of clinical notes, which will involve the monitoring of patients while they are in the hospital and the extension of the request manager to other laboratories. A telemedicine project for clinical orders is also underway with Palma prison. As Joan Marquès points out, "the Son Dureta project is a pilot so that Oracle HTB and the Orion clinical manager/portal are used in all hospitals in the Balearic health service (IBSalut)".

Andalucía – a Regional eHealth Success Story

Interview with

María Jesús Montero, Regional Minister of Health, Andalucía

By: Karmin Ruocco

As the Member States of the European Union continue to make progress in implementing eHealth tools and solutions, regional plans are already well under way in some Member States. One such notable case is that of the Andalucía Region in Spain, which has developed a 'universal' health system aimed at fostering social equality amongst the region's eight million inhabitants.

Founded on the belief that research and development efforts should go hand-in-hand, the creation of the Andalusian public health project has, from the beginning, been a public / private collaboration. Led by innovations in the public health system, the system itself has become a driver of the economy. Using technology to improve the relationship between providers and patients, the main goal is that ICT should help to achieve fairness and combat inequality between citizens throughout the region.

The cornerstone of the Andalusian eHealth strategy is the Diraya initiative. Diraya incorporates all the health information for each citizen into a single electronic health record that is integrated into the entire healthcare system. The record is accessible by primary care physicians, at any healthcare centre in Andalucía, as long as the user authorises its use. This health card is seen as the component that enables access to the single clinical record between hospitals and primary care centres, ultimately enabling the continuity of care.

Diraya consists of several components, amongst which the electronic prescription (Receta XXI), telemedicine and emergency response (SALUD Responde) components are central to the initiative's success. The electronic prescription component allows citizens to renew their prescriptions without having to return to their healthcare provider.

Meanwhile, the telemedicine component connects rural areas hospitals, allowing healthcare professionals to treat patients at a regional level and assists in the transfer of knowledge between professionals – which is seen as one of the biggest benefits of the initiative. SALUD Responde is a health response system that connects the entire health system and is accessible via the Internet, telephone and next-generation mobile phone technologies. (to clarify: Salud Responde is like the NHS Direct in the UK).

In an interview with María Jesús Montero, Regional Minister of Health, Andalucía, at the recent World of Health IT conference (Geneva, 10-13 October), we asked about her perspective on the Andalusian eHealth strategy:

What have been the major drivers of the eHealth initiative in Andalucía?

Ultimately, the political will - not only of the whole society, but also of the government - was responsible for pushing the initiative through. The strong leadership in the government was strategic for the entire region.

The most important aspect of the strategy was to make changes in healthcare organisations from being organisations providing services to becoming ones that enable citizens to have the right to universal access to healthcare services and the freedom of choice in choosing their own doctors. In order to guarantee these rights, a powerful information system was needed to support and track the care provided throughout the entire healthcare system.

Another important aspect was the universal public financing of the healthcare system,

which needed decision support to provide the right data to ensure the ultimate objective: the sustainability of the healthcare system.

What were the main challenges faced in implementing this initiative?

First and foremost, it was a huge financial effort just to create and support the infrastructure. It was critically important that we allowed enough flexibility to make necessary adjustments to the budget as the project progressed. Secondly, we needed to change the culture of healthcare organisations and professionals. The idea was not really to reorganise the entire healthcare system, but to reorganise the care process to provide continuity of care.

From a high-level perspective, what are the biggest benefits that have been realised as a result of the eHealth strategy in Andalucía?

From a political point of view, three main benefits have resulted from the strategy. First, the sustainability of the system allowed for changes to be made (as necessary) and has reoriented the healthcare system to focus on the citizen (rather than the other way around). Second, the electronic clinical record has been important not only for the clinician to see the patient's health data, but also to empower citizens to choose their own doctor and always have their health information available. Third, the quality of care has been improved and we now have greater access to data that is critically needed for future planning.

The Andalusian eHealth strategy has received a lot of recognition across Europe – do you think that it has practical application in other regions across the EU / is it adaptable enough to serve as a model for others to follow?

Yes, definitely! By using events such as this conference and linking people together to share their experiences, best practices and benchmarking, we are able to learn from each other.

It is especially important to share the best parts of this project with others, and to also learn from their experiences in their own Member States or regions. This knowledge sharing, not just from the perspective of institutions, but also from public / private partnerships, encourages the industry to provide the best possible technologies in order for these types of eHealth strategies to be the most productive and beneficial to all of the stakeholders involved.

If you could offer one main lesson learned as the result of the Andalusian eHealth experience to other regions or Member States across Europe who are looking to begin similar projects, what would it be?

Before embarking on these types of initiatives, it is critically important to have a strong commitment from the administration, not only in the interest of technology itself, but in using technology as a tool for change.

First, the structure of the healthcare organisation must change to allow the reshaping of the previous model to become one that is citizen-centred.

Secondly, the sum of the efforts is the most important element – not in focusing on creating new technology, but becoming innovative in using existing technology differently in order to reach the final goals.

Thirdly, the most important factor in the construction of an electronic health record, the basis of any eHealth change, is the buy-in of eHealth professionals. It is essential to the success of the adoption of an electronic health record that eHealth professionals take an active part in the process. (400 healthcare professionals participated in the Diraya project).

About María Jesús Montero:

María Jesús Montero was born in Seville in 1966. She is married and has two daughters. She studied medicine at Seville University and later specialised in Hospital and Healthcare Management.

From 1995 until 2002, she held different positions on the management teams of the University Hospitals Valme and Rocio in Seville. She was then Deputy Regional Minister of Health in Andalucía from September 2002 until she was appointed Regional Minister in 2004.

Montero has also been the President of the Inequalities Commission of the Andalusian Youth Counsel from 1986 - 1988 and later served as Secretary-General of the organisation from 1988-1990.

The Spanish Health Informatics Society (SEIS)

By: Marcial García-Rojo, Salvador Arribas & Luciano Sáez Ayerra

The Spanish Health Informatics Society is a not-for-profit association of more than five hundred health and technical professionals with interests in improving and promoting the use of information and communication technologies in healthcare. SEIS was formed on 24 June 1997 and has become a common place of participation for computer science engineers, medical and nursing professionals, pharmacists, veterinary medicine professionals, biologists and all other health science professionals, as well as students.

Amongst the multiple activities and projects that SEIS has developed, we can mention the National Congress of Health Informatics, currently in its 11th year, as well as other National Congresses such as: the National Congress of Informatics and Pharmacy, the National Congress of Informatics and Nursing, the National Symposium on Bioinformatics, Genetics Information and Health and the veteran National Congress of Medical Informatics.

Other important activities organised by SEIS are: the Health Informatics Meeting in Andalucía, the meetings of the Forums of Telemedicine, the Forum of Data Protection and the Forum for Standardisation. SEIS has also organised other international congresses and meetings: the 2nd International Symposium on Medical Data Analysis, the 5th International Symposium on Biological and Medical Data Analysis and the 6th Internet World Congress for Biomedical Sciences.

In addition to these events, SEIS has also established formal cooperation agreements with public institutions (data protection agencies), standardisation bodies and companies. SEIS also collaborates with other national and international societies in events related to healthcare informatics.

The main editorial activities of SEIS are the bimonthly journal *Informatics & Health (I+S)* and the book *SEIS Reports* . More information about SEIS is available online at: www.seis.es.

Authors:
Marcial García-Rojo, SEIS Board member
Salvador Arribas, General Secretary of SEIS
Luciano Sáez Ayerra, President of SEIS

eHealth is Worth it

Dr. Karl A. Stroetmann &
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When the eHealth IMPACT Study began, what was the main objective – was there anything you set out to prove or disprove?

There is an awful lot of rhetoric about the great benefits from all kinds of eHealth solutions; simplistic, if not sometimes naive calculations of prospective cost savings to be expected in the near future; reports on pilots, but very little, if any, reliable evidence from proven, longer-term, routine use of eHealth. This lack of evidence is retarding the expansion and diffusion of eHealth, and is a barrier to achieving stronger political support. The objective of the study was to provide some of the missing evidence to fill this gap.

In January 2005, the eHealth IMPACT study (www.ehealth-impact.org) was awarded by the European Commission to empirica and its partners. We set out to develop a generic method for evaluating the economic performance of eHealth solutions; identify good practice in routine use of eHealth; and evaluate ten proven sites, to provide an insight into the actual economic impact of effective eHealth solutions. This research was a great learning experience for everyone involved, both the study team and our many partners at each of the sites.

Did the objective change during the course of the study?

Not really. Over the course of the project, the study went along two different but parallel paths. One developed, validated and refined the method, and then applied it. The other identified, selected and collected reliable, verified data on a number of good practice cases for a public database. Initially just part of identifying ten proven solutions, collecting even basic data on a large number of good practices turned out to be much more time consuming and challenging than we had anticipated.

What were the main lessons learned from the study?

The study brought a lot of insights at different levels – about the methodological approach and execution of economic evaluation in the eHealth domain; about the state of play in data availability, internal reporting and controlling at healthcare organisations; and about what makes an eHealth initiative a success. The third level is the most important one, because it can be used to improve existing practices that do not deliver the expected benefits, and for support in business case development, investment decisions, and implementation management.

An important policy result of the ten cases, as a combination of individual solutions, was that eHealth applications, by addressing specific needs, can help increase benefits to health at broadly stable costs. Realising this potential depends on a few key factors:

1) A strong vision, focusing on citizen and healthcare needs should guide a flexible, regularly reviewed and adapting eHealth strategy. It must address concrete needs, and combine this with a pragmatic approach of setting achievable shorter-term goals within an eHealth investment dynamic – a 'big bang' with a short lead-in preparation period does not seem to work.

2) A comprehensive assessment is needed that takes into account the benefits and costs of all stakeholders, particularly those of citizens and for society as a whole.

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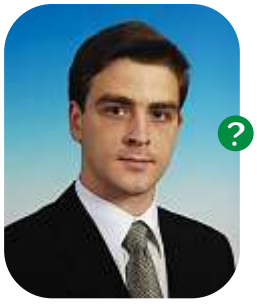

Considering a financial return on investment from just one perspective may lead to suboptimal overall decisions.

3) The optimal use of ICT-enabled solutions and comprehensive benefits realisation usually requires substantial changes in clinical and working practices. Simply replacing paper by electronic means will not be enough. New models of providing healthcare, or secondary uses of information recorded once, need to be considered.

4) Strong clinical leadership, good organisational change management, multi-disciplinary teams and well-grounded ICT experience will make the difference between success and failure.

5) Beneficial eHealth investment is like a good wine. It takes a considerable amount of time to mature and fully develop its potential. Policy makers, healthcare providers and other decision makers should take this longer-term perspective.

Were there any surprises in your findings?

One small surprise was the wide range of time for eHealth solutions to deliver a net economic benefit. The first year of net benefits was between two to eight years, depending on the complexity and scale of the specific solution. The average was four years.

Another surprise was the range of benefits distribution. In all ten cases, at least two stakeholder groups shared the benefits – health provider organisations, including the healthcare professionals, and citizens. Citizens reap about 45% of the benefits on average, but sometimes as much as 95%, as in the case of Kind en Gezin's children vaccination support system in Flanders, Belgium. This has a profound implication for planning eHealth investments – citizens should be taken into account in decision-making. Benefits to them, not usually in the form of cash, can make the difference between an investment being economically worthwhile and one that does not seem to be worth it. An important note: here we are talking about an economic, cost-benefit perspective, not a financial return on investment.

With regards to the economic analysis – how were the benefits of the eHealth solutions assessed?

We identified seven generic types of benefits. The first five are components of health services quality:

- better informed citizens and carers, for example preventing citizens from becoming patients in the first place;
- information designed to streamline healthcare processes;
- improved timeliness of care, not always faster treatment, but at the optimal point in time;
- contributions to patient safety and risk management; and
- improved effectiveness of healthcare service, treating those who actually need treatment and not treating those who do not, as well as facilitating multi-disciplinary consultations optimally matching specific diseases.

The other two types of benefits are:

- improved access to services and – spatial, but also independent of social background, financial situation, etc.; and
- improved overall economic efficiency, reflecting optimal use of resources.

Benefits were identified according to each case, and monetary values were assigned to them. An example is time savings. For healthcare workers, these were valued at the relevant employment cost. Another example is the avoided cost of achieving the same seven types of benefits, but by conventional, non-ICT methods. This usually involves considerable increases in staff costs.

In some cases, proxies were derived from similar services, and willingness to pay estimates, and expert estimates were also used. A contingency rate increased all costs and decreased all benefit values to reflect potential optimism bias and unaccounted indirect costs. The size of these adjustments depended on the extent to which we had to rely on estimates. Finally, all the results underwent a rigorous sensitivity analysis.

What are the implications of this study concerning future healthcare IT investment decisions?

Probably the most important implication for future eHealth investments is to include cost-benefit analysis (CBA) from a holistic perspective, i.e. accounting for all relevant stakeholders, into the decision making process, be it at the local or the national level. As our colleague, Tom Jones, who collaborated with us on this study, discussed in his article in the last edition of Healthcare IT Management (Volume 1, Issue 3, page 34), CBA is not enough, but it is essential

for identifying optimal investment options towards the ultimate goal of health services: healthier people.

The eHealth IMPACT method will be expanded to allow for ex ante assessments and to measure the impact of different risks. This will provide a validated methodology for prospective business cases across the whole eHealth domain.

How transferable are the results of the eHealth IMPACT study to other eHealth activities across the EU?

The method is easily transferable. It was designed to cover the whole eHealth domain in its widest definition. The ten selected sites consider very different solutions – from classical telemedicine applications, through highly complex ICT-enabled Electronic Patient Record (EPR) and meta-search engine solutions in a hospital, to insurance validation and reimbursement procedures, and supply chain management. This breadth of applications is deliberate and has enabled us to test and improve the methodology, and to also be simultaneously rigorous and generic.

Numbers from the ten eHealth IMPACT evaluations cannot be simply transferred to another site. At each new site, all the relevant cost and benefit variables need to be identified, and then used to set up a detailed empirical data model over the full time period, which could be up to 15 years. Economic analysis of eHealth solutions is not an exact science.

The aim is to show whether the estimated benefits exceed costs with an acceptable degree of certainty, or not. The exact individual numbers depend on the assumptions and expert estimates, whereas the overall outcome is usually not very sensitive to them.

Transferability is also limited because the ten evaluated cases were not selected at random. They had a reputation for good performance. This means that the results are showing the potential of eHealth investments, but only if designed, implemented and managed effectively. Different settings will lead to different results, even if the same, proven eHealth systems are transferred.

For more details and the case studies, please see: www.ehealth-impact.org.

"eHealth applications, by addressing specific needs, can help increase benefits to health at broadly stable costs"

Continued from page 37

- Added value: this represents the necessary basis, for the purposes of developing systems based on hospital workflow and of supporting healthcare decision-making;
- A necessary foundation for the purposes of developing new projects based on interoperability (electronic prescriptions, domiciliary care, etc.) in which the coordination between the various organisations plays a crucial role and eliminates the imposition of a single software supplier;
- It allows the management to have the planning and the controlled and safe development of healthcare computerisation applications and systems - the EAI platform must guarantee a safe and coded connection of operating data;
- Efficiency and hospital administration processes improve - it simplifies the exchange of appointments, cross-consultations, registration relations and laboratory test results interchange by significantly reducing the timing related to waiting for results or transferring X-rays and reports, as well as to the related distribution to the healthcare centres;
- It improves the safety, control and traceability of data shared between different centres; and
- Control over critical processes taking place at the healthcare centres is improved in terms of the processing of waiting lists, admissions and transfers. The sharing of data by means of the EAI makes it possible to record the critical times of the processes, thus ensuring that they are reviewed and improved.

The future of ICC development

The employment of an integration based on open platforms and standard languages is backed by a number of market studies conducted by industry analysts. From some hypotheses put forward by Gartner for the year 2005, the following data emerged:

- Over 50% of large enterprises will implement a corporate integration bus in 2006 (forecast 0.7)[8];
- One-third of the Integration Competence Centres (ICC), among those that are most drawn to optimisation, will save on average of 30% in terms data interface development timing and 20% in terms of maintenance costs, thus obtaining a 25% recovery of integration components over the 2004 - 2007 period (forecast 0.8). The remaining two-thirds will not attain the result, owing to organisation problems and lack of human resources[8]; and
- In 2008, 50% of the companies accomplishing B2B integrations will use a consolidated EAI to connect 50% of their partners and service suppliers (forecast 0.7)[8].

The employment of an integration engine not only speeds up, but serves as a key element for, the development of regional / national Electronic Health Records.

For a complete list of references contained in this article, please contact k.r@hitm.eu.

Healthcare IT Events

February

Personal Health Systems 2007
Deployment opportunities & ICT Research Challenges
12 - 13 February 2007
Brussels, Belgium
www.ec.europa.eu/information_society/events/phs_2007

HIMSS
HIMSS Annual Conference & Exhibition
Healthcare Information and Management Systems Society
25 February – 1 March 2007
New Orleans, USA
www.himss.org

March

ECR 07
European Congress of Radiology
9 - 13 March
Vienna, Austria
www.ecr.org

HC 2007
Challenging Boundaries
Annual Healthcare Computing Conference
19 – 21 March 2007
Harrogate, England
www.health-informatics.org

World Healthcare Congress Europe
3rd Annual Congress
Barcelona, Spain
26 - 28 March 2007
http://www.worldcongress.com

International Conference on e-Medicine
1st Egyptian International Conference on e-Medicine
Cairo, Egypt
27 – 30 March 2007
www.onlinediabetes.net/emedicine/intro.htm

April

IHE 2007 Connect-a-thon
Integrating the Healthcare Enterprise
14 – 20 April 2007
Berlin, Germany
www.ihe-europe.org/europe2007

Med-e-Tel
International Education and Networking Forum for eHealth, Telemedicine and Health ICT
18 - 20 April 2007
Luxembourg
www.medetel.lu

Cross Border eHealth in the Baltic Region
Healthcare Delivery for Patients
21 - 22 May 2007
Stockholm, Sweden
www.ehealthconference.info

HIT Paris 2007
Health Information Technologies
22 – 24 May 2007
Paris, France

June

TTeC 07
Tromsø Telemedicine and eHealth Conference
11 - 13 June 2007
Tromsø, Norway
www.telemed.no/ttec2007

CARS 2007
21st Conference of Computer-assisted Radiology & Surgery
Berlin, Germany
27 - 30 June 2007
http://cars-int.org

November

Medica 2007
World Forum for Medicine
Düsseldorf, Germany
14 - 17 November 2007
http://www.medica.de

The World of Health IT Conference & Exhibition

By: Karmin Ruocco

The recent World of Health IT Conference & Exhibition, held 10-13 October in Geneva, Switzerland, was billed as the first of its kind on a Europe, Middle East and Africa (EMEA) scale. Attracting leaders and experts in health IT from across the EMEA region, it was designed for and by the healthcare IT community. Over the course of four days, the conference offered up an array of peer-identified educational sessions, 54 vendor exhibitions, networking sessions / events and professional development opportunities.

Surpassing initial estimates, figures from the conference organisers confirmed its success with over 1,800 visitors from 63 countries – an impressive result for a first-time event on this scale. Amongst the many news bytes to come out of the event, the Healthcare Information and Management Systems Society (HIMSS) announced the much-speculated opening of their EMEA office in Brussels, Belgium.

Promising repeated success in 2007, Michael Strübin - Executive Director, HIMSS EMEA and H. Stephen Lieber - President / Chief Executive Officer, HIMSS US, offered a glimpse of what the goals are for next year's World of Health IT Conference & Exhibition:

- A deeper count of attendees by country – looking at who they are, where they work, what level they work at, etc.,
- Anticipate 8-10 major themes in the programme,
- Putting providers in a more critical role,
- More case studies and best practices of actual projects,
- A larger vendor exhibition, and
- Pre-conference programmes to run for specialised audiences.

More information on the World of Health IT Conference & Exhibition is available online at: www.worldofhealthit.org.

IMAGING GENERATIONS

Record high in abstract submission: + 5%!

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- 16,000 PARTICIPANTS
- 92 COUNTRIES
- 270 SCIENTIFIC AND EDUCATIONAL SESSIONS
- 1,600 ACCEPTED PROFFERED PAPERS & EXHIBITS
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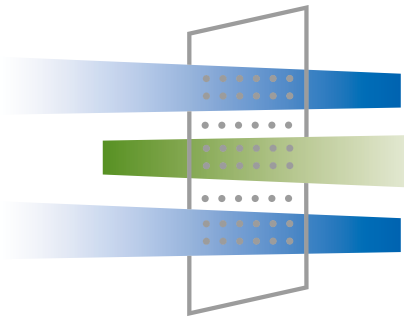

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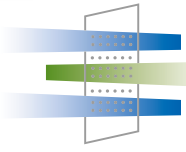

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