HEALTHCARE IT MANAGEMENT

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Wireless and Portable Devices

The Legacy Systems Challenge

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Autumn 2007

Outsourcing Healthcare IT

Databases and eHealth

Modernising Hospitals

RFID

COUNTRY FOCUS: Austria

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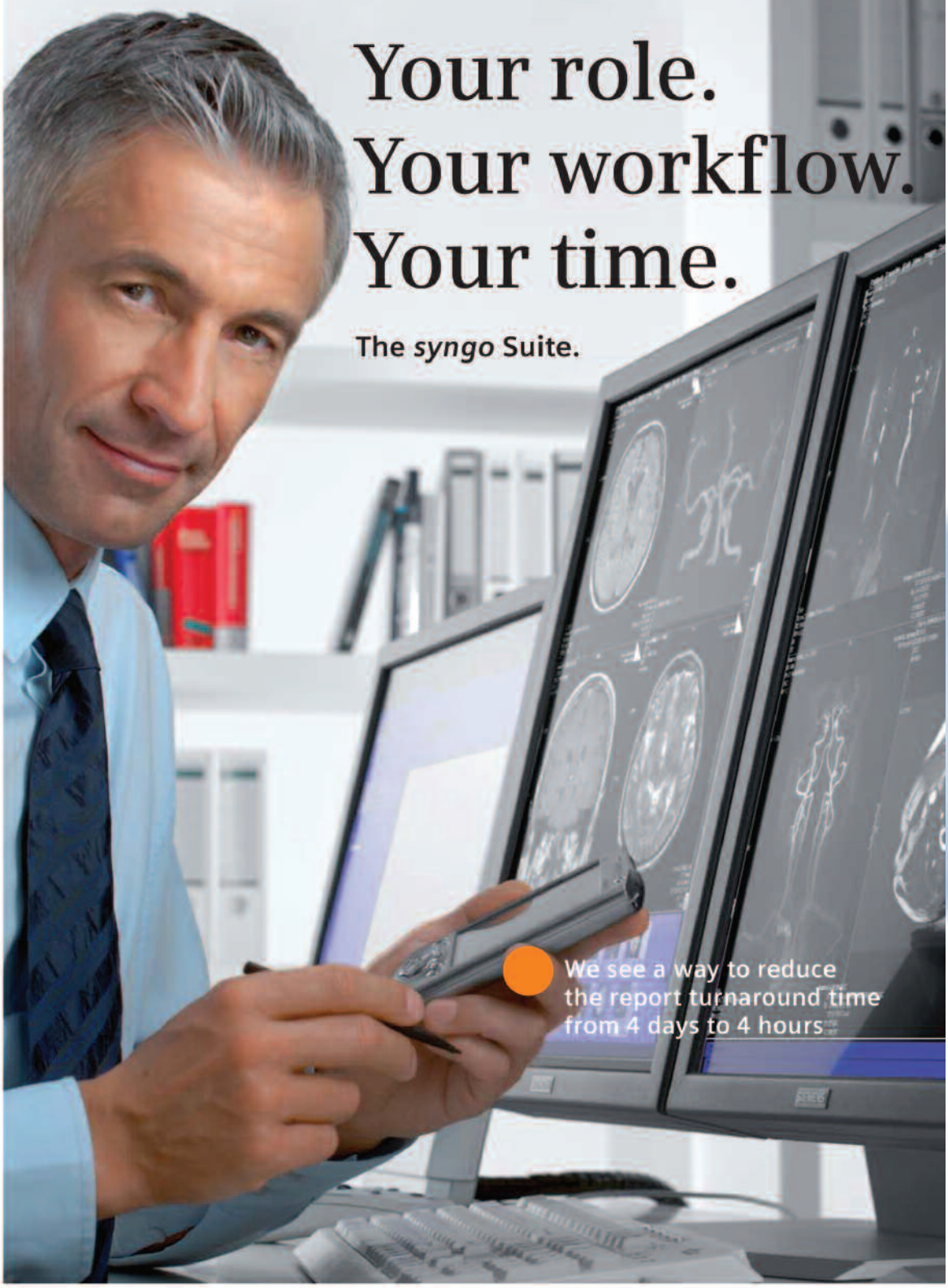

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Dear Reader,

There has always been a reflexive association between the words 'medicine' and 'emergency'. Modern technology, especially at the cutting-edge of IT and communications, have brought wholly new meanings to the ability of the medical profession to manage and respond to emergencies. Our cover story looks at CANIS, a project by a combined physician-university-private sector-government consortium, which targets the quickest and most-informed response to one of the most-common forms of medical emergencies, namely accidents.

While accidents involve one or a dozen, or even a few hundred victims, another kind of medical emergency usually extends to thousands, and not rarely, the millions. These are the result of both natural and human disasters, and the relief response here also directly involves the healthcare profession. Again here, modern IT and communications are permitting the attainment of more effective results. This is shown in our profile of Medair, a Swiss humanitarian organisation set up to provide first-line relief and rehabilitation to victims of disasters- ranging from earthquakes to civil wars.

For IT managers, disasters are usually much more mundane – but nonetheless challenging in their own way, and on an everyday basis. This is the loss of data (in a healthcare setting, not only important but often vital data), resulting from a vast and growing range of possibilities: theft of computers, virus and Trojan attacks, or even fire, natural disasters and lightning strikes. We profile some of the solutions which have been devised, especially in the context of the sharp rise in data generation (which is expected to accelerate further due to e-Health and other IT system modernisation programs) as well as growing concerns about the privacy of personal health information in a networked world.

This issue also provides expert opinions on the state of the electronic health record in France – especially in the sometimes vexed context of database interoperability and security. We also give an in-depth expert overview of an ambitious reorganisation and modernisation at a hospital group in Austria, the subject of this issue's Country Focus.

One everyday gadget in tomorrow's digital hospital consists of Patient ID systems. These are reviewed in our Product Comparison section. Alongside, we also provide an analysis of a relative newcomer in the hospital space – but one which may well become ubiquitous in tomorrow's digital e-Health era, the radio-frequency identification device (or RFID).

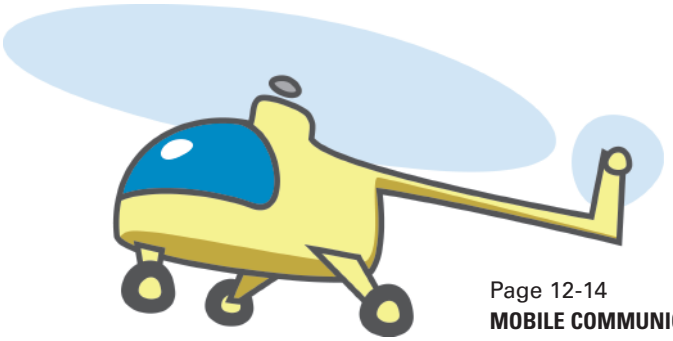
e-Health is no doubt fast becoming part of everyday lexicon. While the EU's e-Health agenda holds its own dynamics in the relatively advanced countries of northern and western Europe, it also provides some exciting potential for newcomers to the EU. Here, as discussed in our feature on a Romanian telemedicine project, e-Health may prove a far more quick and cost-effective solution for meaningful healthcare delivery than investments in the bricks-and-mortar infrastructure of an era which seems to soon pass us by.

Beauty, as we all hear, lies in the eyes of the beholder, and truth can sometimes be subjective. An article on perceptions by US healthcare opinion leaders makes salutary reading, since it shows that many Americans believe that Europe's healthcare technology infrastructure is more sophisticated than their own. While this may surprise some Europeans, what will surely not is the fact that, just like them, Americans too see IT as the key to improving healthcare quality and patient safety.

Yours faithfully,

Christian Marolt

HEALTHCARE IT MANAGEMENT



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MOBILE COMMUNICATIONS IN EMERGENCY SITUATIONS

Austria's CANIS project showcases the use of wireless, mobile applications in the saving of life and limb.

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THE LEGACY SYSTEMS CHALLENGE

Legacy systems may pose challenges for the European Union's e-Health vision to become a reality.

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RADIO FREQUENCY IDENTIFICATION TECHNOLOGY

As a relatively recent entrant, the healthcare sector has benefited from more maturity in RFID, gained from real-world application, and the beginnings of a fall in unit prices. However, the siutation continues to remain fluid.

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TRANSITING HOSPITALS FROM PAST TO FUTURE

Hospital managers are being compelled to rethink strategy and policies as a result of changes in the healthcare environment. In the future, strategic IT management will be a requirement at all hospitals. Austrian hospital group KABEG explains why.

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

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European Association of HEALTHCARE IT MANAGERS

THE EUROPEAN ASSOCIATION OF HEALTHCARE IT MANAGERS

The European Association of Healthcare IT Managers (HITM) is a non-profit 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.

HITM is strategically based in Brussels, for easy access to the European institutions and associations.

HITM'S MISSION

- To establish common healthcare IT standards, best practices, cross-border collaboration, unifying policies and strategies at EU and international levels
- To increase the visibility, role and importance of IT management in healthcare facilities
- To educate key policy-makers, industry players and the general public about the benefits of healthcare IT
- To promote cross-collaboration in different healthcare sectors
- To promote the efficient, cost-effective use of IT

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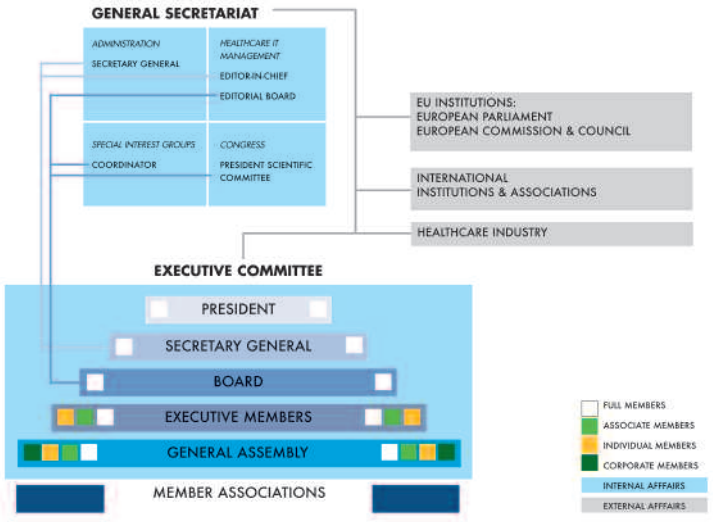

HITM'S MEMBERSHIP OPPORTUNITIES

- Participate in advocacy groups that impact healthcare IT legislation
- Share knowledge with peers
- Learn about, and contribute to, industry best practices and standards
- Attend the HITM Annual General Assembly and network with colleagues

For more on HITM and information about membership, please contact Catalina Ciolan, Project Director, at c.c@hitm.eu

European Association of HEALTHCARE IT MANAGERS

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MOLDOVA
Center for Public Health

NORWAY
Norwegian Centre for Telemedicine

PORTUGAL
EHTO-European Health Telematics Observatory

ROMANIA
Romanian Society of Medical Informatics

SLOVENIA
Institute of Biomedical Informatics, Faculty of Medicine

SLOVENIA
Slovenian Medical Informatics Association

TURKEY
Turkish Medical Informatics Association

UKRAINE
The Ukrainian Association for Computer Medicine
Association for Ukrainian Telemedicine and eHealth Development

AUSTRIA

Austrian Hospital to Implement Radiation IT

The newly-constructed Vöcklabruck Hospital in Upper Austria will implement a digital radio-oncology suite provided by a Swedish healthcare IT firm, Elekta.

The implementation cost is estimated at €5 million and is part of a 10-year contract between the hospital and vendor. At Vöcklabruck, considered one of Europe's most modern healthcare facilities, an in-depth evaluation of available treatment systems and information management software systems has been conducted before choosing a specific vendor. The hospital consulted a range of healthcare facilities using radio-oncology IT from different vendors, with the aim of finding the best possible treatment for its patients.

Two Elekta Synergy systems will be installed at Vöcklabruck in the spring of 2008. The hospital will also use a variety of supporting systems and solutions, including IMPAC Medical Systems' MOSAIQ electronic medical records, patient fixation and positioning technology developed by Medical Intelligence and treatment planning software from 3D Line.

For further information, please visit:
http://www.elekta.com

BULGARIA

Electronic Health Cards Implemented in Bulgaria

Bulgaria's first national electronic health cards were issued in September 2007, under a pilot program of the Ministry of Health and the National Health Insurance Fund (NHIF). InterComponentWare AG, Cisco Systems Inc. and Kontrax Consulting, a U.S.-based contract management firm, have helped develop and deliver the cards. The cards contain a microchip that stores personal data and security certificate. Insurance status and e-prescriptions can also be recorded and accessed on the cards.

Residents of Slivnitza and Aldomirovzi, two villages close to Sofia, received the first 1,000 personal health cards. The majority of the initial cards went to chronically ill patients and were issued by general practitioners.

For further information, please visit:
http://www.mh.government.bg

CROATIA

Resolution Plan for e-Croatia Available

1.237 billions of kunas were allocated by the Croatian Government to the Operational Plan for implementation of the e-Croatia program. This program carries out all current IT projects in administration as well as the review of 130 related activities such as e-Index, free access to high-speed Internet in student dormitories (StuDOM), an information system for higher education (ISVU), distributed IT infrastructure for common usage of IT capacities (CRO-GRID), Mobile CARNet, and the System for Authentication and Authorization (AII).

e-Croatia projects have been making significant progress in recent years, and played an important role in reinforcing its position on the markets. The past three years have been characterized by a rise in the demand for modern technologies in Croatia – a fact closely associated with a rise in the country's competitiveness level to the 46th position in the world.

For further information, please visit:
http://www.e-hrvatska.hr

REPUBLIC OF MOLDOVA

National Survey for Health Information Systems Available

Following publication in 2007 of *"The Evaluation of the Health Information Systems in the Republic of Moldova"*, the Ministry of Health of the Republic has decided to push further the modernisation of the health information systems.

The above-mentioned study, from Health Metrics Network, includes an assessment for HIS institutions, human resources and financing, and points to their inadequate availability. The resources allocated for HIS maintenance, for example, are insufficient, capacity building activities are limited and informational technologies that are in place do not satisfy personal needs.

Better results have been obtained in an evaluation of HIS infrastructure. However, it has also been mentioned that there are a limited number of computers and these are not used for quick compiling of information; communication technologies infrastructure is unavailable, especially at the sub-national level; IT and database support to health and HIS staff at both national and sub-national levels are not always available.

Based on these facts as well as trying to align the Republic of Moldova towards EU standards, the Ministry of Health is conducting a national survey to evaluate the following:

- ICT budget spent per institution
- communication infrastructure
- software
- IT security infrastructure
- decision-making process

Identifying the real/specific problems of each institution, the Ministry of Health will be able to better answer these needs and bring the Republic of Moldova closer to EU integration. Preliminary results of the national survey will be published in early 2008.

For further information, please visit: http://www.ms.md

HEALTH AND MIGRATION IN THE EU – BETTER HEALTH FOR ALL IN AN INCLUSIVE SOCIETY

One of the main initiatives of the Portuguese EU Council Presidency in the field of Health was to organise a European Conference at Lisbon in late September on "Health and Migration in the EU - Better Health for All in an Inclusive Society". Member States, national and international institutions as well as NGOs were invited to present strategies and intervention policies to increase access of migrants to health care, health promotion and disease prevention.

Four main objectives shaped the content of the Conference:

- To assess international migration flows in the 21st century and their impact in the EU's demography and economy;
- To improve the knowledge of migrants' health status and health determinants (based on the demographic dynamics of the migratory process and its impact, the specific political and legal frameworks at both national and international levels, as well as the socio-economic integration of migrant families);
- To identify good practices about migrants' access to health services (health promotion, prevention and access to care), including formal and informal care, as well as social and cultural activities aimed at facilitating inclusion;
- To contribute to the definition of health policies and strategies aimed at improving migrants' integration, which could be implemented at both EU and Member States levels.

Based on the above factors, one of the expected outcomes of the Conference is to establish a Network of key experts in Public Health/Health and Migration (in collaboration with DG SANCO). Furthermore, the results of the two-day programme (including parallel sessions and round tables/debates on mobility, public health, information systems, health promotion) is due to be published in two technical reports on "Health and Migration in the EU".

For further information, please visit: http://www.eu2007.min-saude.pt

"REAPING THE BENEFITS OF EGOVERNMENT"

To mark the Portuguese Presidency of the European Union, the European Commission and the Government of Portugal jointly organised the fourth Ministerial eGovernment Conference on "Reaping the Benefits of eGovernment".

The conference, held on 20-21 September, focused on four main ICT and Public Services related areas, namely:

- Better public services for growth and jobs
- Participation and transparency
- Social impact and cohesion
- Effective and efficient administration, with special emphasis on the local and regional levels

Against this backdrop, the Conference focused on highlighting the direct impact of eGovernment on economies and citizens as well as its added-value in terms of achieving the initial goals of the Lisbon Strategy. The agenda also included an analysis of the progress made since the 2005 Manchester Ministerial Declaration and the i2010 eGovernment Action Plan.

More than 1,000 participants, including top-level representatives of public authorities (from the regional and local levels and the European Commission) as well as delegations from third countries, EU candidates and EFTA countries as well as high level business executives attended the event. Together with the EU Member States' Ministers, they created a platform for debate and exchange of ideas around the main four themes mentioned above.

The Conference also presented finalists of the European eGovernment Awards 2007, namely Norway, the Netherlands, Germany, Italy and France, selected from 53 cases. Based on a public vote, the prize for the "Most Inspiring Good Practices" was awarded to the State Police of Italy. (CC)

For further information, please visit:
http://www.megovconf-lisbon.gov.pt

PORTUGUESE COUNCIL PRESIDENCY

On July 1, Portugal took over the EU's rotating presidency from Germany.
Portugal is now responsible for the EU presidency for the third time, after 1992 and 2000.
In turn, it will hand over the presidency to Slovenia on January 1, 2008.

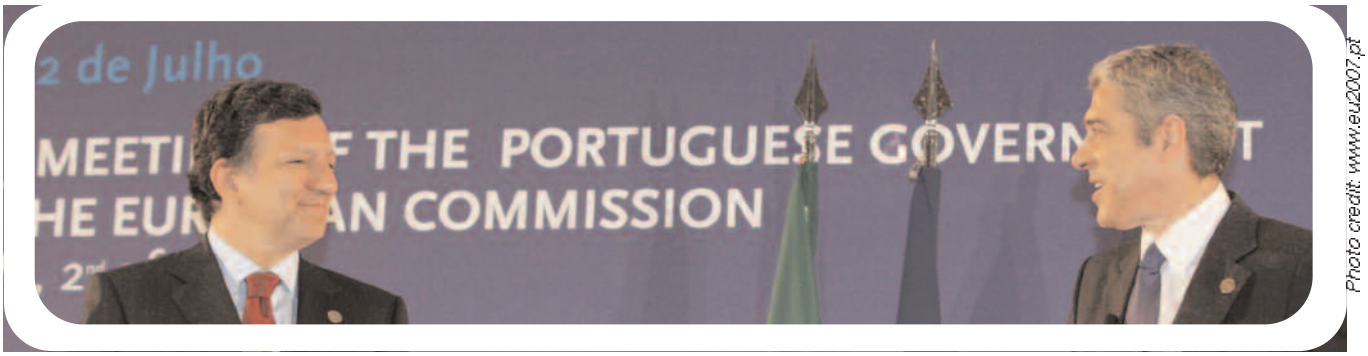

Photo credit: www.eu2007.pt

The Portuguese presidency has set up several priorities for its six-month mandate. The most important one includes continuation of the Lisbon Agenda of 2000, when the economic reforms for the EU were launched. Portugal wants to broaden it again, to give greater weight to social and environmental objectives. Although Portugal has not explicitly highlighted them, energy and climate change will continue to be priorities for the European Union.

Established well in advance, the challenges and the agenda for the Portuguese EU Presidency are established around four main areas:

- A New Treaty: Stepping up efforts to solve the political impasse by 2009
- Lisbon Agenda: Facing the challenge of global competition without losing ground
- Security, Freedom and Justice: Adapting to new security threats after 9/11
- External Relations: Strengthening the EU's role on the international stage

With regard to the road map laid down by the German Presidency at the European Summit in June 2007, Luis Amado, President of the European Council, urged: "This is a critical moment of negotiations. We need a new Treaty and we need it fast." He added that the Constitutional Treaty should serve as a basis for institutional reform.

On research, Portugal hopes to stimulate initiatives in a variety of areas. The Presidency wants to attribute a new impetus in science and technology to the Lisbon Strategy which defined collective targets, but left responsibility for implementation in national policies and strategies. The main areas are:

1. Publishing and Scientific Information

Portugal believes that the launch of Seventh Framework Programme (FP7) for research provides an opportunity to take a fresh look at EU science policy.

Based on a mid-February 2007 Communication from the European Commission on "Scientific information in the digital era: access, dissemination and preservation", the Presidency is committed to encourage debate on a European policy for publishing and scientific and technical information, namely in the field of digital scientific libraries, involving all interested stakeholders, and requiring that mutual trust be established.
Within this key area, special attention is paid to scientists and scientific jobs. The goals identified by the Lisbon Strategy cannot be reached without highly qualified human resources. The expansion of scientific jobs in Europe does not meet the ambitions and the policy objectives defined in the Lisbon Strategy. Hence, the definition of shared policy objectives in the field of Human Resources in Science & Technology has become increasingly indispensable.

The European Union gained an important science policy instrument with the creation of the European Research Council (ERC). The Scientific Council of the ERC met in Lisbon, symbolically representing the first event of the Presidency in science and technology and providing the occasion to discuss with the scientific community the activities developed by the ERC.

SURVEY

Legacy IT Systems: Perspectives and Implications for e-Health

Are you a CIO, CMIO or healthcare IT manager ?
Are you concerned about legacy IT systems and their future ?

Legacy IT systems remain a key part of Europe's hospital infrastructure. However, for some, their future is questionable. This is principally due to perceived limitations with respect to real-time, e-Health programs. Adding further uncertainty is the decline in availability of legacy IT programming skills and pressure from vendors in terms of rising licensing costs and withdrawal of support for older ICT platforms.

The European Association of Healthcare IT Managers

is surveying a selected panel of hospital IT managers across the EU on these issues.

We are now seeking spontaneous participants in the Survey.
An online version of the questionnaire is available from the Association's Website.

Please use the link: www.hitm.eu

Thank you for supporting this important initiative.
We look forward to represent your interests at a pan-European level.

For more details, please contact us at:
survey@hitm.eu

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2. Nanosciences and Nanotechnologies: A Priority for Europe

Coinciding with the Commission's preparation of its mid-term review of the European strategy for nanosciences and nanotechnologies, the Presidency has again highlighted this field, spelling out a specific intention to stimulate the coordination of national and European efforts and initiatives.

3. Reform and Modernisation of Universities

Universities are one of the most important strategic resources for a knowledge-based society and economy. The Presidency will contribute to the process of the modernisation of higher education in Europe, focusing in particular on the opening, diversification and internationalisation of universities, in the context of advanced research and training networks.

The Portuguese Presidency will promote the working agenda of the strategic framework **i2010** (please see *Healthcare IT Management*, Issue 2, 2007) for the information society, network security, and the general theme of Internet governance.

For more information, please visit http://www.eu2007.pt/

Within the context of ongoing actions developed by the European Commission and the former presidencies, the main priorities will be Digital Inclusion (eInclusion), electronic Government (eGov) and Research & Development for the information society.

a. Digital Inclusion

The development of Information and Communication Technologies (ICT), particularly in the last decades of the 20th century and its wider availability to the population, have led to profound changes in economic and social activities. These, in turn, have had a substantial impact on the quality of life of the EU's citizens, and in the competitiveness and productivity of its enterprises. Nowadays access to ICTs, and to the required competencies for its usage, are very important factors differentiating social opportunities. Furthermore, ICTs are a powerful instrument for social inclusion, opening up new horizons to social policies and actions promoting inclusion. Hence, these technologies can and should be social cohesion factors, as far as possible explicitly combating exclusion.

In the field of European policy for the Information Society, the Portuguese Presidency will highlight the priority given to digital inclusion, namely ICT usage by the social groups who are, so to speak, information society excluded. Within this framework, the Presidency will place special emphasis on the following themes: accessibility, ageing, and illiteracy.

b. Electronic Government (eGov)

Electronic government is a process backed by the difussion of ICTs, which sets the citizen and the enterprise at the core of any activity. It aims "to improve the quality and the commodity of services, and to strengthen the practice of citizenship through active participatory means". At the same time, it increases efficiency, reduces costs, and contributes to the modernisation of States.

The Portuguese Presidency will continue the effort carried out by the European Union in the sphere of electronic government, and will accelerate the visibility of national policies and the allocation of best practices at a European level.

c. R&D in the Information Society

Within this scenario, the Portuguese Government states: "We know that globally, the European Union has not yet reached the goal of 1% public investment in R&D, or the 2% of private investment in R&D. The exchange of experiences and mutual learning between national governments is still scarce and the collaboration between governments, R&D institutions and scientific organisations at the European level is still in its initial phase."

Finally the Presidency also addresses the advances registered in topics related to security and trust within information systems and communication networks. (CC)

A EU RFID (R-)EVOLUTION?

The Commission has decided to study the options for using Radio Frequency Identification (RFID) technology in healthcare, with applications ranging from the identification of patients in hospitals to tagging pharmaceutical products. Therefore, a call for tenders for a study on requirements and options for actions in Radio Frequency Identification (RFID) technology in healthcare has been published on the Commission's TED website.

The main objective of the study is to assess the expected features of RFID applications in the healthcare market and to build future scenarios in the field. The aim is also to identify possible obstacles and needs for policy actions or specific research activities on the subject. In healthcare, RFID is used primarily for track pharmaceuticals. In hospitals, RFID systems are used, for example, to identify patients and to allow relevant hospital personnel to access medical records.

Results of a recent Commission consultation on RFID with a focus on RFID use, Privacy, Data, Standardisation and Interoperability, Radio spectrum and Research opened a debate about RFID and its application. For the use of RFID-based solutions in healthcare, 45% of respondents to a survey said they were positive about the technology, while 40% said that they had a negative view. Overall, 60% of respondents believed that there is insufficient information available to make an informed analysis of RFID technologies.

Moreover, even the question whether RFID can ameliorate the lives of citizens are evenly shared. Some of the benefits of RFID touch upon food safety (identification of allergens, more comprehensive information, easier product recalls), healthcare (prevention of drug misuse, authentication) or supply chain management (fewer stocks-out, better after sales service). On the other hand, the risks, which RFID may encounter are privacy, health and environmental risks.

As for the European Commission's role in the RFID debate, 68% of respondents thought that the European Commission should take a more active role in setting RFID standards, in particular to ensure that standards comply with "European cultures and values".

Under the auspices of the Portuguese Presidency a Conference & Exhibition entitled "The Internet of Things" will be organised in November 2007 in Lisbon, in order to showcase cutting edge innovations and research in RFID as well as to further discuss the existing barriers and concerns with respect to the acceptance of RFID. It should be mentioned, that since its adoption, RFID is still in an incipient stage and it remains far from fulfilling its full potential for citizens as well as the markets.

For more information, please visit http://ec.europa.eu/information_society

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MOBILE COMMUNICATIONS IN EMERGENCY SITUATIONS

Innovations from Austria

AUTHORS
Simon Grasser works for Carinthian Tech Research AG, an Austrian R&D firm.
Carmen Hafner and *Jürgen Thierry* are researchers at the Department of Medical Information Technologies of the Carinthia University of Applied Sciences.

"The objectives of emergency medicine are to rescue lives and to limit the extent of injuries to accident victims. Emergency physicians analyse the accident situation, decide the best first aid procedures to implement on-the-spot and select a hospital for immediate follow-up care. Legal emergency accident protocols are usually completed by hand. This delays, or otherwise makes it virtually impossible, to, establish an optimal chain of therapeutic steps."

These were the conclusions of an Austrian emergency physician (EP) who established contact with us in November 2004. As a university of applied sciences in the field of medical IT, we decided to respond to the challenge. In a matter of about three weeks, we drew up the key project specifications, estimated a budget of approximately 500,000 Euros, located an industrial partner, ilogs GmbH, and secured the participation of Dr. Christian Wutti, the Medical Director of the Department for Emergency and Rescue Services of the Carinthian Chamber of Physicians. After two years of development and field testing, along with a significant amount of related efforts, our research project - known formally as CANIS, for Carinthian Notarzt (emergency physician) Information System - was finalised in July 2007. It is now already in use at several Austrian cities, with marketing undertaken by ilogs.

This article recapitulates some of the key steps in our journey. We believe they may have considerable significance for other such initiatives elsewhere.

DEVELOPMENT TARGETS

The following objectives were established to streamline and buttress the communication process between the partners:

- Development of a unique, Austrian-wide *mobile medical information system to support emergency rescue operations* in order to effectively increase the quality of patients' medical treatment.
- *Reducing the latency time* to the necessary treatment while at the same time *increasing the quality of treatment*.
- Creation and optimisation of a *bi-directional digitally secured information flow* between the emergency physician at the accident site and the corresponding hospital utilising the *fire-and-forget principle*.
- Portable system architecture for the *interconnectivity of different mobile data collection devices* ('off-the-shelf' components) and communication architectures.
- *Contactless identification of the emergency physician* (RFID / Health Professional Card).
- Connection of the *E-card (Electronic Health Card) to support the identification of the patient*.
- Data collection/entry simultaneous to the first aid measures via *speech recognition protocols and data entry*.

IDENTIFICATION OF SYSTEM COMPONENTS

At first, we identified and evaluated principal components of the system: the Central Office for Emergency Response and Notification, the regional hospital information systems (HIS) and key medical equipment (defibrillators, respiration machines) – all of which are equipped with communication interfaces and utilised by emergency physicians. These components communicate over the standard Health-Level 7 (HL7) interface or proprietary formats.

THE E-CARD: STILL TRANSITIONAL

In Austria, the E-Card plays a special (but momentarily limited) role; it is not yet permissible to integrate or read an E-Card for patient identification, because it is not recognised in law as a valid identification card. Thus, a request for the patient's basic data (medications, allergies, etc.) from the HIS based upon the identification of the patient via the E-Card is not yet possible.

Regulatory changes in the pipeline, principally in the shape of amendments to the Health Telematics Law, should bring

more transparency and clarity to this issue. In the future, a digital signature on the E-Card could be used among other things, for example, to identify an emergency physician and provide the foundations for data integrity during transmission.

BENCHMARKING AGAINST THE REST OF EUROPE

The integration of new systems in what remains a heterogeneous IT landscape is unavoidable. In addition to their recognized benefits, there are also possible risks, for example, false patient identification due to lack of machine-readable patient identification.

Given that documentation for medical emergency events in Austria largely involves paper-based emergency patient care report forms (EPCRF), we decided at the outset to research the situation across Europe. After collecting over 70 EPCRFs from 23 European countries, we found that conditions were almost similar everwhere. Yet another interesting result was that EPCRFs not only frequently vary from one country to another, but sometimes there were up to 10 different kinds of EPCRFs in a single country.

DYNAMIC SYSTEM

Nevertheless, further investigation revealed that the information entities within EPCRFs were pretty well structured. This, in turn, led us to seek development of a completely dynamic system, where the GUI (graphical user interface) is created by the underlying database structure.

Given the well-known problems of mobile devices in real working environments, we focused right from the start on designating system usability as a key success factor.

THE EMERGENCY PHYSICIAN – A BEAST OF BURDEN ?

To overcome the commonplace image (and reality) of an over-burdened EP (emergency physician), we performed a range of hardware evaluations to draw up guidelines for mobile hardware platforms. After choosing appropriate platforms, we designed the software user interface – once again entailing different GUIs for different hardware platforms.

This was only made possible due to the dynamic layout of the system. In brief, separating the user interface layout from the software application was, we believe, an important success factor.

Depending on the range of capabilities and cost structures, EPs can determine the ideal IT support combination for their real-life work settings.

MULTIPLE HARDWARE SETUPS

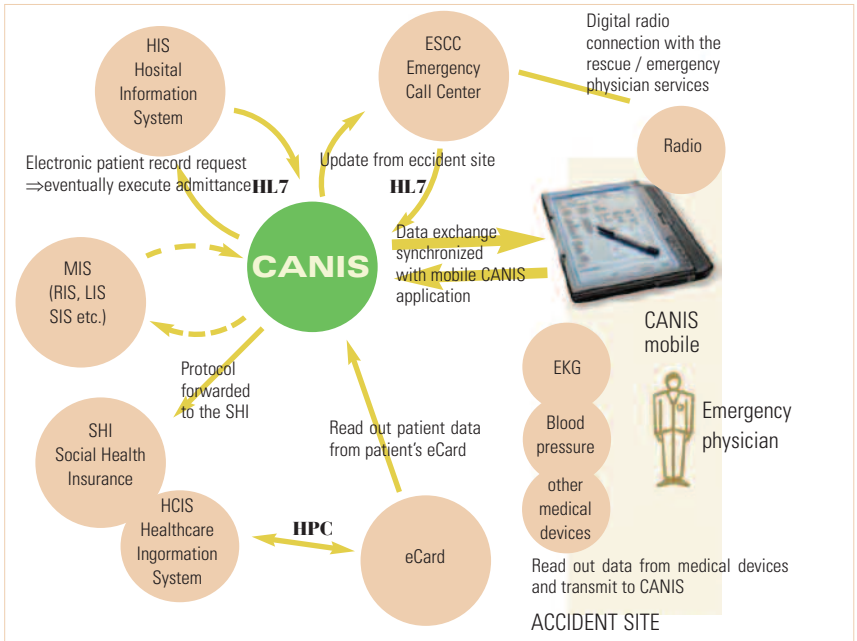
Setup 1 supports the EP with either a Tablet PC, which is mounted in the emergency rescue vehicle (ERV) or via the EP's own PDA.

Setup 2 contains only a Tablet PC. This is either a rugged device carried by the EP to an accident site or mounted inside the ERV. In both instances, EPs can enter data via voice.

Setup 3 focuses on the PDA as a carry-on device, including speech recognition.

Setup 4 is an extension of Setup 1. It provides a choice of Tablet PC or PDA, plus electronic data acquisition through a

System environment of the mobile emergency system



CANIS: PROJECT PARTNERS

- Carinthia University of Applied Sciences, School of Medical Information Technology (Dipl.-Ing. Simon Grasser)
- ilogs GmbH (Managing Director Dr. Walter Liebhart)
- Carinthian Chamber of Physicians (Medical Director Dr. Christian Wutti, Department for Emergency and Rescue Services)
- The project is supported by the Austrian Research Promotion Agency (FFG)

www.fh-kaernten.at/canis

digital pen or speech recognition. [The application of a digital pen is recommended, with speech recognition seen as an option].

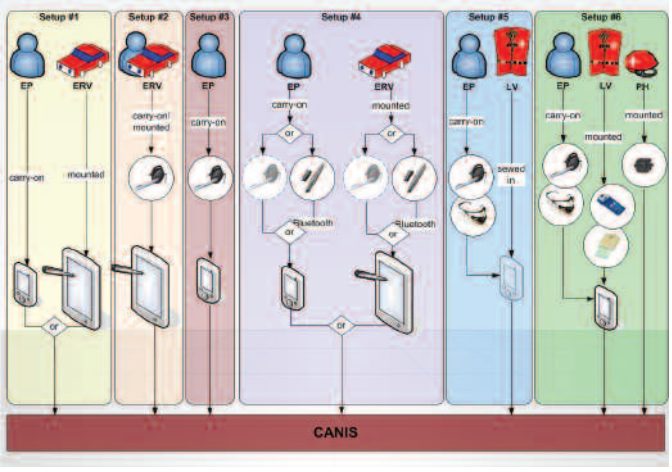
Setup 5 entails a hands-free approach, with the PDA body-mounted or sewed into the EP's suit. This, however, prevents a user from receiving visual feedback directly from the display. To solve this, a wearable VGA computer monitor (Head Mounted Display [HMD]) is being introduced, on which the content of the standard display is projected.

Setup 6 additionally equips the EP with two card readers (RFID, Smartcard) in order to be able to identify the EP or the patient, as well a tiny wireless camera. This camera is mounted on the EPs helmet and enables the taking of photographs of both the accident scene as well as the patient, which increases the value and quality of documentation.

FINETUNING TO REAL-LIFE IN THE REAL WORLD

The final choice of equipment specifies displays which are easily read in different real-world lighting conditions and equipped with all necessary communication components (GPRS/UMTS, GSM, Bluetooth). Also mandatory is a battery duration for over 8 hours, warm battery swap features and a high (military-grade) protection MIL-STD 810F.
The system is now live, and crucially, avoids the need for dedicated training of EPs.
This, in turn, is a direct result of the usability tests and research efforts undertaken from the outset. An increasing number of supplemental systems and devices are now online and we have completed the first field tests with speech recognition capabilities.
Though paper-based EPCRFs are widely used all over Europe, the next years will lead to a change as more countries move to an electronic solution to increase the efficiency of the process and enhance the quality of emergency medical treatment.

Six different hardware setups for emergency scenarios



THE US HEALTHCARE SYSTEM

In June 2003, a landmark study in the New England Journal of Medicine showed that American adults received appropriate medical treatment only 55% of the time (or just about once on every two occasions).

In the years since, a private organisation called The Commonwealth Fund has routinely conducted an X-Ray of expert perspectives about the US healthcare system. In the form of a survey of a cross-section of opinion leaders, its views are held in high regard not only by healthcare professionals but also by lawmakers and the media. The Fund is chaired by Dr. Samuel O. Thier, a respected professor at Harvard Medical School and former president of Partners Healthcare System and the Institute of Medicine.

The latest (11th) Commonwealth Fund Health Care Opinion Leaders Survey finds that the current US health system is neither achieving, and moreover, does not seem to be designed to encourage high quality.

By and large, Europeans tend to look wistfully across the Atlantic to the US as The Place for Healthcare Technology. Ironically, some of the Survey's key conclusions seem to suggest that Americans, on their part, are looking at Europe in just such a light.

Responses to the Commonwealth Fund Survey indicate strong support for a greater leadership role by government, the creation of a new public–private entity to boost quality, reforms in payment mechanisms for healthcare providers as well as steps to promote medical homes – in other words, various aspects of what passes for the archetypal continental European model.

Of European Models, Lessons and Enhancing Healthcare IT

AUTHOR
Tosh Sheshabalaya, HITM

One of the Survey's findings was that just 19 percent of primary care doctors in the US have advanced information capacity in their practice, compared with more than 80 percent in both the Netherlands and the United Kingdom.

Indeed, accelerating the adoption of healthcare IT is seen in the US as the best way to deliver efficient, high-quality and cost-effective healthcare. Other strategies for improvement include public reporting of providers' performance on quality-of-care measures, alongside financial incentives for improved care. Some of these steps, as we described in the previous issue of Healthcare IT Management, are already being methodically implemented in the Netherlands.

On the other hand, few believe that legislation can improve patient safety. In 2005, the US Congress passed the Patient Safety and Quality Improvement Act, which calls for a new system of voluntary and confidential reporting of "patient safety events".

By a massive margin, healthcare leaders doubt the efficacy of such legislation – no more than 7% believe the Act will improve patient safety. More interestingly, 60% of respondents believe that information about patient safety events should not be confidential.

CHALLENGES TO BOOST HEALTHCARE IT IN THE US

By a large margin, healthcare opinion leaders see healthcare IT as the key to improving quality and safety. Advanced health information systems, providing decision-support tools and enabling clinicians to monitor and assess care, can improve outcomes and foster more innovative, efficient use of resources.

The main challenge to expanding healthcare IT is cost - of implementation and operations. In several cases, healthcare providers receive only a small share of the financial benefits derived from greater adoption of healthcare IT. The bulk of the benefits is instead passed on to payers.

The Survey also found that large practices were far more likely to use EHRs (electronic health records) than small practices, which often lack the requisite infrastructure, funds and other resources. As a solution to this, 70% of respondents said that the federal US government should play a leading role in assisting providers with healthcare IT financing, while almost six of 10 felt that linking pay-for-performance bonuses to the use of healthcare IT would directly help providers pay for the technology.

Strategies to Improve Healthcare in the US

- Accelerating adoption of healthcare IT: 66%
- Public reporting of provider performance on quality: 59%
- Financial incentives for improved quality of care: 51%
- Stronger regulatory oversight of providers: 50%

Source: Health Care Opinion Leaders' Views on the Quality and Safety of Health Care in the United States. Katherine K. Shea, Anthony Shih, and Karen Davis, The Commonwealth Fund, July 2007.

90% of respondents believed a good way to kickstart such a trend would be to compel Medicare, the largest purchaser of healthcare services in the US, to require use of EHRs by all providers participating in its programmes.

For smaller physician practices, respondents suggested that the best way to optimise healthcare IT investments would lie in networks for the exchange of patient information across providers and provider settings.

And although mushrooming, none of the current plethora of emerging health information exchange networks (HIENs) have established operational or business models. 42% of respondents thought that it would be up to the US government to help finance the development and maintenance of HIENs, while over half (52%) said that private insurers/payers should be mandated with this responsibility.

Patient ID and Security Systems

ECRI Institute, a non-profit organisation, dedicates itself to bringing the discipline of applied scientific research in healthcare to uncover the best approaches to improving patient care. As pioneers in this science for nearly 40 years, ECRI Institute marries experience and independence with the objectivity of evidence-based research.

ECRI Institute
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ECRI's focus is medical device technology, healthcare risk and quality management, and health technology assessment. 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 and accrediting agencies worldwide. Its databases (over 30), publications, information services and technical assistance services set the standard for the healthcare community.

More than 5,000 healthcare organisations worldwide rely on ECRI Institute's expertise in patient safety improvement, risk and quality management, healthcare processes, devices, procedures and drug technology. ECRI Institute is one of only a handful of organisations designated as both a Collaborating Centre of the World Health Organisation and an evidence-based practice centre by the US Agency for healthcare research and quality.

For more information, visit www.ecri.org

	ECRI-RECOMMENDED SPECIFICATIONS
MODEL	**Patient ID and Security Systems**
WHERE MARKETED	
CE MARK (MDD)	
APPLICATION	
Configuation	Stand-alone and central station preferred
SIGNALING TAG	
Configuration	Wrist, ankle preferred
Transmission type	RF preferred
Active or passive	Active preferred
Frequency, MHz	System defined
Range, m (ft)	System defined
Pulses/ sec	System defined
WxL, cm	
Weight, g (oz)	
Operating time, months	>12 preferred
Rechargeable	Optional
Low-battery signal	Preferred
CENTRAL MONTINORING	Preferred
Patient capacity	User preference
Location(s)	At least at nursing station
Hardwired/wireless	User preference
STAND-ALONE SYSTEM	Preferred
Location	Optional
Range, m (ft)	User preference
Hardwired/wireless	User preference
Faceplate	Steel is preferred
Alarm response	Minimum audible
Display	User preference
WxL, cm	
REMOTE ANNUNCIATOR	Optional
Patient capacity	User preference
Faceplate	Steel is preferred
Display	User preference
WxL, cm	
MOBILE LOCATOR	Optional
Range, m (ft)	User preference
EMERGENCY RESPONSE	
Programmed calling	
Responders called	
Answer detection	
Termination of calling sequence	
Manned relay center 3rd-party patch-in	
Confirmation of patient location	
Staff register	
Staff/patient follower	
ALARMS	Required
Priority levels	
Distinct audible tones or visual	Multitone is preferred
STAFF BYPASS	
Type	User preference
Time allotted, sec	
Reset options	
HOLD/ RECALL BUTTON	
INTERFACES	
SUPPLIER FOOTNOTES	These recommendations are the opinions of ECRI's technology experts. ECRI assumes no liability for decisions made based on this data.

CARE ELECTRONICS	CODE ALERT	PROSEC	RF TECHNOLOGIES
PatientCARE WANDERER MONITORING SYSTEM	**CA 9450 WANDERER MONITORING SYSTEM**	**RoamAlert**	**SAFE PLACE 9450 INFANT AND CHILD SECURITY**
Worldwide	Worldwide	USA	Worldwide
No	Not specified	Yes	Not specified
Wandering, elopement	Wandering, elopement	Wandering patient (adult/pediatric), asset protection, real time location, staff location and duress	Infant, child
Stand-alone door with wireless remote annunciator at nurses' station	Stand-alone, central monitoring	Stand-alone or networked door and elevators, central station with remote annunciation or workstation	Stand-alone, central monitoring
Wrist, ankle	Wrist, ankle	Wrist, ankle, umbilical-cord clamp, asset, staff	Wrist, ankle
RF	RF	RF (tag ID, detection, tag tamper, location, low battery)	RF
Active	Active	Active	Active
433-450	262KHz	433	318; 262 kHz
0.6-3.7 (2-12)	1.2 (4)@262 KHz	4 (13)	9 (30) @ 318 MHz; 1.2 (4) @ 262 KHz
1	1	16	10/min @ 318 MHz; 1 @ 262 KHz
3.8 x 3.8	3.8 x 5	2.8 x 2.5	3 x 4.1
28.4 (1)	45 (1.6)	10 (0.4), cord	20 (0.8)
48	36	36, standard	12
No	No	No	No
Optional	No	Yes	Yes
Optional	Yes	Yes	Yes
50/64 doors	User-configured	Unlimited	240
Not specified	Nursing station, door triggers	Nurses station, security (up to 100 workstations)	Nursing station, door triggers
Wireless	Both	Both	Both
Yes	Yes	Optional	Yes
Wall	Door	Ceiling	Door
0.6-3.7 (2-12)	Not specified	Selectable	Not specified
Wireless	Both	Both	Both
ABS case	Cold-rolled steel	Steel screw-down	Steel surface/ flush
Audible, visual	Audible, visual	Audible, visual	Audible, visual
LCD	LED	LED	LED
2.5 x 7.8	22 x 13	17 x 28	22 x 13
Optional	Staff-alert panel, Quick-Look Display	Yes	Staff-alert panel, Quick-Look display
50	User-configured	Unlimited	Not specified
Not specified	Optional	Plastic	Optional
LED	Optional	LED	Optional
Not specified	Not specified	11.5 x 11.5	9.14 x 28
Optional	No	Optional	No
61 (200)	NA	9.1 (30)	NA
No	Yes, paging	Optional	Yes, paging
NA	Yes	Optional	Yes
NA	No	Optional	No
NA	Yes, when reset	Optional	Yes, when reset
No	No	Optional	No
No	Yes	Optional	Yes
No	Not specified	Optional	Not specified
No/ No	Yes/ Yes	Optional	Yes/Yes
Parameters adjustable by user at door unit	Door, elevator, room, exit, wire damage, hallway, stairs, loss of power	Exit alarm, door auto lock, open door or breach of door, tag tamper alarm, battery low, tag location message, missed tag pulse, transport timeout, network node status alarm, others	Door, elevator, room, exit, signaling tag, wire damage, hallway, stairs, loss of power
Not specified	3	User, supervisor, team leader, administrator	3
Audible tones, visual	Colored lights	Visual, custom audible tones	Colored lights
Yes	Yes	Yes	Yes
Key, bypass transmitter	Keypad	Transport function, keypad, staff tag, or interface to access control system	Keypad
7 after release of transmitter button	12 choices from 10-120 sec in 10 sec increments	Variable	13 choices from 10-120 sec in 10 sec intervals
Key switch	Keypad	Automatic or manual	Keypad
Yes	Not specified	No	Not specified
Door locks, nurse call, wireless remote annunciator	Dry contact paging, central monitoring system, voice alarm, Emergin	Fire alarm, door, 2 relay contacts, elevator, access control, CCTV, card readers, pagers	Paging, central monitoring system, voice alarm, Emergin

	ECRI-RECOMMENDED SPECIFICATIONS	SENIOR TECHNOLOGIES	VERICHIP
MODEL	**Patient ID and Security Systems**	**FirstQ**	**HALO Infant Protection System**
WHERE MARKETED		Worldwide	Worldwide
CE MARK (MDD)		Yes	Submitted
APPLICATION		Wandering, elopement	Infant, wandering
Configuation	Stand-alone and central station preferred	Stand-alone door	Stand-alone door/elevator, central station, networked with multiple consoles, remote annunciator
SIGNALING TAG			
Configuration	Wrist, ankle preferred	Wrist	Arm, leg, umbilical cord
Transmission type	RF preferred	Near-field RF	RF
Active or passive	Active preferred	Active	Active
Frequency, MHz	System defined	300	433
Range, m (ft)	System defined	2.4 (8)	15 (50)
Pulses/ sec	System defined	13	10
WxL, cm		2.7 x 3.2	3.5 x 3.4
Weight, g (oz)		11 (0.4)	13 (0.5)
Operating time, months	>12 preferred	3, 12	12
Rechargeable	Optional	No	No
Low-battery signal	Preferred	No	Yes
CENTRAL MONTINORING	Preferred	No	Yes
Patient capacity	User preference	NA	Unlimited
Location(s)	At least at nursing station	NA	Nursing station and security
Hardwired/wireless	User preference	NA	Hardwired
STAND-ALONE SYSTEM	Preferred	Yes	Optional
Location	Optional	Door	Ceiling
Range, m (ft)	User preference	2.4 (8)	15 (50), receiver
Hardwired/wireless	User preference	Both	Hardwired
Faceplate	Steel is preferred	Plastic screw-down	Steel
Alarm response	Minimum audible	Audible	Audible, visual
Display	User preference	No	CRT/LCD/touchscreen
WxL, cm		NA	17.8 x 24.1
REMOTE ANNUNCIATOR	Optional	Optional	Optional
Patient capacity	User preference	User-configured	Not specified
Faceplate	Steel is preferred	Plastic screw-down	NA
Display	User preference	LED	Not specified
WxL, cm		Not specified	Not specified
MOBILE LOCATOR	Optional	No	No
Range, m (ft)	User preference	NA	NA
EMERGENCY RESPONSE			
Programmed calling		NA	Varies with nurse call
Responders called		NA	Varies with nurse call
Answer detection		NA	Varies with nurse call
Termination of calling sequence		NA	Varies with nurse call
Manned relay center 3rd-party patch-in		No	Varies with nurse call
Confirmation of patient location		No	Varies with nurse call
Staff register		No	Varies with nurse call
Staff/patient follower		No/ No	Varies with nurse call
ALARMS	Required	Auto lockdown, prealert, EMI	Skin contact sensing alarm, door auto lock, open door, EMI, breach of door, antenna tamper, in-service tamper
Priority levels		Normal	2 (warning, full alarm)
Distinct audible tones or visual	Multitone is preferred	1	Visual, custom audio tones
STAFF BYPASS		Optional	Yes
Type	User preference	Key, code	Keypad, card access integration
Time allotted, sec		20	Variable
Reset options		Push-button, key, digital keypad	Automatic or manual
HOLD/ RECALL BUTTON		No	No
INTERFACES		Fire alarm, CCTV, elevator, door locks, pagers, nurse call	Fire alarm, door, 2 relay contacts, elevator, access control, CCTV, card readers, pager, others
SUPPLIER FOOTNOTES	These recommendations are the opinions of ECRI's technology experts. ECRI assumes no liability for decisions made based on this data.		

THE LEGACY SYSTEMS CHALLENGE

HEALTHCARE IT MANAGEMENT
ANALYSIS

Over the past decades, European e-Health projects have principally focused on research and development. Some have also been demonstrated on a large scale through programmes like eTEN. However, many are now close to real-life deployment and use, and the European Union's e-Health Action Plan has become a central plank of its broader i2010 strategy.

According to interviews and briefings conducted by HITM with healthcare IT managers in a variety of EU countries, legacy systems may pose challenges for the European Union's e-Health vision to become a reality.

A robust European e-Health infrastructure will need to distribute and deliver personalised healthcare on demand, and do so in real-time.

Two factors will determine whether this is achieved, sustainably and efficiently.

First, all healthcare IT systems must be able to communicate with each other, and do so all the time. Second, they should also interact seamlessly with new devices – such as wireless transmission, speech-recognition and radio frequency identification (RFID), portable input/access terminals and mobile lab units – as well as emerging technologies like patient biomarkers and smart devices which are directed at enabling home-based, on-demand care.

DISPARATE SYSTEMS AND INFRASTRUCTURAL BOTTLENECKS

Such a scenario is, however, not straightforward.
Even now, it is common to find different departments of hospitals having their own IT systems and databases. As a result, internal communications can still be confined to paper printouts - and some physicians, at least, seem to prefer it that way. More problematic is the fact that small differences in spelling or address make production of a single electronic record for each patient or customer immensely time-consuming.

These bottlenecks must be sorted out to meaningfully tackle issues of convergence and seamless interaction with emerging – and future - e-Health era technologies. The reason: the back-end of the EU healthcare infrastructure is evidently crucial for an end-to-end e-Health solution. However, such a back-end is often based on proprietary legacy systems, and then again, not rarely, in the shape of relatively-elderly mainframe computers.

Although robust, legacy systems are limited in terms of modern functionalities and connectivity. They were designed for an era when processing power was a premium product rather than the commodity it has since become. They operate within what the IT industry terms isolated "silos". While a variety of technological workarounds (above all in the shape of middleware) have build gateways into such silos, very few can predict whether they will cope with the explosion of real-time data access/transfer requirements of a distributed, real-time e-Health environment.

Users have also been occasionally hit by withdrawal of support for platforms considered non-profitable, or squeezed by escalating license and support costs. Some have also been caught on the wrong side of a paradigm shift in technology. This was the case with minicomputers in the early 1990s. A more recent case was Hewlett-Packard's decision in 2002 to drop its popular 3000 series, after its proprietary MPE operating system began losing market share to rivals. Caught unawares were 2,000-odd users in Europe (including several hospitals). Some had installed 'new generation' HP e3000s – enticingly upgraded with new processors - barely months previously.

OF FAMILIARITY AND COMFORT FACTORS

So far, responses to legacy IT challenges have been ad-hoc. In several instances, they are driven by vendors and the momentum of technology, rather than the needs of users. Nor have most of the responses involved a realistic assessment about the scale and expected impact of underlying legacy IT problems, or even sought to learn from the experience of other healthcare IT manager peers.

Indeed, despite their shortcomings, several facilities have found compelling reasons to maintain their legacy IT systems.

Legacy IT systems represent a significant investment. Moreover, they are robust and deliver – and do this at least for present-day needs; these, of course, remain the highest priority for hard-pressed IT managers. The incentive for inaction is highlighted further when we consider that in Europe, most healthcare IT managers are considered (and view themselves as) risk-avoiders. Although some IT users see replacement of legacy systems bringing platform- and vendor-independence, many remain apprehensive about scalability, and above all, system stability.

Legacy systems often house mission-critical information, which requires near-100% availability. This means that the IT system cannot be taken out of service for modernisation.

Meanwhile, the cost of designing a modern IT system with similar availability levels is seen to be (sometimes-prohibitively) high, especially when managers have to struggle for budgets in an era of organisational consolidation and financial pressure. Such factors can have serious consequences. For example, a study published in the *Journal of the American Medical Association* ('Physician Order Entry Systems in Facilitating Medication Errors'. JAMA. 293,10: 1197-1203) reported how a computerised practitioner order entry (CPOE) system installed at an academic hospital resulted in no fewer than 22 types of medication errors, due to poor system design.

'The demands of e-Health will be at least as strenuous as those facing banks and industrial corporations.'

IT managers also see their legacy application as the result of decades of progressive refinement, and the accumulated wisdom of a generation of workers about the rules that run their organisation. Adding to barriers to change here is the fact that refinements are usually undocumented. Some are believed to be critical – and cannot be easily deciphered or replicated.

Another major hurdle is cultural. Changeovers face resistance as they require redrawing of turf and relative positions within internal hospital staff hierarchies. In a commentary for the Spring 2007 issue of *Healthcare IT Management*, the CIO of France's Arras Hospital noted that a legacy systems overhaul at his hospital was "a major undertaking in its own right" and did not seem viable "without a parallel re-structuring of the organisation's internal processes and a change in its culture."

Vendor relationships, too, encourage the status quo. As a 2004 study by market researchers Frost & Sullivan determined, established vendors tend to have a distinct advantage, due to strong relationships with hospitals which continue to depend on legacy systems. Most hospital IT departments, furthermore, believe they do not have the funds required for modernising legacy systems, according to the study.

WAYS OUT, AND AROUND

One of the instinctively-favoured solutions for legacy IT problems, to re-engineer the system in a Big Bang modernization, has begun to show evidence of serious limitations in large-scale environments like healthcare.

In the UK, for example, the ambitious multibillion pound program to modernise the IT infrastructure of the National Health Service (billed as the world's largest civilian IT project), has run into serious difficulties; this has been discussed in a previous issue of *Healthcare IT Management*. More recently, modernising two legacy systems at Britain's Barnet and Chase Farm Hospitals trust saw patients receive wrong appointment letters. According to Alex Nunes, a patient representative, the Trust had been sending appointment letters "to people who haven't got appointments and for people who should have appointments it hasn't." Mr. Nunes said he saw someone really shaken by being wrongly called for major surgery. Misdirected letters, he added, could result in people not getting the treatment they actually need.

Some IT managers have sought solutions which do not necessitate replacement of legacy systems. They have instead moved on a hybrid route - keeping the procedural component of the legacy system in a source code format while migrating data, or by replicating functionality in core systems with downstream systems or interfaces that bypass primary processing rules, among them GUI (graphic user interfaces), datawarehousing and a variety of bespoke systems – such as rewriting part of the legacy code for new platforms.

The outcome is again not always desirable: two incompatible cultures within the hospital IT staff – one in modern e-health/e-business and Web initiatives, and the other, in existing legacy system administration. This problem is compounded because of the sometimes uncoordinated nature of transitional measures with what one IT manager observed was a "nightmarish" mix of isolated client-server and customized packaged applications.

BEYOND HEALTHCARE: THE LEGACY 'TICKING TIME BOMB'

Legacy challenges apply to other sectors, too. Certain banks in the European Single European Payments Area (SEPA) have found their legacy systems cannot accommodate extra information such as IBAN (International Bank Account Number) and BIC (Bank Identifier Code), and a senior EU Commission official has publicly warned that some may well miss the SEPA deadline "and even also fail to stay in business."

In the wider industrial/corporate area, a survey in summer 2006 by Britain's National Computing Center concluded that legacy IT systems were a 'ticking time bomb'. Four out of 5 of the companies in the survey reported that a lack of (legacy) system agility made it difficult to align IT with business objectives, and over 60 per cent believed there was a negative return on investment (RoI) in the maintenance of legacy systems.

The demands of e-Health will be at least as strenuous as those facing banks and industrial corporations. Clearly therefore the key to building a dynamic and viable e-Health infrastructure will depend on quantifying, understanding and finding solutions for the challenges accompanying hospital legacy IT systems.

A final threat is the expected decline in the availability of legacy IT skills. Even as the bulk of legacy programmers in Europe approach retirement age, legacy languages are no longer on the curricula of IT training institutes. Recently, according to one of our interviewees, there have been moves in the UK to reintroduce legacy IT language courses, especially Cobol, at Oxford Brookes University and the University of Central England.

TECHNICAL CHOICES FOR LEGACY IT PROBLEMS

GATEWAYS

One of the simplest workarounds is to wrap legacy data in gateway software such as Sun Microsystems' Java Database Connectivity (JDBC) or Microsoft's Open Database Connectivity (ODBC). Some users seek to wrap not just data but also the business rules of legacy systems through the Common Gateway Interface (CGI) - a bridge between external applications, information servers and legacy systems.

RE-ENGINEERING APPLICATIONS

This involves the rewriting of applications from scratch, using the latest tools and technologies, converting all data structures and subsequently the data itself, along with its business logic. In an ideal world, where applications are small and there is ample staff and money, the re-engineering option is attractive. Even in some large-scale projects, where original application code has run out of control over decades, this is sometimes the clearly preferred option.
However, for the large majority of applications, re-engineering is the most expensive and least successful route. Understanding complex business rules and algorithms contained within a system, especially without access to the original programmers and system architects, is a tough call at the best of times. In the real world, yet another problem is that requirements are themselves changing and may have mutated into something new by the time the re-engineered application is ready to go live.

PACKAGE IMPLEMENTATION

For generic applications, a popular option is to integrate a package like SAP, Oracle etc. Indeed, many legacy applications are considered to be generic - for example, accounting, manufacturing, human resources etc. In addition, since package vendors have a large customer base with millions of dollars invested, they have sought to stay compatible with customer legacy IT architectures.

As a result, they have not completely redesigned applications but instead wrapped existing code to be invoked by industry-standard component models such as CORBA (common object request broker architecture) and COM (Component Object Model).
Package implementation also confronts other problems. They require modifying of a user's specific business practices. This is usually entrusted to in-house programmers, who make the necessary changes.

However, follow-on changes are once again entrusted to the in-house team, rather than a vendor, for all new releases of the package. As a result, hospital IT staff end up with increasing maintenance responsibility.

Meanwhile, those who have chosen packages, but decide not to upgrade to new releases (or versions), face another major risk – withdrawal of support by the vendor for older versions. Oracle, for example, has stopped technical support for all its Version 10 applications.

MIDDLEWARE AND EAI

Middleware or Enterprise Application Integration (EAI) tools go one step further. They employ methodologies such as object- and component-orientation; they are run on Web servers which utilize object architecture like CORBA, EJB (Enterprise Java Beans) or COM.
Like CGI, middleware/EAI also faces a steep increase in (permutational and combinational) complexity as new devices are incorporated into the IT system. This is expected to be a result of e-Health and other previous infrastructural modernization programs; their scale is expected to only grow with time.

In an analysis of EAI, the 'Economist' warned : EAI "is expensive, and so far it connects only a limited set of applications. But its biggest disadvantage ... is that it does not provide the flexibility of changing business processes in real time."

MIGRATION/TRANSLATION

Migration involves the transfer and redeployment of current programs on to alternative, less expensive hardware platforms. However, there are often significant hidden costs. Migration also rarely provides extra functionality, which is not seen as its essential objective.

A related option is to translate existing legacy IT applications to current-generation programming technologies such as Java/J2EE or Visual Basic/DotNet. A strong argument for migration and translation is not the preservation of data for its own sake, but the preservation of business rules, data rules, process flow, computing resources and application integrity.

XML

XML (extensible mark-up language) is aimed at allowing exchange of information between disparate systems. However, the global IT industry has yet to agree to a set standard for data and field definitions, and there is a continuing lack of browser support and end user applications. It is also becoming likely that only newer IT systems would be designed to comprehend XML; this raises questions about the time and costs required to convert existing legacy databases to XML. In brief, XML is still experimental and not solidified.

TRANSITING HOSPITALS FROM PAST TO FUTURE

The Case of KABEG

Like other countries in Europe, the Austrian hospital and healthcare system faces a period of rapid change, accompanied by a host of new and sometimes-unfamiliar challenges. Managers are being compelled to rethink strategy and policies as a result of changes in the healthcare environment. These, in turn, have been catalysed by market and technological developments, the pressures of an aging population, discussions on healthcare outcomes and quality of care as well as limited financial resources.

In the future, strategic management will be a sine qua non for all hospitals. This applies in particular to IT.

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Obsolete, Heterogeneous Legacy

Until the year 2000, somewhat-obsolete IT systems constituted the bulk of the infrastructure ot the Carinthian hospital system. There was no master plan for IT development. As a result, many solutions evolved in isolation, making further development difficult or, in some cases, impossible.

Due to the diversity of IT sub-structures, there were neither uniform standards nor comprehensive cross-hospital cooperation. The running of hospital IT systems could thus only be maintained with relatively high financial costs and not a little human ingenuity. More crucially, stability of the IT systems began to pose growing challenges, especially in the face of a steep rise in the amount of data generated.

Against this backdrop, an integrated IT strategy was defined for the first time in 2001. This covered all aspects of infrastructure, applications as well as the contours of IT organisation. It was backed up with concrete plans for action. Implementation of the new strategy began immediately.

The Current Situation, Future-proofing

Based on the integrated IT strategy, a large number of projects have been carried out. Their aim has been to provide optimal IT support across the entire hospital activity chain and refocus on the field of medicine and healthcare delivery, in spite of growing legal and administrative demands.

These have resulted in the KABEG group becoming a modern enterprise with state-of-the-art technology.

Today, new technologies are helping to reduce process costs further while guaranteeing the fast and effective processing and management of greatly increasing amounts of data. Due to the forward-looking elements of the integrated IT strategy, such a trend is also expected to continue in the future.

Streamlining the Organisation

In the past, there were five independent IT departments at Carinthia's provincial hospitals. In 2004, a new organisation was established to more efficiently fulfil their IT requirements.

KABEG IT, as it was christened, replaced the previous orientation towards individual hospitals and specialist fields by comprehensive task assignment. An internal organisation thus came into being, providing services for all KABEG hospitals in the form of a Competence Centre. The overriding aim was to deploy existing staff

and resources in the most optimal manner and guarantee scale and synergies for the internal transfer of knowhow.

IT Infrastructure and Applications

The basis for a robust and efficient information technology architecture of course lies in the IT infrastructure. In order to create a stable, secure and extensible IT infrastructure in consonance with the philosophy and practical requirements of the reformed organisation, the entire IT hardware architecture of the KABEG hospitals was renewed and modernised. In addition, its system architecture was standardised, making it possible to optimise the overall IT operation. During the process, a modern storage management was also introduced. This, on the one hand, has permitted coping with the increasing demands for data protection/security and, on the other, to seamlessly enable management of the fast-growing volume of data itself. From the applications point of view, a standard accounting system was implemented on SAP R/3. This covers a wide range of functions, ranging from medicinal requirements and catering management to the classical areas of business operations and enterprise management. As a result, the entire process, from the requirements at the ward level up to commodity management and logistics, is now fully electronic and without interfaces.

Meanwhile, a uniform Picture Archiving and Communication System (PACS) has also been introduced at all hospitals and the laboratory information software (LIS) consolidated. A new hospital information system (HIS), the core system of every healthcare provider, has also been implemented at the largest hospital, LKH Klagenfurt.

Far-reaching measures have also been undertaken in the area of telemedicine. At the moment, teleradiology, telepathology and teleconsultation are all in successful operation, alongside a Carinthian-wide central patient index. The secure electronic dispatch of medical results, coupled to an electronic image data platform, enables information to be exchanged rapidly with general practitioners. This, of course, helps reduce process costs as well as overheads such as postage, paper, visual material etc.

Looking Ahead: Building an Ultra-Modern Hospital

In terms of buildings and physical infastructure, LKH Klagenfurt is divided into so-called pavilions and extends over an area of several hectares. The result is that the organisation is decentralised, the logistics costly and the overall structures somewhat less than optimal.

By the late 1990s, it was becoming evident that the continued operation of the LKH Klagenfurt would exceed financial targets. As a result, the hospital authorities and the KABEG supervisory board began planning a new hospital. In the year 2000, a master-plan for the renewal of LKH Klagenfurt – both on the constructural and organisational sides – was agreed upon. The eventual aim is to create one of Europe's most modern health centres, whose reach would extend far beyond Austria's borders into Italy and Slovenia. The master-plan envisages health provision to the highest standards with state-of-the-art medical structures and high-efficiency operational procedures bringing forth a massive reduction in running costs.

Of course, such a vision also bears directly on the operational procedures of the IT system. New processes and

KABEG: Vital statistics (2005)

Beds	
Acute hospitals	2,724
Hospitals for the chronically ill	278
Throughput:	
Total occupancy	82.14%
In-patients	138,020
Out-patients	551,993
Patient days	816,878
Average stay	5.92 days

organisational procedures have entailed adapting and streamlining the IT structures still further. For this reason, a new integrated IT strategy was adopted at the beginning of 2007.

In such a context, our concerns have not been limited to simply rebuilding LKH Klagenfurt, but also taking account of new realities such as mounting cost pressures, limited human resources, increased demand for mobility, the Austria-wide initiative for introducing an electronic patient record (EPR) as well as the interests of the owners.

In future, it is clear that comprehensive medical care should be delivered as directly as possible to the patients - in their sick-beds, or via telemedicine to their homes – and IT will no doubt be integral to make this happen.

Integrated IT Strategy 2007

The new IT strategy is fully coordinated with business strategy. All future operational procedures in medicine and nursing care will have an immediate impact on the organisation of the IT system. For example, the introduction of medical centres also impacts on clinical and nursing care processes, given the need for streamlining procedures, shortening distances and bringing medical care to the patient.

The IT Competence Centre of KABEG will concentrate fully and purposefully on core processes and core applications, while peripheral areas will be subject to a carefully pre-planned and calibrated outsourcing system. Core areas include PACS (picture archiving and communication system), KIS (clinical information system), EPD (electronic nursing care documentation) and the LIS (laboratory information system). Also included are application support and further development of SAP R/3 . On the other hand, the Call Desk and Field Support are areas which can be outsourced.

As far as infrastructure is concerned, full and comprehensive coverage of wireless LANs, IP Telephony and Thin Clients is being introduced in all hospitals to meet demands for greater mobility. The data centres are being consolidated further, while Terminal Server technology is being applied more extensively.

In future, all applications will be made available directly at the patients' bedsite, while a robust Identity Management system will provide optimal workflow procedures notwithstanding the highest levels of data security. New technologies such as radio frequency identification (RFID) are also being introduced. So too is a driver-less transport system; controlled electronically via wireless-LAN, this is expected to result in an optimisation of logistics.

The new IT strategy extends to all hospitals of KABEG. The benefits are dual-edged. On the one hand, while uniformity and homogeneity are guaranteed across the group, smaller hospitals will profit enormously from the scale and other advantages of streamlined new organisational structures and processes.

However, in the final analysis, it is going to be implementation, which will be the cornerstone of the new IT strategy – just as it has in previous years. For this, it is essential to have good, and above all, motivated employees, both in the IT field and in the medical and nursing care areas.

Besides such IT-related considerations, it is in particular, in the field and the real world where KABEG has sought to envision and take concrete measures. These are already bearing fruit today and will make KABEG a modern, flexible and competitive enterprise on the healthcare market.

The KABEG Training Centre

In summer 1993, well before the term cross-disciplinary came into fashion at business schools, KABEG established an inter-hospital Training Centre, as part of the restructuring programme then under way.

The Training Centre provides not only holistic, cross-disciplinary training, but also specialist courses and continuing education for its staff (and occasionally, for those from other provinces in Austria). Towards this, it works in conjunction with a variety of other extra-mural healthcare bodies in Carinthia.

The Centre's over-riding aim is to maintain the quality of professional care and healthcare management at the highest possible levels, and also keep these up-to-date in an ever changing environment.

CISCO AND THE SERVICIO DE SALUD DE CASTILLA-LA MANCHA (SESCAM)

Business Challenge

The Servicio de Salud de Castilla-La Mancha (SESCAM; literally, Health Service of Castile-La Mancha) serves what is perhaps the most emblematic autonomous community of Spain: the windswept La Mancha region which was the backdrop to Cervantes's famous novel, Don Quixote. Delivering healthcare to a population of more than 1.8 million people (according to figures from 2005, making Castile-La Mancha the ninth-largest community in Spain by population and third-largest by area), SESCAM is not, however, 'tilting at windmills'.

In recent years, SESCAM has opted to include market-leading technology in the specification for its new hospitals, and in the last four cases the Cisco® Unified Wireless Network has played an important part in delivering a ground-breaking level of service to patients.

SESCAM initially looked into wireless LAN as a way of replacing pagers, a time-honoured communications system in the medical profession that was becoming outmoded, with something that would offer additional functions such as voice applications.

In addition, the service was keen to introduce new ways of tracking expensive medical equipment and even personnel, including vulnerable patients who might be at risk of wandering away from their wards, without having to install and run a separate network for this purpose.

SESCAM first introduced Cisco Unified Wireless Network at the Hospital General de Ciudad Real (Ciudad Real General Hospital), a 540-bed new-build facility serving the capital of the province of Ciudad Real, with a population of more than 69,000.

The Ciudad Real deployment has subsequently been used as an example–with location-based service improvements to improve the service's awareness of the whereabouts of people and objects–for three other new hospitals, in Almansa, Villarrobledo (both in Albacete province) and Tomelloso (in the province of Ciudad Real).

Throughout these deployments, SESCAM wanted not only to make the most of wireless technology to deliver improved, more responsive services to patients, but at the same time help ensure that security and reliability would not be compromised.

Network Solution

Faced with the impending demise of the pager as a communications technology, when SESCAM started rebuilding the Hospital General de Ciudad Real in 2005, it sought to find a suitable replacement.

Indra Redes, the systems integrator tasked with creating the IT infrastructure for the hospital, wanted to use the latest available technology in building what SESCAM hoped would be a national reference point for healthcare applications. As a result, Indra Redes proposed a Wi-Fi network that would support high-bandwidth and delay-sensitive applications such as voice over IP (VoIP) and video transport.

As a Cisco Gold Certified Partner and former Gold Partner of the Year award winner, with a strong working relationship with Cisco and specialist experience in assembling complete systems, Indra Redes had no hesitation in recommending Cisco technology for the job.

"Our main concern was availability of the network. Communication is critical within our hospitals and we could not afford to have network outages," says Rafael Nuñez, head of communications for SESCAM.

A total of 256 Cisco Aironet® 1131 and 1232 Series wireless access points were distributed across the hospital's six floors, supporting 140 Cisco Unified Wireless IP Phones.

In addition, 450 desktop Cisco IP Phones were connected to the Cisco IP infrastructure.

The hospital-wide wireless infrastructure complements a 720 Mbps, 3840-port network featuring a range of Cisco technologies, including Cisco Supervisor Engines, Catalyst® Series Switches and Cisco routers, in addition to 44 cabling cabinets.

The Cisco Unified Wireless Network also allows SESCAM to configure its Nokia E61-series mobile handsets for dual-mode use. Dual-mode phones are handsets that can connect to the WLAN when on campus for collaboration and business applications but switch to the Global System for Mobile Communications (GSM) cellular network while on the road or, if needed, as a backup.

SESCAM is currently piloting this mode of communication using a single numbering system based on a Cisco IP Contact Center Express platform and mobile numbers integrated into an IP telephony infrastructure supported by a cluster of Cisco Unified Communications Managers.

Although the main purpose of the Wi-Fi infrastructure at Ciudad Real is to replace pagers before they become obsolete and suffer from lack of vendor support, the network overall supports a wide range of medical applications at the point of care, including, for example, the transfer of X-ray and other patient files in digital format to cut down on paperwork.

Here, says Rafael Peñalver, physician and Vice President and General Secretary of SESCAM, "We have reduced the use of film by 90 per cent and the introduction of an electronic patient record system has reduced the overall amount of information by 15 percent thanks to the removal of duplicate records."

The Wi-Fi capability of the network also enables medical staff to retrieve, update, and file patient

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LIZARDS, DUST, AND VACCINATIONS

ICT in the World of Humanitarian Aid

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ICT is vital to the success of disaster relief operations. However, its implementation is fraught with some unusual challenges, especially for Medair, one of the world's handful of ISO 9001-certified humanitarian aid organisations.

Alongside the banks of the Nile in southern Sudan, Medair's Mattias Liesch carefully aims his satellite phone aerial into a cloudy sky. Overcast conditions hamper satphones, but Mattias persists until he receives a reasonably strong signal. His purpose is urgent: to contact UNICEF and coordinate receipt of thousands of measles vaccines for an emergency response. It should be so simple - just one phone call. But this is ICT in the world of humanitarian aid, where little is straightforward.

In much of the developing world, electricity is rare and ICT infrastructures virtually non-existent. A humanitarian NGO like Medair faces staggering challenges to deliver the robust, high-quality ICT capabilities required from an organisation with ISO 9001 quality certification.

Medair's Swiss international headquarters (HQ) are its hub for coordinating field operations, finance, HR, marketing, and ICT. The ICT infrastructure at Medair HQ is similar to those of most international companies in Europe: a managed high-performance network and servers, VOIP telephony, and a Virtual Private Network (VPN).

Despite limitations at field locations, reliable IT equipment and communication is crucial because staff work in areas spread over large regions, and often face dangers to personal safety. Field staff make time-sensitive decisions, communicating both with the Medair team as well as other NGOs and government agencies, reporting to donors, receiving flight schedules and getting up-to-date situation reports. And, of course, staff are thousands of miles away from family and friends, thus relying on emails for personal support.

The best field ICT infrastructures are found in the main country offices, usually in the capital city or a relatively developed hub. They coordinate all field site activities and are generally equipped with broadband internet, and sometimes a landline phone system and mobile coverage. Many, however, face erratic electricity supplies.

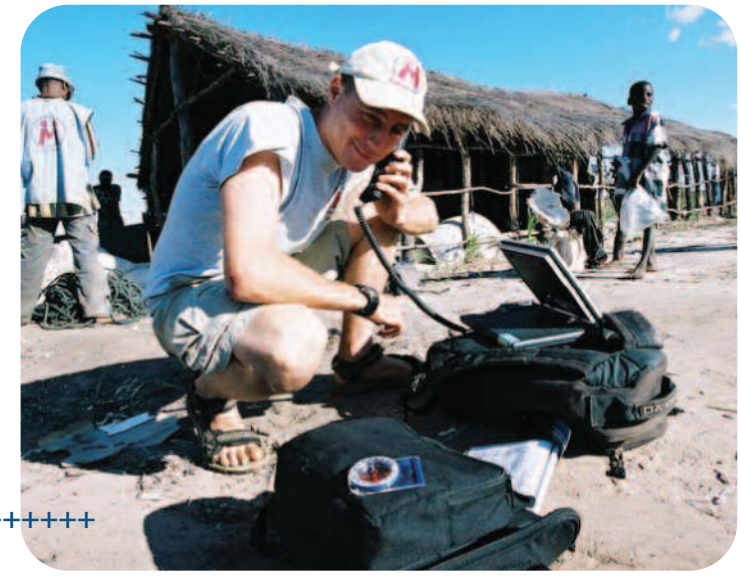

Photo credit: Medair - Odile Meylan

Half-Human, Half-Device

In remote field sites, the ICT infrastructure is a different story altogether. With no grid electricity, diesel generators or solar power provide intermittent supply. However, generators rarely supply sufficiently stable power, while UPS devices, requiring four hours of good quality supply to charge internal batteries, remain unreliable.

As a result, an array of different ICT tools are employed. Visitors to Medair's compound in Payuer, Southern Sudan, might be astonished to see solar panels mounted atop small mud huts, with dust-filled IBM T43 laptops inside and people walking outside with Thuraya satellite phones. As Medair's East Africa ICT manager Willem

van Amerongen said, "Sometimes I really feel like I am 'I Robot.' I walk around with a QMAC, Thuraya, Motorola radio, and laptop. I'm half-human, half-device, and this in a developing country!"

Internet connection is only available via satellite, with connection speeds painfully slow. Satellite phones are also expensive. One tip from Willem: "Don't leave 'Automatic Updates' on. Your bills could be several thousand dollars a month!"

Landlines are virtually non-existent in most remote field sites, and the occasional mobile networks unreliable. While VHF radio frequencies are often allocated to humanitarian NGOs in crisis countries for short-range communications in populated areas, they are open (and therefore insecure) channels.

The environment also poses severe challenges. In a country like Sudan, very high temperatures and frequent dust storms cause havoc. "It is amazing to see how much dust can be stored in a laptop," said Willem.

The types of ICT problems one encounters can be truly unusual. A few weeks ago, Willem received a broken desktop computer from a remote field office, with reports of a big bang followed by smoke coming out of it. "After checking its insides, I saw nothing burned," said Willem. "But I saw that one cooling fan wasn't working anymore. I opened the protection covers and found the problem: a burnt lizard, caught by the blades of the fan. Upon removing the lizard, the computer worked fine again."

The Khaldak Measles Outbreak: Unique ICT Challenges

In August 2007, a deadly measles outbreak struck Khaldak, Southern Sudan, and the Medair team mobilised a response. From an ICT standpoint, there are unique challenges with mobile emergency interventions, due to a raft of unknown, unpredictable variables. The five-person Medair team launched a vaccination campaign, targeted at children from six months to 15 years old. This required extensive logistical coordination, because Khaldak consists of four different villages, with a total population of 19,000.

The communications needs on this project were high, and the stakes nothing short of life and death. "The entire area needed to be mapped," said Heather Dunlop, Medair's team leader. "Local staff needed training to conduct the vaccinations, existing patients needed to be treated, and we needed reliable communications with our management and logistical base in Malakal."

Founded in 1988, Medair (www.medair.org) provides emergency relief and rehabilitation in disasters, crises, and conflict areas, serving the world's most vulnerable in some of the remotest places on earth. With almost 2,000 national and international staff, Medair has dozens of offices worldwide: in Europe and the US, Asia and Africa.
Across the organisation, the range of ICT needs are as diverse as the populations being served.

The base in Malakal has good ICT infrastructure, but in Khaldak, there was neither electricity nor generators, ruling out the use of laptops. The team needed to rely on voice communications for all its logistics, with access to an HF radio, a VHF radio, and a satphone, each of which came with its own specific challenges.

A QMAC HF-90 radio was deployed for daily security radio checks, and for transmitting non-confidential messages. It worked just once. Thick clouds and trees in the compound made it impossible to get reasonable connectivity, while its weight and seven-metre-long antenna made it difficult to move to open spaces.

The lightweight Motorola GP380 VHF is designed for short-range communications, but it was useless at Khaldak, as Medair staff were spread out over large distances. In addition, the Motorolas could only be used for one day, because there was no way to recharge their batteries.

That left the Thuraya SO-2510 satellite phone as the only functional communication device for the Medair team. It had a solar charger and a spare battery. However, the batteries had low capacity and could only be charged in the daytime. Though lightweight and permitting secure communications, the Thuraya is expensive to operate, and must be used outdoors to get decent reception.

Careful Planning and Processes = Results and Rewards

Medair's ICT Specialist Michael Nonweiler reflected on the rewards of doing this kind of ICT work -- which can sound extremely frustrating to outsiders. "We have careful processes that lead to professional results, despite the obstacles. We use good equipment, and make sure there is plenty of redundancy. We also keep the setup and operation of equipment very simple."

"It also helps that all field staff are briefed and trained in ICT before their first assignment. They take direct responsibility for equipment and data, managing power and back-ups on-site, not at HQ or in the country office."

Despite the routine unpredictability of field ICT, it plays such a vital role in ensuring that aid effectively reaches the most vulnerable and helps save lives. In Khaldak, prudent use of the Thuraya helped facilitate coordination of the entire Medair campaign.

"In under two weeks, 3,800 vulnerable children received a potentially life-saving vaccination," said Michael. "Those kinds of results are their own reward."

THE RFID OPPORTUNITY FOR HEALTHCARE

ICT in the World of Humanitarian Aid

RFID (Radio Frequency IDentification) devices have been visibly gaining acceptance across a variety of industries, principally for supply chain management in fast-moving areas such as retailing.

As a relatively later entrant, the healthcare sector has benefited from more maturity in the technology gained from real-world application, the emergence of second-generation (Gen-2 security standards) in passive RFID, a different option in active RFID, and the beginnings of a fall in unit price as the RFID user base has grown.

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Healthcare and RFID

According to some IT industry leaders, healthcare RFID – especially in the area of pharmaceuticals - offers considerable opportunities – given the sensitive role of tracking drugs for product recall.

On the other hand, healthcare also faces some of the greatest legal and technological challenges, for example in the US, in the form of HIPPA (Health Insurance Portability and Privacy Act) which protects patient privacy; as a result, passive RFID-tagged prescriptions must have guarantees that only a pharmacist will be able to read them.

RFID in Hospitals: Initial Concerns

Healthcare RFID applications date back to 2004, when the US Food and Drug Administration (FDA) allowed hospitals to use passive and active RFID to identify patients and authorise access to medical records – in addition to its more traditional application in workflow and stock management.

Shortly after, US hospitals also began to implant ('tag') patients with RFID. However, within months, the FDA warned of very serious risks – including adverse tissue reactions, internal "migration" of transponders, electrical risks and incompatibility with MRI scanners.

Such concerns tempered the takeoff of healthcare industry applications. However, RFID are both passive and active now steadily gaining widespread acceptance – both for tracking supplies and patients at hospitals, and increasingly, as an added layer of security within the hospital infrastructure – in terms of providing physical and network access to staff.

The Sureties of RFID

In terms of patients, the highest receptivity to active RFID has been in maternity wards (given fears of abduction), and for elderly patients – especially those suffering from diseases like Alzheimer's. Indeed, by early 2004, certain US hospitals were claiming up to 60% reduction in patient watches, thanks to RFID.

In 2005, the Boston Globe reported the case of a patient switching beds to be near the window (a common-enough situation in many hospitals). However, she died after the hospital gave her a blood transfusion with her roommate's blood type. The Globe also reported cases of a Florida woman dying after a technician mislabeled her blood sample and a case in St. Louis, where a man underwent successful heart surgery but died in recovery after staff mistook him for someone else and used the wrong blood bag.
The Globe went on to note that transfusion patients today "are 100 to 1,000 times more likely to get the wrong blood than to get the virus that causes AIDS" and that several hospitals sought to improve safety via RFID.

Pilots Set the Stage .....

Indeed, in 2005, many hospitals began swapping bar code bracelets with RFID tags. This was also opportune, as several hospitals were at the time also beginning to implement a wireless infrastructure.

In April, Germany's Klinikum Saarbrücken became one of Europe's first hospitals to launch an RFID pilot which sought to improve efficiency and reduce clinical errors. As part of the project, 1,000 tagged patients were monitored by staff using PDAs and tablet PCs and accessing encrypted patient data on their wireless network.

Nonetheless, implementation of RFID in many other

RFID TECHNOLOGY: AN OVERVIEW

The Product

RFIDs consist of a tag attached to a product with a microchip which contains data about the product, and an antenna which broadcasts this data to a receiver. RFIDs can either be active or semi-active (with an internal power source) or passive (without power); the latter are activated by specific receivers.

In lay terms, RFIDs are futuristic versions of barcodes, and much easier to use – since they do not require a line of sight for scanning. This allows for much swifter product throughput. Indeed, one of its recent definitions is 'The Internet of Things'.

An emerging area is so-called 'chipless RFID'. This allows for identifying tags without an integrated circuit. It is cheaper than traditional RFID and allows tags to be printed directly on to products.

RFIDs are compared on the basis of several parameters. The most common ones are: power output, read distance, receive sensitivity and interference rejection.

Of Spies and Fighter Jets

The roots of RFID allegedly date back to the Soviet KGB's infamous bugs. Though passive listening devices rather than ID systems, there are believed to be strong parallels. There also is a military connection in terms of the IFF (identification friend of foe) transponder systems used by warplanes to this day. However, the first patent explictly using the term RFID dates to the early 1980s.

Current Uses

RFID is already widely used in logistics (for tracking products from warehouse floor to destination), in motorway tolling systems, and above all, in retail shops. US retail giant Wal-Mart is one of the largest RFID users in the world.

In September 2007, Metro unveiled an end-to-end RFID system at its Galeria Kaufhof high-end retail store in Essen, Germany, which fully integrates item-level tagging, supply chain visibility, back room inventory visibility, smart shelves, smart mirrors, point of sale (POS), and theft prevention. In the UK, a pilot project is under discussion for tagging airline baggage, while other similar initiatives are being planned in the US, Singapore and Australia.

Security advantages of RFID are especially strong in areas such as drugs and aircraft spare parts – where counterfeiting is a perpetual menace. Boeing and Airbus plan to store parts' histories on tags, while pharmaceutical firms are considering the use of tags to create secure "electronic pedigrees". In the future, many countries are also planning to use RFIDs in passports and identification documents.

Privacy Concerns

In Europe, there have long been major concerns about privacy – especially in terms of convergence with GSM telephony, GPS satellite positioning and closed circuit TV, which would allow intrusively-rich images of users.

In Britain, demonstrations have been held outside Tesco supermarkets as far back as 2003, when tests were started on RFID tags in Gillette Mach 3 Razor blade packages. In Germany, Metro has faced similar opposition from consumer groups about its use of smart tags in stores.

So far, industry has sought to address concerns about data privacy in several ways. Some firms have propagated self-regulation: to inform consumers about RFID use and assure them that there is no link to personal identity. This is unlikely to be much of a buy-in, since much of industry's push on RFID is post-sale loyalty programs and/or to associate a purchase with a credit or debit card.

Others are looking at more novel approaches. One of these is to mechanically clip the RFID antenna, and thereby reduce its range from 10 metres to 10 cms.

European Initiatives

European RFID users and vendors have recently launched CE RFID, an initiative for 'Coordinating European Efforts for Promoting the European RFID Value Chain'.

CE RFID aims at improving the conditions of competition for RFID technology and its further development in Europe and at reinforcing political environment for RFID at European level. The initiative directly contributes to the Working Group RFID/Logistics within EPOSS - the European Technology Platform on Smart Systems Integration. Members so far principally consist of Austrian and German RFID solution providers.

Efforts are also being made to inform users and the general public. In Germany, a website launched at the end of last year by Informationsforum RFID aims to educate the public about RFID applications in everyday life. Informationsforum RFID is also working with partners in the Netherlands (RFID Platform Nederland) and the UK (National RFID Centre), to increase awareness and acceptance of RFID technology and ensure that RFID projects are implemented in a responsible manner.

existing hospitals has usually been limited to closed-loop applications and there are continuing issues on radio wave interference vis-à-vis other medical equipment as well as difficulties associated with data integration into existing IT networks. Certain IT managers are apprehensive that RFID data could overload their systems, especially if these are centered around legacy systems.

.... for Hospitals of the Future

Others have, however, moved further. At Denmark's Horsens Hospital, all key personnel are now RFID-tracked, and paper and pagers have been wholly eliminated.

Workflow scheduling, for instance on operating theatres, has been directly impacted. AwareMedia, a cluster of flat-panel screens, posts schedules, alongside indicating the presence of physicians, support staff and patients in operating room, recovery room and wards.

Today, many new hospital projects in Europe are taking RFID applications into their building plans – to install receivers at key points and ensure connectivity to wired and wireless networks. These have been covered in previous HITM issues.

The EU and RFID

On its part, the EU Commission has highlighted the promise of RFID, but warned industry to pay more attention to privacy and security.

At the CeBIT Trade Fair in Hanover in March, EU Information Society Commissioner Viviane Reding said that the potential growth of the RFID market was "huge". She estimated a near-15-fold leap from 500 million Euros in 2006 to 7 billion Euros in 2016, and announced the formation of a high-level RFID advisory 'stakeholder group', with representatives from industry and consumers.

Ms. Reding stressed her commitment to avoid 'top-down' approaches and over-regulation on RFID. She said the new stakeholder group would advice her, especially on the RFID aspects of privacy and e-security, and these, in turn, would be reflected in Commission recommendations to Member States.

Last year, a consultation on RFID organised by the European Commission found that the public was under-informed and that concerns about RFID systems – especially with regard to privacy - needed to be satisfactorily resolved to ensure that the technology was accepted and used to its full potential. At that time, Commissioner Reding noted the need for far "greater efforts to explain the risks and benefits of RFID." It is, she said, no longer "just a playground for technologists and lawyers."

Under the European Union's Seventh RTD Framework Programme (FP-7), RFID research is being focused initially on applications in healthcare, intelligent vehicle and mobility systems, micro- and nanosystems, organic electronics and future networks. At a later stage, the Commission intends to boost funding support in areas such as RFID security, and the development of privacy-enhancing RFID protocols and systems.

This is welcome because it shows increasing awareness by the Commission that in the real-world, markets are at least as (if not more) important than technical innovation for its own sake.

In the RFID area, the largest of the EU-funded projects involve seven pharmaceutical and healthcare organisations, using RFID to trace drugs from the manufacturing plant to delivery at a hospital or pharmacy. The project is part of a wider initiative known as BRIDGE (Building Radio-frequency Identification solutions for the Global Environment) – a Euro 7.5 million, three-year project falling under the ambit of the previous Sixth Framework Programme for Research and Technological Development (FP-6), and aimed at driving acceptance of EPCglobal standards in Europe.

EPCglobal, which is leading development of industry-driven standards for the Electronic Product Code (EPC) to support RFID use across different industrial sectors, is a spin-off from the Massachussets Institute of Technology (MIT). With members from the IT, healthcare, consumer goods industries and the US military, it has the continuing involvement on its management team of MIT's RFID pioneer, Dr. Sanjay Sarma.

BRIDGE was created to research, develop and implement tools enabling EPCglobal applications and to drive the acceptance of EPCglobal standards in Europe. It is launching pilots to test EPC Gen 2 RFID in five industries - retail, pharma, maufacturing, logistics and services.

The biggest, known as the Pharma Traceability Pilot, will be dedicated to tracking pallets of medicines from manufacturer to pharmacy, and involves a consortium of manufacturers, packagers and retailers as well as Barts and the London NHS Trust. The first phase of the Pharma Traceability Pilot is due to last until late spring 2008 (March or April) and use both 2-D bar code labels as well as passive EPC RFID tags. The promoters of the pilot state that such a hybrid environment will enable validating the pluses and minuses of each technology.

As the product moves through the supply chain, RFID will be used to document location and ownership, as well as custody– that is, who received them, at what date and time, and when it was shipped out. Some 22 products will be involved in the pilot – and, instead of bulk shipments, they will be packaged in blister packs and other forms of direct dispensing to patients at pharmacies. For comparative purposes, bar codes will also be present, and the pilot will use a network-based system to allow for the storing, access and analysis of data collected.

TELMES

A Romanian Multimedia Platform For Medical Teleservices Implementation

Telemedicine is part of the expanding use of information and communications technology in health care for prevention, disease management, home health care, long-term care, emergency medicine, and other applications. In Romania, the diversification of telecommunication networks and advances in communications technologies, including the Internet, has considerable potential as a medium for telemedicine applications.

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In this context, the National Communication Research Institute (INSCC) has developed a Romanian telemedicine project, Multimedia Platform for Medical Teleservices Implementation –TELMES. The main propose of this project is to implement a scalable medical telecenters network, based on new IT technologies that are available in Romania. It is supported by a grant from the Romanian Ministry of Education and Research.

Secure Transmission and Records Acquisition

TELMES seeks to design a secure multimedia transmission (medical telemetry, digital images, video, and text) and a secure medical records acquisition system, in order to enhance the integrity of a telemedicine consultation.

Its main objective is to enable personalised teleservices delivery and patient safety enhancement based on prior diagnosis with medical telemetry using images, video and text transmissions, and also applying the most-appropriate treatment, according to recommendations from remote medical experts.

The TELMES project intends to enable a diversity of medical staff to provide complex medical teleservices; this could be achieved through a regional telecenters network. Medical teleservices will inevitably become part of the growing trend in Romania for using IT and communications technologies to deliver public services such as e-commerce, e-government and e-health.

TELMES Network Structure

The TELMES network consists of a variety of medical telecenters interconnected within a multimedia platform.
At the moment of writing, we are developing a pilot network with two regional telecenters, located in the cities of Pitesti and Iasi.

The TELMES network has the following main components:

- Medical telecenters
- Network management center
- Medical database

The medical database represents a well-defined data structure for defining and managing all system dates. Each region has a regional database which will contain all patients and doctors resident within the particular region.

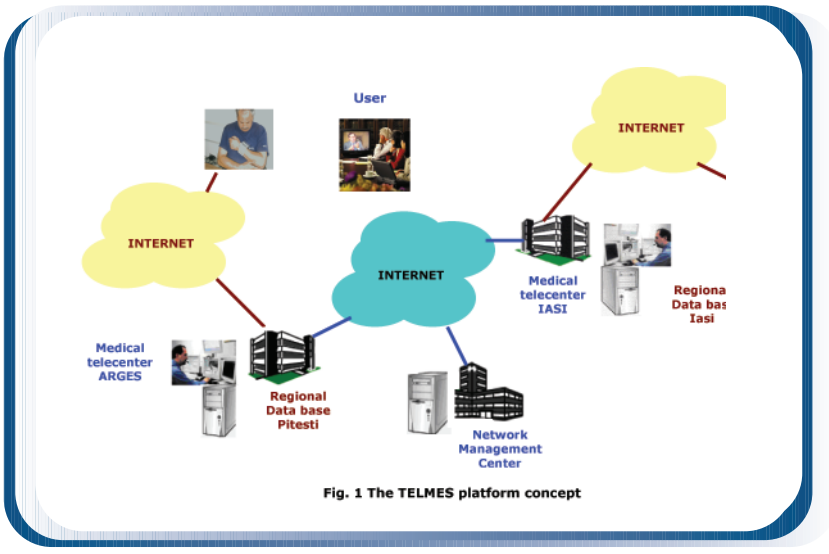

Fig. 1 The TELMES platform concept

TELMES database uses standard SQL for managing data. Because one of the main system architecture requirements has been to define a database independent layer, we are able to interact with different database systems that support standard SQL language.

Applications

From a user point of view, TELMES is especially directed at the segment of general practitioners in order to allow:

- Access to qualified information, by enabling direct cooperation with specialist physicians

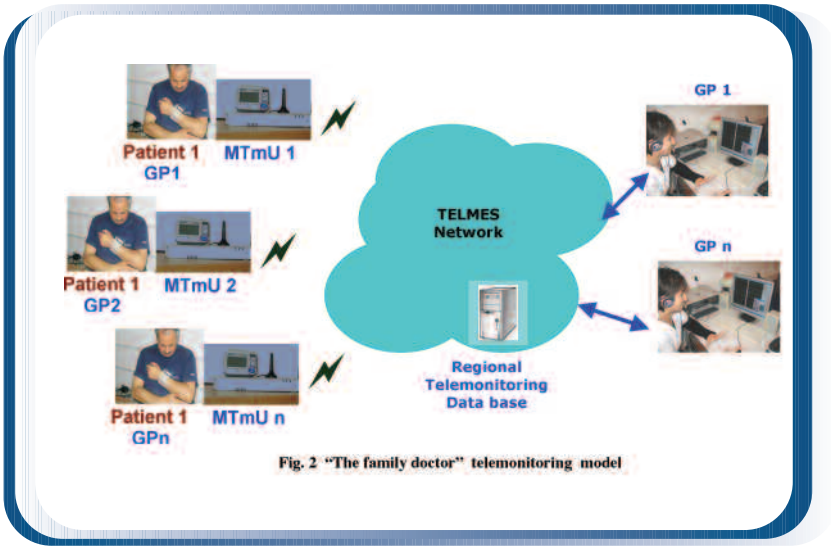

Fig. 2 "The family doctor" telemonitoring model

- Efficient management of chronic illnesses
- Coverage of rural and remote areas

We believe that access to such a tool by GPs or other physicians in rural environments, especially those covering a large area, would permit them to call upon a group of experts through the TELMES telecenter, without a need to move the patients - sometimes hundreds of kilometers away. In our opinion, this would entail real gains for medical practice in Romania.

Teleconsultation Services: Off-line and On-line

Teleconsultation is simply the remote discussion of a concrete clinical case. Answers would be provided to precisely formulated questions for help in the making/acceptance of a clinical decision.

- Off-line teleconsultations comprise a type of remote consultations not involving real-time network communication
- On-line teleconsultation involves real time network communication systems: video, chat, ICQ etc. This type of teleconsultation is used for emergency (urgent) medical care

Teleconsultation services can be used for:

- Determination and/or confirmation of diagnosis
- Determination and/or confirmation of treatment
- Medical care for patients located at considerable distance from medical centers, when geographical distance between the patient and health-care provider cannot be overcome.

Telemonitoring Services

Telemonitoring services represent a set of activities necessary for planning and deployment of medical telemonitoring applications.

Medical telemonitoring is the transposition of distance medical monitoring activities, through a dedicated communication network. Telemonitoring system must comply with the core interoperability principle: "anytime, anywhere, by anyone who is authorised, and in any manner."

The TELMES platform has developed two telemonitoring models: respectively centred on the family doctor and secondly, on rural environments.

The Family Doctor Model

Within the family doctor model, we enable GPs (family doctors), to supervise a large number of chronically patients. GPs have the possibility to connect to the medical regional telemonitoring database (TmDB), which is dedicated to telemonitoring activity, and access their own patient's related information.

Meanwhile, patients will be equipped at home with a medical telemonitoring unit – MtmU. This records the data from specific medical devices used for measurements, stores it in a local buffer memory and then transmits all information to the data base.

The information stored in the buffer memory is locally processed. This means that the values received from the measurement device are compared with the limit monitoring values (which were set by the doctor).

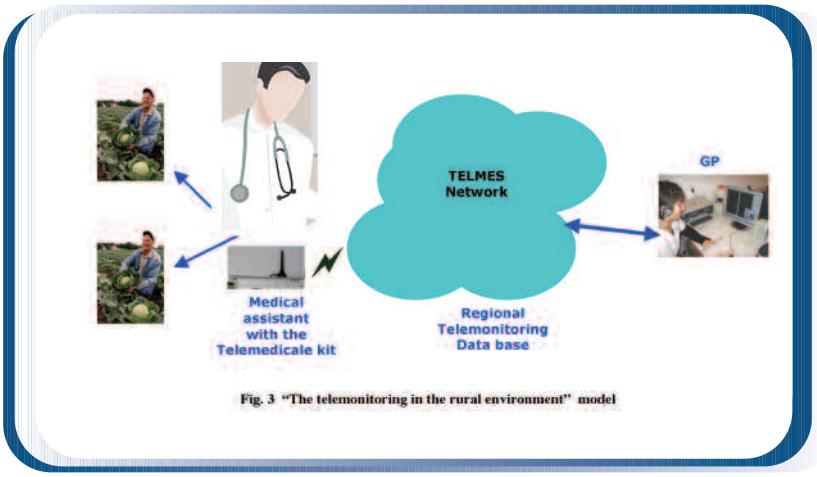

Fig. 3 "The telemonitoring in the rural environment" model

The Telemonitoring in the Rural Environment Model

Within this model, we enable GPs (family doctors) to supervise chronically patients in often-dispersed rural environments. GPs also have the possibility to connect to the medical regional telemonitoring data base – TmDB.

In this model, a medical assistant responsible for a designated rural area is provided with a dedicated telemedicine kit – MTmK – to perform medical measurements and capture data from the specific medical devices. MTmK will store the data in a local buffer memory and desptach data collected from all patients to the regional TmDB.

⋈ *continued from p.25*

records while at the bedside, using a personal digital assistant or tablet PC.

This capability improves accuracy and responsiveness, both important factors in improving care, by cutting out errors caused by handwritten notes and helping ensure updates to patient records are recorded at the same time that they are made.

Ciudad Real's IT infrastructure, completed in 2006, has been so successful that it has served as a model for all of SESCAM's other new hospital projects to date–three so far, in Almansa, Villarrobledo and Tomelloso. With these newer centers, however, SESCAM has updated and improved on the original Ciudad Real blueprint, for example by using more powerful switches from the Cisco Catalyst range.

On the Wi-Fi side, the most important addition at Almansa, Villarrobledo, and Tomelloso has been to introduce location-based services, where the wireless network is used to track people and objects using Radio Frequency identification (RFID) tags. "It saves staff time in finding medical equipment," says Ambrosio Rodríguez, head of Information Technologies. "Previously, there was a danger that precious minutes would be wasted looking for life-saving equipment. Now we know straight away whether the unit or device we need is available, and where to find it."

Business Results

SESCAM has no doubt that the Wi-Fi networks across the Ciudad Real, Almansa, Villarrobledo, and Tomelloso hospitals have added value.

"Even though our hospital personnel were used to using the pager as their main means of communication, we have had a 100 percent success in replacing pagers with IP phones for our medical staff in Ciudad Real," says Rodríguez.

"It was vital for us to find an alternative because pager companies are disappearing, and with dual-mode phones, covering Wi-Fi and GSM, we have been able to completely substitute this outmoded technology. We still have all the functionality of before, plus we voice capabilities in the same device."

Not only have pager messages been completely superseded by short message service texts, but the handsets can also deliver an alarm in the event of a patient requiring assistance, to make it easier to find them.

"Believe it or not, it was not unusual to pay a routine visit to a patient and find nothing but an empty bed," says Nuñez. "If you were lucky, you might find them wandering somewhere around the hospital. Now we can track them all the time and make sure an alarm sounds if they stray too far from where we can provide them with the correct medical assistance."

The Location Solution has also enabled SESCAM to introduce applications such as Guide Me, which tells patients with disabilities which routes they have to take to find their way around the hospital, for example for medical examinations or for consultations with specialists in different locations.

Running VoIP over the Wi-Fi network has helped SESCAM reduce its call costs but, says Nuñez, it was also crucial to have reliability and security.

And its security extends to access to data, which is an important consideration given the need for patient confidentiality and the fact that one of the hospitals is next door to a university, from where students could potentially launch hacker attacks.

"Right now, wireless is one of the most popular technologies for our hospitals because of the range of new services and applications it allows us to offer," says Ambrosio Rodríguez.

Next Steps

Besides the planned extension of the location solution to include the Hospital General de Ciudad Real, SESCAM is continuing to look into new location-based applications, using feedback from medical staff and patients.

In addition, the healthcare provider is committed to including wireless in its future hospital development plans. "Wi-Fi changes the concept of the facility, allowing us to integrate a whole range of functions into a single handheld device, making it far more effective than the simple functionality offered by pagers," says Nuñez.

For More Information

To find out more about Cisco Unified Wireless Networks, go to: *http://www.cisco.com/go/wireless*. To find out more about Cisco healthcare solutions, go to: *http://www.cisco.com/go/healthcare*. To find out more about SESCAM, go to: *http://www.sescam.jccm.es/webl/home.do*.

Product List

Cisco Unified Communications

- Cisco IP Contact Center Express
- Cisco Unified Communications Manager
- Cisco Unified IP Phone 7912
- Cisco Unified IP Phone 7970
- Cisco Unified IP Phone 7960

Routing and Switching

- Cisco Catalyst 6500 Series Supervisor Engine 720
- Catalyst 3750 Series switch
- Catalyst 4500 Series switch
- Cisco 2509 Series router

Cisco Unified Wireless Network

- Cisco 2100 Series Wireless LAN Controllers
- Cisco 1131 Access Points
- Cisco 1232 Access Points
- Cisco 7920 Unified Wireless IP Phone
- Cisco 2700 Series Wireless Location Appliance

Technology Partners

- Nokia E61 dual-mode handsets

THE DATA CHALLENGE FOR E-HEALTH

Patrice Blemont

Questions about healthcare data access and sharing on the one side, and security and privacy on the other, are integral to debates about European e-Health.

In technical terms, there is also a need for data management, issues of data entry, access and storage, and this at a multitude of levels – from patients through doctors through hospital administrators to parastatal organisations and, finally the State. All this is not really final – as there is/will be a need for coordination at both the EU and international levels.
One opinion leader in this context is Patrice Blemont, Director of the Regional Agency of Hospitalisation for the Franche-Comté region in France.

HITM *interviewed Mr. Blemont on his perspectives about the DMP, France's shared medical record project and other e-Health initiatives, especially with regard to the challenging question of databases.*

HITM: France seems to have chosen a 'head-on' approach to facing the inherent health informatics challenges of emerging e-Health programmes and the consequent debate on the complex ethical/legal issues involved. We hear a lot about the projects, but the DMP (the "shared medical record") seems to be one of the cornerstones. What is the current status and timetable for implementation?

Patrice Blemont (PB): After the 2007 Hospital Plan for information technology and the new 2012 Hospital Plan which entails investments in the region of 1.5 billion euros, we can say that France is now clearly en-route towards the modernisation of its healthcare IT systems.
The DMP has been legally ratified since March 2004. It, alongside a variety of other projects such as T2A, the Vitale 2 card, secure remote transmission, etc.; are all catalysts for the process of modernisation.
Some regions such as Franche-Comté contribute a great degree to the modernisation process by virtue of its regional healthcare platforms that serve as the medical data repositories for all healthcare professionals in a certain region.
The implementation of a regional platform is integral to providing patient care continuity. It is a necessity within each region and its organizations, to prevent any interruption to the sharing of medical information between healthcare professionals.

HITM: Do you agree with some assessments of France's hospital IT expenditure to be among the lowest per capita in the EU? Or are there statistical issues involved?

PB: Even though the percentage of investments in healthcare IT by hospitals seems relatively low, it should be noted that certain expenditure categories are not always included in the statistics and are therefore not integrated into the budget of IT managers. If one takes into account investments in related technical fields such as telephony and/or biomedical technology; we, without a doubt, achieve a higher, more realistic, view of the level of investment.
In recent years, these have begun to be consolidated under the heading of "IT" – investments in areas such as voice-over-IP (VoIP), imaging, etc. The 2012 Hospital Plan targets information system investments in France to approach 3%, which would bring it well into line with the EU average.

HITM: According to a White Paper from Lesiss in 2006, only 10% of French healthcare facilities had shared patient records at the hospital level – while 30% had partial sharing?
Do you see the low penetration level of the former (the *acquis* if you will) as an advantage?

PB: In reality, it may make a compelling case to start from scratch and build up a wholly new approach to data sharing, which in turn would centre on a global approach to healthcare information systems. However, one can also point to the communication limitations of present-day IT systems.
Focusing efforts on data acquisition is of the utmost importance and specialized tools are already available to meet these needs. Effective data acquisition and the ability to efficiently and flexibly deal with the complexity and scalability issues inherent in a data sharing project are the key factors to a project's success, as are general change manage-

ment and the ability to adapt to the requirements of medical staff.

HITM: Technically, we see some key problems at the database level: the question of data definition. Medical data is sensitive by definition, access is often time-critical for patients and efficient healthcare delivery – this can conflict with issues of privacy and ownership (individual versus collective, public versus private).

PB: Our strategy is based on a centralized clinical data repository approach. This repository is located within the regional healthcare platform.

As a result, we have sought to reach a maximum of data availability in a Regional Data Centre. This solution has numerous advantages. Totally distributed architectures make it far harder to ensure that all data sources can be accessed and available at any given moment.

Finally, we cannot have direct and open access to databases since this would compromise security. Thus, it would become necessary to duplicate data entry. As a result, this increases costs on one hand and continues to leave security issues as a challenge.

We made the decision to use the technology from a company called dbMotion which offers the possibility of having a mixed approach - of a regional data centre, fed from one side by certain agreed/endorsed systems and then, when and where necessary, distributed databases connected to this central repository.

HITM: So, overall, you are in a technically complex, politically-charged and fast-moving business. Do you have any comments – especially on the popular buzzword interoperability ?

PB: Interoperability is core to our strategy. Since 2000, we have made architectural and technical decisions in Franche-Comté inspired by the global IT community (eg. XML, HL7 with EJB, SOAP connectors). In 2004, we implemented an IHE Pix profile for the first time for patient identification reconciliation; in 2006 we followed with IHE XDS for our repository.

HITM: In the above context, what is your opinion regarding the dbMotion Solution that the Franche-Comte region has officially adopted? Any limits to its adaptability? Scalability?

PB: The dbMotion Solution has many positive benefits, but for our purposes two are of primary significance. The first is its proven ability to provide a field-proven DMP (shared medical record) on a national scale. The second is its practical approach to health information exchange in terms of its rapid presentation of a unified real-time view of the integrated medical record derived from disparate and diverse IT environments; a record that can be either shared or personal.

What we still lack is the familiarity and understanding of what is exactly meant by the concept of the national "DMP" in France. This would enable us to further reduce some of the major concerns expressed, especially among physicians, about the incorrect use of data sharing. Incidentally, the legal framework to protect data security and patient privacy in France is already in place to prevent any abuse of the system.

The dbMotion Solution also offers very advanced functionalities at the level of access rights management and data confidentiality, which allows us to implement operational aspects of the current legislation.

HITM: So there are technologies that can integrate distributed data, do this in near-real-time and still provide security?

PB: As mentioned, the data repository in our region is based on IHE XDS which was developed by one of our partners - SQLi. This repository was implemented within the framework of a regional interoperability platform that enables the connection of various regional healthcare organizations. In order to extend this platform, we are leveraging the strength and power of dbMotion's solution and the company's experience with large-scale medical information sharing implementations.

A key factor to the Franche-Comté project's success will be its ability to move quickly and to share competencies on common technical platforms, not only in terms of technology but also between key suppliers.

The auto industry, for example, faced such challenges, and carried out a number of joint developments, which has not stopped vendors from subsequently competing for the same market share.

HITM: Any comments on the French versus UK approach in these areas – basically incremental versus Big Bang. Do you think the French approach has more user/physician involvement upfront, and is likely to build positive consensus amongst all concerned?

PB: There are indeed significant differences between the approaches. In France, the DMP (shared medical record) project's many individuals and organizations involved in its development have had to overcome the multiple differences in philosophies and approaches, especially within the steering committee for the DMP; all the while maintaining transparent processes – not an easy task.

In France, it is not only representatives from the user community but also medical bodies such as the DHOS (the French Health Ministry's Hospital Directorate), representatives from public and private federations, the CNIL (National Commission on Data Protection), etc., who have been involved.

From outside, this may all look somewhat chaotic, but I have to say that the story is rather different from inside. In Franche-Comté for example, there are a great number of working, technical and medical groups that have been able to discuss this project and reach a consensus.

In turn, such groundwork has permitted the State to invest significant sums in precisely-targeted e-Health projects (health files, telemedicine, DMP, etc.). I am convinced that given such clearly identified objectives, healthcare professionals are left in no doubt about the need for modernising our system and enabling efficient healthcare delivery in the best interests of the patient.

OF DISASTERS AND DATA MANAGEMENT

An Increasingly Strategic Concern

As computers become ubiquitous, the issue of vital data loss due to disaster, is a growing concern for all computer users – from individuals and small firms, to large organisations in sensitive areas such as the military, banks or hospitals and, of course, healthcare facilities.

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Catalina Ciolan

Such security concerns sweep across a vast range of possibilities: the theft or loss of physical assets such as computers, the possibility of viruses and Trojans in IT systems, or fire, natural disasters and lightning strikes.

In June 2006, the newspaper USAToday reported the findings of a survey by Carbonite, a Boston-based firm, of 185 self-described 'business-savvy' people. 69% of the respondents said they had lost data due to accidental deletion, disk or system failure, viruses, fire or another disaster. 40% said they had lost data two or more times in the previous year. Globally, the cost of such losses can be estimated in the upper tens of billions of dollars.

THE SCENARIO IN HEALTHCARE

In the healthcare field, protecting confidential patient information is more critical than ever as more data moves from paper to computers and is then made available online.

The best-known scandals in such contexts have been in the US: most recently, in the shape of an Internet posting in March of the names and medical records of 2,000 patients at Rhode Island's Westerly Hospital, or the theft of an unsecured laptop last year with similar data on over 350,000 patients of Providence Healthcare, which operates hospitals in the western US.

Such situations cannot be ruled out in Europe. However, it is true that the US is less stringent about protecting private information, unlike the EU, where the Data Protection Directive has forced companies and institutions to take security more seriously – to avoid being punished for privacy violations. Indeed, one shape of things to come was a near-GBP 1 million fine imposed last February by the Financial Services Authority on British Building Society Nationwide, after a laptop containing sensitive customer data was stolen from an employee.

THE EXPLOSION IN DATA GENERATION

For many healthcare IT managers, however, the cost of data storage and security remains an issue. So too does the unremitting growth in data volumes. One EU hospital IT manager told Healthcare IT Management that data has begun to "literally explode" at his facility. This would become a "major issue in the coming years", especially as e-Health programs began to go live. He however had found it a hard case to make to his CFO about the limitations of their 2nd generation disk/tape backup; "buy some more tapes", was the response.

Indeed, according to a March 2007 report from IT industry analysts IDC, digital data creation over the next four years is set to increase sixfold – from 161 exabytes in 2006 to 988 exabytes in 2010 - and have major consequences for IT departments. Businesses and organisations, on their part, would be responsible for the security, privacy, reliability and compliance of around 85 percent of this.

As a result, IT managers would "see the span of their domain considerably enlarged."

On its part, industry has been seeking to move to provide state-of-the-art, but realistic choices – although some of the cutting-edge solutions remain expensive because of low demand.

Remote storage vendors, for instance, already deploy specialised tools to gather data from remote servers, compress and encrypt it, and then transfer it offsite. Technologically, as part of their online backup to clients, some provide not only sophisticated data compression – but also, more recently, tools to detect data changes at the block level – saving common files and unique data just once. This caps the speed of growth of data, and also reduces data transfer and storage requirements up to threefold.

E-HEALTH AND DATA GROWTH

The IDC report mentioned above noted that around one-fifth of the extra data generated last year was a result of new compliance rules and laws such as Sarbanes-Oxley and Basel II. Though these focus on corporations and financial institutions, it is not too difficult to draw parallels about new e-Health regulations providing exactly such an escalation in data creation. Indeed, a study by Accenture in 2005 already pointed to a spike in digital data arising simply from the use of RFID devices (which remains a priority for modernising hospitals).

In the face of this, it is clear that proactive, strategic thinking by hospital CEOs and CFOs on data storage – within the framework of security and disaster prevention - needs to become a priority.'

GROWING COMPLEXITY OF HEALTHCARE IT WILL DRIVE OUTSOURCING

Technology in general, and IT specifically, have become one of the most pervasive aspects of healthcare delivery, touching nearly all its aspects. Today, a whole new universe of possibilities is being opened up in the shape of e-Health programmes. Most hospitals, however, lack the resources or skills to go it alone in building new IT infrastructures for such e-Health programmes. Many also lack the capacity to train staff to handle complex new software packages or align them proactively to the still-evolving policy requirements and unremitting pace of technological developments in their field.

HEALTHCARE IT MANAGEMENT ANALYSIS

PUBLIC FUNDS POSE SPECIFIC PRESSURES

In Europe, public funds account for almost 75% of hospital spending and decision-makers have to grapple with questions of efficiency on the one hand, and limited financial resources to allocate to healthcare IT. As a result, hospital managers will increasingly have to consider the only viable way forward – to outsource their IT requirements.

Unfortunately, the first efforts at large-scale outsourcing – in terms of Britain's NHS – have not lived up to expectations.

However, there have been encouraging success stories in the case of smaller-scale but still-meaningful initiatives – such as those in the Nordic region (covered in the previous issue of Healthcare IT Management). Elsewhere, hospital modernisation efforts – many part of broader equipment and facility renewal lifecycles, and the launch of wholly new hospitals – are both seeing IT outsourcing as an integral part of their plans and programmes. Such a trend is bound to intensify with time.

In conversation with IT experts, both within hospitals and in the vendor community, it is clear that the key phases of a successful healthcare IT outsourcing strategy are essentially similar to that in other user segments. In the broadest terms, the steps are as follows:

- Align Strategic Goals with IT Sourcing and Service Provision
- Select Best Partners
- Contracts: Pilots and SLA
- Successful Transitioning

ALIGN STRATEGIC GOALS WITH IT SOURCING AND SERVICE PROVISION

For most hospitals, the overriding goal is to provide high-quality, patient-centric services. In this case, IT must provide quick access to patient information and allow consultation at prior treatment locations. If such a capacity is not available in-house – and on-demand – there is a clear need for outsourcing.

However, internal IT staff need to remain highly involved, while senior management – alongside their in-house IT staff – need to assess overall choices in terms of platforms and applications, and any latent lock-in or longer-term limitations in their choice of outsouring partners.

Before choosing vendors, requirements must be fitted to such strategic goals– and directed at the attainment of two in-tandem objectives: operational continuity and service improvement. All these, as well as any (new) regulatory/compliance requirements can be jointly met only through mature outsourcing partners.

SELECTION OF BEST PARTNERS

Prior to developing an outsourcing relationship, it is therefore important to assess and make changes in internal IT staff deployments. One sometimes-overlooked fact is that an outsourcing partner, howsoever large in its scale and skills, is no more than a pilot ship for a large liner. Indeed, there are many cases where an outsourcing partner simply swamps the previous internal harmony within the hospital IT department.

It is therefore important to make sure of both strategic and cultural fit in a potential partner. Given the sheer pace of creative destruction in today's IT industry, it is also crucial to make sure that an outsourcing partner has both the systems integration experience as well as agility and scale to survive what will surely be sweeping shakeouts in the IT services landscape in the years to come.

In the US, many organisations seeking an outsourcing partner firstly make sure that it has an offshore strategy already in place. In Europe, this is also beginning – for example, in the shape of acquisitions in India by the likes of Capgemini (of Kanbay). Steria's more-recent takeover of Indo-British firm Xansa was directly aimed at acquiring critical mass in healthcare IT capacity following its alliance with the Nordic private hospitals group Capio; one of Xansa's biggest customers is the now-troubled NHS.

CONTRACTS: PILOTS AND SLA

By far, meaningful outsourcing agreements require vendors to firstly conduct a demonstration and pilot-phase project – in order to assess and

fine-tune technological and organisational fit.
In turn, parallel negotiations in such a phase would be best centred on a service-level agreement (SLA) with clearly-agreed performance metrics, accompanied by penalty clauses for non-performance.

SUCCESSFUL TRANSITIONING

A successful transition involves both existing hospital IT staff, almost always via training/re-training programmes and employment with the outsourcing partner. In Europe, unfortunately, strict labour regulations and closed-door negotiation practices often force second-best choices.

This takes the shape of finding 'local' outsourcing partners, who lack the scale to hold their own in the face of the sometimes violent winds of globalisation. Such players are unlikely to provide either meaningful business continuity, or even jobs for the hospital IT staff they acquire for the long term.
Early warning signals for overstretch in a partner are therefore crucial. These can be negotiated as opt-outs from the contract based on the pre-agreed performance matrices, such that the hospital IT department can revert to the status quo ante before any damage is done.

As one interviewee noted, it is always "possible to make a fresh start, as long as it is still timely."

ISSUES TO DOUBLE-CHECK

While it is fairly straightforward to identify the drivers of outsourcing and perceive its general countours, consultants and insiders point to some key issues:

Accountability: This is one of the most important legal aspects of an outsourcing relationship. In Europe, in particular, outsourcing is still artisanal, a people-sided feel business, and a lack of clarity can jeopardise relationships at take-off and ramp-up stage, between the hospital and the outsourcing firm, and more crucially between staff on either side – especially those set to straddle the borders and boundaries. Like any contract, it is therefore important to identify and put in writing what an outsourcing partner is responsible for how success will be measured and what will be the consequences of failure to meet such measurements.

Benchmarking: As opposed to metrics (see below), benchmarking is a study by the hospital or third party to compare metrics and pricing – to best practices in comparable environments. This is not always the easiest of tasks – especially if it is an ongoing or regularly-repeated process. Firstly, it sometimes costs more in time (or fees to third parties) than can be achieved in savings – which would arise from forcing an outsourcing partner to perform more efficiently against the agreed benchmarks.
Secondly, if the atmosphere between a hospital and an outsourcing firm becomes confrontational due to benchmarking, it is always possible for the latter to cast doubt on a core criterion in benchmarking – the 'comparable' environment.
Instead, many experts believe that the one-on-one system of agreed metrics is far more useful and user-friendly, for both parties.

Evolution: Outsourcing is not static. Hospital IT management and CFOs must also upfront consider future requirements, above all plan to accommodate an increase in the scope of outsourced services, especially if these need to be coupled into wider modernisation programmes and/or the introduction of new equipment and systems.
The advantage of proactiveness in this respect is simple: a hospital's bargaining power is at its peak before an outsourcing agreement enters into force. It is, therefore, possible to exert some pressure on price – especially if this holds forth the prospect of more work volumes for an outsourcing partner.

Metrics: Service level metrics and performance indicators are vital to a successful outsourcing relationship, for both sides. Such metrics must of course, by definition, be measurable and quantifiable, but also realistic, useful and to some extent, flexible.
In practice, hospitals and outsourcing partners would firstly run through sample metrics, against a variety of facts and scenarios, and then settle on a mutually-agreed framework.

Pricing: Pricing is closely linked to service levels and metrics. They also are the basis for any accountability. Needless to say, in a service industry, pricing is one of the toughest areas given large capital commitments and not wholly certain returns from service fees over the duration of agreement. Solid pricing mechanisms are aligned with a hospital's core strategic goals, be this to reduce costs, build scale and staffing flexibility, or increase performance.
Many outsourcers, in an increasingly competitive environment, factor cost saving achievements into their pricing offer. Others propose to steadily reduce fees by virtue of confidence in preserving margins as the outsourced work grows in volume and the relationship matures.

Termination: All relationships come to an end – eventually, or at a point before what was planned. It is, therefore, usual for outsourcing relationships to incorporate an exit strategy. Crucial issues here include intellectual property developed over the duration of the contract; a shareout of joint assets, the rights and obligations towards employees, and any regulatory consents.

HEALTHCARE IT MANAGEMENT ANALYSIS

HEALTHCARE IN AUSTRIA

The roots of the Welfare State in Austria date back to the Middle Ages, in the shape of the Ausgedinge, a flat-rate income paid to free farmers in rural areas after they retired and transferred their holdings. Miners too had their own health insurance and pension scheme. Indeed, some believe that Austria's mining law cooperatives are the world's oldest form of welfare organisation.

The Austrian healthcare system is also marked by a deeply-ingrained federal culture, dating back to the 'Mittelbare Bundesverwaltung' or indirect federal administration system of the 1870s which assigned authority and responsibility, from the Federal Minister through the provincial Governor to district and local health officials. Not unsurprisingly, moderm Austria's healthcare system is also financed in a complex manner by its various stakeholders.

Over the past three decades, the stakeholders have used typically Austrian models of advance planning and cooperative models to ensure near-universal healthcare, accompanied by comprehensive benefits. This has blunted the edge of more recent cost-containment measures. In addition, reforms dating back five years have resulted in a model based on decentralised contracts with private service providers.

One of the most notable aspects of the healthcare system in Austria is its relatively early response to the specific problems associated with an aging population, principally in the shape of legislation dating back to the early 1990s.

Overall, satisfaction levels of Austrians with their health care system is high in an international comparative context.

COUNTRY FOCUS: AUSTRIA

		DATE
Population (million)	8.23	2005
Live births/female	1.42	2004
Deaths/1,000 pop.	9.84	2007 (est.)
Life expectancy (years)	79.5	2005
GDP (billion Euros: 2006)	256.4	2006
Total healthcare expenditure (% GDP)	10.2	2005
Total healthcare expenditure per capita (PPP dollars)	3,519	2005
% of healthcare system financed by public funds	75.7	2005
Number of hospitals (per 100,000 inhabitants)	3.4	2003
Number of CT scanners (per million inhabitants)	29.4	2005
Number of MRIs (per million inhabitants)	16.3	2005
Number of acute care beds (per 1,000 inhabitants)	6.0	2003
Length of stay (average in days)	8.0	2004
Number of physicians (per 1,000 inhabitants)	3.5	2005
Number of nurses (per 1,000 inhabitants)	9.4	2005
Percentage of households with Internet access	NA	
Percentage of individuals using the Internet for interacting with public authorities	NA	

Source: European Central Bank, OECD, WHO, EU Commission.

Austria's health care system is complex, with cross-stakeholder structures at the federal, Länder (provincial) and local government levels. These assign competencies for both planning as well as operations and financing.

According to the Austrian Constitution, regulation of health care is the responsibility of the federal government – with one important exception, namely hospitals. Indeed, as far as hospitals are concerned, the passage of laws and their implementation rests with the nine provincial governments. Public health services (which involve epidemiology, preventive health, infant-and-mother care, and school services) are delegated by provincial governments to local authorities.

So-called 'fund hospitals' (listed within the Hospital Plan of a province) have a statutory requirement to admit or provide care for patients. In return, they receive subsidies from public sources for investments, maintenance and running costs.

Austria's 40+ private-sector hospitals have also been given a boost after the founding in 2002 of the Private Hospitals Financing Fund (PRIKRAF) which finances inpatient services. The fund makes payments to hospitals on a performance-and quality-oriented basis known as LKF (Performance Related Hospital Financing System), essentially an Austrian DRG model.

Neverthless, the federal government continues to play a key role in the healthcare system, above all in providing it with an overall strategic direction. Towards this, the Federal Ministry of Health and Women (BMGF) is assisted by a number of high-powered advisory boards, commissions and institutes. These include the Supreme Health Council (Oberster Sanitätsrat) with 30 members from the medical scientific community; a 27-member Structure Commission with national and regional politicians as well as healthcare policy experts; and the Austrian Federal Health Institute (Österreichisches Bundesinstitut für Gesundheitswesen, ÖBIG).

LONG-TERM CARE

In 1993, a Long-Term Care Law stipulated that long-term healthcare be financed almost wholly from the federal budget. Long-term care is estimated to account for about 10% of all healthcare spending.

Like long-term care, acute in-patient care also leverages federal instruments to ensure both transparency and a level playing field in terms of entitlement criteria and quality standards. Alongside, patient rights have been strengthened by virtue of a Charter and the appointment of ombudspersons.

Nevertheless, there continue to be considerable differences in access to healthcare and physician density across different provinces, as well as between cities and villages; the share of Austria's rural population is about one-third of the total.

A MIXED PUBLIC-PRIVATE FINANCING MODEL

At the moment, just under half of all healthcare financing is borne by the social health insurance system, a quarter by the federal, provincial (Lander) and local governments, and the balance quarter through private payments. As a result of the latter, Austria ranks in the lower third of EU countries as far as the public share of total health care expenditure is concerned.

The inherently complex nature of the Austrian healthcare system is reflected in the fact that private health providers continue to get over two-thirds their revenues from public sources, principally Austria's 21 health insurance funds (as well as federal grants).

Mandatory insurance is based on occupational status and/or place of residence. As a result, there is no competition between health insurance funds. The unemployed and people in marginal part-time employment are not subject to statutory social health insurance. Medicines and outpatient care regimes are organised, on the one hand, by negotiations between the health insurance funds (alongside their umbrella Federation – the Hauptverband der österreichischen Sozialversicherungsträger), and on the other, the public law or stautory chambers of physicians, pharmacists, professional midwives and veterinarians.

Insured patients have a free choice of physicians for outpatient services. 60% of the country's approximately 20,000 physicians work in individual capacities for outpatient services, while 40% have contractual relationships with one or more of the health insurance funds. Outpatient care is also offered by clinics and hospital outpatient departments.

HEALTHCARE REFORMS

Healthcare reforms have targeted cost containment, sought to encourage more efficiency in organisation and delivery and increased cost-sharing arrangements. This has been spurred by the fact that recent years have seen health funds running annual deficits of about €250 million.

Reforms have also sought to couple reimbursement regimes more strongly than in the past to health technology assessment. On the other hand, developments in such a direction have hardly been rigid and one-way. An outpatient clinic fee, which was introduced in 2001, was suspended in 2005 as a result of high implementation costs and considerable resistance from the public.

As part of ongoing reforms, there also have been increased efforts to streamline decision-making and financing patterns across different provinces – as well as healthcare sub-segments (from dentistry and opthalmology to chronic care). Since 2002, all provinces (except Vienna) have privatised their hospitals, principally in the form of an organisational restructuring (with the provincial government remaining majority owner in most cases). As a result, private companies have taken responsibility for hospital management and service provision for their clients, namely health insurance funds, while the provincial and/or local authorities function as guarantors. In this manner, Austria has sought to separate service provision from payment.

HEALTHCARE IN AUSTRIA AND THE EU

Physician density in Austria is in line with the EU average. The ratio of nursing staff, traditionally much lower than the EU average, doubled between 1980 and 2003 to 6 per 1,000 inhabitants, and has since risen to 9. No estimates have been made about waiting lists for medical treatment, but the consensus is that these are short in comparison to other EU countries. Also worthy of attention is the fact that Austria has one of the EU's highest admission rates, at 28.4 per 100 inhabitants in 2003.

IT AND AUSTRIAN HEALTHCARE

Healthcare IT has an unusually high official profile in Austria. The Federation Board, which manages the Austrian social insurance system has four Advisory Committees. Three of these are typical in much of the EU – on work and accident insurance, on old age, and health insurance.
But alongside, one committee is dedicated wholly to IT.

DRIVERS OF CHANGE

Overall, healthcare IT in Austria is driven by a combination of technology- and regulatory-push factors, alongside pressures for cost-containment. The latter, in turn, coupled to demands for greater quality, transparency and efficiency in the delivery of healthcare.

Austria's Health Reform Act 2005 established the legal framework for devising quality strategies and setting national standards – both for health services and professionals (and including technical staff). It also provided hospitals with incentives for attaining higher quality in healthcare delivery, and laid the groundwork for key programs such as the successful Austrian eHealth Initiative (EHI).

The EU Commission's i2010-Initiative also led Austria to establish a comprehensive IT programme – within which e-Health is a key application.
The Austrian authorities, on several occasions, have reaffirmed their commitment to harmonise e-Health and closely-related eGovernment systems and methodologies. The Austrian eGovernment Strategy itself is considered by some to be a European trendsetter, and places special emphasis on identity management – which, in turn loops synergistically into its e-Health plans as well as those of the EU.

EMPHASIS ON HEALTHCARE QUALITY

The federal government has financed a multitude of quality-related projects.
These include areas with direct relevance for IT such as interface management and quality reporting as well as patient orientation and safety.
Since the mid-1990s, the Austrian Institute for Technology Impact Assessment (ITA) has been devising methods to conceptualise and disseminate health technology assessments across a cross-section of disciplines, including information systems. The ITA's work, in turn, has been bolstered by the Major Medical Equipment Plan, which was integrated into the Austrian Hospitals Plan in 1997. Interestingly, this provides an analysis of the demand (rather than cost-benefit) aspects of health technology.

EMEDICATION AND EPRESCRIPTION: STEPS TO E-HEALTH

Meanwhile, as mentioned above, the EU's e-Health program remains integral to the promotion and deployment of new healthcare IT care systems in Austria, where a voluntary eMedication System is seen as the first step to an ePrescription System.
The ePrescription project expects to quickly demonstrate an increase in efficiency and quality improvements to benefit both patients and payers.
Austria has established an information management system which includes the following steps:

- An infrastructure reporting system
- The economic evaluation of technology projects
- The evaluation of the social effects of the use of technology.

Discussions on the above have been held between the federal Health Ministry and all stakeholders in the health care system (including private companies).

The goal of this e-Health initiative is to concentrate and synergise experiences from isolated clusters of prior experience and lay down the basic form and content of a national eHealth strategy.

The e-card System is aimed at providing the network and security backbone for Austria's emerging e-Health infrastructure. In the interim, the authorities have also defined the establishment of a National Electronic Health Record (ELGA), with adjustment of existing legislation foreseen, if this is necessary, as the diverse internal elements of the e-Health superstructure continue to evolve.

THE CONTOURS AND CONTENT OF E-HEALTH IN AUSTRIA

Rather than a high-octane techno-policy buzzword, e-Health is seen in a relatively down-to-earth manner by Austrians. There are official reference to e-Health as "a set of new business models and tools to enhance the delivery of healthcare services".
The e-Health application field is affected by legislation, and in turn, through stakeholder forums such as the Austrian eHealth Initiative (EHI), impacts and influences lawmakers and legislation.
Austria's Health Reform Act 2005, which established a framework for quality strategies and national standards, also

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HEALTHCARE IT POLICY IN AUSTRIA

HEALTHCARE IT MANAGEMENT
INTERVIEW

To obtain an overview of policymaker's perspectives on healthcare and IT in Austria, HITM's Catalina Ciolan interviewed Stefan Sauermann from the University of Applied Sciences Technikum Vienna.

Dipl.-Ing. Dr. Stefan Sauermann lectures at the University of Applied Sciences Technikum Vienna (www.technikum-wien.at) and is Associate Director of Studies of its Biomedical Engineering Bachelor and Master programs. Since 2003, he heads the Committee for Medical Informatics of the Austrian Standards Institute and the working group on Medical Devices. He also contributes to international standardisation work within CEN, ISO and IEEE. Since 2005, he is moderator of the Working Group on 'Interoperability – Standards' of the Austrian e-Health Initiative, initiated by the Federal Ministry of Health and Women, and is contributing to the Austrian Electronic Healthcare Record project (ELGA).

Stefan Sauermann

HITM: Healthcare IT has an unusually-high official profile in Austria. The Federation Board, which manages the social insurance system in your country has four Advisory Committees. Three of these would be typical in much of the EU – on work and accident insurance, on old age, and health insurance. But could you explain why, alongside, one entire committee is dedicated to IT?

SS: Austria's 'Main Association of Austrian Social Insurance Institutions (Hauptverband der Österreichischen Sozialversicherungsträger) has a legal assignment to perform administrative tasks for the State. It has been doing so for a long time, and as a result of this, the healthcare reimbursement processes in Austria are steadily getting more support from IT solutions. One of the main activities over the last few years has been the introduction of the Austrian social insurance card, the e-card. The Main Association will also be contributing to the Austrian electronic healthcare project (ELGA). Information technology has therefore been an issue for social insurers in Austria for a long time, and will be even more so in the future.

HITM: Would you believe that such foresight also underlines a university in Tyrol which is one of Europe's first to offer a comprehensive sweep of bachelors' and masters' programs in healthcare IT?

SS: There are a number of high level study programs in the field of healthcare IT, in Innsbruck/Tyrol, Graz/Styria, and also in Vienna. All of these do have a longstanding tradition in healthcare IT, and they are all recognised at an international level. Recently, the introduction of the Bachelor and Master system, following the Bologna process, and the newly formed "Universities of Applied Science" have added new educational offerings, as well as many other organisations in Austria.

In brief, healthcare IT has been around in Austria for a long time, and the big hospital groups have decades of experience with IT systems in clinical practice. Research and educational institutions across Austria, like those elsewhere in Europe and the world, are responding very actively to new challenges. In the Biomedical Engineering programs at our university, we also have major elements of IT instruction, so that our graduates can help specify and implement IT systems in healthcare, communication on both sides. We see a very strong exchange of students from all over the world, and specialised knowhow exists in many different places.

Today's students are growing up in a world of IT, and they will help shape healthcare in very useful ways. Things are very interesting, and as a teacher I do frequently experience my students knowing more than me. This is a good

CompuGROUP
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HUMAN INFORMATION SYSTEMS

CompuGROUP and Systema

increasing focus on expansion of their activities towards Central and Eastern Europe.

Following the acquisition of Systema Human Information Systems GmbH early 2007 by CompuGROUP Holding AG the leading IT provider for hospitals enjoys to explore new perspectives with regard to extending their position on the total healthcare market. The overall CompuGROUP Vision to be the leading provider of IT solutions across all segments of healthcare is actively driven towards the CEE region by the Austria based CompuGROUP CEE.

„Within the core of CompuGROUP's vision one of the most important elements is to integrate all members within the healthcare chain. Feature-rich and powerful software systems are the basis for simplifying integration of all health service provider across all segments. The combination of CompuGROUP's broad experience and product portfolio now enables to focus on the healthcare system in its entirety. This experience is a clear advantage primarily in Eastern European countries , which quite often have to focus on integration in parallel while implementing basic core systems at the same time. Beyond this the introduction of EHR (electronic health records) is on top of the priority list in almost every country" explains general manager, Hannes Reichl.

Hannes Reichl

Willi Salomon

A clear proofpoint underlining CompuGROUP's commitment towards CEE is the launch of a central office in Vienna, which is used as central hub to drive the activities across Central and Eastern Europe. CompuGROUP CEE will be managed by Willibald Salomon and Hannes Reichl and will carry responsibility for extending the activities in Austria, Switzerland, Hungary, Romania, Bulgaria, Serbia, Montenegro, Bosnia, Croatia, Slowenia und Greece.„Systema Human Information Systems as leading provider of hospital information systems in Austria is playing an important role within this strategy. Our broad experience gained on the Austrian market is providing us with tremendous advantages in order to understand the requirements and challenges other countries are now facing at almost the same patterns. With our classical product line Systema G2 and the broad product portfolio of CompuGROUP we are confident to have the right tools in place to help health care systems in other geographic markets to increase efficiency and thus lower costs at the same time." complements Willibald Salomon.

Systema will be present at the **World of Health IT in Vienna** together with many other members of the CompuGROUP Holding from **Oct 22nd to Oct 25th, 2007**.

Underneath the headline „Synchronizing the World of Healthcare" we are providing you with infor mation and presentations about how CompuGROUP can help to increase efficiency within today's healthcare systems by integrating IT systems across health providers. While the European Union has declared to launch a huge initiative in the shape of an eHealth action plan, it has become obvious that apart from operational procedures a key element to increase efficiency is to be able to access relevant patient data from any place ideally real time. A consolidated 360 degree view of the total health status requires to have integrated data across today's boundaries, which will stimulate new ways of cooperation and information transfer.Learn how already existing technologies can help to transform today's IT systems to achieve this goal by talking to Systema and CompuGROUP representatives.

We look forward to welcome you at booth 305, Hall X, Austria Center Vienna.

thing, and in a fast-moving world like ours, anything else would be a problem.

HITM: On a broader level, do you believe there is something, which may be called an Austrian healthcare model – in terms of financing, organising and delivering healthcare? What are its key differences vis-à-vis similar countries like Switzerland or even Germany?

SS: The German system is in a way similar to Austria: The social insurance companies pay for healthcare for citizens, and in many places, municipialities, regions or the State own and manage hospitals, and contribute to overall funding. There are also elements of autonomous administration in both (Austria and Germany).

One main difference is the number of social insurers: In Austria, we have about 25 of them, while in Germany there are a few thousand. We all know that it takes some time to learn management and process details of the healthcare system in a state. Before we can introduce cross-border healthcare processes, those involved will inevitably have to learn more about each other, and find out with who to clarify the many issues that turn up as cross-border projects continue to evolve and take increasingly concrete shape.

HITM: Given commonalities in language (and if one may so, in culture), are there any formal structures in place for coordinating efforts and initiatives between Austria, Switzerland and Germany?

SS: Speaking for the standards area, of course there are formal international bodies who contribute to coordination. However, healthcare IT is designed in many different ways, by many different types of people. Recently, the states have been occupied getting things going internally, so we still do not see many active, nation-wide initiatives. A lot is on the move, but those involved have so much to learn and organise, that cross-border cooperation has not reached the attention it deserves. Additionally, experience shows that things get even more complicated when patients or data start crossing borders. However, national projects do emerge, and there are things like the "Large Scale Pilots". These initiatives form points of reference, and all stakeholders start to get involved.

Overall, there is light on the horizon, and many new contacts between persons do emerge daily, as we begin to learn who is actually responsible for what. The international standardisation bodies CEN, ISO, HL7, and IHE have continued their efforts to join forces, both formally and also in numerous small cooperation projects. This variety of steps will finally improve things. However, there still is a lot of communication and coordination required in the years ahead.

HITM: We know that, given your federal structure, the Austrian healthcare system is rather complex. There are considerable degrees of both autonomy and cross-stakeholding, as well as a move towards privatisation of operations since 2002. As all these factors evolve – both due to demographics and the need for closer convergence with the rest of the EU - do you believe IT will have to play an even more central role than it is now?

SS: First and foremost: Within medicine, IT is not intended to play a central role. It shall support caregivers, and optimal care for patients has to be the central thing. At the moment, there is a big change as IT moves into healthcare, and this causes irritation on both sides. Over the next few years, caregivers and IT providers will have to learn how to cooperate efficiently, and will cooperate to make IT "elegantly invisible". In the old days a jukebox was big and heavy, and offered a very limited number of songs. Today, a music player may be updated wirelessly, and we can share music around the planet from everywhere, and even I can learn how to do it. The same thing remains to be done in healthcare: We will add functionality, and we reduce the amount of visible technology. Sounds simple, but beware!

Things are only beginning: In 2005, a major reform of the healthcare system was started in Austria. One of the main targets is to improve cooperation between resident caregivers and hospitals. All these partners join forces to care for patients, and this causes additional requirements for communication between those involved. The documentation efforts are increasing, and medicine itself constantly gets more diverse and complex. This causes additional work for caregivers, and IT systems will have to do their best to reduce this workload.

Over the next few years, caregivers and IT providers will learn how to cooperate efficiently, and will cooperate to make IT 'elegantly invisible'.

A lot needs to be done, both in the basic healthcare record infrastructure, and also within the medical workflows itself. IT people will have to learn much more about the many ways healthcare is delivered, and healthcare providers will have to guide and help them, insisting on useable, user-centered and helpful systems. Things will become easier when modular, standards-based systems reach the market. These can then adapt to specific needs. Things will get cheaper. As the healthcare record infrastructures become stable, we all will be able to focus our work even more on medicine itself, building on reliable systems, and slowly improving their functionality and performance.

HITM: Hospital IT departments are at the centre of many changes – e-Health and e-business are new developments alongside their traditional roles in administration and operations. Are these forces having an impact on hospital IT departments in Austria?

Integration of Healthcare Enterprise (IHE)

Project NÖMED-WAN Patient Index

Interoperability between medical information systems is a necessity in modern health care. Under strong security measures, healthcare organisations are striking to unite and share their data assets in order to increase the quality of care and to reduce treatment costs. Due to the immense volumes of medical data, the architecture of the future healthcare networks focuses more on interoperability than on integration. Standardized electronic documentation and communication are crucial factors for the necessary modernisation of healthcare systems.
In Austria a project for the federal state of Lower Austria was setup in 2006 with the name "NÖMED WAN Patientindex" and this is based on IHE (Integrating of Healthcare Enterprise) Profiles.
Global aim was to exchange medical documentations of patients in hospitals which different HIS (Hospital Information System).
The goal of the project is the integration of 27 hospitals in 22 organizations with four different HIS-Systems and 7 different versions. A shared MPI (Master Patient Index) with demographics of the patients and a registry which will contain data about patients' treatments, medical summaries, hospital stays and diagnoses is the basic of the solution.

Despite the scientific and technological development progress over the recent years in the healthcare delivery, a significant portion of the decision-making information on the treatment of a patient's illness is still based on unstructured information.
With the IHE Profile RFD (Retrieve Form for Data Capture) CDA Vers. 2 Level 3 (Clinical Document Architecture) structured documents can be exchanged between different Document Consumer (View a Document – see Figure 1).

The fulfilment of the goal of the NÖmedWAN Patient Index project - to facilitate clinical document sharing among the healthcare providers in Lower Austria – bears following major requirements on the clinical documentation: renunciation mail transmission of medical findings, change over to online availability of all relevant patient's data and creation of a life time patient's health record.

Figure 1 presents the clinical document sharing process in Lower Austria. Clinical documents are created (MAKE) in the hospitals, which are participating the document exchange network. Document structure and format are created according to the clinical affinity domain specification. Only pure clinical documents (clinical referrals, hospitalisations, admission, transfer and discharge) are created here.
Clinical documents which are released to be shared among other healthcare providers are stored in document repositories (STORE).

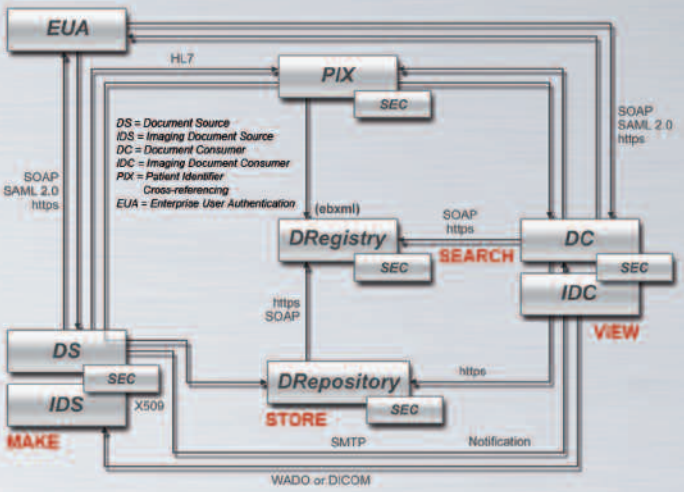

Figure 1: XDS in NÖmedWAN EHR project

MAKE and STORE activities are performed by document producers (hospitals), while SEARCH and VIEW are accomplished by document users (hospitals and private practices).
In order to retrieve a document (SEARCH), document consumer has to know document identification number (EHR-Index) and respectively patient master index (MPI PIX Cross Reference Manager).

Why IHE ?

IHE IT Infrastructure is the base of this project because all necessary profiles are defined from this community and are tested 3 times in the year at Connect-a-thon (US, Japan, Europe).
IHE is standing for interoperability and interfaces between different systems.

Which IHE IT Infrastructure Profiles are used:

PIX - Patient Identifier Cross Reference
PDQ - Patient Demographics Query
EUA - Enterprise User Authentication
PWP - Personal White Paper
XDS - Cross Enterprise Document Sharing
XDS-I - Cross Enterprise Image Sharing
RFD - Retrieve Form for Data Capture

Which IHE IT Infrastructure Profiles will be used in the next future:

BPPC - Basic Patient Privacy Consent
XUA - Cross Enterprise User Assertion
XCA - Cross Community Access

SS: Austria's hospital IT departments are doing fine. They know exactly what they want, and they are getting better and better in getting it. A lot of the knowledge that is used to design the Austrian EHR comes from there. From my own experience, I know what happens if a hospital IT system crashes, when queues get longer, when data gets lost etc. If you have been through that, you try to avoid it, upfront. You learn a lot and you exploit your full potential. As a result of this, hospital IT people are a very select and efficient breed. They know what e-Health means, and they are prepared to do their part.

HITM: What are the key challenges and priorities for traditional healthcare IT in Austria (that is, over and above those connected with e-Health)? For example, interoperability and new standards, legacy systems, skills availability, budgets ....?

SS: All of these, many more that we have already heard of, and many more that we never have heard of. It is a hugely complicated venture, and as people are lifting more stones, they also find increasing complexity creeping out from the dark. This is true for many areas, for IT, legal issues, management, etc. We all will have to do our best to make this come true. However, you can watch people learn very fast, and most of them grow to the challenge. The motivation is high, and I am optimistic.

HITM: In the face of all these changes in the Big Picture, do you think Austrian and European IT managers need a common voice?

SS: Yes. It is always good to have organisations do networking for a certain group of specialised people. We need networking on all places, horizontally and vertically. Networking is one of the main challenges. There are so many people around, and they all have to be involved. We have to take care that communication is not restricted - within groups: It only gets hot when groups from different areas get in contact with each other. Seeing things from different angles brings up the real issues, and things turn emotional.

Emotion is energy, and we will definitely need a lot of that.

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provides the legal basis for e-Health. Other relevant elements of the legislative/regulatory framework include the Health Telematics Act, which aims at the secure exchange of individual health data, as well as the eGovernment Act, which predates the Health Reform Act by one year.

Key stakeholders and activities encompassed within the broad framework of Austria's e-Health Strategy are seen as:

- Citizen-patients
- Healthcare providers and other actors
  - Hospitals, doctors, dentists, pharmacies, nurses, mid-wives, physiotherapists, occupactional therapists, etc.)
- Financiers
  - Social insurance companies
  - Private health insurance companies
  - National and provincial health care agencies
- Science
  - Health economics, including quality of care
  - Epidemiology
- Politics
  - Planning
- Public
  - Information

EHI: A LIVING MODEL OF STAKEHOLDERS IN DIALOGUE

In 2006, Austria released its first draft for a National e-Health Strategy. After a process of consultation with concerned groups and the general public, the Austrian eHealth Strategy was officially unveiled in January 2007. It consists of the following facets:

- Interoperability-standardisation
- Patient identification and archiving
- Network of the health care and social system, infrastructure
- Customer related information systems
- Health care system related information systems
- Telemedicine

Within working groups dedicated to each of the above, EHI brings together over a hundred participants from the government, hospital organisations, social and private insurance companies, universities IT vendors and professional chambers - of doctors, pharmacists and universities). A living example of the meaning of stakeholders, EIH's aim is to achieve a workable strategy and best-practices roadmap to deploy IT and communications technology in the Austrian healthcare system.

On its part, the EHI has set up study groups and pilots to make recommedations in a variety of areas: e-cards for patient identification; establishment of an electronic directory of health service providers in Austria.

CLOSED AND OPEN: THE HEALTH INFORMATION NETWORK

Austria is also building a health information network to facilitate data exchanges, including medical/lab examination results and ePrescriptions. It has been conceptualised as a 'closed network' with 'open architecture' – with the former limiting access (for privacy and security reasons) to a defined group of users, while the latter permits the seamless extension of services to the future medical information highway (including payments to physicians by health insurance funds and access by private physicians to databases). The network is, however, not related to the e-card and envisages a separate communications pathway.

The general consensus is, however, towards a service-orientated technological and organisational infrastructure, which is not only in tune with the realities, requirements and specificities of the Austrian health care system but also dovetails into the evolving national and EU-level e-Health programmes.

EHI has made recommendations on using SOAP, XML, SAML for messaging. In addition to IHE, XDS has been proposed as the fundamental architectural framework for data interchange. For semantic structuring of the health records, CEN prEN 13606, HL7 (V3), CDA, UN/CEFACT CoreComponents, and DICOM (for graphic data) are under consideration and evaluation.

Further down the horizon, as discussed, is the electronic health file and the ePrescription – which would plug into the health information network. A feasibility study has been evaluating the context and content of these initiatives – alongside technical and legal issues as well as costs of development and implementation.

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London, UK
www.rsm.org.uk/telemed/

ACCELERATING PROCESS IMPROVEMENT AND INNOVATION VIA E-BUSINESS STANDARDS
15 – 16 November 2007
Utrecht, Netherlands
http://www.cen.eu/cenorm/businessdomains/businessdomains/isss/activity/ebif-conference2007_announcement.asp

ON RFID
The next Step to the Internet of Things
15 – 16 November 2007
Lisbon, Portugal
http://www.rfid-outlook.pt/

December

CEHR INTERNATIONAL CONFERENCE 2007
E-Health: Combining Health Telematics, Telemedicine, Biomedical Engineering and Bioinformatics to the Edge
2 – 5 December 2007
Regensburg, Germany
www.cehr.de

THE EUROPEAN LEADERSHIP SUMMIT ON CHRONIC CARE 2007
3 – 4 December 2007
Amsterdam, Netherlands
www.worldcongresses.com

March 2008

WORLD HEALTH CARE CONGRESS EUROPE 2008
10 – 12 March 2008
Berlin, Germany
www.worldcongress.com

April

MED-E-TEL 2008
16 – 18 April 2008
Luxembourg, Luxembourg
www.medetel.lu

May

HIT PARIS 2008
27 – 30 May 2008
Paris, France
www.health-it.fr

HOPITAL EXPO
27 – 30 May 2008
Paris, France
www.hopitalexpo-intermedica.com

HEALTHCARE IT MANAGEMENT

WINTER ISSUE

In our Winter issue, HITM will make an analysis of some of the new 21st century hospitals being built across Europe. Some, as we have seen in previous issues are being built atop existing ones, others as greenfield ventures.

Several of them claim to target near-paperless operations. They also provide an upfront integration in their design stage of the assortment of new-generation IT and communication technologies now on offer - from VoIP and wireless through touch-screen bedside terminals to RFID and automated robot-centric logistics. Naturally, all such facilities are being primed to receive the forthcoming European health/medical record.

We also take a look at some of the new large-scale, health-specific architectures and platforms on offer from leading vendors as well as a relative rarity in today's world – a clinical information system designed to a considerable degree by healthcare rather than IT professionals.

Carrying forth from a Feature in the current issue on Disasters and Data Management, we will investigate cost and other issues in remote data replication.

With hospital and healthcare management rapidly becoming a high-focus specialty in some business schools, the Winter Issue will also take a look at how strategic issues shape the choices and behaviour of hospital managers in the real world, and whether Six Sigma practices have any role to play in such areas.

After Austria in this issue, the Country Focus section will move next door, to Switzerland.

Any potential authors with expertise in the above fields are invited to contact the Editor by email: editor@hitm.eu.

European Association of HEALTHCARE IT MANAGERS

The European Association of Healthcare IT Managers is a non-profit pan-European umbrella organisation for all relevant national healthcare IT associations in Europe.

OUR MISSION:

- **The European Association of Healthcare IT Managers** supports and encourages the emergence of common healthcare IT standards at both EU and international levels.

- **The European Association of Healthcare IT Managers** believes that the European Healthcare IT sector needs a common voice - especially in the face of rapid technological change and growing socioeconomic pressures.

- **The European Association of Healthcare IT Managers** invites you to be involved in a community to exchange opinions and experiences with like-minded colleagues. We defend your interests and make your voice heard, effectively.

If you are a CIO, CMIO or IT Manager in the healthcare area

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European Association of HEALTHCARE IT MANAGERS

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In today's world, logical healthcare security is more critical than ever. You'll find us customizing IT solutions specially for the health market.

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