HEALTHCARE IT MANAGEMENT

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THE OFFICIAL JOURNAL OF THE EUROPEAN ASSOCIATION OF HEALTHCARE IT MANAGERS

INTEROPERABILITY OF MEDICAL INFORMATION SYSTEMS

ENSURING THE FUTURE OF SMART CARD PROGRAMMES

OUTSOURCING– BEYOND ECONOMICS

TELEMEDICINE

THE NEW ERA OF HEALTHCARE

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

Managing Editor
Karmin Ruocco - k.ruocco.me@eahitm.org

European Affairs Editor
Sonja Planitzer - europe@emceurope.com

Editors
A. Heggestad, C. Hommez, D. Sains

Guest Authors
C. Bescos, A.V. Bogdanov, M. Brecklein, B. Crounse, A.B. Degtyarev, M. Diop, A. Dogac, K. Gillick, J. Griffith, T. Jones, J. Kass, M. Masseroli, Yu.I. Nechaev, F. Pinciroli, E. Poiseau, A. Runge, S. Scalvini, D. Schmitt, F. Sicurello, G. Simkin, A.V. Valdenberg, D. Yeates

Publishing House
Euromedical Communications NV
28, Rue de la Loi
B-1040 Brussels
Belgium
Tel: +32 2 286 8500
Fax: +32 2 286 8508
Email: support@eahitm.org
Website: www.eahitm.org

Publisher
Christian Marolt - c.marolt.ed@eahitm.org

Media Contacts
Stefania Onorati - s.onorati.cd@eahitm.org
Francesco Spatuzzi - f.spatuzzi.cd@eahitm.org

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Art Director
Carola Mücke - layout.g4@emceurope.com

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Letter from the Publisher

Dear Reader,

Telemedicine is rapidly spreading across Europe and the rest of the world as an integrated part of healthcare networks and systems. This development brings with it opportunities to improve healthcare across vast geographic areas, provides remote training for healthcare professionals and offers new technologies and possibilities for improving healthcare information systems on a global scale.

In this issue of *Healthcare IT Management*, we consider ways in which telemedicine and mobile technologies are used to connect physicians and patients, how the European Space Agency is using telemedicine to build interoperable eHealth networks across Europe, and we look at the development of a telecardiological monitoring system successfully being used to improve ambulatory care and disease management.

In our Features Section, we introduce Artemis, a European Commission-funded project aimed at achieving interoperability between medical information systems, examine how the healthcare sector can achieve long-term stability in its smart card programmes, and present part 2 of our 3-part series on designing a high-performance telemedicine system.

As a management and best practices based journal, this issue's Management Section covers the issue of outsourcing. Looking beyond purely economic issues, we explore when to consider the outsourcing of IT functions and the benefits that can be realistically achieved through doing so. In our Best Practices Section, you will find the second part of the Boario Home Care Project series. In this follow-up, an economic evaluation (recently presented at the eHealth 2006 High-Level Conference) of the project's success is analysed. Finally, in our regular Country Focus Section, we will be looking at telemedicine and medical informatics developments in Italy.

We hope that you will enjoy this issue of *Healthcare IT Management* and would like to encourage you once again to join the European Association of Healthcare IT Managers. Please visit our website at www.hitm.eu for an application form.

Your opinions and suggestions are always welcome – we invite you to send a message to our Managing Editor at k.ruocco.me@eahitm.org and let us know what you think!

Yours faithfully,

Christian Marolt
Publisher

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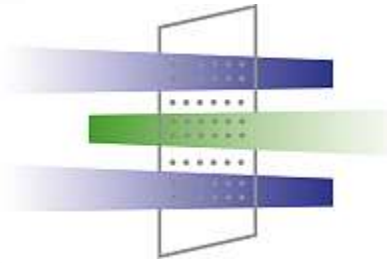
HEALTHCARE IT MANAGEMENT

The European Association of Healthcare IT Managers (HITM)



HITM News

2006 is an important year for HITM as we establish the groundwork for the association's membership and future development. We have already been busy spreading the news about the association's formation and building collaborative partnerships with other organizations involved in European healthcare IT. On 10-12 May, HITM was invited by the European Commission to attend the eHealth 2006 Conference in Malaga, Spain. We also recently participated in exhibitions at ITeG, 30 May–1 June in Frankfurt, Germany and the Tromsø Telemedicine and eHealth Conference held 12-14 June in Tromsø, Norway.

HITM will also be an exhibitor at the upcoming Medmatic@ conference to be held 28-30 September in Fiera di Vicenza, Italy; as well as The World of Health IT on 10-13 October in Geneva, Switzerland. We look forward to meeting you at these events!

About the Association

HITM is a non-profit organisation outlined as the pan-European umbrella association of all relevant national healthcare IT associations in Europe. Believing in the fundamental importance of unifying healthcare IT professionals at European and global levels, HITM is committed to increasing the professional authority and responsibility of healthcare IT managers and representing their interests to international institutions and associations. With membership in HITM steadily growing, the first annual General Assembly is being planned for the end of 2006.

Mission

The mission of HITM is:

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

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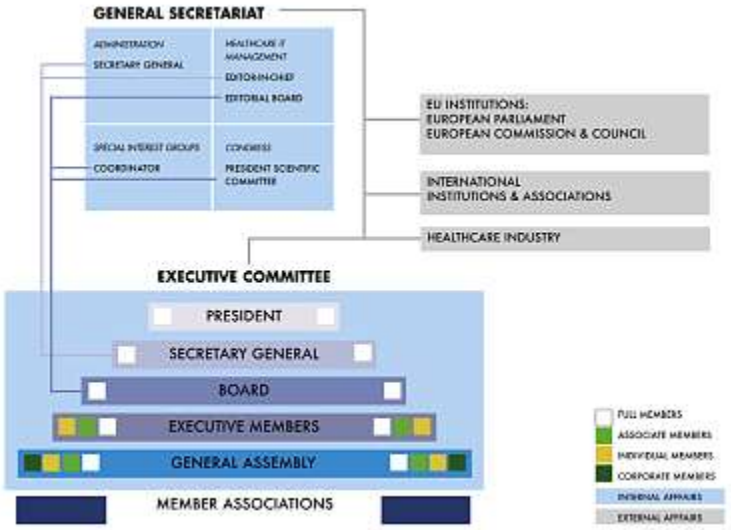
Organisational Structure



Membership

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

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

Membership in HITM consists of four levels:

Full Members

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

Associate Members

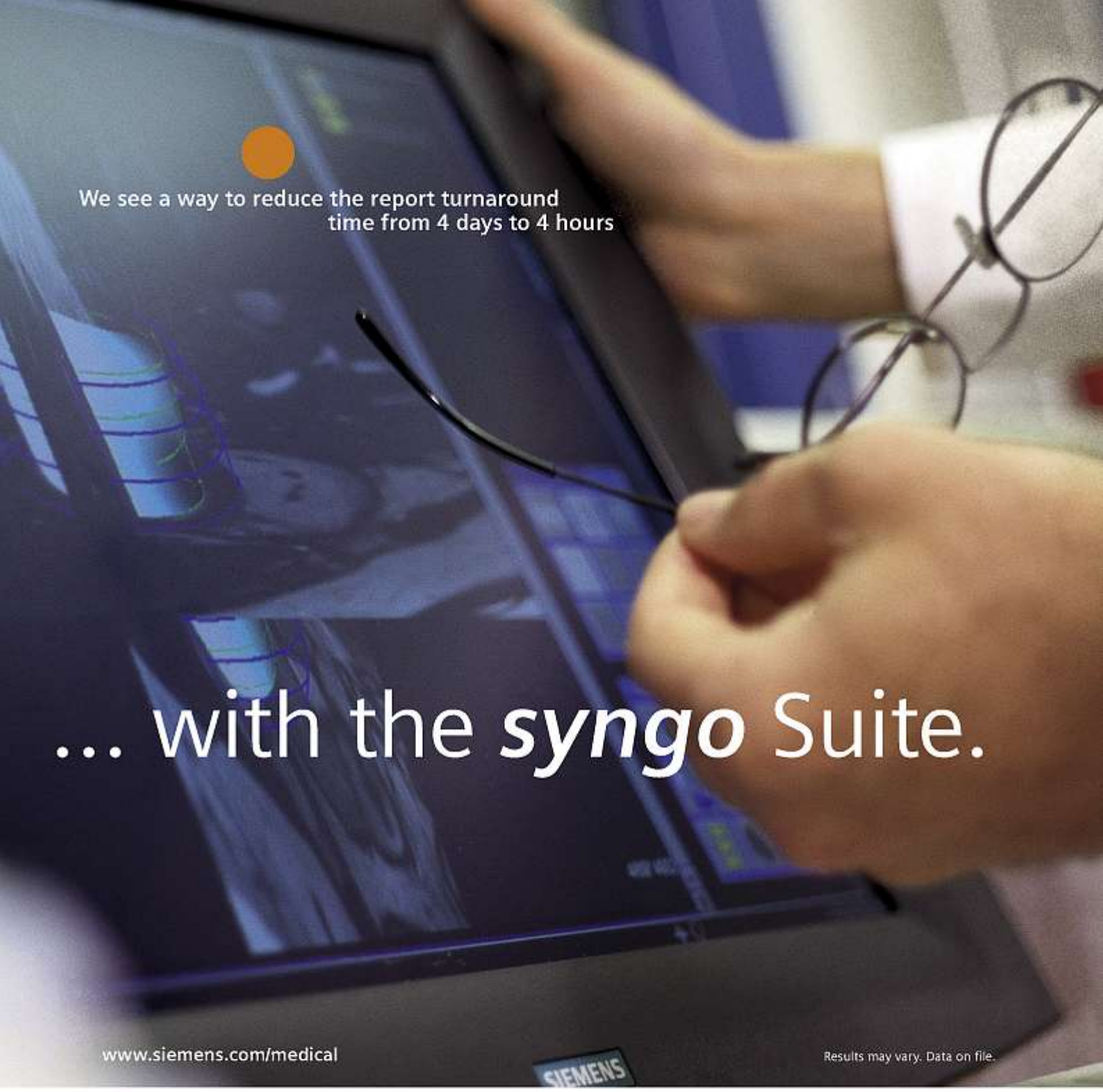
Associate members are representatives from healthcare organisations, who have the opportunity to speak, but not vote, at the HITM Annual General Assembly. Associate members will also have the privilege of electing one member to represent them in the Executive Members group.

Individual Members

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

Corporate Members

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



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European Association of Healthcare IT Managers (HITM) Membership Application

❑ **Yes,** I would like to apply for membership with the HITM as an Organisation

❑ **Yes,** I would like to apply for membership with the HITM as an Individual

Organisation Information

Organisation Name:

Street Address:

City/Town:

Postal Code:

Country:

Website:

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

Preferred Title:

Gender:

First Name:

Surname:

Position:

Function:

Department/Division:

Email Address:

Telephone:

Fax:

Mobile:

Membership categories per year:

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

Full Members: (directly involved in healthcare IT management)

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

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

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

❑ I apply for an initial reduction of my membership fee of 50%, valid until 31 December 2006

Associate Members (indirectly involved in healthcare IT management)

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

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

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

Individual Membership: (directly involved in healthcare IT management)

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

Corporate Membership (companies working in the IT field)

❑ **Please send me an offer.**

For more information on joining the European Association of Healthcare IT Managers, please contact Karmin Ruocco, Project Director, at k.ruocco.pd@eahitm.org.

HEALTHCARE IT MANAGEMENT

Subscription form

Ways to subscribe:

❑ Send an email with your name and address to support@eahitm.org

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

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Subscription rates

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

OPEN SOURCE INITIATIVE TARGETS BIRD FLU

IBM and over 20 major worldwide public health institutions, including the World Health Organization and the Centers for Disease Control and Prevention recently announced the Global Pandemic Initiative, a collaborative effort to help stem the spread of infectious diseases.

As part of the initiative, IBM said it would contribute several of its key software technologies to the open source community and establish healthcare "Innovation Centres" at the company's worldwide research laboratories to work with the global healthcare community on this initiative.

The threat of a pandemic is a definitely global phenomenon," said Samuel J. Palmisano, IBM's Chairman and Chief Executive Officer. "Our response must be similarly global, and must rely - as with so many other major issues we face today - on open, collaborative innovation. IBM is proud to join with our partners in this effort, grounded in our core value of 'innovation that matters'."

Some of the software used in this initiative will allow electronic health information to be more easily shared and mined for trends about outbreaks and how disease could spread. Called the Interoperable Healthcare Information Infrastructure (IHII), the technology is designed to improve communication and collaboration among medical professionals and researchers by helping them collect and share health data.

IBM also plans to build an open source community dedicated to using epidemiology tools to rapidly develop models about how disease might spread from place to place. The STEM (Spatio-Temporal Epidemiological Modeler) is designed to tap into information from IHII and other data sources like roadmaps, transportation infrastructures and animal migration patterns. The models could then be used in preparedness plans such as vaccine distribution.

Virgin to Install Telemedicine Equipment Across Fleet

Virgin Atlantic is to install telemedicine equipment on board all of its aircraft after signing a deal with British hardware company Remote Diagnostic Technologies.

The equipment (Tempus), designed for small spaces, can monitor pulse, temperature, blood pressure and blood oxygen as well as sending back video pictures of the patient. The company says non-medical staff can be trained how to use the new system in a few hours.

The system will be linked to an international telemedicine centre, MedAire Centre, in Phoenix, Arizona, which already has a database of airports and emergeny medical facilities around the world. Using satellite technology, the system will send vital statistics and video to doctors on the ground. The clinicians can then advise the best course of action to the plane crew. The upgrade from the older system will give greater backup to cabin crew.

Images sent across from the plane can be annotated by clinicians on the ground to aid communication. Doctors also have the option of remotely controlling the screen, starting and stopping readings. The telemedicine unit can fit in an overhead compartment or underneath an economy class seat.

European Biotech Industry Shows Signs of Chronic Underfunding

The latest figures published 30 May 2006 compare biotechnology sectors across some 18 European nations and the US. The report finds that European and US biotechnology industries both have around 2000 companies, but the US sector employs nearly twice as many people, spends around three times as much on research and development, raises over twice as much venture capital, and has access to 10 times as much debt finance. It also earns twice as much revenue.

According to John Hodgson, Partner at Critical I - a specialist biotechnology consultancy – who authored the study: "Venture capital is a luxury. Less than 10% of European companies win venture funds each year. But it is an indispensable luxury. Only properly capitalised companies can hope to compete globally in knowledge-intensive industries like biotechnology."

The report shows that Europe's science base is inventive, and the establishment of over 100 new biotechnology firms across Europe in 2004 is testimony to the fact that its inventors are entrepreneurial, too. However, the practicalities of funding innovation, whether in science or in business, are currently confounding the good intentions and enthusiasm", says John Hodgson.

This study identified 2,163 European biotechnology companies whose primary commercial activity was in biotechnology.

For more information, please visit www.europabio.org.

Frost & Sullivan Honours Siemens for Medical Imaging Growth and Technology Excellence

Frost & Sullivan recently presented its 2006 Medical Imaging Growth Award and 2005 Award for Excellence in Technology to Siemens Medical Solutions.

Each year, the Medical Imaging Growth Award is given to a company that has demonstrated an exceptional growth strategy within its industry. Siemens was chosen this year in recognition of its renewed commitment to pursue innovative growth strategies that forget the way for continued market expansion and sustained industry ascendancy. As part of their product portfolio, Siemens' products encompass a line of products and services spanning the entire range of medical imaging modalities and clinical specialties, from computed tomography (CT), magnetic resonance imaging (MRI), and digital radiography (DR) to offerings in mammography, surgical-interventional imaging and oncology care.

Frost & Sullivan's Excellence in Technology Award is given to a company that has pioneered the development and introduction of an innovative technology to the market, and either impacted or has the potential to impact several market sectors. In the field of fusion technology for medical diagnostics, Siemens and the University of Tennessee are recognised for their collaborative effort to create a unique PET/CT (Positron Emission Tomography/Computed Tomography) technology capable of bringing high-resolution fusion imaging into clinical practice.

European Parliament – the voice of European citizens

European institutions - This is the second part in a series which covers the structure and operations of the EU institutions. In the first of the series (Winter 2006), Helicia Herman introduced the European Commission (EC) and details of the EC Directorate-Generals relevant to healthcare IT professionals were presented.
This part of the series describes the composition, functioning and main role of the European Parliament. Parliamentary Committees which are responsible for developing the Parliament's votes on legislation and which may be of interest to healthcare IT professionals are also listed together with the contact details and chair persons and finally the process of lobbying is explained. The final two parts in this series, for Summer and Autumn 2006, will cover the Council of the European Union and the European Court of Justice.

Author
Sonja Planitzer
Title: Editor European Affairs
Organisation: Euromedical Communications
Email: europe@emceurope.com

OVERVIEW

The European Parliament (EP) represents the interests of the people of the European Union Member States. The President directs all activities of the Parliament and acts as its representative. Since 1979, its members (MEPs) have been directly elected every five years by the people they represent. MEPs hence represent their constituents at a European level. The present Parliament, elected in June 2004, has 732 members from all 25 EU countries. However, if the European Union's Constitutional Treaty comes into force in the future, its provisions will cap the size of the European Parliament. Rather than working in national divisions, the members sit in seven Europe-wide political groups; distribution of members across the four largest of these are shown in table 1. The distribution of members across countries is shown in table 2.

Table 1. MEP distribution across the four major European political groups

Political groups	Abbreviation	Number seats
European People's Party (Christian Democrats) and European Democrats	EPP-ED	268
Socialist Group	PES	201
Alliance of Liberals and Democrats for Europe	ALDE	88
Greens/European Free Alliance	Greens/EFA	42

The EP has three places of work: Brussels (Belgium), Luxembourg and Strasbourg (France). Whilst Luxembourg is the home of the administrative offices, the General Secretariat, meetings of the whole Parliament, known as plenary sessions, take place in Strasbourg for one week each month. Two-day and Committee meetings are held in Brussels.

Similar to the US Congress, Parliament does most of its work in specialist committees. Parliament has 20 committees, each covering a particular area of EU activity (for committees of interest to intensive care, please see below). During the committee meetings, MEPs prepare for the plenary session. At the plenary sessions, Parliament examines proposed legislation and votes on amendments before coming to a decision on the text as a whole.

THE EP´S MAIN ROLE

The Parliament's main task is to debate and vote on European legislation, just as a national Parliament votes on national legislation.

EU legislation is normally adopted jointly by the European Parliament and the Council. Both Parliament and Council may hold two readings of draft legislation and if, by then, they have not agreed on the same text, a conciliation committee composed of 15 representatives from each side negotiates a compromise which must then be approved by Parliament and Council. This procedure ensures that European legislation is acceptable both to the representatives of national governments (on the Council) and to MEPs whom the electorate has directly chosen to represent them.

Table 2. ***Distribution of MEPs by country (n = 732)***

Austria	18	Ireland	13
Belgium	24	Italy	78
Cyprus	6	Latvia	9
Czech Republic	24	Lithuania	13
Denmark	14	Luxembourg	6
Estonia	6	Malta	5
Finland	14	Netherlands	27
France	78	Poland	54
Germany	99	Portugal	24
Greece	24	Slovakia	14
Hungary	24	Slovenia	7
		Spain	54
		Sweden	19
		UK	78

In some fields (for example agriculture, economic policy, visas and immigration), the Council alone legislates, but it has to consult with Parliament. In addition, Parliament's assent is required for certain important decisions, such as allowing new countries to join the EU. Parliament also provides impetus for new legislation by examining the Commission's annual work programme, considering what new laws would be appropriate and asking the Commission to put forward proposals.

HOW DOES THE LEGISLATIVE PROCESS WORK?

A Member of the European Parliament, a rapporteur working in one of the parliamentary committees, draws up a report on a proposal for a legislative text presented by the European Commission. The parliamentary committee votes on this report and may amend it. When the text has been revised and adopted in plena-

ry, Parliament has approved and adopted the position outlined in the legislation. This process is repeated one or more times, depending on the type of procedure and whether or not agreement is reached with the Council through the co-decision procedure.

THE CO-DECISION PROCEDURE

Co-decision gives the same weight to the European Parliament and the Council of the European Union over a wide range of areas; two-thirds of European laws are adopted jointly by the European Parliament and the Council. The co-decision procedure was introduced by the Maastricht Treaty on the European Union in 1992, and extended and made more effective by the Amsterdam Treaty in 1999.

IN WHAT WAY DOES THE EP ADD VALUE TO THE EU?

A significant contribution of the EP is in the diffusion of potential national conflicts. Whereas the Council may appear to be concluding decisions following debates between those representing national interests, the Parliament operates in a different way. The fact that the Parliament organises itself in political groups rather than national delegations means that disagreements on most concrete subjects are between political viewpoints or sector interests, rather than between nations.

The European Parliament is part of what makes the EU radically different from a traditional intergovernmental organisation. Indeed, imagine the EU without the Parliament: it would be a system totally dominated by bureaucrats and diplomats, loosely supervised by ministers flying periodically into Brussels. The existence of a body of full-time representatives at the heart of decision-making in Brussels, asking questions, knocking on doors, shining the spotlight on dark corners, and dialoguing with constituents back home, makes the EU system more open, transparent and democratic than would otherwise be the case. MEPs are drawn from governing parties and opposition parties and represent not just capital cities, but the regions in their full diversity. In short: "The Parliament brings pluralism into play and brings added value to the scrutiny of EU legislation" (Richard Corbett, MEP, 2005).

Below is a list of committees working on relevant issues.

Committee for Employment and Social Affairs (EMPL)
www.europarl.eu.int/committees/empl_home.htm
Chairman: Jan Andersson, Sweden, PES
jandersson@europarl.eu.int
The committee is responsible for:
- *employment policy and all aspects of social policy such as working conditions, social security and social protection;*
- *health and safety measures in the work place;*
- *the European Social Fund;*
- *vocational training policy, including professional qualifications;*
- *the free movement of workers and pensioners;*
- *social dialogue; and*
- *all forms of discrimination at the work place and in the labour market except those based on gender.*

Committee for Environment, Public Health and Food Safety (ENVI)
www.europarl.eu.int/comparl/envi/default_en.htm
Chairman: Karl-Heinz Florenz, Germany, EPP-ED
kflorenz@europarl.eu.int
The committee is responsible for:
- *environmental policy and environmental protection measures, in particular concerning air, soil and water pollution, waste management and recycling, dangerous substances and preparations, noise levels, climate change, protection of biodiversity;*
- *public health, in particular: (a) programmes and specific actions in the field of public health; (b) pharmaceutical and cosmetic products; (c) health aspects of bioterrorism; (d) the European Agency for the Evaluation of Medicinal Products and the European Centre for Disease Prevention and Control; and*
- *food safety issues, in particular the labelling and safety of food products.*

Committee for the Internal Market and Consumer Protection (IMCO)
www.europarl.eu.int/comparl/imco/default_en.htm
Chairman: Philip Whitehead, United Kingdom, PES
phillip@phillipwhiteheadmep.net
The committee is responsible for:
- *coordination at the Community level of national legislation in the sphere of the internal market and customs, in particular: (a) the free movement of goods including the harmonisation of technical standards; (b) the right of establishment; (c) the freedom to provide services except in the financial and postal sectors;*
- *measures aiming to identify and remove potential obstacles to the functioning of the internal market; and*
- *the promotion and protection of the economic interests of consumers, except for public health and food safety issues, in the context of the establishment of the internal market.*

Committee for Industry, Research and Energy (ITRE)
www.europarl.eu.int/committees/itre_home.htm
Chairman: Giles Chichester, United Kingdom, EPP-ED
gchichester@europarl.eu.int
The committee is responsible for:
- *EU industrial policy and the application of new technologies;*
- *EU research policy, including the dissemination and exploitation of research findings, and*
- *the information society and information technology, including the establishment and development of trans-European networks in the telecommunications sector.*

Other possibilities for contacting the EP
You can also contact the European Parliament through its Correspondence with Citizens Unit, which will provide an answer to your questions: www.europarl. eu.int/registre/portail/CourrierCitoyen.cfm?langue=EN

Parliamentary committees

The European Parliament has 20 parliamentary committees, each consisting of between 25 and 78 MEPs. These committees are presided by a chair and have a bureau and secretariat. The political make-up of the committees reflects that of the plenary assembly. The committees meet once or twice a month in Brussels and debates are held in public. The committees draw up, amend and adopt legislative proposals and own-initiative reports.

Moreover, any resident of the European Union, whether or not a citizen of a Member State, may, individually or in association with others, submit a petition to the European Parliament on a subject which falls within the European Union's fields of activity, and which affects them directly. Any company, organisation or association with its headquarters in the European Union may also exercise this right of petition.

Finally and also of interest regarding individuals' rights, Article 255 of the Treaty establishing the European Community states that citizens and residents of the European Union have a right of access to European Parliament, Council and Commission documents.

Author

Sonja Planitzer
Title: German Editor
Organisation: Euromedical Communications
Email: europe@hospital.be
Website: www.emceurope.com

Lobbying MEPs

Sonja Planitzer explains what an MEP can do for you, how to reach the right person and how to prepare for lobbying.

+ Lobbying your MEPs

Currently there are about 15,000 lobbyists in Brussels (consultants, lawyers, trade associations, corporations, NGOs) seeking to influence Commission officials and MEPs in their decision-making process. Officially, MEPs attend to their own government policies, the political grouping they belong to in the European Parliament (EP), their constituents and lobby groups in Brussels.
You can lobby an MEP to:

- Vote in a certain way on legislation.
- Represent an opinion in committee discussions on new laws.
- Put you in touch with other MEPs interested in your campaign.

Your MEPs also have a responsibility to help you understand European laws and advise you on their impact.

+ Tips for lobbying

Targeting the right MEP - A full list of MEPs is available at: www.europarl.eu.int/members/public.do? language=en.

To target and prioritise whom to lobby, you need to research MEP's interests:

- Which Parliament Committee do they belong to? (Prioritise members over substitutes.)
  www.europarl.eu.int/memberrrs/expert.do
- Do they chair or vice chair their European political group?
  www.europarl.eu.int/members/expert.do
- Are they the spokesperson for their home party in the EP?
  Visit the EP website or MEP websites. MEPs either have their own sites, or home party sites. Search on www.google.com for each MEP by name.
- Which constituency does the MEP represent? Having a local connection with an MEP gives you the advantage of knowing what that MEP's interests are.

+ Contacting the MEP

Enquiries are dealt with in Brussels or in the home country of the MEP, so you can contact an MEP at either office. Some MEPs have a preference, however, so phoning the home office to ask an MEP's assistant how best to proceed may help. The kind of contact MEPs are most likely to respond to is a personal letter or email. This needs to be signed (or contain the constituent name and address), easy to read, and explain in a few sentences your reasons for contacting the MEP and what your main arguments on the issue are.

+ Meeting the MEP

MEPs spend some time in Brussels, Strasbourg and their constituency office, so you can arrange to meet them in Belgium, France or their home country. The meeting should be well prepared for - it is important to express your concerns clearly. Prepare a short speech of approximately 10 minutes, and write your arguments in a position paper to leave with the MEP. If you see the MEP together with other people, make sure your position is clear and that no contradictions confuse the issue.

+ Targeting the rapporteur

If your local MEP is not involved in the issue of your concern, you need to contact the rapporteur (designated MEP) who is in charge of preparing the committee´s report on the relevant legislative proposal. Find an MEP who is on the committee you are interested in and ring them to ask who the rapporteur is. If you do not speak a common language with the rapporteur, lobbying will be more difficult and you may need to contact your home country MEP on the Committee, and work through them. Once you know who the rapporteur is, a letter campaign directed at them, whatever their native language, still highlights the issue.

+ Follow-up

Once you have sent a letter or email, you need to follow up by phoning the MEP some time later, to re-emphasise your points.

"They gave me back my life."

Fusing SPECT and CT images to diagnose infection with pinpoint accuracy.

Dr. Stephen Scharf (left) and Ronnie Sitton (above)

When renowned Orthopedic Surgeon Lon S. Weiner, M.D., Section Chief, Orthopedic Trauma, Lenox Hill Hospital (Manhattan, New York, USA), agreed to see Madlyn Sitton's son, he had no idea just how grave the situation was. Until he saw the leg. Hit by a car in the summer of 2004, 15-year-old Ronnie Sitton was lucky to be alive. Rushed to a nearby hospital, surgical fixation to repair shattered femurs in both legs left him immobile for three months and on crutches for six. While his right leg healed, his left leg started to swell.

"By the time I saw him, nearly a year and a half post surgery, I knew we had just a matter of time to reverse a potentially tragic outcome," says Dr. Weiner. "Ronnie had no knee mobility. His left leg was twice as big as the other; it was so swollen and angry that we thought he might have a vascular situation. When his Doppler came back clear, I suspected we were dealing with an occult infection. That's when I sent him to Dr. Scharf."

Stephen C. Scharf, M.D., Chief of Nuclear Medicine, Lenox Hill Hospital performed a gallium study using the new Philips Precedence SPECT/CT system and immediately discovered an abnormality in the leg. "With SPECT alone, we would have been able to confirm a soft tissue infection. However, by fusing SPECT images with CT images we were able to pinpoint the exact location of the infection. In this case, the SPECT/CT scan showed infection in the screws with soft tissue infection in the lateral part of the thigh," recalls Dr. Scharf.

"We used the power of the scan to help us save this boy's leg. Not only did the scan confirm one of our suspicions, but it also guided us and allowed us to intervene with tremendous accuracy. We removed the plates and screws, cleaned out the infection, and most importantly, stayed away from the knee," says Dr. Weiner. "We eliminated the 'maybes' by fusing the two images, by connecting the what with the where," adds Dr. Scharf.

Mrs. Sitton shudders to think of the 'what ifs?' and credits Dr. Weiner, Dr. Scharf and Philips for saving her son's life. "Ronnie had had numerous scans and no one was able to determine what was going on with his leg. I knew something was wrong and I knew I had to find an answer. I sorted through 200 names until I found Dr. Weiner. The fact that he knew Dr. Scharf and that Dr. Scharf had the technology to diagnose the problem … it's a miracle."

As for Ronnie, he's not only walking, but is also back on his skateboard. "Folks kept telling me how lucky I was to have survived the accident with just two broken legs. But the lucky part was having my mom with me — she never left my side and never let me give up."

For more information on this story and Philips Medical, go to www.philips.com/patientstories

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ECRI Europe
Weltech Centre Ridgeway
Welwyn Garden City
Herts AL7 2AA
United Kingdom

Tel: +44 (0)1707 871511
Fax: +44 (0)1707 393138

info@ecri.org.uk
www.ecri.org.uk

ECRI (formerly the Emergency Care Research Institute) is a nonprofit health services research agency and a Collaborating Centre of the World Health Organization (WHO). Such organisations are appointed to contribute to the WHO's public health mission by providing specialised knowledge, expertise and support in the health field to the WHO and its member nations. ECRI's mission is to improve the safety, quality, and cost-effectiveness of healthcare. It is widely recognised as one of the world's leading independent organisations committed to advancing the quality of healthcare with over 240 employees globally.

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ECRI's services alert readers to healthcare system and technology-related hazards with strategies to correct them; disseminate the results of medical product evaluations and health technology assessments; provide expert advice on technology acquisitions, staffing, and management; report on hazardous materials management policy and practices; and supply authoritative information on risk control in healthcare facilities and clinical practice guidelines and standards.

Amongst its many products and services, ECRI is pleased to provide the readers of Healthcare IT Management with sample information on products for computerized provider order-entry systems (CPOE) from its Healthcare Product Comparison System (HPCS), which contains over 280 reports. This Product Comparison covers networked computerised provider order-entry systems that allow authorised users to assign tasks to specific healthcare workers and to enter orders online. Included are systems that are capable of bidirectional communication with pharmacy, clinical laboratory, and radiology information systems.

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

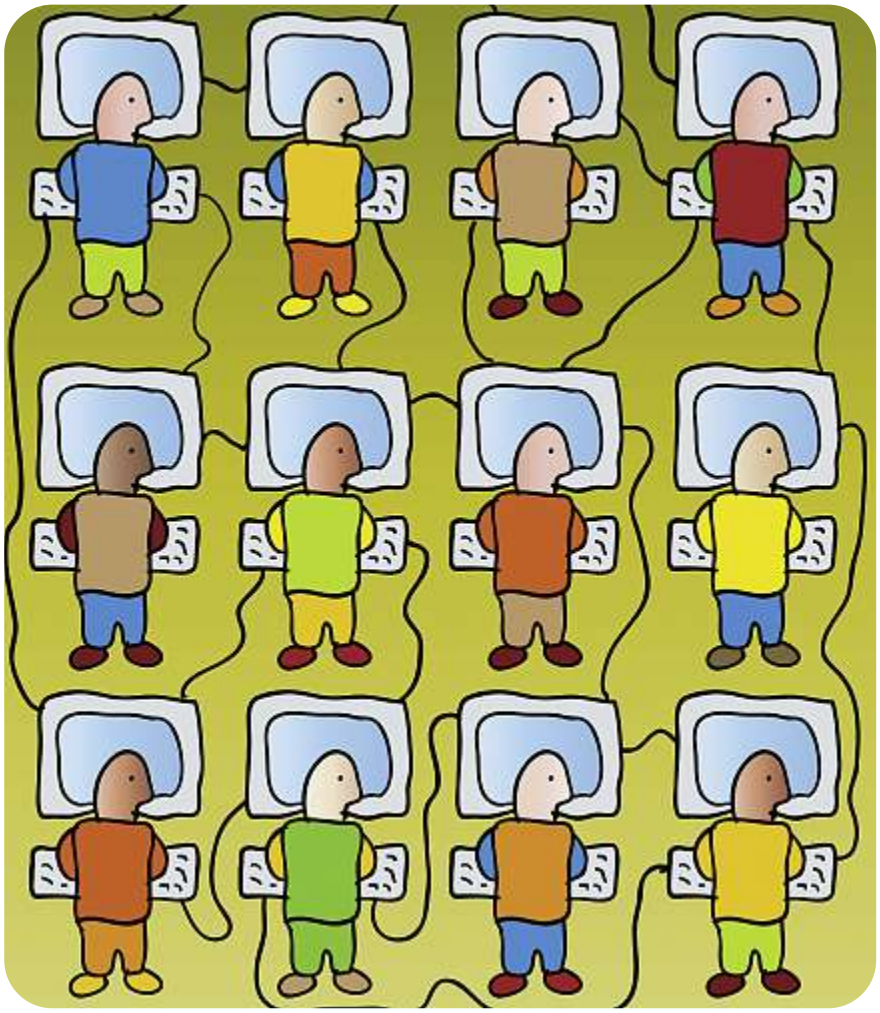
The data presented are extracted from ECRI's 2005 database and have additionally been reviewed and updated, where possible, by the respective manufacturers. Publication of all submitted data is not possible: for further information please contact ECRI or k.ruocco.me@eahitm.org.

ECLIPSYS	ECRI-RECOMMENDED SPECIFICATIONS	CERNER	CLINICOMP
MODEL	COMPUTERIZED PROVIDER ORDER ENTRY	POWER ORDERS	ESSENTRIS CPOE™
WHERE MARKETED		Worldwide	Worldwide
SYSTEM CONFIGURANTION		LAN/WAN/remote host	Both
LAN/ASP			
Server		IBM or Compaq	Gen5 (based on HP-UX platform)
Remote stations	Hardwired, wireless	Hardwired, wireless	Hardwired, wireless
Operating systems		Windows NT/2000/XP	Windows NT/2000, XP, LINUX, UNIX
Program languages		Visual C, Visual Basic, OLE, OCX	C++, JAVA, others
Database management		Oracle	Real time, Oracle 9i, ODBC compliant
Peripheral devices	Laser printer, ID devices	Laser printer, biometric ID devices, PDAs, barcode device	Laser printer, biometric ID devices
NETWORKING			
Architecture	Client/server	Client/server	Client/server, 3-tier
Communication protocols		Ethernet, TCP/IP	Gigabit Ethernet, TCP/IP
Extranet	Yes	Yes	Yes
Configuration		VPN	VPN
PhIS			
Integration	Yes	Cerner PharmNet, Cerner EMR	Connects to any HL7-compatible PhIS
Interfacing	Specific to facility PhIS	Yes	Connects to any HL7-compatible PhIS
ORDERS/TESTS			
Medication	Yes	Yes	Yes
Diagnostic lab	Yes	Yes	Yes
Radiology	Yes	Yes	Yes
IV fluids	Yes	Yes	Yes
ADT and bed type	Yes	Yes	Yes
Consultation	Yes	Yes	Yes
Diet	Yes	Yes	Yes
Enteral/parenteral nutrition	Yes	Yes	Yes
Activity/restraints	Yes	Yes	Yes
Respiratory therapy	Yes	Yes	Yes
Physical therapy	Yes	Yes	Yes
Occupational therapy	Yes	Yes	Yes
Treatments	Yes	Yes	Yes
Monitoring	Yes	Yes	Yes
Nonformulary drugs	Yes	Yes	Yes
Others	Customizable	Personalized/conditional orders	Yes
SOFTWARE			
Patient management			
Demographics	Yes	Yes	Yes
Profiles	Yes	Yes	Yes
Allergies/ Diagnoses	Yes/ Yes	Yes/ Yes	Yes/ Yes
Drug database	Yes	Cerner Multum	Medispan
Last update		June 2006	Quarterly
ORDER ENTRY			
Single screen	Yes	Yes	No
Auto time-out	Yes	Site adjustable	Configurable
Resume/restart	Yes/yes	Yes/yes	Yes/yes
ORDER RPROCESSING			
Response time, sec (basic)	<1	<1	2
Parameters	User defined	Medication, patient allergies, dose, dose form, route, frequency, duration of order, others	Medication, patient allergies, dose, dose form, route, frequency, duration of order, PRN order
Order sets	Define, store, retrieve	Define, personal favorities, others	Define, store, edit, retrieve
Prep instructions	IV solutions/TPN	Additional specs available	Treatment/procedures
ORDER OUTPUT MAR		Yes	Yes
Reports	Electronic, printed	Printed, electronic	Printed, electronic
Generation	Ad hoc, scheduled	Ad hoc or scheduled batch	Ad hoc, batch
KNOWLEDGE BASE			
Internet	Directly accessible	Directly accessible	Directly accessible
Rules engine	Yes	Yes	Yes
Rules details	Directly accessible	Directly accessible	Directly accessible
Drug monograph	Directly accessible	Directly accessible	Directly accessible
SAFETY ALERTS			
Synchronous	Allergies, drug interactions, test interactions, dose limits, duplicate therapy, contraindications	Allergies, drug interactions, test interactions, dose limits, duplicate therapy, contraindications, others	Allergies, drug interactions, dose limists, duplicate therapy, contraindications
Asynchronous	Lab results	Abnormal lab results, assessment documentation result	Not specified
Severity levels	User defined	Customizable	Customizable
Override			
Low level	Mouse click	Mouse click	Mouse click
High level	Reason, signature	Reason, electronic signature	Persmissions driven with audit trail
DATABASE INTEGRITY	Automatic backup	Automatic backup, disk mirroring	Automatic backup, redundant, fault tolerant
SYSTEM SECURITY	User ID, password, encryption	User ID, password, biometrics	User ID, password, order verification, permissions, audit trail
HL7/ Version	Yes	Yes/ 2.2, 2.3, 2.4, 2.5	Yes/ 2.3, 2.4
Other standards supported		CCOW, ASNIX.12 version 4010	None specified

ECLIPSYS	EPIC SYSTEMS CORPORATION	MCKESSON	MISYS
SUNRISE CLINICAL MANAGER	EPICCARE ENTERPRISE CLINICAL SYSTEM	HORIZON EXPERT ORDERS	MISYS CPR VERSION 5.0
Worldwide	Primarily North America	Worldwide	USA, Canada, UK, Ireland, Denmark, Middle East
Either	LAN	Networked server	Not specified
Windows 2000/2003 compatible	HP, IBM, Sun, and others	HP or IBM	Mid-range enterprise IBM AIX server
Hardwired, wireless	Hardwired, wireless	Hardwired, wireless	Windows 2000/XP
Windows 2000, XP	C# (.Net), Visual Basic, DHTML	UNIX (HP/UX, AIX)	Windows 2000/XP
Visual Studio .NET, C++, C#	Chronicles, Oracle, MS SQL, Teradata	Java, Visual C++	C, Java, Cache Object Script
SQL	Printer, fax, biometric devices, handhelds	Oracle	InterSystems Cache
Optional printers, biometric ID handhelds		Laser printer, biometric ID devices	Workstations, printers, info systems, instruments
Client/server	Client/server	Web based, service oriented, n-tier	Client/server
TCP/IP	TCP/IP	Internet, Ethernet, TCP/IP, FTP	TCP/IP, 802.11b standard
Yes	Yes	Yes	Not specified
VPN, broadband	SSL, VPN	VPN	IPX/SPX, Named Pipes
Pharmacy support module within core products	EpicRx Pharmacy System	Horizon Meds Manager	HL7, others
Mediware WORx, Cerner Classic, others	Bidirectional HL7 to exchange data for outpatient prescriptions	Horizon Meds Manager	ATC-212, Pyxis, SureMed, HBOC Robot, GE Centricity, etc.
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Nursing and conditional orders	Nursing/conditional/reflex, residency	None specified	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes/ Yes	Yes/ Yes	Yes/ Yes	Yes/ Yes
Multum 2.3.7	Open platform	First DataBank	Medispan
Monthly		September 2004	May 2006
Yes	Yes	Yes	Configurable
Configurable	Configurable	Yes	Yes
Yes/no	Yes/yes	No/no	Yes/yes
<1 on submit	<1, field-to-field	Hardware dependent	1
Medication, patient allergies, dose, dose form, route, frequency, duration of order, PRN order	Medication, site, allergies, dose, dose form, route, frequency, duration of order, PRN, other	Medication, patient allergies, dose, dose form, route, frequency, duration of order, PRN order	Yes
Definable	Define, store, retrieve	Define, store, retrieve	Yes
Within order sets	IV, TPN orders	IV solutions	Yes
Yes	Yes	Yes	Yes
Crystal Reports 8.5	Printed, fax, Web	Printed	Yes
Ad hoc	Ad hoc, schedules	Ad hoc	Yes
Directly accessible	Directly accessible	Yes	Yes
Yes	Yes	Yes	Yes
Directly accsessible	Directly accessible	Yes	Yes
Multum	Directly accessible	Yes	Yes
Orders, allergies, diagnoses, charting, clinical documentation, ADT (new visit), allergy checking	Med allergies, drug-drug/ food/ alcohol/ result, procedure-allergy, dose limits, duplicate therapy, contraindications, others	Allergies, drug interactions, test interactions, dose limits, duplicat therapy, contraindications	Yes
Orders, results, tasks, new-visit creation, allergies	Real time at POC, on demand before orders signed	Abnormal lab results	Yes
Customizable	Configurable	Customizable	Yes
Mouse click	Mouse click, signature	Customize at facility level	Yes
Reason, electronic signature	Reason, signature	Reason, electronic signature	Yes
Automatic backup, disk mirroring	Automatic backup, disk mirroring	Automatic backup, disk mirroring, RAID	Redundant database servers, online backup
User ID, password, network encryption	Configurable	User ID, password, order verification	Menu function, procedure specific, data element, intrafunction, employee type
Yes/ 2.1, 2.3, 2.3, 3.0	Yes/ 2.3, 2.4, 2.5; architectural support for V3	Yes/ 2,3	Yes/ any 2.x
Arden syntax, HL7, CCOW, SOAP msg	ITSANSI X12, XML	CCOW	DICOM via Media Manager

TELEMEDICINE & MOBILE TECHNOLOGIES – IMPROVING CONNECTIVITY BETWEEN PHYSICIANS & PATIENTS

By: Bill Crounse, MD



ENTERING INTO A NEW ERA IN TELEMEDICINE

By the year 2010, approximately four out of ten people in Western Europe will be over the age of 65. Like most older people, many will have at least one chronic medical condition, with large numbers suffering from two or more. This aging population will have a significant impact on a healthcare system already straining to overcome labour shortages and budget limitations. With growing demand and constrained resources, the cost of treating more and more people with chronic conditions such as diabetes, cancer, and congestive heart failure could stretch government healthcare budgets to the breaking point.

In the face of inevitable demographics, we must find ways to deliver more efficient, cost-effective, personalised care to our patients. But how? Of course there is no simple answer to such a complex challenge. Nonetheless, I believe that any affordable solution must include the effective use of advanced communication and collaboration technologies.

In particular, telemedicine promises greater access to healthcare and, in some cases, higher quality care, at reduced overall costs to the patient and the medical system.

AFFORDABLE TECHNOLOGY IMPROVES THE VIABILITY OF TELEMEDICINE

Broadly defined as the use of information technology and telecommunications to deliver health care at a distance, telemedicine was once considered a good choice only in cases where there simply was no other alternative - for example, to treat patients in locations where healthcare resources were scarce or non-existent. Its limited role for delivery of routine care had in part to do with preconceptions about how medical services should be delivered, and in

part with its related costs, as telemedicine was once an expensive and hardware-intensive way to reach out to patients.

Advances in technology during the past ten years have been so great, however, that anyone with a notebook computer, a personal digital assistant (PDA), or even a wireless telephone can do what just a few decades ago required a multimillion dollar broadcasting facility, namely linking individuals or groups with rich media, text, graphics, audio, video, and interactive applications.

Consider how things have changed. Dr. Joseph Kvedar, founder and director of Partners Telemedicine and Vice Chair of Dermatology at Harvard Medical School, tells me that ten years ago he began researching the role digital imaging might play in dermatology. His camera was a Kodak model that sold for € 8,500 and took photos with 1.5 megapixels of resolution. "Plus, at the time," Dr. Kvedar says, "we didn't have a clear path to digital storage. Hard drives were small, we didn't have burnable CDs, and web browsers weren't yet prominent. Now you can pick up a cell phone or SmartPhone, with a great lens and two megapixels of resolution. It's about € 290, with the network built right in."

What does this mean for medicine? In the case of Dr. Kvedar's specialty, dermatology, it means that anyone with a wireless phone has more imaging and transmission capability today than what was available to researchers a decade ago. Patients and physicians can quickly and easily exchange photos of a healing wound, bedsore, or rash, possibly eliminating a trip to the doctor's office - or identifying a problem early enough that it is still easily treatable.

More significantly, it means that many of the routine tasks involved in preventative care and health maintenance can now be performed from a remote location without a daunting investment in equipment and infrastructure. That is why I am convinced that telemedicine and home monitoring may be part of the answer to many of the crises we currently face in healthcare, including a growing population of elderly patients and a shrinking supply of healthcare providers.

CHANGING HEALTHCARE FOR A CHANGING POPULATION

Advances in wireless technology have been one key to the rapid evolution of applications and services. Wireless technology today is not only inexpensive, it is simple and reliable. It can be adapted for use in recognisable cell phone form factors or embedded in any number of other medical devices. And it can easily be used to record, analyse, and display relevant health information about a patient.

Scientists have developed software that can connect inexpensive physiological monitors to SmartPhones by using Bluetooth technology. The SmartPhone serves as a computer to analyse the data and as a communicator to transmit the data to a relevant caretaker. Likewise, a small wireless device for monitoring heart rates has also been developed. Worn on a belt clip or around the waist, the device transmits a patient's heart rhythm to a wireless phone-like device that transmits ECG information to a monitoring station. Should a patient experience an arrhythmia, information about the heart's condition is beamed to a monitoring centre for evaluation, and a doctor can be immediately consulted.

Such technology not only makes it feasible and less expensive to monitor patients, it makes better use of limited healthcare resources. Consumers benefit from unobtrusive, but effective, home monitoring and interventions when necessary. Healthcare workers can now watch over many patients at once and intervene in a timely manner—possibly circumventing a crisis—when a patient's vital signs indicate a need for medical assistance.

MOVING TO A PROACTIVE MODEL OF CARE

Recording information and transmitting an analysis is just one step in the continuum of what we can do with telemedicine. The technology is capable of much more than this. And we need to exploit its full capabilities if we are to truly extend our care model.

Instead of only monitoring a patient's current state, telemedicine can also include the dispensation of advice and medical education, even proactive intervention.

One new development is a wireless phone with an embedded chip for monitoring glucose. Diabetes patients can insert a blood test strip into the phone. The phone reads the test strip, and then sends blood-sugar levels to a doctor, nurse, or even a parent. In this manner, a patient in need of rapid intervention can be summoned promptly to a hospital or doctor's office. This is a great start.

But how about giving patients a gentle reminder to check their blood sugar before a crisis requires an office visit? This type of proactive care is exactly what Dr. Harold Goldberg set out to do when he employed video games and SmartPhones to help teens with diabetes monitor and control their disease. Goldberg devised software that can be connected to a game system or SmartPhone and used to entice adolescents to check their blood sugar, to exercise, and to eat right, in addition to giving them an easy way to report glucose levels to their managing physician. The software, which can send a text message or pop-up reminder, has been shown to improve compliance and adherence to insulin protocols among diabetic teens.

Call it telemedicine, or call it home-based "co-management" of disease, as Goldberg notes, it changes the paradigm of chronic disease management. No longer something that happens once every four months for 15 minutes inside an examining room, it goes on every day, with the patient taking more responsibility for his or her health, and the provider giving prompt, regular, personalised feedback. Such feedback is an important and often overlooked element in helping *all* patients to adopt and maintain healthier behaviours. In other words, telemedicine, thoughtfully implemented, enables healthcare practitiotioners to deftly provide just the right amount of care when and where it is needed, strengthening the bond between patient and provider.

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Author

Bill Crounse, MD
Title: Healthcare Industry Director
Organisation: Microsoft Corporation
Email: bcrounse@microsoft.com
Website: www.microsoft.com

For a copy of the references contained in this article, please contact k.ruocco.me@eahitm.org.

About the Author

Bill Crounse, MD, is Healthcare Industry Director for the Microsoft Corporation. Prior to joining Microsoft, Dr. Crounse was Vice President and Chief Medical Information Officer for Overlake Hospital Medical Center and the Overlake Venture Center in Bellevue, Washington. Dr. Crounse has also served as a physician broadcaster and medical editor for numerous networks. Most recently, he was also the keynote speaker at the National Meeting for the American Telemedicine Association in May 2006.

EUTELSAT. COMMUNICATIONS VIA SATELLITE FOR MEDICINE WITHOUT FRONTIERS

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

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Eutelsat S.A.
70 rue Balard
75502 Paris Cedex 15 - France
T. +33 1 53 98 47 47
F. +33 1 53 98 37 00
www.eutelsat.com

Pentastudio
Eutelsat External Relations in Italy
C.so Palladio 114, 36100 Vicenza - Italy
T. +39 0444 543133
F. +39 0444 543466
penta@pentastudio.it

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TMA Vision for citizen-centred eHealth

TMA-BRIDGE: A STEP TOWARDS INTEROPERABLE eHEALTH FOR EUROPE

By: Arnaud Runge, Cristina Bescos, Marie Diop, James Kass & Didier Schmitt

THE TM ALLIANCE

In 2002, the European Space Agency (ESA), the World Health Organisation (WHO) and the International Telecommunication Union (ITU), under the auspices of the European Commission (EC), initiated a unique partnership in eHealth: specifically, to build a vision for the provision of telemedicine to European citizens by 2010. This partnership was called the Telemedicine Alliance[1].

During its first phase of work - Phase-I: TM Alliance (Build the Alliance and analyse the terrain), a vision for citizen-centred eHealth services by 2010, was formulated. This vision presents a network of healthcare systems centred, not only around the healthcare providers, administrators, decision-makers, or other powerful interest groups, but around actively demanding European citizens. A key outcome of this study[2] phase was that a major obstacle to implementation of eHealth was the issue of interoperability[3] in its broadest meaning[4].

TMA-BRIDGE: BUILDING THE BRIDGE TO IMPLEMENTATION

Having identified interoperability, in Phase-I, as being a major obstacle to the development of eHealth in Europe, this was chosen as the main theme for Phase-II. In this phase, TMA took up the challenge of planning a strategy that would bring the Vision one step closer to reality, thus the name of this phase: "TMA-Bridge - building the bridge between the present state and the future state." The goal of achieving transnational interoperability is illustrated in the figure above, where services and data exchange move freely across borders, even between very different healthcare systems. Rather than make high-level recommendations associated with the desired end goals, TMA took it upon itself to identify a set of concrete actions of limited scope, which if carried out, would each help and serve as a basis and catalyst towards further progress along the difficult road towards the realisation of citizen-centred transnational eHealth in Europe.

To reach this goal, TMA called together two workshops of experts representing the various stakeholders of eHealth, where the key problems of interoperability were discussed and recommendations were worked on and reviewed. In line with TMA's philosophy of approaching these issues holistically, an attempt was made to span all frameworks of eHealth, including political, organisational, social, and technical. Implementation of mutually complementary perspectives will ensure reasonable progress and optimise the timing for the process change. The expected involvement of the European Parliament and the Council of Ministers, the

inclusion of eHealth in the developments of eEurope, and adequate financial commitment are underlying conditions in order to place the issue of transnational interoperability as a high priority for decision-makers. The resulting concrete recommendations are considered to be necessary steps that will help the eHealth community come closer to achieving its goal and serve as catalysts for future actions.

The following summary of the recommendations are reproduced from the TMA-Bridge Final Report[1] and are addressed to the EU Council of Ministers, the European Commission, the national Ministers of Health, the European Parliament, and all those from the eHealth stakeholder community who are able to take action:

POLITICAL PERSPECTIVE

1. Take legal and regulatory action.

a. Develop a legal framework (common guidelines) for health data transfer.

b. Bring Member State's confidentiality and privacy laws into harmony, especially regarding health data.

c. Develop a clear statement on the legal liability for treatment both to cover bilateral and European-wide agreements.

2. Create and implement a framework for monitoring and evaluation, to measure progress towards meeting transnational citizen's needs.

ORGANISATIONAL & SOCIAL PERSPECTIVE

3. Develop a workflow model that will incorporate organisational and social models into transnational systems so that clear and unambiguous guidelines can be developed for all aspects of transnational eHealth.

4. Create an environment for sharing knowledge of proven (good) practice and build the knowledge and capability of health professionals.

5. Create the facilities and the content to ensure that eligibility to receive treatment and reimbursement, can be known at the point and time of care, by the patient and the care provider.

6. Ensure that relevant data, in electronic form, is available to the treating healthcare professional and citizen.

7. Ensure that language and cultural differences are incorporated into the system and available at the point and time of care.

TECHNICAL PERSPECTIVE

8. Create a European telecommunications infrastructure as part of the eEurope initiative, which will provide the technical support for the transmission of data in a manner conforming to the data protection legislation in place, and which meets the needs of eHealth.

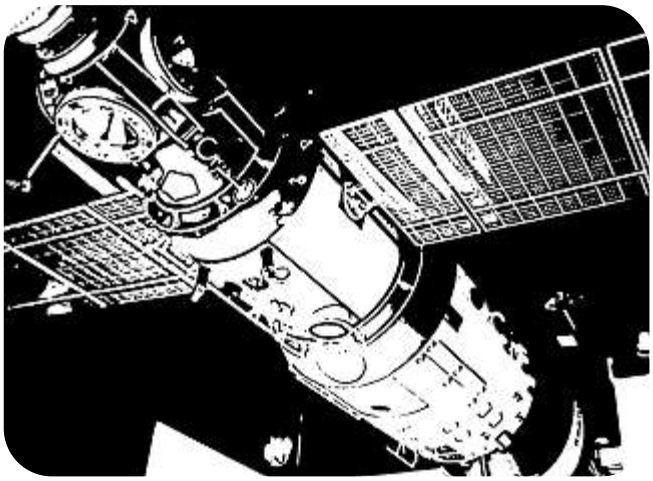
9. Incorporate a set of value-added applications into the infrastructure, by identifying and implementing a set of achievable key applications.

10. Develop a central access point for health information standards, by establishing one access point for health information standards for the semantic content, coding classification and ontologies.

11. Increase awareness of the importance of existing interoperability-related standards for eHealth, by ensuring that data-interchange standards are known, understood and implemented in both supplying and procuring organisations.

By publishing these recommendations, TMA is challenging decision-makers to take concrete action towards achieving the long-term vision of truly citizen-centred healthcare that attempts to resolve artificial obstacles such as problems of interoperability, national boundaries or distance. There were many more proposed recommendations considered, and certainly those selected are only a subset: but by keeping them to a small number, it is hoped that action can and will be taken. The selection was based on the highest impact for all key players involved. Implementation of these measures, and the resulting impetus thus given to transnational eHealth should galvanise European Industry and the European Health Care Organisations to increased action and initiative.

The ultimate goal of achieving interoperable eHealth will not only enable growth of transnational European cooperation and foster the growing group of transnational European citizens, but also strengthen the hand of European industry and catalyse innovation, thus enabling Europe and Europeans to assume their rightful place, role, and responsibilities incumbent upon them on the world stage.



Authors

Arnaud Runge
Title: Biomedical Engineer
Organisation: European Space Agency
Email: Arnaud.Runge@esa.int
Website: www.esa.int/telemedicine-alliance

Cristina Bescos
Title:
TMA-Bridge Project Manager
Organisation:
Consultant for the European Space Agency
Email: cbescos@gmail.com
Website: www.esa.int/telemedicine-alliance

Marie Diop
Title: Policy & Law Support
Organisation:
European Space Agency
Email:Marie.Diop@esa.intWebsite: www.esa.int/telemedicine-alliance

James Kass
Title: Senior Scientist
Organisation:
European Space Agency
Email: James.Kass@esa.int
Website: www.esa.int/telemedicine-alliance

Didier Schmitt
Title: Head of Life Sciences Unit
Organisation:
European Space Agency
Email: Didier.Schmitt@esa.int
Website: www.esa.int/telemedicine-alliance

For a copy of the references contained in this article, please contact k.ruocco.me@eahitm.org.

AN INNOVATIVE WIRELESS TELECARDIOLOGIAL MONITORING SYSTEM

By: Martin Braecklein

Author

Martin Braecklein
Title: Head of Telecare
Organisation: Corscience GmbH & Co. KG
Email: braecklein@corscience.de
Website: www.corscience.de

The need for a cardiological home monitoring system

Heart-related diseases and disorders are abundant in the western world. Around 500,000 cases of sudden cardiac death, over three million patients with atrial fibrillation and about 600,000 heart attacks are a significant factor in the cost structure of the European healthcare system every year.

Effective therapy in this area is usually no longer the problem. Defibrillators and sufficient medication have had revolutionary success in saving the lives of patients with heart disorders. Crucially, the biggest issue is the lack of diagnosis. So far, the standard is that even high-risk patients only visit their physician every six months for a check-up. If the health situation worsens between visits, problems will not be identified until the symptoms become acute. Due to a prevalent fear of hospitals, many patients wait until their health condition develops into an unbearable situation. It is at this point that they would call the emergency service and be brought to the hospital, normally needing to remain there for days before becoming healthy enough to return home, thus costing the healthcare system a great deal.

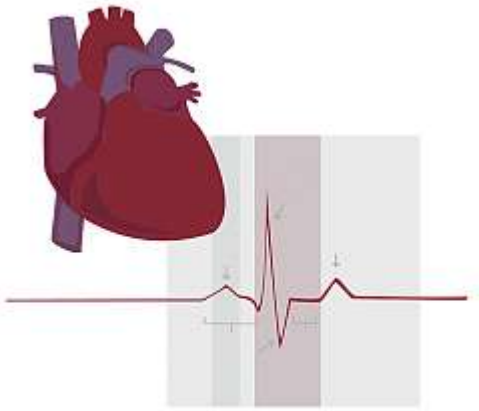
Different programs to circumvent these problems have been carried out with patients for the first symptoms of heart-related diseases. These programs have proved to be successful. However, for more effective prevention, the best solution would be a continuous monitoring of the relevant vital parameters, especially the electrocardiogram (ECG). The monitoring in hospitals is very effective but also very expensive. Furthermore, most patients prefer to remain at home in their place of comfort, where they have the support of their family and friends. In contrast to the often very sterile atmosphere in hospitals, from a physiological point of view, the home is a much better surrounding for treating patients. Obviously, it is also much more cost effective if patients do not have to stay in a hospital or can leave the hospital as early as possible. To give the necessary medical security at home, a monitoring system for the homecare area must be the goal.

There have been many attempts to find a practical and efficient way to monitor patients with heart-related problems at home. Recent approaches rely on the interaction of the patient. In the event that symptoms arise, the patient has to apply an ECG recorder or, as a minimum precaution, has to activate a recorder that he is wearing. Afterwards, the ECG is transmitted via the telephone line or a mobile phone. Some downsides are that often this procedure is not possible because the patient either does not feel any symptoms or it is an acute situation where he is unconscious within seconds and therefore unable to activate the device.

The proposed system

An innovative system has been developed which overcomes these disadvantages. The central part of this monitoring system is a mobile sensor, an ECG chest strap[1,2], which is worn by the patient and analyses the patient's ECG. When an event is detected, an automatic wireless connection is activated to a relay station, which receives the message from the ECG chest strap and sends it via the mobile telephone network to a central internet-based Electronic Health Record (EHR). This EHR automatically informs a care giver via fax. The care giver logs in the EHR, checks what happened and initiates the appropriate help.

In this scenario, the patient is monitored with a small and light ECG chest strap, which is worn in a way similar to the pulse watches familiar from the sport area. This



sporty connotation, together with a high level of comfort, reduces the patient's inhibition to wear the device over a long period of time.

The chest strap contains an integrated ECG sensor, which continuously analyses the patient's ECG readings. A one-lead ECG is picked up with dry stainless steel electrodes, further adding to the comfort. The ECG is filtered to a bandwidth of 0.5 to 60 Hz and sampled with a rate of 200 Hz. If the analysis identifies a tachycardia including ventricular fibrillation[3], a bradycardia including an asystole, or an arrhythmia absoluta, a message is automatically sent to the relay station via a wireless data transmission. The message includes an indicator for the detected event and two minutes of ECG. The transmitted ECG starts one minute before the detected event and ends one minute afterwards. To enable this, the ECG chest strap always has the last minute of ECG stored in its memory. Testing has shown that the settings for the detection need to be adapted to the individual patient, and is now possible via the EHR.

Once the ECG reading has been transmitted, the relay station switches the wireless near-field communication from the ECG chest strap to the wireless far-field communication and then to the EHR[4]. For near and far-field communications, bluetooth and General Packet Radio Service (GPRS), respectively, are applied. The relay station is a mobile phone with an integrated application for data handling. Once the data is in the EHR, it is stored in a database and, depending on the prior setting, a message is sent to a care provider. This can be via FAX, SMS, email or voice call. The EHR is especially adapted to the needs of a telemonitoring system. To ensure data security, the EHR complies with high security standards for EHRs such as tripple DES incryption and XPath compatible access rights managed. The care provider has to log in via a secure internet connection and can then access the ECG and any additional data from the medical history of the patient. On this basis, he can make a qualified decision as to what actions should be taken. In less acute cases, it is sufficient to make an appointment with the family physician. In acute cases the emergency medical service is sent to the patient to guarantee prompt assistance.

Results of the system implementation

sensor	parameter
scales	body weight
blood pressure meter	blood pressure
pulse oxymeter	oxygen saturation of blood
peakflow meter	lung function (PEF, FEV1)

Table 1 Sensors for a modular system extension

The described system and its parts were tested in detail and were proven to be reliable. Although dry electrodes were used, the ECG signal in this long-term application showed no significant differences to standard Holter ECGs. The system was tested with a dozen patients suffering from persistent atrial fibrillation, tachycardia and bradycardia. All the pathologies were identified correctly. The patients were questioned about the application and the benefit of the system and the overall impression was a remarkable 1.6 average score (1 best; 6 worst), with comfort, simple application and handling especially being mentioned. The algorithm tests with different databases showed both a sensitivity and a specificity of over 88%. Further extensive tests are currently being conducted.

Scenarios of application

There are different circumstances in which the system can be applied. The most important may be for hospitals to save costs in diagnostic related group (DRG) surroundings. With such a system, patients can leave the hospital much earlier without the risk of unnoticed medical complications. At home they profit from a more comfortable atmosphere. Furthermore, patients hooked up to an expensive monitoring unit can be moved to a normal ward when they are equipped with this system.

Other scenarios would be the temporary monitoring of pre-operative patients who could stay at home instead of waiting for the operation in the hospital.

Another interesting area is the preventative monitoring of high-risk patients, e.g. in disease management programs, where the option to extend the ECG system by other relevant sensors (see Table 1) is an advantage. This allows an adaptation of the system to the specific needs of the patient.

Final analysis

This monitoring system meets current and future demands of the healthcare sector, which is more and more aiming at the ambulatory area. This system provides the necessary security for patients and their relatives to live without the threat of an unnoticed cardiac event. The ECG chest strap is the first device that can summon help to the patient's home automatically without the necessity that the patient himself has to be active, and is an available CE certified medical product. This system, which can be combined with other vital sensors, provides an ideal platform for hospitals, disease management programs and many other homecare applications.

SINCE 1996 WORKING ALONGSIDE THE MOST IMPORTANT HEALTHCARE INSTITUTIONS

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WEB TECHNOLOGY FOR CLINICAL DATA MANAGEMENT

NOEMALIFE AWARDED THE ULD CERTIFICATION FOR DATA SECURITY

e-health.solutions®, the innovative, award winning Electronic Medical Record developed by Berlin-based GMD of NoemaLife Group, will receive today at the ITeG exhibition in Frankfurt the data security certification issued by ULD (Unabhängige Landeszentrum für Datenschutz), the German data security authority based in Kiel.
It is the first certification of this kind issued to an Electronic Medical Record and it represents a very important result for NoemaLife also because it provides healthcare organizations and citizens an additional assurance about the safe handling of their clinical data. The certification comes at the end of a detailed analysis conducted by the German authority since the second half of 2005 and it confirms NoemaLife's commitment to developing solutions designed to allow healthcare organization to handle clinical data about their patient-customers in a secure way.
Safe data management represents a very important aspect for Electronic Medical Records since this systems manage information that is for its nature extremely sensible like clinical data.The certification awarded to e-health.solutions® fills an institutional gap underlined since a long time by institutions all over Europe and represents an example that will be followed by other actors of the healthcare arena.
e-health.solutions® is an advanced clinical data management platform that allows healthcare institutions to integrate clinical information, organize it around each patient and distribute it via Web "where it is needed at the time it is needed" inside and outside the hospitals. Thanks to its flexible architecture, its Web technology and the MPI (Master Patient Index) module, e-health.solutions® allows healthcare institutions to share clinical data within a group of hospitals or inside a whole region.
e-health.solutions® is used today by thousands of healthcare professionals in more than 100 European hospitals that use it to improve their clinical processes.

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ARTEMIS: AN INFRASTRUCTURE FOR THE INTEROPERABILITY OF MEDICAL INFORMATION SYSTEMS

By: Asuman Dogac

Author

Asuman Dogac
Title: Director
Organisation: Software R&D Center, Department of Computer Engineering, Middle East Technical University
Email: asuman@srdc.metu.edu.tr
Website: www.metu.edu.tr

The interoperability challenge

Today's eHealth information systems are proprietary and often only serve one specific department within a healthcare facility. This means it is impossible to easily share data across one facility, never mind trying to share between different facilities, or even different countries. The European Commission-sponsored project Artemis (A Semantic Web Service-based P2P Infrastructure for the Interoperability of Medical Information Systems - IST-1-002103-STP, http://www.srdc.metu.edu.tr/artemis/) addresses this important interoperability problem.

The issue of healthcare IT interoperability can be investigated in the following ways: exchanged healthcare messages and Electronic Health Records (EHRs).

Achieving interoperability

For the interoperability of exchanged healthcare messages, messaging interfaces or interface engines are used. Currently, the Health Level 7 (HL7) Version 2 Messaging Standard is the most widely implemented standard in healthcare. Unfortunately, HL7 V2 compliance does not imply direct interoperability between healthcare systems because V2 has no explicit information model. Instead, it has rather vague definitions for many data fields and contains many optional fields. It offers great flexibility but it also requires detailed bilateral agreements amongst the healthcare systems to achieve interoperability. HL7 Version 3 was therefore developed, based on an object-oriented data model called the Reference Information Model (RIM). However, a drawback is that HL7 V3 cannot communicate with HL7 V2.

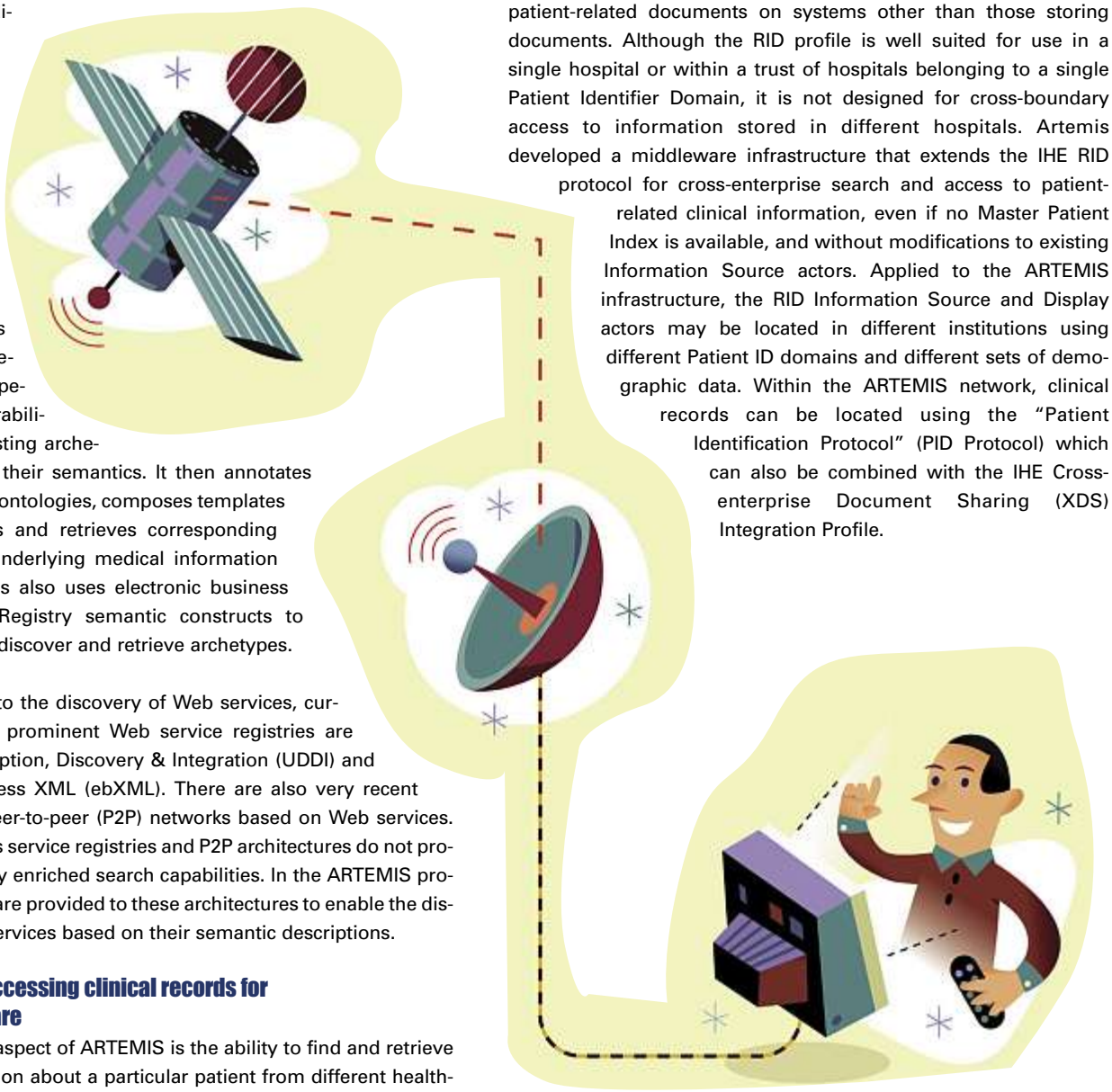
EHRs also suffer from similar problems. An EHR is healthcare information digitally stored throughout an individual's lifetime that supports continuity of care, education and research, while ensuring confidentiality at all times. A number of standardisation efforts are progressing to provide the interoperability of EHRs such as CEN/TC 251 EHRcom, openEHR and HL7 Clinical Document Architecture (CDA). However, an exchange of well-structured and machine processable electronic healthcare records has not been achieved in practice at this point in time.

How Artemis addresses the challenges

The Artemis project addresses these problems and provides an interoperability platform where organisations keep their proprietary systems, but expose their functionality through web services. Whilst these web services provide technical interoperability, they do not yet provide a mechanism for automatic processing of the message content received, unless the sent and received messages conform to the same interface standard. Since it is not realistic to expect a globally unique healthcare message standard, Artemis takes an alternative approach and semantically annotates both web service functionality and the messages web services exchange. An essential element in defining the semantics of web services is domain knowledge. Medical informatics is one of the few domains to have considerable knowledge developed through standards. For example, HL7 standards categorise events and define messages in healthcare based on-service functionality, which reflects business logic. Artemis uses HL7 as a basis for defining both the service action semantics and the message semantics.

The Artemis message exchange framework provides the exchange of meaningful clinical information among healthcare institutes

through semantic mediation. An ontology mapping tool is developed for mapping different healthcare ontologies into one another and then using the mapping definition produced for automatically translating message instances. The framework proposed is generic enough to mediate between any incompatible healthcare standards currently in use.



For the interoperability of EHRs, Artemis uses "archetypes". Archetype-based interoperability discovers existing archetypes based on their semantics. It then annotates archetypes with ontologies, composes templates from archetypes and retrieves corresponding data from the underlying medical information systems. Artemis also uses electronic business XML (ebXML) Registry semantic constructs to annotate, store, discover and retrieve archetypes.

When it comes to the discovery of Web services, currently the most prominent Web service registries are Universal Description, Discovery & Integration (UDDI) and electronic business XML (ebXML). There are also very recent efforts to use peer-to-peer (P2P) networks based on Web services. However, today's service registries and P2P architectures do not provide semantically enriched search capabilities. In the ARTEMIS project, extensions are provided to these architectures to enable the discovery of web services based on their semantic descriptions.

Locating and accessing clinical records for continuity of care

Another crucial aspect of ARTEMIS is the ability to find and retrieve clinical information about a particular patient from different healthcare organisations where concrete sources are unknown. In most countries there are no unique personal identifiers that would be valid for the whole lifetime of an individual, and would be used by all parties in healthcare and for all episodes of care. On the contrary, in many cases several identifiers for a patient exist - even within a single organisation. Consequently, a protocol is needed that allows for the identification of patients by means of non-unique patient-related attributes. Artemis developed a "Patient Identification Process Protocol" (PIP)'. PIP provides a solution for a common problem in the healthcare sector that is likely to become very important with the increasing mobility of the workforce in Europe; locating and accessing prior clinical records for the continuity of care.

Healthcare information systems operate within a strict regulatory framework that ensures the protection of personal data and outlines the conditions where processing is allowed. The Artemis project responded to these conditions by providing comprehensive security and privacy protection mechanisms.

Currently, an Integrating the Healthcare Enterprise (IHE) initiative proposes the Retrieve Information for Display (RID) integration profile to allow users to retrieve and display patient-related documents on systems other than those storing documents. Although the RID profile is well suited for use in a single hospital or within a trust of hospitals belonging to a single Patient Identifier Domain, it is not designed for cross-boundary access to information stored in different hospitals. Artemis developed a middleware infrastructure that extends the IHE RID protocol for cross-enterprise search and access to patient-related clinical information, even if no Master Patient Index is available, and without modifications to existing Information Source actors. Applied to the ARTEMIS infrastructure, the RID Information Source and Display actors may be located in different institutions using different Patient ID domains and different sets of demographic data. Within the ARTEMIS network, clinical records can be located using the "Patient Identification Protocol" (PID Protocol) which can also be combined with the IHE Cross-enterprise Document Sharing (XDS) Integration Profile.

The Artemis prototype

The ARTEMIS Project has a prototype that realises a scenario where, after an accident, a patient is admitted to the most appropriate hospital from the ambulance. The patient is admitted before the ambulance arrives at the hospital, via a mobile device. The hospital admissions service then automatically seeks out any relevant healthcare records of the patient in the ARTEMIS P2P network, and presents them to the doctor, even though the hospitals discovered may not be using interoperable standards with each other. In the prototype, the mediation between HL7 Version 2 and HL7 Version 3 messages is also demonstrated. This is a considerable improvement over current systems.

LOOKING TO THE FUTURE: HOW TO ENSURE THE HEALTHCARE SECTOR ACHIEVES LONG-TERM STABILITY IN ITS SMART CARD PROGRAMMES

By: Kevin Gillick

2006 will see the deployment of 85 million smart cards in the government and healthcare sectors, according to forecasts from the industry body, Eurosmart. For a sector that faces complex administrative challenges, such as the healthcare industry, the move towards a smart card based system represents a real commitment towards increasing efficiency and improving service delivery within healthcare provision.

As healthcare authorities move with greater momentum towards utilising emerging technologies such as smart cards to simplify administration processes and increase efficiency, they must demonstrate to end users the benefits such a programme can bring. With costs in public healthcare escalating, it is vital that the value of the smart card programme is maximised, and the project is implemented to ensure long-term efficiencies and results.

THE OVERRIDING DEMANDS OF THE HEALTHCARE SECTOR

Within Europe, there are differences in the way each country delivers its healthcare provision: either through tasking government departments or working in partnerships with commercial healthcare providers. Despite this diversity, the challenges faced are universal:

+ Traditionally, paper-based processes have been a central healthcare standard, creating inefficiencies through labour-intensive administration processes, and a system that is vulnerable to fraud.
+ The industry is experiencing escalating healthcare costs due to an ageing population, increase in research and development into new drugs, and the impact of litigation.
+ Patient choice has led to greater demands on the service; consumerism and the increasing amount of healthcare decisions being driven by the individual have necessitated a growing portfolio of new customised products and financial options, to meet consumer demands for individualised products and personalised service.
+ Within the healthcare environment, both physical and logical access is vital for staff and patients.

Author

Kevin Gillick
Title: Executive Director
Organisation: GlobalPlatform
Email: kevin.gillick@globalplatform.org
Website: www.globalplatform.org

What is left is an industry that requires complex administration, management and optimisation across very disparate enterprises.

ADVANTAGES OF A HEALTHCARE SMART CARD

The smart card can facilitate a multitude of different transactions, and represents the most transportable, secure and manageable medium for personalised data. A healthcare system based on a smart card can offer audience benefits across the sector, primarily through enabling secure authentication and digital signatures. With a card based system, healthcare providers can offer services to citizens in an efficient computer environment that also provides secure card content management for applications with privacy requirements. Such a system can:

+ Provide citizens with the ability to access their own medical records online, while retaining control over third-party access.
+ Allow doctors to digitally sign prescriptions, removing the need for a paper based system that is vulnerable to fraud.
+ Make information management easier and more efficient by encouraging self-service.
+ Improve security standards of physical and logical access.
+ Provide a platform for successful joint initiatives – a single secure identity token that will allow a variety of e-services.

The overriding benefit for healthcare providers is increased security and a reduction in paperwork and management time, which leads to a significant reduction in the high costs associated with traditional paper based systems.

THE CASE FOR STANDARDISING THE SMART CARD ENVIRONMENT

Many countries in Europe have already begun deployment of electronic health cards to citizens, but in many cases these have focused on delivering just one function. When an implementation is designed in isolation, without investigating the full potential and long-term viability the smart card programme could offer to various technology providers and end-users, the programme can soon become outdated, resulting in a decrease of usage.

It is not just the advancement of new, efficient technologies that can force the need for healthcare providers to make alterations to the programme - regulatory requirements also have a significant impact. The healthcare industry is subject to a great deal of regulation and updates from governing bodies that often results in a review of the way services are delivered, which in turn necessitates changes to the smart card programme infrastructure. Therefore, the solution envisaged during the start-up phase may not reflect future demand. This can result in extensive and costly re-design, re-building and re-testing.

As healthcare smart card programmes are often deployed widely across a region/country, any modification to the programme, such as the addition of a new application or regulation, could require an extensive upgrade of the implementation's system architecture and the redeployment of cards in a variety of locations and facilities.

GlobalPlatform technology looked to address this problem and provide a standard smart card infrastructure solution that, if implemented into the programme, would prevent the need for costly system architecture upgrades and redeployment of cards, while allowing for multi-applications to be added to the same smart card programme seamlessly. This technology simplifies and accelerates development, deployment and management of applications across industries.

GlobalPlatform provided the foundation on which to build a smart card management environment capable of hosting multiple applications and implementations, and yet able to be adapted to the card holders' requirements. The technology ensures that the continual re-writing and customisation of applications is avoided. Providing a flexible and future-proof smart card architecture, it establishes a universal platform able to support new or modified applications, new cards and interaction with government or commercial entities. Validation of the smart card system only needs to happen once, and updates can be made throughout the programme's life-cycle, efficiently and cost effectively.

Backed by an active forum of 50 global member companies, that provide card, device, and system technical specifications on a royalty-free basis, GlobalPlatform standards are universal. By stipulating these standards within a smart card programme, healthcare providers can:

- Reduce development and testing time, and therefore costs, as these standards have undergone rigorous security testing.
- Establish competition between solution providers; as a like-for-like product is being compared.
- Easily switch from one technology provider to another, as the standards are free and can be implemented by any technology vendor.
- Implement a future-proof and scaleable card and systems infrastructure that can support the entire evolution of the healthcare smart card programme.

Case Study:

A World First - Taiwan National Health Insurance Card

Pioneering the first and the largest healthcare smart card project in the world, the Bureau of National Health Insurance of Taiwan (BNHI) began rolling out Integrated Circuit (IC) health cards based on GlobalPlatform technology to Taiwan citizens in July 2001. The new cards were brought in to replace its original paper-based system, which brought with it high fraud rates and high administration costs.

The aim of the smart card solution was to create significant time and cost savings for the BNHI as well as provide greater transparency for its service provision.

The cards are able to store up to 32KB of information related to health insurance programmes, past medical services, the patient's public health administration and recent medical expenses. As of May 2006, the programme reported the following results:

* More than 23 million Health Care Cards have been issued.
* Appx. 50,000 Health Professional Cards have been issued and is still on-going.
* Appx. 50,000 chip enabled readers were installed in hospitals, clinics, etc.
* De-centralised card issuing centre on service at 6 sites around the island.
* GP Card offers dynamic downloading possibility for improved Health Care Application renewal.

DRIVING USAGE: MANAGING A MULTI-APPLICATION SMART CARD ENVIRONMENT

A key concern for any service provider issuing a smart card based system is to ensure the long-term viability of the solution. Multi-application smart cards represent the future of healthcare provision. The introduction of a single card, capable of housing multiple applications would represent an enormous advantage for the healthcare industry. In addition, combining healthcare functionality with other applications such as a government ID and electronic driving license can help to drive public acceptance and usage of the schemes.

In order to meet these current and future requirements, the standard smart card infrastructure needs to be in place at the beginning of the implementation to support a future multi-application environment.

In the initial phase, many service providers are reluctant to issue high memory cards as these can be deemed prohibitively expensive. However, by ensuring that the smart card infrastructure is based on GlobalPlatform standard technology, low-capacity memory cards with the same level of security can be issued in the first instance, with the option to migrate to higher capacity memory and multi-application at a later date. By adopting these standards and specifications at the beginning, the smart card project becomes future-proof and the need for a costly re-issuance and re-development is removed.

Once established, the management of this multi-application smart card environment is the real challenge. From a provider perspective, these specifications are capable of isolating and simultaneously managing all of the different applications on the card, as providers do not need to re-invest in a separate management system for each of the different applications.

From the point of view of the end-user, the patient, the existence of a centralised application management system means that if the patient were to lose their card, they need only call one phone number to arrange a replacement. The central system will act to maintain the data status for each of the different card applications.

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DESIGNING A HIGH-PERFORMANCE TELEMEDICINE SYSTEM

Part Two of a Three-Part Series

By: A.V. Bogdanov, A.B. Degtyarev, Yu.I. Nechaev & A.V. Valdenberg

In the first part of this series, (published in Issue 1 of Healthcare IT Management this Spring) the steps taken towards designing a telemedicine system based on high-performance computer technologies for the Institute of High Performance Computing and Information Systems in St. Petersburg, Russia were explained. In this article, the concept proposal for a telemedicine Internet portal, the roles of a territorial telemedicine centre in relation to the distributed organisation and the functional prototype for a distributed telemedicine cardiologic system are addressed.

Developing a telemedicine Internet portal

One of the major tools used towards achieving the system design of a high-performance telemedicine system, as described in Issue 1, is a telemedicine Internet portal. The portal represents a specialised program with a complex framework of Internet technologies. Its basic purpose is to associate medical information network resources in a uniform system in order to achieve the following:

+ The remote consultation of specialists,
+ A reference information service,
+ A medical statistical service, and
+ the remote training of medical personnel.

Concerning the remote consultation of specialists, the portal contains an extensive database with information about leading medical institutions that support remote consultations and provides access to it for doctors and patients. All user requests are classified based on categories of consultations and automatically directed to the corresponding specialist. The diagnosis of the specialist, with the preservation of all necessary conditions of confidentiality, is similarly achieved. The use of a remote advisory service improves the quality of diagnostics for diseases and in choosing the correct course of treatment. Therefore, statistics of disease outcomes (e.g. lowering of the death rate, physical inability and a reduction of disability time) are optimised.

The reference information service of the portal includes a database of medical resources available in a region: basic hospitals (with profiles), polyclinic complexes, stomatological and diagnostic centres, pharmacies, etc. It defines the role of specialised medical service reception and simplifies the admission procedure. In addition, the portal can contain updated references to the Internet resources concerning supported types of diseases.

The medical statistical service is based on regular information acquisition reflecting clinical, organisational and epidemiological characteristics of diseases, organisation of medical aid, and results of remote consultations. A special interest represents an opportunity for the efficient updating of various specialised databases (registers) online by inputting records from distant clinic prophylactic organisations (CPOs), ensuring an efficient and up-to-date database.

Analysis of data and their comparison with the characteristics of ecological conditions in a region permits the permanent monitoring of citizens' health states, receiving information profiling the details of medical institutions, revealing "doubtful" cases of treatment for which interdepartmental examination are required, and also determining statistical standards of treatment duration and costs across various groups of diseases. It also provides an opportunity to plan illness payments with more flexibility, efficiency, and with due consideration towards the specifics of the given region. This function of the portal is therefore only accessible to regional or departmental administrators and specialists.

Remote improvement of the professional skills of medical personnel is the most accessible method carried out with daily practice. The portal provides an opportunity to access leading libraries and periodicals in the field of public health services and remote training, along with popular scientific and reference information in the medical field.

It should be noted that remote consultations conducted with the use of standard Internet portal tools sometimes have a low validity. Increases in this are necessary in order to: maintain interaction between patients and physicians; develop "virtual consultations"; receive texts, video images and results of laboratory diagnostics (including modern medical technique); and develop specialised telemedicine centres and networks of telemedicine points in remotely located CPOs. The centre is an integral part of a telemedicine system for consultations and improving professional skills. It has complex hardware and software, including equipment for teleconfer-

ences and projective video systems. The structure of the centre also includes a virtual reality system that improves the quality of distance learning and professional skills of medical staff.

Development of the high-performance telemedicine system

In accordance with this proposed concept, the development of a high-performance telemedicine system is now in progress. This system is based on developed prototypes of cardiologic real-time telemedicine systems. Developing telemedicine centres territorially represents the distributed organisation that consists of:

+ mobile cells of the telemedicine network of remote patients;
+ distant CPOs and regional medical institutions – hospitals, big polyclinics and medical institutions in large rural settlements will be considered as CPOs, being the centres of medical statistical information gathering. Small rural medical aid stations are also based on these CPOs;
+ central servers for conducting telemedicine information gathering and processing from mobile cells of telemedicine networks and distant CPOs; and
+ equipment parts contained in general-purpose regional super computer centres. Unique computational and visualisation resources, archives and storage capacity of large volumes of information will be used.

This functional prototype (telemedicine cardiologic system) represents a three-level distributed system including:

+ Remote Automated Workplaces (RAEW) of doctor / medical assistants for the gathering, reception and transferring of medical information (both the measurement of data and results of medical examinations);
+ a central kernel of telemedicine systems for the gathering, processing and assimilation of information; and
+ RAEWs of medical experts.

RAEWs are being built on the basis of mobile personal computers, or handheld computers, together with specialised portable medical equipment such as cardiographs and measuring instruments for blood pressure, pulse, etc. Remote implanted equipment such as cardiac pacemakers and other similar devices are also considered. RAEWs are consequently supported by doctors, in remote mode, from telemedicine centres. The following demands are therefore made on this equipment and software:

+ equipment and software must be simple to use by medical personnel of average qualification;
+ it should be multipurpose in its function;
+ it must have high reliability: to restore itself automatically in case of failures, to possess noise immunity, to maintain work in an aggressive environment (moisture, impacts, vibration, etc.); and
+ it has to be inexpensive and easy to duplicate.

Except for doctors' mobile RAEWs at the first level of the system, the network of fixed specialised telemedicine aid stations in distant CPOs is considered. These serve as the intermediate centres of information accumulation, for the formation of necessary medical and statistical data. They are also intended to be used for performing consultations and improving the professional skills of CPO medical personnel.

The proposal for the central kernel of the telemedicine system is based on two types of computer centres: 1) specialised hardware-software medical systems intended for direct work with RAEWs of doctors and medical assistants, and 2) general purpose equipment in a powerful supercomputer centre.

As the first specialised medical part cluster of high availability intended for operative information processing, medical equipment control, mathematical modelling, real time expert system operation, recommendations and processing of online doctors' requests from RAEW is considered. In addition, the distributed hardware-software system is intended to support the telecommunications components of the project, the organisation of virtual consultations and also the operation and processing of requests to specialised databases and archives stored on general purpose equipment located in regional supercomputer centres.

Functionality of computers and data storage

Computers and data storage devices in the supercomputer centres are functionally intended for:

1 medical archive creation and the long-term storage of information that is not already accessible;
2 the development and maintenance of heterogeneous medical information systems;
3 the supply of telemedicine portals by Internet services;
4 gathering, assimilation and storage of medical and statistical information; and
5 situational modelling in the field of public health services, the use of virtual reality systems, and conducting teleconferences, etc.

An archive system permits working with any type of document, making it possible to store previously viewed medical information (cardiograms, case history data, X-ray and other images). The file, placed in an archive, is registered and supplied with an electronic digital signature and cryptographic protection. It is then linked to other information that will allow for increased effective information inquiry, extraction and utilisation.

Such an approach makes it possible to provide a high level of information protection in order to prevent the overload of specialised medical servers. In this case, the archive system only conducts operational work and provides medical personnel with reliable access to archived contemporary records by means of

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Authors

A.V. Bogdanov
Organisation: Institute for High Performance Computing and Information Systems, Russia
Email: bogdanov@csa.ru
Website: www.csa.ru

A.B. Degtyarev
Organisation: Institute for High Performance Computing and Information Systems, Russia
Email: deg@csa.ru
Website: www.csa.ru

Yu.I. Nechaev
Organisation: Institute for High Performance Computing and Information Systems, Russia
Email: int@csa.ru
Website: www.csa.ru

A.V. Valdenberg
Organistion: Leningrad Region Clinical Hospital, Russia
Email: walden@mail.ru
Website: www.oblmed.spb.ru

For a copy of references contained in this article, please contact k.ruocco.me@eahitm.org.

Beyond Economics in Outsourcing

By: Gayle Vernon Simkin

Background of the outsourcing agreement

There is a story behind every outsourcing agreement. In 2001, Catholic Healthcare West (CHW), an organisation with the mission of providing high quality healthcare to the poor and disenfranchised in the community, was in economic trouble. Like many other organisations across North America and Europe[1,3], CHW considered the outsourcing of information technology (IT) services as a source of acutely needed cost efficiencies and to build a foundation on which to support standardisation of financial operations, clinical processes and procedures. During the summer of 2001, in a $600 million, ten-year deal, the organisation outsourced its IT services. Now, halfway through the contract, while cost efficiencies were foremost in CHW's decision to outsource, it is clear that the economics of an outsourcing approach is only part of the story.

Establishing a good fit between the outsourcer and customer

In a Gartner survey, North American outsourcers identified cost savings as the top driver in more than 80% of organisations that outsource IT[4]. Despite the fact that published surveys repeatedly indicate that cost savings were a primary reason for considering IT outsourcing, a balanced approach that includes the ability to deliver operational effectiveness, alignment with the core business, and flexibility to move in concert with changes to the customer's business strategy must be considered. Additionally, the less obvious but hard impact of softer issues such as compatible leadership styles, core values, and cultural fit between the outsourcer and customer must be examined when selecting potential outsourcing partners.

Key economic drivers

To start with the key economic driver, it must be said that saving costs is a legitimate goal but expectations must also be set realistically and have associated metrics that will allow for objective measurement. The outsourcer must be able to achieve economies of scale through standardised offerings or leveraged models of service. CHW's original business model prior to 2001 was a decentralised, holding company model in the early stages of evolving to a more efficient operating company model. Redundant services and costs were inherent in the holding company model for IT.

One of the first steps taken to resolve these issues, in partnership with the outsourcer, was to eliminate redundancy through the consolidation of more than 20 data centers and 19 help desk locations. This was accomplished during the first 22 months of the contract. The co-location of these functions created labour efficiencies as well as reductions in maintenance and utility expenses. With the initiation of the contract and in consideration of the outsourcer's expertise in technical services management, the contractual run rate for IT expenses was set below CHW's previously existing run rate. This metric was measurable from the first day internal resources were transferred to the outsourcer. Additional cost efficiencies have since been realised through centralisation of technology contracting and procurement.

Author

Gayle Vernon Simkin
Name: Gayle Vernon Simkin
Title: Chief Information Officer
Organisation: Catholic Healthcare West, USA
Website: www.chwhealth.org

For a copy of the references contained in this article, please contact k.ruocco.me@eahitm.org.

Realisation of cost efficiencies

For the successful execution of tasks that lead cost efficiencies, it is important to consider elements of a measurable partnership that benefit both the customer and the outsourcer[6]. Year over year savings in maintenance have been realised every year of the contract to date. While some of the savings from efficient negotiation and management of maintenance contracts serve as a hedge against inflation, it should be noted that in the

tenance contracts for new projects and installations, CHW has experienced an actual expense reduction. Another metric that points to a realisation of cost efficiency is the cost of IT as a percent of business operating expenses. Prior to outsourcing, CHW's total cost of IT was 2.8% of operating expenses as compared with the Gartner average for integrated health care delivery systems of 3% (published in 2001). The year following the transition to outsourcing, the total cost of IT fell to 2.1% of operating expenses. While this metric has increased during the subsequent years, analysis reveals that the increases are primarily due to the business-driven implementation and support of new technologies to support the core business of the delivery high quality patient care and management of associated business processes.

About Catholic Healthcare West

Catholic Healthcare West (CHW) is a system of 40 hospitals and medical centers in California, Arizona and Nevada and is the eighth largest hospital system in the US. The CHW network of more than 7,500 physicians and approximately 44,000 employees provides health care services to more than four million people annually.

Overcoming operational complexity

If economics opened our story, the need for simplicity to overcome complexity was the next chapter. We understood that centralisation and standardisation would bring opportunity for greater efficiency but learned that accompanying the consolidation was unprecedented operational complexity. We also found that the initial discipline required managing processes involving user requests for services and projects was greater than had been in place prior to outsourcing. In outsourcing and the consolidation of services, potential complexity needs to be identified and simplified and its impact on the users served must be measured and minimized. Most outsourcing agreements contain service level agreement (SLA) measurements that customarily measure system and network uptime as well as metrics that capture the user experience with the help desk and desk side services. We found that the SLA measurements, even when results were positive, did not fully capture areas needing improvement in the user experience.

More than a year into the outsourcing relationship, we determined a need to augment the contractually required SLA measurements with a method to address the perception of service at the business unit/ hospital level[5]. While not traditional in outsourcing measures, our partner created a process to solicit subjective perception of service and value to the business. This method is called Performance Evaluation Report Card (PERC). The PERC consists of an in-person interview of local leadership covering five questions intended to capture the perception of service. This monthly interview and subsequent "stop light" report creates a venue, information, and action plans that fill in the gaps in service measurement that exist in a SLA only scorecard.

Shared strategies

The SLA measurements and PERC assist in the alignment of outsourced IT services with the core business, but additional activities are needed to assure that the IT strategy is created in support of business goals and strategies. An internal IT function has many of the same requirements for alignment but when an outsourcing partner is providing the IT service, their business goals and strategies must also be examined for areas of alignment as well as areas of potential conflict. CHW accomplished this exchange of information routinely at the IT leadership level but also created a meeting between CHW executives with executives of the outsourcing partner, specifically to share relevant goals and tactics.

Sharing strategies at least once annually is key to alignment but to be most effective, requires flexibility on the part of the outsourcing partner. Particularly in a long-term agreement, the business strategy during the initial transition to outsourced IT services is likely to change in later years. A method to remain flexible with the business must be embedded in the contract, and more importantly, be part of the culture of the outsourcing partner. CHW has specifically experienced the importance of flexibility in the outsourcing agreement. As noted above, in 2001 at the time of the initial outsourcing of IT, CHW was experiencing economic pain. At that time, while CHW never wavered from its mission to care for the disenfranchised of society, strategies were focused around financial improvement and long-term viability to assure the continuance of the mission. Those strategies have been successful and five years later, strategies are now focused on growth, innovation and leadership. The technology strategy to support CHW today must enable transformation as it also focuses on growth, innovation and leadership, rather than solely on the original direction to standardise and consolidate. IT flexibility from the outsourcer has been key to the continued alignment and support of the core business.

Monitoring and measuring contract deliverables, SLA metrics and customer service in alignment with business strategy call for seamless integration between the business, the internal Office of the CIO, the outsourcing partner vendors and others providers of technology services.

Managing the rest of the story - alignment, flexibility and service - is an extremely complex task but one that successfully supports business strategies.

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standard network interfaces. It is on the basis of the central kernel that the development of teleconference systems are arranged, allowing for the effective retraining of medical staff and the improvement of their qualifications with the use of unique computer equipment and virtual reality systems.

RAEWs of medical experts are therefore intended for remote postponed consultations in instances of especially important and serious cases for the specification of diagnosis and use of unique experience of concrete medical specialists.

Series on Developing a High-Performance Telemedicine System

Volume 1, Issue 1: Designing the system
This Article: Building the Internet portal & functional prototype for the system
Volume 1, Issue 3: Creating the telemedicine system architecture or High-Performance Computing and Information Systems, Russia

Outsourcing – An Ideal Solution?

By: James Griffith

When to consider outsourcing

Information technology outsourcing is used by the majority of hospitals today. Results from the 17th Annual Healthcare Information and Management Systems Society (HIMSS) Leadership Survey indicate that more than 70% of responding healthcare organisations currently outsource at least one information technology (IT) function. This demonstrates that as outsourcing begins to mature within the healthcare space - as it has previously in other industries - the opportunity now exists for hospitals and health systems to go a step further to embrace broader, more comprehensive IT outsourcing.

Through the use of comprehensive or total outsourcing, the outsourcing provider takes responsibility for both technology and people resources as well as the management of the entire IT function on behalf of the hospital. Under this model, healthcare executives and IT directors are presented with the opportunity to address antiquated IT infrastructures and staff without necessary training and/ or skills, or the lack of specialised resources, to address critical initiatives. An examination of the factors that lead many healthcare executives to consider and execute a decision to outsource the IT function dispels many of the myths surrounding outsourcing, and provides evidence of the strong benefits obtained by healthcare IT professionals, as well as the provider organisation as a whole.

Author

James Griffith
Title: Senior Vice President, Outsourcing
Organisation:
ACS Healthcare Solutionss
Email: james.griffith@acs-hcs.com
Web: www.acs-hcs.com

For a copy of the references contained in this article, please contact k.ruocco.me@eahitm.org.

The primary reason for the decision to outsource IT functions is the realisation that current systems – hardware, software, and associated analyst, operator, and helpdesk support - is not sufficient to support an IT function that is, in turn, supportive of broader organisational goals. Increasingly, these goals are motivated by competitive necessity: the viability of the organisation is contingent upon the availability and integration of advanced clinical and financial documentation and decision support tools, and preparation for the advent of the universal electronic health record, with the execution of an internal electronic medical record as an integral first step.

Optimising organisational IT functionality

The senior healthcare executive that comes to the realisation that IT functions need to be upgraded to support organisational objectives quickly understands the significant cost in terms of both capital and human resources requirements: hardware and associated infrastructure support, which often involves the need to expand physical plant and facilities; necessary software upgrades, and associated implementation and workflow re-engineering initiatives; training and retraining of IT staff and user groups; and ongoing support and maintenance. A healthcare executive facing decisions on how to optimise organisational IT functionality has three primary options:

1. Fund and internally execute the necessary upgrade utilising existing staff. This requires pinpoint accuracy as to forecasting current and future needs, and by inference, burdens the existing internal resources with forecasting and resulting execution.
2. Supplement the IT upgrade implementation, integration and optimisation with outside resources for such activities as assessments, systems design and selection, implementation, process re-engineering, and other technical or specialised skill requirements that are typically not resident in a healthcare organisation's IT department. This is increasingly necessary in most "go it alone" initiatives, often requiring extensive and lengthy engagements of specialised outside resources.
3. Outsource the IT function, and make the achievement of future-state information technology objectives the contractual obligation of the selected IT outsourcing service provider.

A closer examination of the factors -why healthcare executives choose any one of these options- provides an understanding of the rationale by which senior healthcare executives increasingly choose IT outsourcing with a reputable service provider.

Focus on "core competencies"

Healthcare organisations, like many other organisations, are increasingly re-focusing on examining and determining future activities around an understanding of their core competencies. Healthcare providers immediately conclude that their core competency is the provision of effective, efficient and exemplary acute and long-term healthcare to their patients and their communities. While IT is a strong contributor to healthcare initiatives, healthcare executives understand that they are not in the "IT business", much like they have realised they are not in the catering, laundry or housekeeping businesses. In order to maintain focus on the core competency of the organisation, healthcare executives see IT outsourcing as a logical decision, and choose to partner with an organisation with high-level IT operations and support as its core competency- with that competency often acquired in a healthcare specific environment.

Risk reduction / cost certainty

IT objectives are attainable via well-written IT outsourcing agreements. Necessary hardware, software, infrastructure and user/ helpdesk support at a defined budget become the responsibility of the service provider, as governed by Service Level Agreements (SLAs). The service provider achieves this through the experience they have with similar projects, the specialised, expert resources they can bring to bear on an as-needed basis to address non-recurring tasks, and the economies of scale they pro-

vide with a centralised data center and network support infrastructure, with state of the art security and disaster recovery support. Cost certainty is enhanced by the economies of scale the outsourcing service provider brings into negotiations with hardware, software and infrastructure support vendors – they leverage existing relationships, market power and their experience in negotiating complex contracts on behalf of their clients.

Enhanced skill sets

The implementation of advanced clinical and financial systems requires specialised skills often not found in most healthcare provider organisations. Existing staff often have effective knowledge of current applications, but may not possess a high degree of knowledge or the background necessary to effectively upgrade, implement, integrate and optimise them. Likewise, staff are highly unlikely to possess practical knowledge of new vendor applications that the healthcare organisation may want to consider. As mentioned, hiring consultants with such knowledge and skill sets is a possibility, but the organisation hiring these resources must be careful that the working knowledge of the application is transferred to existing staff. In an outsourcing relationship, the service provider has incentive, again in the form of SLAs, to utilise the resources it has at its disposal to execute prescribed IT initiatives, and to effect knowledge transfer to existing staff in order to ensure optimum system performance. The IT staff is structured to meet the needs of the upgraded IT system/ configuration, and skill sets are enhanced through knowledge transfer, training and effective support provided by the IT outsourcing service provider. In an environment of constantly evolving technology, the "currency" of IT staff skill sets becomes the long-term responsibility of the IT outsourcing provider.

Optimisation of working capital

Capital constraints prevent many significant IT initiatives from getting off the ground, particularly when there are upfront costs associated with a major IT initiative, such as assessments, implementation, software purchases, training and infrastructure upgrades. In a well-written IT outsourcing agreement, many of these costs are reduced due to previously mentioned efficiencies and economies of scale. Many other costs, however, while they still occur, can be spread throughout the course of an IT outsourcing agreement, and in effect, shift financing of them to the IT outsourcing service provider. This frees significant, short-term

working capital for application towards other critical projects.

Transformation

A summarisation of these factors is that through outsourcing, the healthcare organisation achieves a transformational change – from a sub-optimised information technology environment to a desired future state with managed risk, and predictable, defined costs and operational outcomes.

When executive management of a healthcare provider organisation makes the decision to outsource IT functions to an outside provider, existing IT management can initially feel uneasy about the disruption to their environment, as well as the magnitude of change their organisation is about to undergo within a short timeframe. In effective outsourcing relationships, however, these feelings quickly give way to a feeling of relief, increased opportunity, and ultimately, renewed commitment. Regardless of whether these executives are retained by the organisation or join the staff of the IT outsourcing service provider, significant benefits soon become evident.

First, the decision to outsource signals a focus on the IT function that may not have occurred previously in the organisation. The extensive process of researching options, selecting an outsourcing partner and negotiating a contract creates a keen awareness of the IT function and its many variables among senior executives of the organisation, and results in a long-term commitment to understanding and supporting the function. This process continues as governance structures are established and the performance of the outsourcing service provider is evaluated.

Second, the IT outsourcing organisation provides a like-minded, similarly functioning peer and support group for the executives, managers and staff. They become IT professionals in an IT-focused organisation, and contribute to its core competency and knowledge base. Career opportunities exist in the IT organisation that were not available in the healthcare organisation, and career development follows an IT-specific path in line with current and relevant trends in the industry.

Finally, there is the opportunity to achieve the satisfaction that occurs with tasks and projects that are completed effectively and efficiently. When the advantages of an IT outsourcing relationship are channeled through the efforts of an individual contributor, the individual becomes more effective, and achieves a greater sense of self-satisfaction as a result.

The decision

The IT outsourcing decision is increasingly a logical, effective solution to senior-level healthcare provider executive management. IT executives and managers that embrace the reasons why outsourcing represents an improvement, and embrace their role in making the partnership work, will be rewarded by a greater awareness of what they do to contribute to a function that is critical to the long-term success of the organisation. Their career opportunities will expand as a result of the new experiences they will obtain, and their satisfaction and performance will be enhanced.

Is IT outsourcing an ideal solution? That is to be determined by an individual healthcare organisation. However, IT outsourcing is a solution that is coming of age for hospitals and health systems- just as it has for other industries.

Telecardiology in Italy: Economic Benefits of the Boario Home Care Project

By: T. Jones, S. Scalvini & D. Yeates

As a follow-up to the article on the Boario Home Care Project, published in Issue 1 of Healthcare IT Management, an economic evaluation of the project's success (a recent topic at the eHealth 2006 Conference, organised by the European Commission Information Society and Media Directorate General) is presented below.

Economic evaluation of eHEALTH

As a relatively new technological development, analysis of the economic performance of eHealth projects has been scarce and tended to receive minimal attention. Such lack of evidence of the cost benefits to be gained can, in turn, inhibit future investment in eHealth initiatives. To improve this situation, the European Commission's (EC) Information Society and Media Directorate General set up the eHealth Impact (eHI) study1 in 2004. An important feature of this is the economic evaluation of ten proven eHealth sites in Europe. These evaluations apply cost benefit techniques to include monetary values of costs and benefits for all the stakeholders in each eHealth application. An eHI methodology and model have also been produced to support the evaluations.

eHealth and its economic impact have been a core theme of the Association of Chartered Certified Accountants' (ACCA) health policy since 2001, when ACCA set out to work with the EC's Information Society and Media, to add to the small volume of knowledge on the impact of eHealth on citizens, patients and health services, and so support realistic and beneficial eHealth investment decisions. The fourth ACCA study2 evaluated the economic impact of the Boario Home Care Project3 providing telecardiology in Italy. The eHI methodology was used because it is consistent with the evaluation models used for the first ACCA eHealth Impact Report with the European Commission in 2003, and presented at the first EU Ministerial Conference on eHealth in 2005. A summary of the findings of the telecardiology evaluation is:

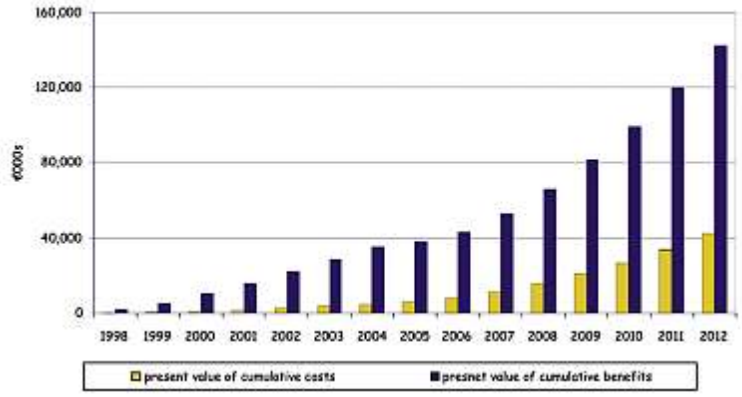
Table 1 – Main Findings of the Telecardiology eHI Evaluation

15 years - 1998 to 2012	%	€m	Estimated Economic Return
Estimated Present Value of Benefits			
Citizens		44	
Avoiding hospital inpatient admissions	35		
Avoiding hospital out patient admissions	12		
Extra, needed hospital inpatient admissions	14		
Extra, needed hospital out patient admissions	4		
Avoiding general practitioner visits	99		
Extra general practitioner visits to modify therapy	8		
Avoiding 15 days delay in therapy start or change	14		
Healthcare providers Improved use of healthcare resources	98		
Total Estimated Present Value of Benefits		142	
Estimated Present Value of Costs		43	
Estimated Net Benefits		99	230%

The Boario Home Care Project

For an eHI evaluation, the Boario Project is very valuable. Data from its clinical trials offer a robust platform for an eHI evaluation. The telecardiology service began in 1998 as a small clinical trial. The Scientific Institute of Research and Care at Fondazione Salvatore Maugeri (FSM) organised the research. As the service expanded, the Health Telematic Network (HTN) was created to deal with the increased activity generated by the new service. These two organisations have assembled the clinical and technological evidence-based platform for the telecardiology services now available throughout the Lombardy Region, and potentially throughout Italy. ACCA's eHI evaluation provides data for an eleventh eHI site,

Chart 1 – Estimated Present Value of Cumulative Costs and Benefits



expanding the EC's eHealth Impact findings and knowledge.

Without telecardiology, patients in Italy with signs and symptoms of a heart problem, or with known cardiovascular diseases, relied on conventional health services from general practitioners (GPs) and hospitals. Access to cardiology services combined with the high number of inappropriate hospital or emergency department admissions, most with high costs, has been identified from the numerous Boario Home Care Project reports. Patients with extremely complex cardiology conditions, such as those with chronic heart disease, those waiting for heart transplants or other types of cardiac surgery, and those who need multidisciplinary care management in their homes, can now use the telecardiology service, and gain health benefits. This service is essential to reduce hospital re-admissions and to improve their quality of life.

At the other end of the spectrum, some citizens experience the onset of cardiac disease, but do not have any outward, noticeable signs and symptoms. They are not yet patients, unaware of their need to access cardiology services, and so do not seek the healthcare they need at the right time. From 1998, telecardiology services began to provide access for these citizens to adequate cardiac screening services that can help to prevent cardiac conditions developing, and so change these scenarios.

With this potential, the Boario Home Care Project aimed to apply new models of disease management and new technology to cardiology services in Italy. This first phase aimed to install, evaluate, and then establish a telecardiology network for GPs in Boario, a mountain region in Lombardy. During this research stage, FSM, and later, HTN, participated in several projects with the Health Institution, Health Ministry and Health Department of Lombardy.

The second phase extended telecardiology to the Lombardy Region from 2006. From this initiative, telecardiology could potentially be made available to the rest of Italy. In the service operating from 2006, the third phase, the structure of the service centre has been expanded, with new broadband technologies, web services and an innovative teleworking model. Three different types of services are now available: one is a service to provide a rapid second opinion for GPs; the second is home telenursing for chronic patients; the third service is the call centre services for hospitals.

Authors

Tom Jones
Title: Director
Organisation: TanJent Consultancy, UK
Email: tomjones@tanjent.co.uk
Web: www.tanjent.co.uk

Dr. Simonetta Scalvini
Title: Head of Telemedicine dept.
Organisation: IRCCS Salvatore Maugeri Foundation, Italy
Email: sscalvini@fsm.it
Web: www.fsm.it

Dennis Yeates
Title: President Elect
Organisation: Association of Chartered Certified Accountants, UK
Web: www.accaglobal.com

For a copy of references contained in this article, please contact k.ruocco.me@eahitm.org

SERIES ON THE BOARIO HOME CARE PROJECT:

- **Volume 1, Issue 1:** project background & results
- **This Article:** project cost analysis

Benefits

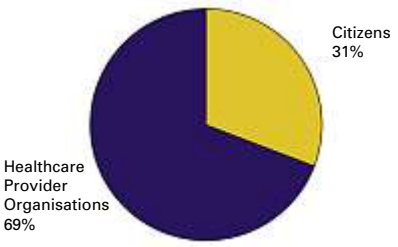
For citizens, patients and carers, they include:

+ Avoiding 35% of hospital inpatient admissions and 12% outpatient visits for hospital care that is unnecessary.
+ Securing hospital admission for 14% of patients, and 4% of outpatients who need hospital care, but were not identified by conventional cardiology services.
+ Avoiding 99% of cardiology-related visits to general practitioners.
+ Avoiding 15 days wait for the beginning or modification of therapy for 14% of patients;
+ Reducing travel time and costs for patients and carers.
+ Reducing anxiety for patients and carers.
+ Improving quality of life for patients, families and carers.

Benefits for GPs and hospitals include fewer avoidable hospital admissions and visits for patients who do not need these services. This reduction releases capacity that can be used for other patients, especially those citizens identified by the FSM research as in need of hospital services, but who were not receiving them.

These improvements in resource utilisation also enable quality to be improved. By deriving service standards and protocols directly from the clinical research in the Boario Home Care Project, and recording the data and conversations of every telecardiology transaction, HTN monitors and reviews its performance and clinical protocols promptly, regularly and routinely. This ensures that the performance of its network of cardiologists, other healthcare professionals and call centre staff complies consistently with the required, evidence-based protocols, and so enables the HTN to maintain high quality standards.

Chart 2 – Distribution of Benefits of Telecardiology in the Lombardy Region



eHI economic evaluation

Over the 15-year lifecycle of the eHealth investment in telecardiology, an estimated economic return of some 230% will be achieved. The return is the present value of the net benefit as a percentage of the present value of costs. The cumulative estimates of costs and benefits are shown in Chart 1.

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Facts and Figures: The Italian Healthcare System

By: Karmin Ruocco

Healthcare System & Administration

Italy has a national health plan (Servizio Sanitario Nazionale), which provides universal coverage for hospital and medical benefits, however about 30% of the population has contracted additional private health insurance. The Italian public healthcare system is decentralised and is based on three levels: the State, region and local health boards. The State is responsible for issuing general system guidelines, establishing work contracts, handling international relations and financing research hospitals. The 20 regions of Italy control the functioning of the health services within their areas of jurisdiction and finance independent hospitals. Finally, the local healthcare units provide daily management of services and finance public and private hospitals under contract with the regions. The remaining private hospitals are financed by their patients.

Healthcare Facilities, Services & Staff

Throughout Italy, there is a coexistence of public hospitals, private non-profit hospitals and private for-profit hospitals. While most private hospitals are under contract with the regions, public hospitals may also engage in private activities as they are, for the most part, independent hospitals.

A gatekeeper physician is responsible for providing citizens with access to secondary healthcare. Patients may choose their own physician, however each physician has a cap on the number of patients he or she is allowed to cover (1,800 patients for a general practitioner and 800 patients for a pediatrician).

Italy at a Glance

Population:	57.3 million
Live births:	9.3%
Death rate:	9.7%
Life expectancy:	78 years for men / 84 years for women
GDP:	1,300 billion euros
GDP per capita:	22,700 euros
Total healthcare expenditure:	8.5% of GDP
Healthcare expenditure per capita:	1,800 PPP euros
Inpatient care expenditure per capita:	730 euros
% of healthcare system financed by public funds:	75%
Number of equipment & scanners per million population:	8.6 MRI 3.8 radiology equipment 21.9 scanners
Number of hospitals:	1,307 hospitals, including 1,144 acute care hospitals
Number of beds:	226,700 acute care beds (public beds 77%, private beds 23% of all beds)
Number of beds per 1,000 population:	4.0%
Rate of occupancy:	76%
Length of stay:	6.9 days
Number of acute care hospital admissions:	157 admissions % population
Waiting list:	Significant

The Role of IT

IT has played a significant role in the Italian healthcare system. Some of the most promising opportunities in the Italian healthcare IT sector are in telemedicine and communication (Internet) services. Because of the disparity between the regional healthcare networks, telemedicine is seen to hold particular promise for use in providing consultations amongst doctors and between doctors and their patients from region to region.

Already, the Lazio and Lombardia regions have established successful teleconsulting and telecardiological service programmes to provide home care as well as linking different medical facilities that have different technologies and treatments available.

In 2005 a national electronic healthcare card was launched to approximately 15 million Italian citizens and residents. A key component of the Italian healthcare program, the card, is used to monitor and manage each phase of the public health expenditure cycle and contains medical as well as European health insurance information.

More information on the Italian healthcare system is available on the website of the Servizio Sanitario Nazionale (www.ministerosalute.it).

Health Informatics and TeleCare in Italy

An Overview from the Italian Association of Telemedicine and Medical Informatics

By: Francesco Sicurello

Health Informatics and Telemedicine in Italy

The development of Health Informatics and Telemedicine in Italy started several years ago, following the development of Information and Communication Technologies. More recently, in the '70s and '80s, different projects and products were developed in this field (Finalized Programs of National Council of Research on Parallel Computing and Expert Systems and Epidemiological Diseases Risk Factors). In 1991 the Ministry of Research financed a €50 million initiative (TELEMED) that for 10 years represented a focal point for several applications in radiological teleconsulting, telecardiology, network of excellence

Hospitals (institutes and centres of oncology, neurology, etc.), teletraining in medicine, etc. The main results of the TELEMED project were to initiate prototypal platforms in radiological, cardiological and oncological fields and in the implementation of some Hospital information Systems Network.

Since 2001, the Italian Health System has been decentralised. Health policy and management is now under the government of Regions.

The Regional Authorities have started different projects and applications in health informatics and telemedicine, involving their hospitals, ambulatories of health districts and GPs (from regional level to national level now the new Italian Health Information System in the development phase). The development of health informatics and telemedicine systems in Italy needs to improve networking backbones with high bandwidth, in order to improve speed and the quality of data and images during teleconsulting / telediagnosis applications.

In Italy, as in other countries, Health Informatics and Telemedicine services have captured the attention of the medical community and of the health authorities as a tool to improve the access to quality assistance. Such services offer the potential to improve the quality of treatment and care, while reducing costs.

KEY AREAS OF INTEREST

- Telemedicine and teleassistence
- Teleconsultation and telediagnosis
- Health and territorial networks
- Medical records and health cards
- Clinical and epidemiological databases
- Healthcare and hospital information systems
- The use of the Internet in healthcare
- Distance training of healthcare professionals (eLearning)
- Medical decision support systems
- Statistical software used in epidemiology and healthcare

The Italian Association of Telemedicine and Medical Informatics

The Italian Association on Telemedicine and Medical Informatics (@ITIM) has held a leading role in improving the co-operation and diffusion of medical informatics and telemedicine culture and application in the whole Italian Health System.

The main purposes and activities of the @ITIM are:

+ To promote the study, research and application of information technologies, telecommunications (computer science and data transmission) and methodologies used in healthcare.
+ To develop an awareness of the administrative, social, cultural, technical and scientific healthcare IT structures of these themes at local, regional and national levels.
+ To develop professional qualifications in the field.
+ To develop standard technologies, methodologies, and guidelines.
+ To develop research on technologies, methodologies, guidelines and protocols used in telemedicine and healthcare information systems.
+ To participate in research and development projects and plans at regional, national, European and international levels on the topics of medical informatics and telemedicine (i.e hospital information systems, clinical databases, medical records and health cards, medical decision support systems, statistical software, etc.).

+ To promote the use of information technologies in the diagnostic-therapeutic process, the careful monitoring and surveillance of authorized medicinal products during their market life, the quality of care, and cost reductions of the Health Service at local, regional and national levels.
+ To contribute to the utilization of information technologies and telematics in the treatment of data for health prevention and the improvement of the quality of the life of citizens.
+ To promote the diffusion of information and communication activities, such as the publication of journals, newsletters, books, general and organizational information bulletins, profiles of national and international training courses, conventions and exhibitions, etc..
+ To involve associations, healthcare and hospital organizations, regional and local administrations (ministries, government agencies, etc.), university and research networks, cultural and social organisations, public and private companies with various forms of collaboration.

INITIATIVES

- Annual Congress of the Association.
- Seminars of study and deepening on specific arguments.
- Telemedicine and medical informatics courses.
- Promotion of and participation in related regional, national and international activities.
- Participation in conventions on topics of interest to the Association at European and international levels.

Examples of Telemedicine and Telecare Systems in Italy

The list of telemedicine and telecare systems in Italy is very long. These systems have been developed within the framework of both local and national health ICT programs and even within the context of European projects. Some examples are:

+ Telematic Cardiological Ambulatory: a network between ambulatories of General Practitioners (GPs) and Cardiologists (L. Sacco Hospital, Milan).
+ Telemedicine INRCA (National Institute of Research and Treatment of the Elderly, Ancona): Telecardiology and telespirometry for home treatment via ECG transmission through the phone, spirometry test at the INRCA, active 24 hours a day, with telephone assistance in case of emergency.
+ M2DM (Pavia): Multi-access services for diabetes management to provide sustainable care to diabetes patients at home and when out of the house.
+ e-CARE Medical Expert System for continuity of care and healthy lifestyle (EU - ALDIA, Pavia): Home monitoring for patients with chronic pathologies, those in post-operation recovery, or those predisposed to the risk of serious pathologies that require constant contact with the doctor;
+ Web-based real time system for home monitoring of vital parameters in pain therapy (Rome): An operating model for home telecare activities able to support real-time activities in pain therapy.
+ Teleassistance of children with peritoneal dialysis (Clinical Institutes of Improvement, Milan): Home monitoring via the Internet of a child as he undergoes peritoneal dialysis.

Telecare for Respiratory Diseases

In Italy, there are also telemonitoring services for patients with severe respiratory illnesses requiring long-term oxygen therapy. Patients were initially monitored at home for 12 months; during that time a determination of arterial oxygen saturation and heart rate were performed twice a week and automatically transmitted to the hospital's processing centre via a normal telephone line. The results showed a reduction of acute exacerbations and hospital admissions during the telemonitoring phase.

Another service in this field is delivered by INRCA of Casatenovo (Lombardia region). In this case, different methods are employed to monitor, at home, patients affected by respiratory insufficiencies and who are mechanically ventilated. This project, begun in June 2001, is different from others because some patients who are on ventilation 24 hours a day are monitored with the possibility to directly modify the ventilator settings from the Respiratory Unit, which is located far from the patients' houses. Many of the patients monitored were also affected by Amiotrofic Lateral Sclerosis.

In recent years, other investigators have followed their respiratory patients by telemedicine systems. Dal Negro in Bussolengo follows oxygen dependent patients at home and Vitacca in Gussago follows ventilated patients at home by simple pulse oximeters, able to transfer the recorded data by normal telephone line.

Benefits of Telemedicine and Telecare Services in Italy

Telemedicine and Telecare systems permit a more cost-effective solution for health care delivery, providing better clinical outcomes as well as improving patient quality of life.

The impact of these applications particularly affects disease management, the management of ageing populations, reduction of waiting lists and second opinions, improving data collection and epidemiological databases, etc.

In general, the benefits associated with the introduction of Telemedicine and Telecare services in Italy are:

+ Health education of healthcare professionals, people and users.
+ Employment opportunities for healthcare professional at a peripheral levels.
+ Availability of normal (or on demand) health treatments, in distant areas to prevent the population from moving away.
+ Improvement of health indicators used by the WHO and by national governments.

Author

Francesco Sicurello
Title: President
Organisation: Italian Association of Telemedicine and Medical Informatics
Email: segreteria@aitim.net
Website: www.aitim.net

For a copy of the references contained in this article, please contact k.ruocco.me@eahitm.org.

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THE NEED FOR STANDARDS FOR INTEROPERABILITY

Given that it has the potential to address some of the most serious healthcare challenges in industrialised countries today, the recent explosion of interest in and activities around telemedicine is not surprising.

In fact, in 2003 the European Union funded two projects with the expressed goal of developing a roadmap for the implementation of telemedicine and other eHealth services in Europe by the year 2010. One catalyst for such a roadmap may be the numerous studies that have demonstrated the efficacy of telemedicine in increasing the efficiency and quality of home healthcare and decreasing the number of patient visits to the emergency room. Not coincidentally, the number of companies manufacturing home telehealth devices has tripled in the past three years, according to Jonathon Linkous, executive director of the American Telemedicine Association.

Of course, with such rapid growth, we must make sure that devices are able to interact and work together, regardless of the manufacturer. That underscores the need for clear, consistent standards worldwide, so that data can be collected, transmitted, stored, and analyzed anywhere, any time, without errors or confusion.

Industry-leading corporations are doing their part by helping to establish the standards, and by implementing the standards-based technology, that can make telemedicine and e-health services a reality worldwide. Industry-standard products such as SmartPhones and Pocket PCs using mobile software are already helping physicians, nurses, and other clinicians track patient visits, communicate, collaborate, and deliver services more efficiently.

Perhaps even more important, when healthcare organisations select commonly utilised industry solutions, they can be confident that they are investing in integrated, long-term solutions, not standalone products headed for obsolescence.

BARRIERS ARE NO LONGER TECHNOLOGICAL

Clearly the need for telemedicine is here now, and will only grow. The good news is that the technology is available today to implement effective, economical solutions. In fact, with the growing popularity of networked digital TVs, a whole new interface for telemedicine is emerging right in our living rooms. It is surprising then, that telehealth technologies currently account for only an estimated €273 million out of €120 billion spent globally on healthcare technologies. The problem, I believe, is that this method of delivering care still faces many social and cultural barriers to widespread adoption and use, despite the maturity and effectiveness of the technology.

Though the impetus for telemedicine is undeniable and the technologies that support it are well evolved, its full potential will not be achieved until we have incorporated it into the training and practices of healthcare professionals, and have raised the awareness and expectations of patients as to the benefits and economies telemedicine has to offer.

The technology is ready. When will we be?

BioInformatics Application Service Providers of Politecnico di Milano

By: Marco Masseroli and Francesco Pinciroli

The management and interpretation of biomolecular data

As molecular medicine continues to gain relevance, the availability of the complete sequence of the human genome and the new nanotechnology approaches in molecular biology are permitting the quick study of thousands of genes simultaneously. With increasing biomolecular and bioinformatics advancements, many healthcare sites are offering several genetics tests at relatively low costs. Although such tests can now be easily and routinely performed, the management and interpretation of the produced data cause issues that need to be resolved. These tests produce a great amount of data that needs to be efficiently stored and statistically analysed in order to identify significant genes and proteins studied in the tested conditions. Moreover, to correctly interpret test results, structural and functional information about the identified genes and protein products requires further analysis.

Such information is increasingly available within numerous distributed databanks and easily accessible through web interfaces. However, the spreading of required information among many heterogeneous databanks and the way most databanks provide such information (i.e. within unstructured HTML pages, one page for each gene or protein entry with all information in the databank about the entry) is not functional to its effective use for the simultaneous analysis of the relevant genes and proteins identified in each genetic test. The resulting genetic test data and interpretation of results also need to be organised, together with other clinical patient data, within clinical repositories in order to easily and effectively query them.

In order to resolve these issues, new data management and analysis approaches are being developed, and specific databases and software tools are being created. Among these is a set of bioinformatics application services developed at the BioMedical Informatics Laboratory of Politecnico di Milano. They respectively enable:

1) collection of information regarding microarray experiments according to experiment workflow and storage in accordance to the Minimum Information About Microarray Experiments (MIAME) standard specifications;
2) statistical analysis of microarray data in order to identify significant expression patterns of relevant genes involved in the examined conditions;
3) effective use of biomedical information publicly available in several different genomic databanks to enrich lists of identified genes with related structural and functional information;
4) statistical analysis and data mining with the aim of unveiling information patterns of co-regulated genes and highlighting new biomedical knowledge.

Available BioInformatics Application Services

Some original bioinformatics application services are provided at http://www.bioinformatics.polimi.it/. Descriptions of system requirements and instructions for their use are available on each service web site. Among them, the GFINDer system is continuously being developed. Currently, it is one of the few systems available for the analysis of genomic functional annotations of genes and their gene products, and the only one that provides analysis of human inherited disorder phenotypes.

MicroGen: a web server for microarray experiments

www.bioinformatics.polimi.it/MicroGen

MicroGen consists of a core multi-database system able to store information and data completely characterising different spotted microarray experiments according to the MIAME standard. Based on a temporal experiment workflow, MicroGen has a web interface able to support the collaborative work required among multidisciplinary actors and roles. As a result, three different actors can cooperate in the same experiment and share information about its production:

+ The GENERIC PUBLIC USER, who can get information about MicroGen services by accessing all public sections of the system, including a presentation of MicroGen system facilities and services, a tutorial on its use, and an example of a generated experiment.
+ The SUBSCRIBED USER, who can fully use the facilities provided by the system for all areas of specialisation he / she has access to.
+ The WEB MASTER, who can use the functionalities offered by MicroGen to manage the whole system and check the work performed within it.

MicroGen additionally supports four types of subscribed user roles: the researcher who designs and requests the experiment; the spotting operator; the hybridisation operator,

Authors

Dr. Marco Masseroli, Ph.D.
Organisation:
Politecnico di Milano, Italy
Email:
masseroli@biomed.polimi.it
Web:
www.biomed.polimi.it/BioIntro/english/people/research/Masseroli.htm

Francesco Pinciroli
Organisation:
Politecnico di Milano, Italy
Email:
francesco.pinciroli@polimi.it
Web: www.biomed.polimi.it

For a copy of the references contained in this article, please contact k.ruocco.me@eahitm.org.

and the image processing operator. Composed of Active Server Page files, it uses a relational database created in MS-Access. As a result, in order to run MicroGen, an Internet Information Server (IIS) web server and MS-Access must be present. Labeling files containing information about the clones spotted on each array are generated as MS-Excel files.

GAAS: Gene Array Analyser Software

www. bioinformatics.polimi.it/GAAS

GAAS is an integrated software framework for the management, analysis and visualisation of large amounts of gene expression data across replicated experiments. Comprised of management, analysis and visualisation sections that work with several gene expression dataset formats, it permits custom differential expression data analyses, suitable visualisation, and storage of results.

GAAS is designed for a multi-user environment and is composed of two types of software: Gene Array Assembler Software and Gene Array Analyser Software. The Assembler performs pre-processing of gene expression data, transforming any input data structure in MS-Excel format into a built-in database structure in MS-Access format. The Analyser uses a built-in database gene expression data structure to perform fast differential gene expression analyses across multiple replica experiments. It is structured in the following sections:

+ Management: the management framework is based on the relational MasterDB system accessed and administered through software tools integrated in GAAS. MasterDB is composed of several tables available in the MasterDB management window of the Gene Array Analyser Software.
+ Analysis: the analysis framework enables management and customisation of all implemented data processing procedures subdivided in background, normalisation and gene differential expression analysis steps.
+ Visualisation: the visualisation framework enables visual navigation, both in tabular and graphical format, of data analysis results.

GAAS is developed with MS-Visual C++ and interconnected to a relational database system (MasterDB) developed with MS-Access 2000. GAAS can therefore be run on MS-Windows 98/NT/2000/XP platforms, or on Macintosh running Virtual-PC software. GAAS capabilities are compatible for single PC and local network installations in an MS-Windows environment.

MyWEST: My Web Extraction Software Tool

http://www.bioinformatics.polimi.it/MyWEST

MyWEST is a Java software package for data mining in web-interfaced biomolecular databanks. It provides an intuitive visual interface for building templates that define which information should be extracted from HTML pages in web databanks, then uses the created templates to mine information from multiple web pages of different databanks, stores and aggregates extracted data in a common database, and allows articulated queries to be performed on the aggregated data.

A template configuration module enables data mining of HTML pages in web-interfaced databanks of interest and the creation of extraction templates.

It also supports the definition of access parameters of web-accessible databanks of interest and a relational database for storing extracted data. In the data extraction module, users can provide identification codes of nucleotide or amino acid sequences of interest and use the created templates to automatically mine, in batch mode, the available annotations of interest. The resulting data is stored in Excel file format in a relational database. Once in the database, extracted information is aggregated and structured for performing articulated queries. A specifically designed updating software agent enables the automatic updating of all information contained inside the database of the mined data.

MyWEST stores data extracted from databank web pages both in single tab-delimited ASCII text files, and aggregated in relational databases connected to MyWEST.

Therefore, MyWEST can run on any operating system platform with an adequate Java Virtual Machine installed. To use database functionalities implemented in MyWEST, a suitable Data Base Management System must also be available.

GFINDer: Genome Function INtegrated Discoverer

http://www.bioinformatics.polimi.it/GFINDer

GFINDer is a web tool that performs statistical analyses and data mining of functional and phenotypic annotations of gene sets identified in high-throughput biomolecular experiments. It automatically provides large-scale lists of user-classified genes with functional profiles biologically characterising different gene classes. GFINDer automatically retrieves annotations of several functional categories from different sources, identifies the categories enriched in each class of a user-classified gene list and calculates statistical significance values for each category. It also enables gene classification according to functional categories and the statistical analysis of obtained results. GFINDer therefore permits a better understanding of microarray experiment results and mining hidden biomedical knowledge by examining user sequence ID lists, or gene lists, and applying clustering and statistical analysis methods to their currently available genomic annotations retrieved from several databanks. The annotation data considered in GFINDer is taken from many different databanks and includes: Gene Ontology (i.e. Biological Process, Cellular Component, and Molecular Function categories), KEGG (i.e. Biochemical Pathways), and PFAM (i.e. Protein Domains). GFINDer also considers clinical and phenotypic information provided by the OMIM databank, which describes the Phenotypes and Phenotype Locations associated with inherited disorders or genetic loci5,6.

GFINDer is organised as a flow scheme of analysis steps in distinct modules, as follows:

+ Upload: uploads user-classified gene lists

Name	Start Date	N°. of Accesses	Distinct IPs	Downloaded Copies
MicroGen	July 2005	nearly 900	more than 150	nearly 10
GAAS	April 2003	more than 32,000	nearly 5,000	nearly 380
MyWEST	August 2003	nearly 29,400	nearly 5,000	more than 240
GFINDer	July 2004	more than 61,000	more than 3,100	(Web use only)

Table 1. Bioinformatics application services provided at the MedInfoPoli Web site (http://www.bioinformatics.polimi.it/) and their usage since their opening.

to be analysed.

+ Annotation: enriches uploaded gene lists with several gene annotation categories, including structural, functional, and phenotypic annotations.

+ Exploration: studies the distribution of different classes of genes among different annotation categories.

+ Statistics: statistically estimates the relevance of each annotation category of the classes of genes considered in uploaded gene lists.

GFINDer use is open to registered and non-registered users. Non-registered users can test the efficacy of GFINDer's main functionalities by uploading only one sequence ID list at a time that can include only a limited number of sequence IDs.

Registered users can fully access all GFINDer functionalities, upload and store in the system multiple sequence ID lists without any limitation on the number of sequence IDs in each list, save results of GFINDer analyses, and compare results obtained for different sequence ID lists.

Telecardiology in Italy: Economic Benefits of the Boario Home Care Project

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The economic impact of extending telecardiology across the whole Lombardy region, steadily over about six years up to 2012, is material. Much of the investment needed in information and communication technology, ECG equipment and service infrastructure has already been set in place by HTN. The total net benefits are considerable, with an estimated annual benefit cost ratio of more than 3.3:1 by 2012.

The correlation of annual utilisation changes and annual cost changes is weaker, at more than +0.5. It shows the need to manage costs directly, and not rely on utilisation to contain costs. It also shows the need for direct cost control to ensure that costs do not drift and so erode the net benefits.

Benefits of telecardiology have been grouped into citizens and healthcare provider organisations. About 31% are direct for citizens; about 69% are for healthcare provider organisations, as shown in Chart 2.

All the values used in the eHI evaluation are tested for sensitivity.

+ All costs have been increased by 50%, all benefits reduced by 50%, and
+ the discount rate has been increased, and decreased by 50%.

The economic return is not diminished by the sensitivity analysis, confirming that telecardiology can offer an effective eHealth investment, with benefits both for citizens and healthcare providers.

The research sets out a roadmap for policy-makers, based on sound clinical evidence and is an excellent example of clinicians and finance professionals working together to maximise health benefits. Crucially, the significant care improvements identified by the research are relevant to health systems throughout the EU Member States and beyond.

Movers & Shakers: Industry Interview

Eric Poiseau
Title: It Manager
Organisation: Integrating the Healthcare Enterprise (IHE) Europe
Web: www.ihe-europe.org

Eric Poiseau, IT Manager

Integrating the Healthcare Enterprise (IHE) Europe

Please tell us a little bit about IHE Europe, how was it started and what are your 'hot topics' for 2006/07?

IHE is a non-profit organisation sponsored by professional bodies and healthcare suppliers that gathers users and vendors around the same table to discuss and solve the problems of healthcare systems interoperability. We believe that interoperability should be built around a core of common requirements, taking differences between EU Member States into account, but enabling manufacturers to market their products at the European and even global levels with only minor variations. To this end, IHE in Europe maintains close contacts with similar initiatives in North America, Japan and other parts of the world. The IHE approach is a win-win situation in that both vendors and users benefit from it!

IHE in Europe is busy organising activities to achieve the interoperability of existing products and facilitate the development of new interoperable products. Some of these activities consist of:

+ Development of workflow descriptions and associated integration profiles based on user requirements.
+ Organisation of live interoperability testing between vendors (connect-a-thon), and of live interoperability demonstrations at the European level, if required and appropriate.
+ Support to national IHE activities in order to incorporate national requirements into interoperability requirements.
+ Promote and facilitate the use of products that implement IHE Integration Profiles through means such as educational activities, success stories, integration statements.

"Interoperability should be built around a core of common requirements, taking differences between EU Member States into account, but enabling manufacturers to market their products at the European and even global levels with only minor variations."

Our hot topic in 2006 and 2007 is the sharing of documents across enterprises (XDS: Cross enterprise document sharing). National as well as regional projects across Europe are referencing XDS.

What is the process that IHE follows for standards adoption?

The official IHE message on the process for standards adoption is:

IHE follows a defined, coordinated process for standards adoption. These steps repeat annually, promoting steady improvements in integration.

I. Identify Interoperability Problems. Clinicians and IT experts work to identify common interoperability problems with information access, clinical workflow, administration and the underlying infrastructure.

II. Specify Integration Profiles. Experienced healthcare IT professionals identify relevant standards and define how to apply them to address the problems, documenting them in the form of IHE integration profiles.

III. Test Systems at the Connectathon. Vendors implement IHE integration profiles in their products and test their systems for interoperability at the annual IHE Connectathon. This allows them to assess the maturity of their implementation and resolve issues of interoperability in a supervised testing environment.

IV. Publish Integration Statements for use in RFPs. Vendors publish IHE integration statements to document the IHE integration profiles their products support. Users

can reference the IHE integration profiles in requests for proposals, greatly simplifying the system's acquisition process.

I would like to insist on some key points from this:
+ Users and vendors are involved in the process.
+ The cycle is annual.
+ Users are involved at the beginning of the process in the identification of the interoperability problem.
+ Users can and do comment on the specifications (integration profiles).
+ During the IHE Connectathon, some users are involved in the validation of the tests performed by the vendors.
+ Users references IHE in their RFPs.

What is the IHE Technical Framework, and how is it organised?

The IHE Technical Frameworks, available for download, are a resource for users, developers and implementers of healthcare imaging and information systems. They define specific implementations of established standards to achieve effective systems integration, facilitate appropriate sharing of medical information and support optimal patient care. They are expanded annually, after a period of public review, and maintained regularly by the IHE Technical Committees through the identification and correction of errata.

There is an IHE Technical Framework for each of the IHE domains. Volume I provides a high-level view of IHE functionality, showing the transactions organised into functional units called Integration Profiles that highlight their capacity to address specific clinical needs. Volume II provides detailed technical descriptions of the IHE transaction used in the domain.

How is an IHE Integration Statement developed, and what benefits does it provide for healthcare IT managers?

IHE Integration Statements are documents prepared and published by vendors to describe the conformance of their products with the IHE Technical Framework. They identify the specific IHE capabilities a given product supports in terms of IHE actors and integration profiles.

Users familiar with these concepts can use Integration Statements to determine what level of integration a vendor asserts a product supports with complementary systems and what clinical and operational benefits such integration might provide. Integration Statements are intended to be used in conjunction with statements of conformance to specific standards (e.g. HL7, IETF, DICOM, W3C, etc.).

There is no requirement for a vendor to participate in an IHE Connectathon in order to be able to publish an integration statement.

IHE integration statements help users by comparing products functionalities.

> "Access to information, document sharing and security are the biggest challenges facing healthcare IT managers in Europe."

What are IHE's current initiatives in Italy?

IHE Italy became involved with IHE Europe at an early stage and has been present since the first IHE Europe Connectathon in Paris in 2002. IHE Italy organised the third European Connectathon in Padova in 2004 and since then has been one of the three major countries, with Germany and France, to participate in the Connectathon (counting the number of registered systems).

IHE Italy participation to the Connectathon is noticeable with two university projects participating in the Connectathon:
+ O3C from the University of Padova with Claudio Saccavini as contact and the UTS and
+ University of Triest with Paolo Inchingolo as contact.

IHE Italy was also involved in the start up of the IHE Laboratory domain, along with France and Japan.

What are some of IHE's biggest successes in Europe?

I guess the biggest success of IHE in Europe is to have successfully developed IHE in Europe. IHE started in the US! IHE Europe was successful in importing the initiative but more than that, in adapting it to the European context.

IHE Europe is now contributing to the international level and is, in a way, forcing IHE to be international.

IHE Europe is contributing at the international level with:
+ Clinical laboratory and pathology domains;
+ IT-Infrastructure XDS and PIX integration profiles;
+ Radiology PDI integration profiles, which found their origins in Europe.

What were the biggest results / achievements of the 2006 IHE Connectathon in Europe?

Hot topics at the Connectathon were workflow and access to information, security, patient management and document sharing and patient summaries.

For the first time in Europe, we had Public Key Infrastructure (PKI) - the French Groupement d'Interet Public Carte de Professionnel de Sante (GIP-CPS) - involved in the Connectathon process. The GIP-CPS provided the certificates to be used by the vendor for testing the security profiles.

What integration challenges do you think healthcare IT managers in Europe should be most concerned about?

In my opinion, access to information, document sharing and security are the biggest challenges facing healthcare IT managers in Europe. Healthcare information systems will more and more need to interoperate to exchange documents, images, patient identifiers, exchange about user rights.

Software applications are also more frequently required to interact with:
+ Audit trails: sharing of logs, security requirements to centralise logs.
+ User rights: authentication, authorisation...rights that may depend on the role and the context.
+ Patient identification: document sharing requires sharing of identification.

As an IT manager, the transition phase from today to tomorrow is not trivial and constitutes a challenge. Where do we start and what road map do we use to reach that ideal world? IHE is offering some solutions and some hints! This may explain its success.

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Looking ahead

In countries such as France and Germany, which have begun to implement second-generation smart cards for healthcare, the increased economic efficiency and modernisation of the healthcare sector speaks for itself. In Germany, where the multi-application smart cards will replace 800 million paper-based prescriptions, the government can expect savings of up to € 5 billion per year, according to figures from Eurosmart. Not only will the cards serve to eliminate redundant or unnecessary prescriptions, or even potentially dangerous combinations of medication, they will also reduce redundant diagnostic procedures (e.g. identical X-rays being produced by multiple doctors). In France the forecast is just as impressive, with around € 300 million per year of savings in administrative costs.

Case Study:
The Austrian Citizen Card

Austria's e-card is an example of a second generation health card, hosting a range of applications. Issued during the first quarter of 2005, the implementation involved the issuance and management of 8 million social insurance citizen smart cards in Austria. This new "e-card" system replaced the need to issue and process 40 million paper-based healthcare vouchers annually. In addition to the e-cards, more than 25,000 o-cards for authorized staff in doctors' practices were also issued as part of the project.

A web-based management system was adopted to manage the complete life cycle of all e-cards and o-cards with integrated Post-Issuance Personalization (PIP) functionality. This added feature not only allows cardholders to download and reload applications at a later date, but also enables the Main Association of Austrian Social Insurance Institutions to change on-card data via their own e-portal, the Karten Service Portal. In addition, the PIP feature assists the Karten Service Portal in allowing citizens to apply for and download digital certificates.

Used as citizen cards, the new multi-application e-cards contain personal cardholder data as well as up to four digital certificates for data security and verification of the cardholder's identity.

Utilising an open system in providing a smart card infrastructure that is capable of supporting multiple applications and partners will be key for future-proof smart card implementations and in ensuring the healthcare industry achieves continual yearly savings. With technology developing rapidly in today's society, this means consistently providing added value to the end-user; making new services and features accessible from the smart card, and forming multiple partnerships with both the public and private sector. These things can only be achieved through the implementation of an interoperable and cost-effective standards-based solution.

Industry Events

August

IHIC 2006
International HL7 Interoperability Conference
24 – 25 August 2006
Colgogne, Germany
www.ihic.hl7.de

MIE 2006
20th Annual Conference for the European Federation of Medical Informatics
27 – 30 August 2006
Maastricht, Netherlands
www.mie2006.org

BioMech 2006
Fourth IASTED International Conference on Biomechanics
28 – 30 August 2006
Palma de Mallorca, Spain
www.iasted.org/conferences/2006/spain/c542,htm

September

ESC 2006
European Society of Cardiology
2 – 6 September 2006
Barcelona, Spain
http://www.escardio.org/congresses/esc_congress

DMS Expo
Digital Management Solutions Conference
19 – 21 September 2006
Cologne, Germany
www.dmsexpo.de

Medmatic@
International Exhibition of Digital and Satellite Telecommunications
28 - 30 September 2006
Vicenza, Italy
www.medmatica.it/en

October

The World of Health IT
Conference & Exhibition
10 – 13 October
Geneva, Switzerland
http://www.worldofhealthit.org

MedNet 2006
11th World Congress on Internet in Medicine
13 – 20 October 2006
Toronto, Canada
www.mednetcongress.com

November

MEDICA 2006
World Forum for Medicine
15 – 18 November 2006
Düsseldorf, Germany
www.medica.de

IST 2006:
Strategies for Leadership
European Commission's Annual IST Event
22 – 24 November 2006
Helsinki, Finland
www.ist2006.fi

2007

February

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

April

Med-e-Tel
International Trade Shoz & Conference for eHealth, Telemedicine & Health ICT
18 - 20 April 2007
Luxembourg
www.medetel.lu

ITeG 2007
IT Messe & Dialog in Gesundheitswesen
18 - 20 April 2007
Berlin, Germany
www.mesago.de/de/ITeG/main.htm

eHealth 2006 High Level Conference

Resolving to work together

The eHealth 2006 High Level Conference, held in Malága, Spain May 10-12 allowed more than 900 high-level politicians and IT and health experts from all over Europe, including some US and Canadian representatives, to share and exchange ideas and initiatives in the eHealth field.

Under the slogan "eHealth and Health Policies: Synergies for better Health in a Europe of Regions", the fourth edition of this event had the aim of encouraging the implementation of Information and Communication Technologies (ICT) that are going to make it easier for citizens to gain access to efficient and quality healthcare systems and services.

During this year's eHealth Conference, other associated events were also held in parallel such as the World Panel on Interoperability, which was attended by experts from Europe, North America and Australia; the European eHealth Industry Forum, which had the presence of CEOs from leading companies in the development of information technologies, and the Strategic Regional Forum eHealth 2006, in which public managers for health policies shared their experiences and future expectations. The different tracks and sessions of the conference favoured the dissemination of the results of research and technological innovation and allowed the exchange of eHealth experiences between various European countries and regions.

The eHealth 2006 High Level Conference also offered attendees the opportunity to participate in strategic seminars prepared with high-level experts. Another important novelty, compared to previous years, were the site visits which, within the conference framework, were made to various research centres, hospitals and clinics that are currently developing eHealth tools or putting them into practice, both in Andalucía and in other autonomous regions of Spain.

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Fax: +32/2/286 85 08
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Website: www.hitm.eu

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