

HEALTHCARE IT MANAGEMENT

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THE OFFICIAL JOURNAL OF THE EUROPEAN ASSOCIATION OF HEALTHCARE IT MANAGERS

Health 2.0 and Medicine 2.0

E-Health: Risks of the Technology Imperative

Investing
in The Hospital
of the Future

Nursing
and e-Health

Health
Technology
Assessment

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Letter from the Secretary General and Editor-in-Chief, HITM



Dear Reader,

As disruptive as it is pervasive, the Internet has created thoroughly new ways of doing business, exchanging information and delivering goods and services. It has both deepened and broadened interaction between individuals, interest groups, industry and policy makers.

In effect, the Internet has not only redefined the meaning of community; it has also created wholly new communities. The Internet phenomenon called Web 2.0, embodying diffused/participative tools such as wikis, Facebook and blogs, is now sweeping across the globe. Alongside, this has begun to sound the death knell for traditional gatekeepers of knowledge, from icons in the print media to databases such as Lexis-Nexis. Healthcare IT is no exception to this rule.

The healthcare applications of Web 2.0, known as Medicine 2.0 and Health 2.0, allow individuals to access not only vast amounts of healthcare data but structured information, and participate in continuously enhancing the content and utility of the latter. These developments, in turn, will lead to improving healthcare delivery.

Across most sectors of business, informed consumers have redefined the way corporations anticipate and respond to their needs. Medicine 2.0 and Health 2.0 are creating the informed healthcare consumer – the Empowered Patient. As a result, e-health is unlikely to be dictated from the ivory tower of policy, or reflect the take-it or leave-it philosophy corporations (and lawmakers) had got used to – before the advent of the digital age.

But the path forward is by no means clear, or straight. Our Cover Story explains the challenges faced in developing and replicating large-scale Medicine 2.0 or Health 2.0 models from the Internet.

Having informed consumers/patients is clearly desirable. Though Medicine 2.0 and Health 2.0 will help make e-health more patient-driven and participative, there are other concerns, not least in terms of ethics and law, which could undermine success.

One major risk is that technology feeds on itself, and acquires autonomous momentum. This has happened in the past, in other areas. In e-health, however, the implications would be more serious, threatening some near-sacred tenets such as the physician-patient relationship, informed

consent, privacy and liability. An incisive analysis of such issues is provided in the article 'e-health and its Challenges: The Technological Imperative'.

Meanwhile, even as Empowered Patients seek to make sure that e-health serves their interest, the voice of another key healthcare actor, the nursing professional, has so far been largely overlooked. Closer involvement of nurses is urgent to make healthcare IT meaningful for healthcare practitioners, the State, and above all, patients. The first steps, according to a senior nursing professional, should be taken by nurses themselves (see 'Nursing and e-health').

In an age where hospitals symbolise modernity, it may be salutary to take note of a comment by one of the world's best known nurses, Florence Nightingale, 150 years ago: that hospitals were no more than an 'intermediate' stage of civilisation. To assess what hospitals might look like 150 years from now is surely an exciting challenge.

Towards this, experts from Britain and the Netherlands (see 'Capital in the City: Investing in the Hospital of the Future') attempt to deconstruct the roles of a hospital in healthcare delivery. These range from the 'office' to the 'hotel', from the functional to the 'factory-like'. Their exercise, however, aims less at futurology than at helping hospital management get a grip on understanding change, a phenomenon which has been ever-present since Ms. Nightingale's thesis of 'intermediacy'.

Interestingly, given our observations above, the writers conclude that "Medicine 2.0 cannot create a culture of knowledge management."

Like much else in e-health and healthcare IT, the jury is (still) out.

Yours truly,

Christian Marolt

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References

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CAPITAL IN THE CITY: INVESTING IN THE HOSPITAL OF THE FUTURE

Hospitals are, and have always been, in a state of technological flux. Their long lead times entail an inherent paradox in making reviews. If a facility has been running long enough for it to be generating useful evidence about its performance, it must have been conceived over a decade before, and cannot represent state-of-the art any longer. If, however, it embodies latest thinking, it cannot yet have been tested in the real world. The solution to such a riddle lies in deconstructing the different roles of a hospital in healthcare delivery and then using these to develop tools for hospital managers to measure performance.

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NURSING AND E-HEALTH

Nurses are the only healthcare professionals to interact with patients, their relatives and friends, on a 24 hour, seven days a week basis. As a result, any meaningful evaluation of healthcare should start with nursing and build IT and e-health systems to support healthcare delivery from this point. Unfortunately, this is not yet the case.

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HEALTH TECHNOLOGY ASSESSMENT FOR COST-EFFECTIVE HEALTH SERVICES

European countries spend between 5–11 percent of GDP on healthcare. Although these resources have surely improved health and quality of life for many Europeans, it is obvious from research that we do not always use the resources in the most cost-effective way. In order to avoid waste of resources, health technology assessment (HTA) is a means to improve decision-making in healthcare and make more efficient use of scarce resources.



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E-HEALTH AND THE DANGER OF THE TECHNOLOGICAL IMPERATIVE

e-health promises to be a cost-effective and efficient way of providing healthcare. However, it is accompanied by a series of ethical and legal challenges which, if not met before its implementation, could undermine its success.

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HEALTH 2.0 AND MEDICINE 2.0

The internet's impact on healthcare is ever more evident, with over 80% of US citizens searching online for health matters, and 33% of EU citizens using internet health sources every three months. Medicine 2.0 partly drives this increasing use, providing new sources of information and new access models for various healthcare stakeholders. The simplest interpretation of Medicine 2.0, or the closely related term Health 2.0, is the use of Web 2.0 for Medicine and Health.



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COUNTRY FOCUS: AUSTRIA AND SWITZERLAND

The roots of Austria's healthcare system go back to the Middle Ages and it is marked by a deeply-ingrained federal culture. In spite of major Welfare State facets, Austria ranks among the lower third of EU countries in terms of public share in healthcare expenditure. The Swiss healthcare system, on the other hand, is further down, at the bottom of the public healthcare spending league. The load on private contributions is emphasized by the fact that Switzerland also operates the industrialized world's second most expensive healthcare system — behind the US.



READER'S COMMENTS



Grid Computing

Sir,

In your otherwise well-researched cover story on 'Grid computing' (Issue No. 1, 2010), it may have been a good idea to highlight its difference versus another emerging buzzword: cloud computing. This issue is raised at the end of the article where the author correctly notes that many of the visionaries behind grids are now turning their attention to clouds.

The real meaning in a grid is that servers are clustered together so that they can respond, if required, to just one problem. For a moment of time, however brief, the entire grid can be made available to just one user facing a complex problem. This is the real challenge of designing a grid, in terms of networking between the clusters, and then fine tuning the grid.

On the other hand, cloud computing is essentially a service rather than a technology, to provide users with computing resources on-demand. The key difference versus a grid is that one user never gets more than a small share of the total power of the cloud.

Shantanu Das
Hamburg, Germany



mHealth

Sir,

The commentary on mHealth ('Time to Start Developing your Mhealth Strategy', Issue 1, 2010) is timely. I like the author's observation that we already have workable mHealth solutions. This is clearly a case where what exists is good enough, and that the status of the mobile phone - always on, permanently carried, and personal - reinforces something equally vital: (potential) users are already familiar with the technology, and mApplications are likely to face far less resistance than typical new technologies.

Moreover, if I am correct, the British government has already ruled that mobile phones in hospitals are not a health hazard.*

Daniel Bogoescu
Cluj-Napoca, Romania

** Editor's Note: In January 2009, the UK Department of Health issued a Guidance Note for NHS hospitals allowing mobile phones to be used in wards. However, it made several exceptions, including critical care and ICU units, special neonatal wards, and areas with specialist medical equipment, such as dialysis machines, defibrillators, ventilators, foetal heart monitors, and pumps; these No Go areas are to be marked out by the hospital].*



Productivity Measurements

Sir,

I do not agree with your analysis on Asset Management Systems (Issue 1, 2010) that "there is little if any data to quantify the ROI that it can deliver." This may be true of hospitals, and hospitals in Europe.

However, one has to start somewhere. A good place may be a Gartner study four years ago which showed AMS reduces cost per asset by as 30 percent during the first year, and between 5-10% each year over the next five years."

Indeed, there are a variety of US vendors out there with tools which can upfront make assessments of ROI ranges, based on inventorying a user's assets. Even at the lower end, it is evident that knowing where a particular PC or item of medical equipment is located would provide immediate benefit to technical support. As a consultant I have been in (some admittedly large) European hospitals where this can take a few hours.

Jim Ward
New York, US



The EHR and Clinical Research

Sir,

Congratulations for an excellent piece on productivity measurements in healthcare ('Health Information Management: Development of Productivity Measurements', Issue 1, 2010). It is one of the desirable side effects of modern technology that new technologies often force organisations to indulge in some spring cleaning.

The case study cited by the author notes that a review of processes by the concerned hospital was dictated by the need for introducing a new EMR.

Unfortunately, this is not yet common in terms of more traditional technologies such as HIS systems or ERP packages, where new deployments are not prepared for with an IT process review. Instead, healthcare IT managers are often faced with the thankless and time-consuming task of doing two things at the same time: introducing a new solution, while debugging its impact on previous installations.

In an ideal world, process reviews should be a permanent and ongoing process, conducted all the time, and done transparently (a necessity, as the article points out). It is a pity that hospital CEOs do not appreciate that productivity is a permanent problem, and that, as the article hints, poor productivity and demotivation on the part of employees, actually feed off one another.

Ron Culver
Leeds, UK

We invite comments from readers at editor@hitm.eu. Please keep your letters to below 150 words. Healthcare IT Management reserves the right to edit letters for space or editorial reasons.

THE EUROPEAN ASSOCIATION OF HEALTHCARE IT MANAGERS (HITM)

The European Association of Healthcare IT Managers

The European Association of Healthcare IT Managers (HITM) is a non-profit pan-European umbrella association of all relevant national healthcare IT associations in Europe.

Believing in the fundamental importance of unifying healthcare IT professionals at European and global levels, HITM is committed to increasing the professional authority and responsibility of healthcare IT managers and representing their interests to international institutions and associations.

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

HITM's Mission

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

For more on HITM and information about membership, please contact: **Aleksandra Kolodziejska, office@hitm.eu**

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SIEMENS

iSOFT AND ULTRAGENDA JOIN FORCES

HITM spoke to Hugo Schellens (HS), CEO, UltraGenda and Andrea Fiumicelli (AF), Chief Operating Office, iSoft about their recent alliance, the reasons behind it and their shared vision for the future.

Lets talk about the new partnership. How did it happen? Why did it happen?

AF: The answer is very simple, iSoft needs to provide solutions along three walls: cross-sectoral interoperability, centred to the patient and easy to access. This is our vision as a company. Now if I look at what this man did (looks at HS) in the last 10 years, his company and his intellectual property, his software application actually match very well this vision.

From a strategic point of view our existing applications around the world, 13,000 plus clients, have an increased demand enterprise wide and so we will see more and more the intellectual property of UltraGenda being outsourced or integrated or eventually as a standalone.

HS: I think that one of reasons for iSoft buying us was that their application's don't include scheduling so there was a need there. Also we realised that with the management vision formula that we have used so far we have been very successful but we were coming almost to the maximum.

Don't forget we are company that has no sales force, no marketing personnel. So we had very limited power, we had reached our limit. We feel that this application could really be used all over the world. It is generic, not linked to any particular company and we have proved that you can sell it into of different markets. iSoft will do this.

At the minute you say you have 13,000 clients. What would be your dream number of clients?

AF: I think it is not about predicting/stating the number of clients but I think that the aim we share with Hugo is, that in at least those geographies where iSoft are the leaders is to have the UltraGenda intellectual property embedded or as a standalone application as leader in that country. That means our aim is 7/8 countries in a timeframe of 2/3 years.

HS: Scheduling systems on the market today have been designed for healthcare 25 years ago but healthcare has become more complex. So you need very sophisticated systems, we think we have the best system in the world at the minute and it gives us a lot of confidence for the future.



AF: If you change the perspective, as you know for a long time there has been a lot of talk about providing joined up care throughout the patient pathway, wherever the provision of the healthcare service is given. So scheduling, cross-sectoral scheduling across the different providers, stakeholders, community-wide is becoming really the essence of healthcare. So that's the reason why scheduling for us has been strategically an enabling technology to be the leader in the area. We are the "evangelists" of cross-sectoral scheduling.

Who are your core competitors?

HS: Fundamentally, UltraGenda has no competitors.

AF: iSoft is in a different league now. Healthcare as a market is changing, the competitive market is changing. Local companies are competing too. Cross-sectoral scheduling is changing the essence of competition- many companies can offer it so we are competing with new companies.

Integration projects can go right and wrong—how do you see this acquisition?

AF: My main fear is the risk of losing the entrepreneurial mindset of the small company when the size of the companies are so different. It is a delicate process.

HS: The best way to start and ensure success is to realise quick wins. I am very optimistic.

AGFA: LEAVING THEIR TROUBLED PAST BEHIND

HITM had a frank conversation with Eric Maurincommé, Vice-President and Chief Strategy & Marketing Officer of Agfa Healthcare about the problems of the past and the outlook for the future.



Maurincommé spoke openly about recent problems experienced by AGFA, notably their credibility issues. He claims it is all in the past and AGFA now have a new ethos of openness, confident enough to tell their customers the truth. He was keen to point out that Agfa is a reformed company but also that new developments are still in their early stages and not without "growing pains".

Any future in film?

Maurincommé recognises that film is the past and that ultimately IT is the future, "five or six years ago film was our main focus with 15 percent IT, now 35/40 percent of our revenue is IT." The outlook is not however, quite so bleak, "there has been a 25 percent decrease in the use of film in Europe and the US but the situation in developing countries is very different; the use of film is growing. Take China for example: IT usage in healthcare is still very limited; film usage is huge. The challenge is now securing small revenues from all over the world."

What about other film companies?

Agfa claim their situation is not as dire as those of their competitors. As they have only ever produced in Belgium with a single manufacturing plant they have not had to downsize like other companies. Indeed, as it is a declining market there aren't many competitors left. Granted 2009 was a hard year, there was a three to four percent decline in revenue but Maurincommé is confident, "with a clear focus on processes, profitability doubled and we are back in the game- able to invest in the future."

The million dollar question: is AGFA an imaging company?

The answer was straightforward, "No, Agfa is a healthcare company. Our focus is on healthcare transformation through IT. This is what we do with our customers."

Main achievements in 2009

For Maurincommé, the clear achievement of 2009 was securing new customers in IT, "We were able to convince people who didn't know us before, in the healthcare IT industry, to choose us. We have 100 new customers worldwide." These customers range from large contracts with the Cleveland clinic for 27 hospitals to smaller deals of strategic importance.

Another key achievement concerns direct-radiography (DR). "In early 2009 we said we would go into direct-radiography. The objective was Germany, France, Spain and Italy. By the end of 2009, 12 DR systems delivered in these countries, and also in Austria." Maurincommé described this success as "proving we can walk the walk".

New directions: confusing clients?

Agfa have also purchased a small contrast media company. A little out of sync with the rest of their portfolio, Insight Agents has been producing generic contrast media products for 25 years. Maurincommé described them as "deliverable, affordable solutions so pertinent with the current crisis." But why move into this area? The answer is logistics, "we know how to deliver a box of film anywhere so we can deliver a contrast media bottle. The infrastructure is already in place. We are replacing a product with another one for radiologists."

This is not the only new initiative. Agfa is also developing a new range of consumables. They are outsourcing the production and in charge of manufacturing. But why this new venture? "Again for the same reason. Spain used to wash drapes and gowns but for hygiene reasons they now use disposables. We are very strong in procurement channels in Spain." Maurincommé stressed that this is a test venture, "It is a test, there are low expectations. Less than 10 percent of revenue is based on that but distributors are requesting it, they are asking what else can we offer."

Goals for the next five years

For Agfa IT and e-health will be the key focus in the upcoming years. By using these technologies Agfa can "focus on doing a better job in the healthcare system. They are the tools to do this; to improve healthcare settings."

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SLOVAKIA

PREPARING FOR E-HEALTH SERVICES

Following an amendment to the Health Care Act, the Ministry of Health of the Republic of Slovakia is preparing the grounds for a set of e-health services to establish a national electronic health system.

The reform of the healthcare system includes services such as the electronic booking of General Practitioners (GPs), GPs' online consultation, health services that are to be provided remotely, electronic prescription forms or vouchers, as well as the issuing of electronic health cards, as from 2013.

The main purpose of the medical electronic cards is to give citizens access to their personal health records via the Internet at any time and place. The electronic health card will contain patient data including information about vaccinations.

The Ministry of Health believe that this electronic health card will store life-saving medical information, "The electronic records will allow doctors around the world to provide healthcare to citizens, via the National Health portal. These medical data will be stored in an electronic health card through which doctors will be able to access them and therefore provide proper medical care even remotely."

FRANCE

FIRST EMERGENCY TELEDIAGNOSIS OVER REGIONAL TELERADIOLOGY NETWORK

On 5 March 2010, 1:30 am, the first request for an emergency telediagnosis over a radiology network named 'T-Lor' was made in the region of Lorraine, in north eastern France. The T-Lor network project aims to enable tele-expertise and telediagnosis as well as the exchange of medical images between the healthcare professionals of the Lorraine region.

The request was sent from the hospital complex of the Epinal commune by an emergency doctor and directed to a radiologist who was at home. The patient was admitted to the hospital during the night with a suspected stroke. A brain scan was performed.

The emergency doctor then sent his telediagnosis request from a computer of the hospital's emergency department in line with a pre-defined procedure. Once connection was established, the radiologist, located 30 km away, was quickly able to view the images from a laptop specially designed for interpreting them; he could then type and send back his report. The emergency doctor received it without trouble.

DENMARK

SINGLE ACCESS TO PERSONAL HEALTH RECORDS

The 'My Health summary' service, now available through the Danish e-health portal 'Sundhed.dk' allows authenticated users to obtain a faster and better overview of their own patient data.

Once logged into the health portal with their digital signature, users can access this personal health information that has been gathered from various healthcare sources. The available data includes:

- Summary of hospital admissions (back to 1995);
- Recent notes from hospital charts;
- Summary of medication prescribed over the last two years;
- Overview of personal wishes in relation to organ donation and receiving life-prolonging treatment (living wills);
- Status of laboratory tests ordered by physicians, and
- Contact information for the personal General Practitioner (GP).

The secured and controlled access to personal information on medication and treatment is not a brand new function of Sundhed.dk. It has already been possible to find this information through the portal by performing distinct searches respectively focused on medication, diagnoses, admissions, records in a given hospital, etc.

'My Health summary' goes further by providing access to all this information at once, with a single click of a mouse. There is furthermore an option to limit one's search to a specific time period.

'My Health summary' is the first version of the National Patient Index (NPI). It has become a collaboration between Sundhed.dk and Digital Health (Digital Sundhed, in Danish), a public organisation tasked with the national coordination of health IT in Denmark. Digital Health is currently working on new versions of the National Patient Index for both citizens and health professionals.

SPAIN

200 SURGICAL PROCEDURES ACHIEVED USING NEURO-NAVIGATION DEVICE

The Torrecárdenas Hospital Complex of Almería in the Autonomous Community of Andalusia has performed over 200 surgical procedures using a neuro-navigation device, an IT equipment which shows in real time three dimensional (3D) images of the brain and/or the spine.

The image obtained through electromagnetic waves makes it possible to have a global view of the patient's brain or spine in 3D. Moreover, it enables the viewing of the zone to be operated from different angles at the same time, thus improving the results of surgical procedures.

The neuro-navigator proves particularly efficient for the removal of brain tumours; it is extremely precise about the zone to be treated, thus reducing risks of affecting the healthy tissues during the surgery. It is as useful in the frame of surgical procedures performed on the spine.

A prior X-ray computed tomography (CT) and a magnetic resonance imaging (MRI) are required before using the neuro-navigator. They allow localising the reference point that will enable the neuro-navigator to show the live 3D image of the relevant zone.



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This year's ECH Leadership Summit theme is **"Engagement – How do you make it happen!"** Attend the Summit and learn:

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- How do we stop making the same mistakes and remove the barriers to scaled deployments?

These are but some of the questions that the ECH Leadership Summit will help you answer. This will be an international gathering of key practitioners, thought leaders and industry leaders from the field of Connected Health. The ECH Leadership Summit promises a compelling programme, addressing real issues experienced by the many stakeholders and end users. If you are planning a connected

health strategy, you can't afford to miss this event.

The ECH Leadership Summit offers a full range of activities including key note speakers, leadership panels with Q&A, debates, presentations and work streams- where you'll work in smaller groups, with experienced professionals — as well as time for networking and speaking one-on-one with notable industry and academic leaders. There will also be a two day Connected Health Exhibition where vendors will be prepared to provide hands on experience with the technologies of today as well as some new ones that will soon be available.

With speakers and delegates from across Europe, North America and beyond and with experience from successful deployments, technology integration and clinical care, you will return home with a deeper understanding of how to begin your own initiatives.

Speakers include Rick Crossen, President and Chairman of the Board of Directors,

Continua Health Alliance Director, Personal Health Enabling Intel Corporation Digital Health Group, Dr. Joe Kvedar, Director of the Center for Connected Health (Boston), Professor James McLaughlin, University of Ulster Professor and Joan Cornet. Foundation TicSalut President.

ECHCampus was founded by a team of independent business leaders, who identified the need to enable innovation in this extraordinary field. It is therefore a timely response to both societal and economic needs. Its primary mission is to 'deliver leadership for the development of Connected Health markets and practice across Europe'

The ECHCampus is focused on the need to transform Healthcare Delivery, thus enhancing the quality and effectiveness of care and the need to develop the 'Connected Health Economy.'

For more information, please visit: www.echcampus.com



1–3 JULY, LYON, FRANCE

HEALTHCOM 2010

Telecommunications and Networks are enabling technologies for telemedicine in remote and rural locations, but also for continuous health monitoring out of hospital, at home, and during sports, leisure or professional activities.

The 12th International Conference on e-health Networking, Application & Services aims to bring together interested parties from around the world working in the healthcare field to exchange ideas, to discuss innovative and emerging solutions and to develop collaborations. Participants

include clinicians, hospital administrators, IT professionals, researchers, educators, healthcare solutions vendors, and consultants. It will also offer an important forum for discussions on e-health projects supported by world bodies such as ITU, WHO and the EU, including FP6 and FP7 European projects.

The proceedings will be published in IEEE Xplore and EI indexed. As in previous years, the best papers from Healthcom2010 will be submitted for publication in major international refereed

journals. Healthcom2010 is fully sponsored by the IEEE Communication Society and also supported by the IEEE-EMBS French chapter, the SFGBM and the GDR-STIC Santé.

Conference topics will include e-health for public health, e-health for aging, networks for healthcare, new models for healthcare delivery, m-health, applications, education and ethics.

For more information, please visit: www.ieee-healthcom.org

HITM REPORTS



15–18 MARCH, BARCELONA, SPAIN

WoHIT 2010, “CONNECTING LEADERS IN TECHNOLOGY AND HEALTHCARE”

The World of Health IT Conference & Exhibition is a forum for the advancement of healthcare IT in Europe. Addressing the needs of key stakeholders in the European e-health Community, The World of Health IT Conference & Exhibition offers professional development sessions, vendor exhibitions, best practice exchanges, networking sessions, and debates and discussions on the issues that will shape the future of e-health.

Since its inception in 2006, WoHIT has welcomed over 5,000 attendees and 180 exhibitors from over 60 countries throughout Europe and Worldwide.

The main themes of the conference were:

- e-health for sustainable healthcare delivery;
- e-health addressing global challenges through local actions;
- e-health works: here is the evidence;
- e-health market: present and prospects; and
- e-health user platform.

This year’s World of Healthcare IT was special in that for the first time it ran alongside the European Commission’s High Level E-Health Conference. The high level conference was jointly organised by the Spanish Presidency to the EU and the European Commission. Notable attendees included Neelie Kroes, European Commission Vice-President and Commissioner for Digital Agenda; John Dalli, European Commissioner for Health and Consumer Policy; and EU Health Ministers. The objective of the event was to discuss how healthcare solutions can be implemented to advance modern healthcare facilities and to address the challenges of healthcare across Europe.

Also new this year was the World of Health IT Qualified Buyers Programme and Industry Leadership Sessions.

For more information, please visit:

www.worldofhealthit.org



14–16 APRIL, LUXEMBOURG

MED-E-TEL

“THE INTERNATIONAL E-HEALTH, TELEMEDICINE AND HEALTH ICT FORUM FOR EDUCATION, NETWORKING AND BUSINESS”

Med-e-Tel focuses on e-health and telemedicine applications and a wide range of other medical ICT applications and on the convergence of information and communication technology with medical applications, which lead to higher quality of care, cost reductions, workflow efficiency, and widespread availability of healthcare services.

The three key words of this year’s congress were education, networking and business. Attendees from across the globe had the chance to listen to over 150 presentations and workshops and network with healthcare and industry stakeholders to exchange ideas. It was an opportunity to see the solutions and technology at work in the expo area, set up one-to-one meetings with industry leaders and participate in demonstrations to see the potential behind telemedicine and e-health tools.

The conference programme featured presentations of successful business cases, research activities, pilot projects, practical

experiences from health and social care providers, and panel discussions, offering both local and international perspectives on e-health and telemedicine opportunities and experiences. The opening session included presentations on topics such as testing the effectiveness of telehealth and telecare at scale, pervasive healthcare via the Internet of medical things and international developments and initiatives.

There were also thematic sessions throughout the three-day event allowing attendees to choose the topics most important to them. Subjects of these sessions included telenursing, chronic disease management, cybertherapy/tele-rehabilitation and how to implement e-health solutions. Medical specialists also had the opportunity to benefit from up to 18 hours of CME credits.

For more information, please visit:

www.medetel.lu

EU PRESIDENCY, MINISTERS PROVIDE DIRECTION FOR E-HEALTH

Recognising the efforts that brought EU policy on e-health to the present, EU Ministers and the Spanish Presidency have recommended a plan for the future.

In the Ministerial Declaration of European Co-Operation on e-health, a detailed framework was set forth in order to achieve the overall objective of enhancing quality and sustainability of healthcare professionals and society. The main points addressed in the declaration included:

- Political and strategic commitment both at the regional and national level, encouraging collaboration with States outside the EU;
- Building confidence and acceptance, focusing on all stakeholders (patients, health providers, authorities and government);
- Bringing legal and ethical clarity and ensuring protection of personal health data;
- Solving interoperability issues, specifically legal, regulatory and organisational barriers to e-health; and
- Linking e-health policy to competitiveness, innovation and research as well as to cohesion and inclusion policies.

In conclusion, the ministers and representatives responsible for e-health encouraged policy coordination among the various areas of e-health as well as stronger synergies within policy areas like competition, research and regional development. They stressed involv-

ing all stakeholders in strategic planning, validation and implementation of e-health solutions and specifically, including e-health within the framework of the European Digital Agenda. Most importantly, they encourage using e-health solutions to improve patient benefits, welcoming more research, innovation and deployment.

In a recent communication, the Spanish Presidency proposed four goals for e-health as part of a wide strategic framework and corresponding action plan:

- Introduce a global vision for an e-health policy totally integrated in the post 2010 European Agenda;
- Drive a new E-Health Action Plan, facing the new European challenges;
- Develop and promote ministerial agreements, in particular regarding integration of e-health in community policy; and
- Implement reinforced government.

The Action Plan will be directed at the current challenges in European healthcare: crises, ageing populations, sustainability and efficiency in the public sector, and economic and social inclusion. The Spanish Presidency hopes to integrate e-health policy in the post 2010 European Agenda, contributing to its main goals of economic recovery, growth and employment and economic, social and territorial cohesion.

For further information, please visit: www.ehealthspain.eu

COMMISSIONER FOR DEVELOPMENT ADDRESSES GLOBAL HEALTH MDGS

At the Cross Europe Conference, EU Commissioner for Development, Andris Piebalgs, addressed the progress made toward the Millennium Development Goals (MDGs), and the work still need to be done.

In his keynote address at the conference titled "Delivering the Right to Health with the Health Millennium Development Goals," Piebalgs offered an overall perspective of past, present and future actions toward the MDGs. The MDG framework focuses on three main priorities: mortality of children under five years old; maternal mortality; and the impact of major pandemics, such as HIV/AIDS and malaria.

Piebalgs reported that progress towards health-related MDGs remains totally insufficient, giving examples of the little and seemingly no changes in child and maternal mortality, respectively, in sub-Saharan Africa. Piebalgs did recognise the positive changes, citing the increase in the direct aid to health since 2000 by a factor of four, now amounting to 16 billion Euro a year. This

increase has enabled access to HIV/AIDS treatment to three million people in developing countries.

Piebalgs then outlined four priority areas in the EU's future commitment to global health challenges: the challenge of governance, the challenge of coherence of policies; the challenge of knowledge; and the challenge of health coverage. Specifically on health coverage, Piebalg addressed the prioritisation of aid commitments, the fragmentation of the health sector, and the division of labour. These priorities will be addressed in a future Commission Communication on the EU's role in Global Health, in agreement with the Spanish Presidency.

The Cross-Europe Conference for Global Health took place 2 March in Brussels. The day included panel discussions including the EU Presidencies Panel consisting of the EU Presidency of Spain and the upcoming EU Presidencies, Belgium and Hungary, and the EU Institutions panel with representation from the three EU Institutions.

For more information, please visit: www.actionforglobalhealth.eu

NEW LEGISLATION TO REDUCE INJURIES FOR 3.5 MILLION HEALTHCARE WORKERS

The European Commission has adopted a Directive to prevent injuries and infections to healthcare workers from sharp objects such as needle sticks.

The Directive implements in law a framework agreement on prevention from sharp injuries in the hospital and healthcare sectors signed in July 2009 by the European Public Services Union (EPSU) and the European Hospital and Healthcare Employers' Association (HOSPEEM) – European Social partner organisations that together employ more than 3.5 million healthcare workers.

Injuries and infections from needle sticks amount to one of the most serious health and safety threats in European workplaces and estimated to cause one million injuries each year. The agreement addresses one of the priority objectives of the EU's current strategy for health and safety at work, which aims to cut workplace injuries by 25 percent by 2012.

Furthermore, the Directive specifically aims to:

- Achieve the safest possible working environment for employees in the sector and protect workers at risk, as well as patients;

- Prevent injuries to workers caused by all types of sharp medical objects including needle sticks; and
- Set-up an integrated approach to assessing and preventing risks as well as to training and informing.

Speaking at the Council of Ministers meeting, László Andor, EU Commissioner for Employment, Social Affairs and Inclusion said, "The healthcare sector is one of the biggest employers in Europe and needles represent a real risk to workers, both in terms of injuries and increased rates of life-threatening infections like HIV or hepatitis". He added, "This new Directive will better protect workers and their families while reducing the burden of injuries on European health services".

The European Parliament first proposed a resolution for the Commission in 2006, specifically addressing blood-borne infections due to needle stick injuries. Meetings with stakeholders, nurses, doctors, surgeons, etc., and further negotiations took place to arrive at the current legislation.

For more information, please visit: www.europa.eu, Reference IP/10/243

EUROPEAN INDUSTRY RESPONDS TO GOVERNMENT ACTION ON TELEHEALTH ISSUES

Upon release of a European Commission Communication on telemedicine, the medical technology industry has voiced their opinion on the future of telehealth.

Led by COCIR, an industry group representing the healthcare IT sector, the industry has made recommendations to the European Commission and Member States for a better deployment of telehealth solutions in aid of the current challenges facing the EU. The five recommendations for deployment are:

- European Commission and Member States to establish an appropriate legal framework with effective transposition at country level;
- Strengthen cooperation between healthcare stakeholders to "best practice health strategies" supporting telehealth adoption in routine clinical practice;
- Finance more and sustainable large-scale projects with health economic evaluation to assess the impact of telehealth solutions;
- Integrate telehealth into existing care delivery structures and ensure interoperability of telehealth solutions; and
- Establish sustainable economic model for telehealth by starting dialogue between healthcare stakeholders.

Highlighting that the current fragmented legal systems limit evolution of IT solutions across the EU, COCIR says that a new legal framework could eliminate current problems in licensing, liability and cross-border jurisdiction. While COCIR has welcomed the recent Commission Communication on the benefits of patients, healthcare and society, COCIR urges telehealth solutions to be developed at EU and national level. They say these solutions are needed to combat growing financial and staff shortages in the European health sector.

The position paper from COCIR warns that Europe's current financial model for healthcare is unsustainable, making telehealth a key area for the future. The group recommends more cooperation between stakeholders to accelerate the adoption of telehealth in practice, as well as more dialogue in order to establish a sustainable economic model for telehealth.

COCIR answers the fear of an increase in telehealth use having a disruptive impact on clinical practice and downgrade the doctor's role, saying telehealth methods will improve detection of diseases, reduce mortality and hospitalisation rates and empower the patients to deal with their conditions.

For more information, please visit: www.cocir.org

COMMITTEE OF THE REGIONS, "HEALTHY WORKFORCE, HEALTHY ECONOMY"

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For more information, please visit:
www.europa.eu, Reference IP/10/243

EU PROJECT HANDS OUT PRIZES FOR TOP PHDS

Stronger resistance to drugs and increased tourism which puts people at greater risk of acquiring local diseases are just a couple of factors that play havoc on public health worldwide, and humans are under the constant threat of infections with pathogenic microorganisms. Enter the ERA-NET PATHOGENOMICS ('Trans-European cooperation and coordination of genome sequencing and functional genomics of human-pathogenic microorganisms') project, an initiative of the EU targeting more advanced transnational genome-based research programmes on human-pathogenic microorganisms. ERA-NET PATHOGENOMICS recently announced the winners of the PhD Award 2010 for the most outstanding doctoral theses in this field.

The winners, Dr Itay Tirosh from the Weizmann Institute of Science in Israel, Dr Andreja Kovac from the University of Ljubljana in Slovenia, and Dr Cristina Latasa from the Public University of Navarra in Spain, were awarded EUR 2,000 each. Dr Tirosh received the award for shedding light on the evolution of gene expression regulation on a genome-wide scale, while Dr Kovac picked up a prize for searching for and finding compounds that could be used in new antibiotic drug treatments. Dr Latasa was commended for investigating biofilm formation in Salmonella, a pathogen that triggers food poisoning.

The PhD Award Ceremony held in Pecs, Hungary in April, is an annual event jointly funded by all partners in the ERA-NET project.

'This year we evaluated eight candidate theses, recommended by the ERA-NET partner national R&D funding bodies, all of which presented high quality and innovative science,' explained Dr Marion Karrasch-Bott from Forschungszentrum Jülich in Germany,

'The winners were chosen based on excellence in scientific quality and impact of the work, quality of publications and the theoretical approach underlying the research.' Infections with pathogenic microorganisms are responsible for the deaths of many people worldwide. However, despite growing levels of resistance to drugs, advanced functional genomics technologies have enabled researchers to systematically identify pathogenesis-related genes. In so doing, scientists have identified new targets for diagnostics, therapeutics and prevention.

Launched in 2004 and scheduled to end in 2012, ERA-NET PATHOGENOMICS seeks to establish sustained cooperation between national funding bodies and to coordinate their genome-based research programmes on human-pathogenic microorganisms. The ERA-NET is funded to the tune of EUR 3 million under the ERA-NET Scheme of the EU's Sixth Framework Programme (FP6). As well as improving the transparency and coherence of national research programmes, the project team is working to create an internal market for pathogenomics with information exchanges, and to define a European research and training agenda on pathogenomics as part of a European research policy.



HEALTH 2.0 AND MEDICINE 2.0

Promises and Challenges

AUTHOR

Benjamin Hughes,
Researcher,
ESADE Business School

The internet's impact on healthcare is ever more evident, with over 80% of US citizens searching online for health matters, and 33% of EU citizens using internet health sources every three months. Medicine 2.0 partly drives this increasing use, providing new sources of information and new access models for various healthcare stakeholders. The simplest interpretation of Medicine 2.0, or the closely related term Health 2.0, is the use of Web 2.0 for Medicine and Health.

How Web 2.0 is Applied to Health

Web 2.0 denotes a series of highly participative tools such as wikis, social networks or blogs that allow individuals to contribute to or participate in online health conversations. These conversations provide immense opportunities to improve healthcare delivery and efficiency, in a variety of contexts, such as by engaging users in creating encyclopaedic medical resources, improving medical and public health education, or enhancing clinical collaboration.

The concept Web 2.0 emerged at the end of the dotcom boom, as observers noted that certain types of websites thrived though the bust. These sites had in common a highly participative nature, the most successful of which emerging a few years later as household names with millions of users (e.g., Facebook or Wikipedia). The underlying approaches have been translated into the health domain, where Web 2.0's application can be broadly categorised into three types. Firstly, resources vary by the key using stakeholder, with a clear distinction between those that target health professionals or patients. Secondly, sites vary by relative focus on health related subjects, with multi-purpose Web 2.0 tools serving as a platform for health matters amongst other topics. Finally, amongst sites dedicated to health matters, the use of Web 2.0 tools varies, differing from pure-play Medicine 2.0 sites, to hybrid offerings based on the supplementing of traditional health media with Web 2.0 features.

Household Web 2.0 names and health

In the application of multi-purpose or general Web 2.0 sites to healthcare, Wikipedia stands out above other sites. Wikipedia's millions of user-generated articles has documented a significant body of medical knowledge, encapsulating articles on thousands of diseases, disorders, drugs and symptoms. With its high indexing in Google and most internet user's familiarity with the site, it is not surprising that many patients use it as source of medical knowledge, often bringing Wikipedia printouts to consultations with doctors. Perhaps more surprising is its extensive use by doctors, and according to a survey of 1,900 physicians by Manhattan Research, nearly half of doctors going online for professional purposes use Wikipedia as a source of medical information. Other re-

search based in the UK has shown even more extensive use amongst junior doctors, where up to 70% may consult Wikipedia in any given week. While doctors use it more for background medical information, rather than critical patient treatment decisions such as drug dosage, it still represents one of the most commonly referenced medical fact base due to its accessibility and breadth of topics. While Wikipedia is the most obvious example of a general Web 2.0 use in health, many others play a significant role. For example, YouTube contains 285,564 health education videos with sometimes huge audiences, such as the WHO's H1N1 educational videos that was viewed up to 30,000 times a day.

Pure-play medicine 2.0

Given the success of general Web 2.0 tools and their clear applications for health, it is not surprising that the concept has been used to develop pure-play Medicine 2.0 resources focusing exclusively on health matters. High profile examples include revolutionhealth.com and PatientsLikeMe.com (patient communities), Sermo.com (a physician social network), or RateMD.com (a physician rating site). Most have more than 40,000 hits per day. PatientsLikeMe.com allows patients with serious diseases to share information, including ALS, multiple sclerosis, OCD, and Parkinson's. Sermo.com is the largest physician social network, where both medical cases and practice matters such as hiring support staff are discussed. While the success of these sites mean they have started to incorporate content from more traditional sources (e.g., [Sermo](http://Sermo.com) is now looking to link to Nature's journals), in their conception they were positioned as pure Medicine 2.0 sites, relying purely on user-generated medical content to engage readers.

Traditional medical media fights back

Finally, traditional medical institutions are leveraging Web 2.0 to develop hybrid offerings through their traditional media channels. The comprehensive health resource [WebMD](http://WebMD.com) is principally driven by traditional media content, but nonetheless incorporates active blogging or other Web 2.0 features in specific areas, such its eMedicine space that claims 10,000 physicians as user-contributors of content. Other hybrid examples include the British Medical Journals online presence, with traditional journal content now offered alongside blogs, or the launch of its [doc2doc](http://doc2doc.com) social networking accompaniment since 2008.

Overall, there are numerous Medicine 2.0 sites and resources across professional specialty areas or patient condition types. Though some sites cross these boundaries, the types 'General Web 2.0', 'Pure-play Medicine 2.0' and 'Hybrids' largely describe broad applications of Web 2.0 to the health domain.

An Inseparable but Perilous Combination: Medicine 2.0 vs. Health 2.0

Which of the aforementioned case examples are Medicine 2.0 and Health 2.0?

Medicine 2.0 usually refers to the science of medicine and the practice of treating or curing patients, and Health 2.0 is focused on the business of health in general including the delivery, the quality, the safety and the cost or efficiency of the people, a practice or facility. The two concepts are intertwined, and if anything, Medicine 2.0 is the broader concept and umbrella term which includes consumer-directed 'medicine' or Health 2.0. Within any Medicine 2.0 conversation you will find stakeholders pursuing the goals of both concepts, and all have numerous visitors focused on simply finding the best treatment for a condition. However, many of these communities (such as Wikipedia, PatientsLikeMe or Sermo to name a few), have fulltime staff, revenue generation strategies via a mix of channels, and clear policies to promote information quality and safety. These revenue models may encompass donations, leverage of Google advertising, fees for advanced features, or partnerships that might affect the type of information presented and the way it is used. For instance, PatientsLikeMe is very upfront about that the fact that it sells its datasets onto to pharmaceutical companies for revenue.

Herein lies the most cited concern with Medicine 2.0, that user generated content is prone to be either inaccurate, misleading or manipulated, and that privacy and ownership of the generated information is not fully ensured. Anyone can edit Web 2.0 topics allowing the non-medically trained to dispense medical advice. In several instances, pharmaceutical companies modified Wikipedia entries that mentioned adverse effects associated with their drugs. In 2007, a claim that the psychiatric medication Seroquel made teenagers 'more likely to think about harming or killing themselves' was deleted from the Wikipedia entry by a computer registered to AstraZeneca, the drug's manufacturer. While Wikipedia's content has been shown to be as accurate as other encyclopaedic resources, such risk via omission remains a concern. A study from The Annals of Pharmacotherapy compared drug information from Wikipedia with the Medscape Drug Reference, and found that Wikipedia could sometimes omit important information such as drug side effects.

A balanced perspective of the risks

This said, researchers have noted that these risks are potentially overblown. The risk of information inaccuracy is countered with three important effects during Medicine 2.0's use, the encouragement of users to access any information at all, guidance of users to appropriate information through the process of Apomediation, and the purpose for which users seek and use the information found. Firstly, the usability of Medicine 2.0 sources, the underlying factor of their success, increases the chances that both medical professionals and patients seek out a minimum amount of information. For instance, while doctors should ideally be using best in class evidence

Table 1. Selected examples of Medicine 2.0 sites (by major type)



General Web 2.0	Pure-play Medicine 2.0	Hybrids
		
		



cover story

based resources such as Pubmed, the article based structure of data supplied may require a significant search investment that is not realistic given a doctor's specific time constraints. Secondly, Web 2.0 communities sift through volumes of information beyond the capability of the individual, impacting search engines page rank via the links they create, ranking individual information pieces, providing personal recommendations in communities, and rapidly correct wiki-based entries. This process, known as Apomediation, uses collective wisdom to filter for information quality and directs information seekers to higher quality content. Finally, it should be noted that users adapt their search and use of information found depending on their information need. For instance, Web 2.0 sources are commonly used for background information seeking, and when used for critical medical decisions, as an initial structuring device for deeper information searches. The linked nature of these websites means that users will usually incorporate multiple information sources in their decision making process.

In addition, privacy concerns may also be overblown. Surveys indicate privacy is a hot issue for healthy people; this isn't always the case for very ill patients. PatientsLikeMe encourages people to use an alias, however, many people freely self-identify themselves by adding information like photos or indicate their real names. This is true for many social networking sites, where users often provide significant information could be used in adverse ways in the future (think of pictures of people drunk at parties on Facebook). The reality is that most users are aware of these risks, but just as in real life conversations, users individually decide on the trade-off of revealing information about themselves given the increased returns this may bring. Overall, most Web 2.0 sites have become clearer about how a person's information is used, but any organisation hosting Medicine 2.0 conversations must remain vigilant about privacy concerns.

Overall, while it is tempting to prescribe controls on such on-line health information to eliminate the risk completely, efforts

to assess the Quality of Health Information for Consumers in general have had limited success. Use of Medicine 2.0 ultimately devolves responsibility to the individual, and user awareness of its risks and good practices, such as assessing quality and using secondary sources, remains critical.

Using Medicine 2.0, Externally and Internally, for Effective Healthcare IT

For the healthcare IT manager, two main opportunities present themselves. Firstly, Medicine 2.0 enables improved external collaboration, either with patients, through shared clinical knowledge management, or with specific external organizations. Secondly, Web 2.0 may be applied to internal processes, to create new sources of information or improve collaboration.

Working externally with Medicine 2.0

An obvious use of Medicine 2.0 is to engage patients, an approach that is gaining significant momentum with hundreds of US hospitals now using YouTube and Twitter for patient communication. However, this represents a small percentage of all hospitals despite the competitive nature of the US for attracting patients. Moreover, according to research at the RUNMC, Swedish, Dutch and English hospitals lead the use of social networking methods and media (Twitter, Facebook, YouTube, blogs), but in no more than around 10 percent of all hospitals in these countries.

Similarly, another clear external opportunity is promoting public Medicine 2.0 tools as knowledge assets for clinical staff. The reality is that such resources are already used by a significant proportion of medical professionals. Rather than passive acceptance of this, healthcare IT managers can establish policies that can ensure consistent use across the clinical staff. This involves ensuring access, creating awareness of the available resources, and disseminating guidelines for appropriate use. Access in itself is not obvious; research by the

Table 2. Selected examples of Medicine 2.0 exploitation by hospitals

Public and external collaborations	Internally focused collaborations
<ul style="list-style-type: none"> ➤ Supplementing internal reference material with public Medicine 2.0 resources ➤ Patient collaboration (see www.ebennett.org/hsnl/ for examples): <ul style="list-style-type: none"> • Hospital or clinic marketing via YouTube channels and twittering • Patient Self-service and collaboration • Patient support forums ➤ Collaboration with other organisations (medical trusts, professional associations): <ul style="list-style-type: none"> • Collaborating on specific topics (e.g., the HIMSS CDS wiki encompassing 50 hospitals to optimise the use of clinical decisions systems) 	<ul style="list-style-type: none"> ➤ Medical education: <ul style="list-style-type: none"> • Multiple campus and remote teaching models (e.g., Northern Ontario Medical School) • Student Feedback on Facebook (University of Liverpool, UK) • Weekly podcasts for medical students (e.g., John Hopkins) ➤ Improving internal hospital processes: <ul style="list-style-type: none"> • Patient administration through wikis or Google docs (e.g., University Hospital of Mainz) • Documentation and maintenance of protocols with wikis and blogs (Emory Health Services) • Employee portals (Morton Hospital & Medical centre)

MLA indicates the majority hospitals have some form of network blockage due to the perception that Web 2.0 sites are a frivolous waste of bandwidth or a security risk. Appropriate guidelines are also key, given the implied devolution of responsibility to individual users for the determining information quality and appropriate use of information for medical decision making. Guidelines for overall internet use they are common (e.g., see <http://www.mlanet.org/resources/user-guide.html> from the medical librarians association) and apply equally to Medicine 2.0.

“The lifeblood of Web 2.0 models is user activity, including ‘lead-users’ that represent a small proportion of the population, but who generate a large proportion of the content.”

However, the utopian scenario for the user is single access point for Medicine 2.0 resources and local systems, which may take the form of Clinical data or reference material. As opposed to clinical data, internal medical reference, guidelines, lookup tables, terminologies or checklists can often overlap with broader and deeper resources available online. The two sources are complementary, eMedicine may give a better picture of overall diagnosis protocols, but local guidelines are critical to executing them in the specific context. The objective would be, therefore, not to promote external over internal sources, but find an efficient manner of delivering simultaneous access to both. In other knowledge intensive industries, companies are addressing similar issues via improved access to internal and external data, aligned with knowledge creation platforms based on Web 2.0 principles. Concretely, this involves developing ‘single search’ across datasets, coupled to user’s expertise profiles to highlight both codified internal and external data and tactic expertise. Platforms such as REALCOM’s AskMe, Google’s Search Appliance and behind firewall capabilities, FatWire Software’s TeamUp, or IBM’s OmniFind are example market solutions targeting this space. To date, they have mainly penetrated the healthcare sector via clinical collaborators in pharmaceutical companies. The cost of standardising internal data remains a hurdle to implementing this approach, and given constrained healthcare IT budgets, initial steps may need to focus on integrating a limited set of prioritised internal data against a long-term roadmap in order to begin the journey towards this ideal.

Medicine 2.0: life beyond the World Wide Web

Medicine 2.0 approaches can be used to improve existing internal processes, clinical systems or create new sources of local information, and do not necessarily mean a World Wide

Web presence. Given the relative low cost of Web 2.0 add-ons (blogs, wikis, rating systems and community portals), the temptation is to supplement existing internal systems or create Medicine 2.0 specific platforms to address any inefficiencies in knowledge management and user collaboration. From a policy perspective, this delivers the best of both worlds, with the benefits of user generated content, as well as a degree of control over the content used. There are numerous examples of successful small-scale Web 2.0 implementations in healthcare organisations, such as the use of wikis to structure and track clinical research projects or document local protocols and processes, or the use of twitter and RSS feed for informing collaborators about events. One such example is Emory Health Services, which has 10,000 employees at four hospitals and numerous physician clinics across Georgia. Emory implemented a wiki and blog based collaboration platform for clinics to follow and develop specific protocols for patient care. The change has resulted in less travel and manual processes, and in addition to the time savings, allowed discussions and amendments are stored in a repository, where they can be secured and audited.

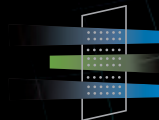
Getting it right: users, scope and control

This said, replicating large scale Medicine 2.0 models from the internet can be difficult. The lifeblood of Web 2.0 models is user activity, including ‘lead-users’ that represent a small proportion of the population, but who generate a large proportion of the content. The breadth of and relative interest of the Web 2.0 topic must be aligned with the potential user base, and clearly for internal collaborations the available user bases can be much, much lower than on the world wide web. Broad ambitious projects that target a heterogeneous but small number of users may fail due to lack of content depth, and failure of processes such as Apomediation. Given this, prerequisites for implementing a Medicine 2.0 resource include identifying an early lead-user base, ensuring that the scope of collaborations is constrained, providing incentives for initial use, and the leveraging of existing platforms to lower initial barriers to use. Lowering these barriers may involve using either existing Web 2.0 tools such as Facebook, or existing internal profile information and sign on for existing content management systems such as SharePoint. Careful consideration must be regarding developing a fully internal resource, rather than collaborating with other organisations to increase the user base.

Finally, managers need to live with negative or critical posts, to deploy beta solutions, and allow users to take control and evolve the nature of the participation wherever possible. Overall, much control may need to be relinquished, but this should not be interpreted as a ‘build it and set it free’ approach. Specific goals and outcomes should be set, incorporating evaluation metrics at every step. Additionally, though the technology around Medicine 2.0 represents a significant step in technical capabilities, it cannot create a culture of knowledge management, and any strategy must consider the human element of the specific context. Addressing these issues is highly feasible, given a clearly articulated and communicated strategy.

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CAPITAL IN THE CITY

Investing in the Hospital of the Future

Florence Nightingale once noted that 'hospitals are only an intermediate stage of civilization'. She was looking at an institution and its buildings which were immensely different from what we have today. And 150 years from now, the hospital will presumably have changed just as dramatically as the current hospital is distant from that of the mid-nineteenth century. There is an inference to be drawn from how strange her quote appears to us, in an environment where the hospital is the epitome of civilisation: it is conceivable that we have now gone all the way from contempt for the hospital to idolatry of it. It is worthwhile instead spending a little time deconstructing the role of the hospital in the delivery of healthcare.

In the past year, the European Observatory on Health Systems and Policies has published two sister volumes on the issues of capital investment in hospitals in Europe (see Box). This article highlights key aspects of the study – the encroachment of market principles into what is still largely a public sector-dominated activity; the financing models being increasingly used; and the relationship of patient flows to physical capacity.

There is an inherent paradox in reviewing hospital projects. Given the timescales for hospital development, if a facility has been running long enough for it to have settled down and be generating evidence about its performance, it must have been conceived more than a decade before, and cannot represent state-of-the-art any longer. If, on the other hand, it embodies latest thinking, then it cannot yet have been tested in the real world. While there is no absolute way round the oxymoron of a proven modern hospital, carefully dipping into the stream of evidence provides suggestions about the direction of travel.

The Impact of the Global Economic Crisis

At present, the world (the West in particular) is suffering from the worst economic recession since the Great Depression of the 1930s.

Adding to the problem is the fact that the recession overlaps with an incipient ageing crisis. This is both a healthcare and a pensions problem. Governments are certain to spend at least the next decade struggling to pay down high levels of debt while simultaneously increasing expenditure as baby boomers retire. This might expose health system spending to cutbacks.

Broadly speaking, Western governments will have to shift overall spending by about 5 percent of GDP to reverse existing fiscal deficits, 5 percent to pay down legacy debt and 5

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percent to rebalance spending towards the ageing. 15 percent of GDP is a massive switch of spending priorities. In this light, one obvious, and favoured, response by governments will be to cut capital investment, including that in the health sector. However, this would be a mistake, as ageing capital assets are unlikely to provide the best environment for innovative healthcare. The current economic circumstances, then, make wise investment choices in healthcare even more important – and more difficult – than before.

'Marketisation'

It may sometimes appear that the introduction of market forces into healthcare is inevitable and uni-directional, as with other sectors previously dominated by government. However, this ignores history, as the immediate post-war period saw many sectors nationalised in western Europe precisely because private ownership was perceived to have failed. Moreover, the concept of market competition is ambiguous and confusing. For instance, does competition mean price competition, or is it sufficient that providers compete for volume contracts with uniform prices set by a central regulating body. Does it imply profit-making medicine? What is the scope of competition? Does it apply to all forms of hospital care or primarily to a few elective (non-acute) services?

In fact, market competition involves multiple developments in hospital care. It may be brought about by a government policy that is explicitly directed at creating competitive relationships. Pro-competition reforms are intended to increase the efficiency and innovativeness of hospital care, to improve its quality and make it more patient-oriented. Examples of these reforms are the introduction of competitive bidding models or the elimination of barriers to entry into the hospital market by new providers. Developing hospital information systems to support perform-

ance measurement, with the goal of improving the quality and efficiency of hospital care, fits perfectly within a market reform, because information is also a precondition for informed choice and more effective management and competition by providers. Furthermore, it would be wrong to view market competition only as the result of central government reforms. The picture is more complicated. 'Bottom-up' initiatives by private providers or local governments to provide services in new settings, such as those using remote patient monitoring technologies, or moves to privatise public hospitals, may also elicit competition.

Wide Range of Changes in Hospital Care

However, there have been various changes in hospital care: in the public-private mix; the role of new entrants; the reform of arrangements for funding; the introduction of new models of capital investment; and the development of information systems measuring hospital performance.

The public-private mix of healthcare delivery is diverse: France has substantial provision of elective care by private clinics; Germany has many not-for-profit hospitals and an increasing number of for-profit hospitals; in many countries with national health services, the share of private groups of any kind remains relatively low. But policy-makers in some countries are seeking to convert hospitals into private agencies through privatisation, and correspondingly to introduce competitive mechanisms into public sector provision. It is not clear whether the underlying belief that private for-profit hospitals are more efficient is correct; most economic research in the US market indicates this is not so. Indeed, several recent studies of the German hospital sector seem to corroborate that, even when corrected for quality, public hospitals are more cost-effective than the private sector.

Most hospitals in Europe are general hospitals offering a wide range of acute and elective care services. A recent development has been the rise of new providers that are mostly private single-specialty organisations delivering routine hospital care, in an ambulatory or stand-alone setting, such as the 'independent treatment centres' in the United Kingdom. This may be coinciding with splitting hospitals, even tertiary facilities, into multiple single-purpose 'factories'.

Hospital funding, mostly recurrent, is also changing. There is a strong trend away from global budgets towards case mix-based funding. While not a market reform in itself, it is a precondition for market competition. Diagnostic-Related Groups (DRGs) and the like do, however, have certain problems. The systems tend to be complex and have unintended consequences. Health insurers are not yet able to function as a countervailing power in price negotiations with dominant hospital providers. There is a lack of transparency and comparable data, even for yardstick competition. And finally, it is not clear that, as prices, DRGs are either appropriate in every-day resource management use (given the growing importance of chronic disorders for which episode-based measures are of limited relevance) or, in particular, give the right signals with respect to new capital investment.

Hospital performance information is not only an instrument to inform stakeholders but also a tool to improve the efficiency and quality of hospital care. Initiatives invariably cover quantity, cost and productivity measures. It is also worth noting the increasing use of quality indices, such as the Patient-Reported Outcome Measurement – the patient's perception of the degree to which they felt better after treatment – now being rolled out in the English NHS.

"An encroaching concept for capital spending is the Public-Private Partnership (PPP) instrument. Concessions of one kind or another have been used for many years, and have included the health sector. However, the modern use of PPPs has expanded greatly with the UK's Private Finance Initiative (PFI)."

Financing Models: State

Within the health systems of Europe, where financing and provision are dominated by the public sector, most of the financial resources are ultimately supplied by the state. Traditionally, with respect to capital investment in new or upgraded facilities, this was by means of something called public sector 'equity' – which bears, however, little resemblance to its private sector equivalent in that the value of the estate often did not need to be accounted for nor a financial return delivered to the shareholders. Public sector debt in principle introduces more discipline, though often where there is a so-called soft budget constraint, there are no sanctions for overspending.

EU Structural Funds: Member States

A new source of capital funding, which is particularly applicable to the new member states of the European Union, consists of 'Structural Funds', grants used largely for regional development. The majority of this funding is applied to transport, energy and environmental infrastructure, but in the current 2007-13 programming period it is thought that up to 5 percent of the total 347 billion euro may be used in the health sector. Projects and programmes go through an elaborate approvals procedure, from the EU through national down to local level. As a result of eligibility criteria, most funds will be focused on relatively poor areas, where they could well account for a substantial proportion of healthcare capital expenditure in coming years. The impact of this spending, and the degree to which its availability biases the choice of projects, are as yet unknown (see www.euregio3.eu).

Public-Private Partnership (PPP)

An encroaching concept for capital spending is the Public-Private Partnership (PPP) instrument. Concessions of one kind or another have been used for many years, and have included



the health sector. However, the modern use of PPPs has expanded greatly with the UK's Private Finance Initiative (PFI). In a PFI hospital project, the hospital trust lets a contract for construction or redevelopment of accommodation on a site (sometimes including medical equipment), with the facilities leased from the private sector for up to 35 years.

The contractor designs the hospital according – in principle – to an output (not input) specification set by the public sector, raises the finance, arranges for construction, and carries out the 'hard facilities maintenance' (and sometimes other maintenance) during the contract life. The facilities are returned to the hospital trust at the end of the term. In return, the contractor is paid a monthly unitary charge, offset by penalties for any unavailability of space or reduced standard. Apart from the in the countries of the UK, variants of this model are used in France, Spain and Portugal.

The accommodation-only PFI model is complemented by others. One example has a clinical services company, paid mainly by volume of activity, operating alongside the infrastructure company (this scheme is used for some hospitals in Portu-

gal). Some of the hospital privatisations in Germany amount to a concession, where a private company takes over a failing public hospital and operates it as a licensed facility within the region's public hospital plan (i.e. there is no cream-skimming of patients, but otherwise operational freedom exists). Similarly, there are arrangements in Spain where a company operates a full hospital concession but in addition runs the community care facilities in an area, and is reimbursed not by performance fees for the sites but rather through a capitation payment (that is, a fee per member of the regional population). This is effectively a version of the Health Maintenance Organisation framework used in the United States.

All of these PPP models attempt to incentivise the performance of the private sector contractor by the bundling of responsibility for the capital costs together with the recurrent costs – certainly at the level of the building (PFI), but sometimes additionally with other more general recurrent costs including hospital medical services or community services. There are pros and cons of each model, with the prime difficulty arising from the tendency for the private partner to capture the tangible (cost reduction) benefits of the contract while leaving the

INVESTING IN HOSPITALS OF THE FUTURE

The Sponsoring Organisations

The two books include a set of case studies¹ and a thematic treatment² of the decision to invest in hospitals, or rather in healthcare assets. The European Observatory on Health Systems and Policies is a partnership which brings together a number of international institutions, national and regional governments, universities and NGOs (www.euro.who.int/observatory). The Observatory promotes evidence-based health policy-making through comprehensive and rigorous analysis of the dynamics of healthcare systems in Europe. The study was organised in conjunction with the European Health Property Network, the research work of which has been taken forward by the European Centre for Health Assets and Architecture (ECHAA), set up recently as a European centre of reference to advice on all dimensions of capital asset strategy in the health sector (www.echaa.eu).

The Case Studies

Capital investment for health is a compilation of case studies – seven individual hospital projects in Netherlands, Norway, Finland, Sweden and Spain, a private hospital group in Germany, regional planning in Italy and Northern Ireland, and a financing system in the UK. Some consistent themes emerge from the case studies: the increasing role of market mechanisms, the value of whole-systems approaches, systematisation of care pathways, integration of medical models of care with business models, importance of sustainability in the widest sense, and the requirement for flexibility in the financing as well as other aspects of a hospital's development and management.

The Thematic Book

Investing in hospitals of the future gleans lessons from the case studies as well as other sources, and attempts to deal systematically with the various dimensions and roles of a modern hospital: models of care, planning systems, workforce, markets (particularly in financing), life-cycle analysis, facility management, wider community impact, sustainable design, and the concepts of designing a stock of capital to deliver a flow of services. The principal message is the need for flexibility, in order to respond to the unknown (and very often unknowable) contingencies of the future; and the importance of understanding the variety of primary and secondary processes, the linkages between them and the nature of the capital assets which will support them.

1. *Rechel, B, Erskine J, Wright S, Dowdeswell B and McKee M, Eds. (2009). Capital investment for health: case studies from Europe. Copenhagen, World Health Organization, on behalf of the European Observatory on Health Systems and Policies.*
www.euro.who.int/observatory/Publications/20090914_1
2. *Rechel B, Wright S, Edwards N, Dowdeswell B, McKee M, Eds. (2009). Investing in hospitals of the future. Copenhagen: World Health Organization, on behalf of the European Observatory on Health Systems.*
www.euro.who.int/observatory/Publications/20090323_1



public sector hospital authorities struggling to ensure quality or to adapt the facilities to changes in medical provision over the very long durations in the contract.

Flowing from Capacity

Hospitals often appear to be black boxes – their complexity is so great, and the interests of those who work in them so entrenched, that it is very difficult to undertake reform. They are usually organised by specialty (cardiology, rheumatology etc.) or by body system (such as Ear, Nose & Throat) or by population group (e.g. mother & child). One issue is that many of these categorisations can fail to match the way that patients present, and this is an increasing problem with an ageing population where people often have multiple co-morbidities. Further, they tend to crystallise current ways of working, and the continued allocation of resources to fiefs within the establishment.

One way of trying to lever open the black box is to view the hospital as a flow system, relating these flows to the capacity accordingly needed. This leads fairly naturally to considerations of ‘lean’ thinking, and operational research concepts.

In manufacturing, two broad types of work can be distinguished – batch and flow. In batch processing, work is episodic, and individualised by a craftsman through to completion; the result is unique. Much, and possibly too much, medicine is arranged in this fashion, and doctors quite like it this way. Flow processing is systematised and made as uniform as possible. Modelling techniques are available, such as queuing theory, which help to understand where the choke points are in a system (relieving such a blockage will enable the system to operate more efficiently, though it will inevitably bump up against a constraint somewhere else).

The model of care for a hospital which is maximising the proportion of its activities treated as systematic flows would incorporate so-called integrated clinical care pathways (ICPs), extend-

ing as appropriate beyond the hospital into community or home care. ICPs can only be efficiently applied with good IT functionality, for transfer of patient information across the boundaries in the system. Lean production notions highlight the paramount need to reduce wasted resources; one of the prime manifestations here is wasted time, and notably hospitals treat patients’ time as essentially free. Patients – they are well-named – wait: in waiting rooms, consulting rooms and wards or bedrooms.

Indeed, in terms of their capacity, hospitals are invariably characterised by the numbers of beds, as though ‘the bed’ is the critical resource which determines the functioning of the establishment. In the light of the queuing theory reasoning given above, this is most unlikely, though it could happen in certain special circumstances. Hospitals only exist because of economies of scope: the idea that functions are better delivered together than separately, such that the additional costs of management created by complexity are less than the benefits of the synergies gained.

Traditionally, it is accepted that medical care is provided alongside research and education and training, but the scope idea goes further than this.

The hospital can be deconstructed into its processing components. Our thematic book includes analysis carried out by the Dutch organisation TNO called the ‘layers’ model. Certain parts of the hospital are ‘signature’ medical ones – operating theatres, imaging, and intensive care; these are capital-intensive and short-life, and can be described as the ‘hot floor’. There are facilities more akin to offices than pure hospital functioning (reception areas, consulting rooms, lecture rooms). Other areas are ‘factory-like’, such as diagnostics, support facilities including laundry and catering, and research facilities. Finally, wards and bedrooms are essentially hotels. Interestingly, offices, factories and hotels within the hospital need not be constructed to the same standard as the hot floor, and as parts of the estate may well be old without unduly jeopardising the fundamental medical delivery of the hospital. The mapping of different flows against the various sorts of capacity offers a possibility of reconceptualising the hospital.

NURSING AND E-HEALTH

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In spite of being at the forefront of healthcare IT, the nursing profession has both abandoned and been overlooked by the former. Closer involvement is essential to make healthcare IT meaningful for practitioners and other professionals and above all, patients. The first steps towards this should be taken collectively by nurses themselves.

Definitions

The World Health Organisation (WHO) defines e-health as "... the use of information and communication technologies (ICT) for health to, for example, treat patients, pursue research, educate students, track diseases and monitor public health." (WHO, 2010)

Nursing is more difficult to define. According to the International Council for Nursing (ICN, 2010), "Nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings. Nursing includes the promotion of health, prevention of illness, and the care of ill, disabled and dying people. Advocacy, promotion of a safe environment, research, participation in shaping health policy and in patient and health systems management, and education are also key nursing roles."

Certainly, this definition gives an indication of the diverse range of nursing roles, and it is such diversity that causes some difficulties in determining collectivity amongst nurses. However, this issue is for later discussion.

Were Florence Nightingale alive today she would be a champion for e-health from a nursing perspective. It was she who invented the pie chart to demonstrate more clearly the issues of disease and public health in the Crimea.

Nursing: A Healthcare IT Early Bird ...

Many working in the health industry consider the development of computer technology to support the delivery and evaluation of healthcare to be a very recent issue. However, this is far from the truth. Indeed, in the past, it was nursing which led the way in the clinical, managerial and educational use of computer technology.

In 1982, the first World Congress for Nursing and Information and Communications Technology was held in London, and attracted delegates from all over the world. It was this conference that resulted in the International Medical Informatics Association (IMIA) opening a Working Group specifically for nursing. This working group continues to be at the forefront of nursing informatics today.

At the 1982 conference, one of the key speakers observed: "Nursing is too big and too important to be left free-wheeling within the system [Health Services Computing] and the more effectively nurses grasp these systems, the more effectively will they be able to participate knowledgeably in the managerial and planning discussions."

... But Bypassed in Years Since

However, nursing has since been left outside both the key discussions and system development. This is regrettable for the profession, and for patient care too. My purpose is not to dwell on the past, but to consider why the current position of nursing in healthcare computer systems development is in the position it is and how this might be changed.

In my role as a teacher, I often use a particular paper from the 1982 conference by Constance M. Berg entitled 'The Importance of Nurses' Input for the Selection of Computerized Systems' without informing the students of the publication date. We use this paper as a discussion trigger. Most students believe that it is a recent article in its description of nursing, and are shocked when they hear it is 28 years old.

Sadly we did not follow Berg's call to make the right choice:

"The choice is there and the time to make the choice is now. The decision must be whether to act traditionally and have change thrust upon the profession [nursing] from the outside or to anticipate this revolution in nursing practice, familiarise nurses with it, and prepare them to take an active part in the introduction of computers into the nursing community."

In general, nursing has covered its head and hoped that this new development would go away. We are now paying for the take up of this choice.

History Repeating Itself

Today, history seems to be repeating itself, for it was in the early 1960s that the WHO arranged international seminars on automatic data processing in healthcare; however, nurses were not invited until 1971.

At present, the voice of the nursing profession is minimal, if heard at all, across the entire spectrum of major system developments. Indeed, in the United States, many of those titled 'nurse informaticians' are gathering data and preparing statistical reports on care provision performance for marketing purposes – not quite what many of us early pioneers had in mind.

Over the past ten years, as we entered the 21st Century, there has been a paucity in champions for the nursing agenda in e-health. Even for the preparation of the next generation of nurs-

es, the number of undergraduate curricula with modules on e-health can be counted on one hand.

Structural Change in Profession

Part of the reason for the 'disappearance' of the nursing voice in e-health may well be the massive and routine changes in nursing and healthcare provision over the past ten to twenty years. Job titles have changed. Job roles have changed. The way healthcare is delivered has, and continues to, change. Meanwhile, professional dilution has occurred and nursing has perhaps been the greatest net loss group.

"Nurses are the only healthcare professionals to interact with patients, their relatives and friends, on a 24 hour, seven days a week basis. As a result, any true system dealing with the delivery and evaluation of healthcare should start with nursing and build systems to support care delivery from that point."

Defining Nurse Roles

There are around 600,000 nurses and midwives registered with the Nursing & Midwifery Council (NMC) in the United Kingdom, a large workforce divided by the roles performed and the changes in operational and organisational management. Nursing tends to be identified not as a cost against particular patient care managed resource groups. Instead, costs tend to be included in the basic room and board for patients in secondary health care. This has aided in our lack of being called to account during periods of high resource measurement.

The Uniqueness of Nursing in the IT/Information Context

The focus in recent years has been on meeting government targets and reducing the costs of care. However, were an information map to be undertaken, it would become obvious that there is a unique function which is nursing.

Its uniqueness lies in the fact that nurses are the only health-

care professionals to interact with patients, their relatives and friends, on a 24 hour, seven days a week basis. As a result, any true system dealing with the delivery and evaluation of healthcare should start with nursing and build systems to support care delivery from that point.

In reality, implemented systems usually start with either finance, personnel or patient administration. This is clearly the wrong way round. Examples of areas where nurses have been at the forefront of development include the use of tele-nursing such as NHS Direct. However, even this exciting development has evolved into algorithm-following rather than an exploration of the full richness and diversity that it nursing.

A Serious Gap in Data Aggregation

The academic study of information systems suggests that all systems should start with Transaction Processing, where the basic data element is recorded as part of a required activity. After this, it is used in Management Information Systems to allow for aggregation and initial reporting in the form of a Decision Support System. In the latter, the basic data continues to be used but at this point, models can be included to test 'What If...?' scenarios to permit informed management decisions.

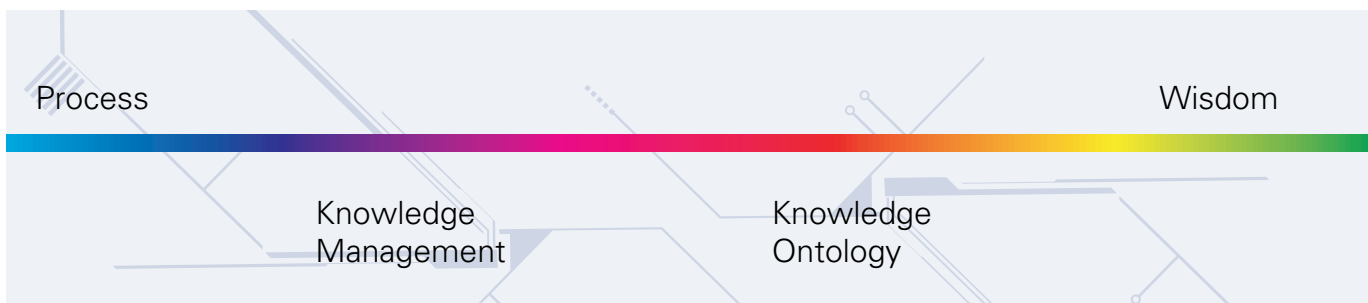
It seems as though the basic data need gets ignored somewhere along the line. If the original data is not being collected as a part of the process that is nursing documentation, then how can we be assured that any aggregation of data is going to be correct?

Coding data is frequently entered by second and third parties, rather than collected as a result of a required activity. This causes additional workload to 'feed' the computer system. Such overhead and its risks can clearly be noted in the collection of coding information. When administrative staff input the information working from clinical notes, the possibility for inaccurate transmission, let alone the lack of professional clinical input, is immense.

The Need for a Louder Voice of Nursing

Given major ongoing investments in healthcare IT and communications technology in Britain, not least in terms of the National Programme for Information Technology (NPfIT), it is a pity that the voice of nursing has not been louder.

No doubt there have been champions who have tried to conjure up support from within the nursing profession along with



organisations like the British Computer Society Health – Nursing Specialist Group, the Royal College of Nursing - Information in Nursing Group, the NHS Connecting for Health Nursing National Clinical Leads. However, the numbers remain very low and the groundswell remains dormant while it should be at a tsunami alert level in order to ensure that systems implemented support safe practice for patients in our care.

New Technologies: From Process to Wisdom

A basic continuum may help in understanding the philosophy of professional involvement with new technologies.

The first step is a process where a series of actions, changes, or functions bring about a result – simple activity. The next is knowledge management, where a range of practices are used by organisations to identify, create, represent, and distribute knowledge for reuse, awareness and learning.

The third step, knowledge ontology, could be described as that traditionally listed within the branch of philosophy known as metaphysics; ontology deals with questions concerning what entities exist or can be said to exist, and how such entities can be grouped, related within a hierarchy, and subdivided according to similarities and differences, along the lines of care classification. This works in theory, but rarely in nursing clinical practice. Finally, we achieve wisdom – an ideal celebrated since antiquity as the knowledge needed to live a good life. In general, scholars have emphasised various combinations of the following: knowledge, understanding, experience, discretion, and intuitive understanding, along with a capacity to apply these qualities well towards finding solutions to problems.

In general, nursing has embraced new technologies where they have a direct positive value in patient care. However, this could be described as the care process; an advanced practitioner has raised their knowledge and practice to wisdom level. According to the American Nurses Association: Nursing informatics (NI) integrates nursing science, computer and information science, and cognitive science to manage, communicate, and expand the data, information, knowledge, and wisdom of nursing practice.

Information More Than Transcription

If nurses simply enter data into a form on a computer screen, we have only ‘mechanised’ health care. All that is achieved is the transcription of handwritten forms on to computer screens, without considering how the information is actually used.

There is no doubt that the transfer of forms onto screens is easy. In some types of organisations such as banking or warehouse distribution, it is also more than sufficient for implementation and use. The reason: paper documentation was extremely functional before the movement to computer use and/or system update.

Record keeping is one of the key requirements of nursing and is within the UK’s Nursing & Midwifery Council’s Code: Standards of conduct, performance and ethics for nurses and midwives. The recent In:Context project (<http://incontext.intrica.net>), where some 200 de-identified full patient case notes were obtained, made it clear that nursing documentation was poor.

Indeed, one reason why the nursing profession is reluctant to move forward in terms of information and communications technology implementation may be the fact that a poor manual system will become a poor or inappropriately-used technical system.

Barriers to Nursing and Healthcare IT

The barriers to nursing and informatics include the fact that it is seen as a cost rather than an investment; the applications are tactical rather than strategic; the impact is limited to the few showing interest rather than creating a pervasive approach; the view of IT as simply computing rather than considering multiple technologies; and finally, management tending towards delegation rather than leadership.

To overcome these barriers it is widely acknowledged that nurses need to be involved in the design, development, implementation and evaluation of clinical computer systems. Sadly this has not happened. So where do we go now?

The Future

There is a choice, but this is now much more severe than in 1982: either to continue to shy away from getting involved in the development, implementation and evaluation of healthcare IT or e-health systems and let nursing quietly disappear or, to get involved through building our knowledge base and working towards adding informatics wisdom to our professional knowledge. The latter would let nurses:

- understand and improve, influence and use new technologies and informatics, including remote care;
- find the most reliable sources of information to support evidence-based practice;
- guide patients through publicly available information sources;
- incorporate ICT into patient consultations;
- manage the nurse patient relationship when the nurse is not physically in the same place as the patient;
- perform a quick and accurate data entry at the point of care;
- understand the legal and ethical issues associated with managing and sharing patient information;
- extract data to support decisions and monitor the outcomes of practice;
- understand the role of technology in the delivery and organisation of care, and
- train other users such as patients and carers how to use relevant ICTs.

The final resolution around nurses and e-health will depend upon nursing itself. This is the 21st century and there are ever-more complex technologies just around the next corner, among them nanotechnology, biotechnology, RFID and remote home monitoring. These require to be used correctly for our patients’ safety and care.

I can only hope, after working within the domain of ICT and nursing for the past thirty years or so, that nursing en masse will finally make the right choice.



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COST-EFFECTIVE HEALTH SERVICES IN EUROPE

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Need High Quality Methods In Health Technology Assessment

European countries spend between 5–11 percent of GDP on healthcare. Although these resources have surely improved health and quality of life for many Europeans, it is obvious from research that we do not always use the resources in the most cost-effective way. We spend billions of euros on methods that have been shown to be useless or even harmful. In order to avoid waste of resources, health technology assessment (HTA) is a means to improve decision-making in healthcare and make more efficient use of scarce resources.

To avoid unnecessary duplication Europe needs a common understanding of how these assessments should be carried out and of the methods used. There are still large variations in the quality of HTA reports, regarding domains to include as well as methods used. This is why the Swedish Council on Health Technology Assessment (SBU) decided to contribute to the development of common standards and methods focusing on methodology.

During the Swedish presidency in the EU, SBU hosted a conference in Stockholm together with the European network for HTA (EUnetHTA), a permanent collaboration in Europe for the assessment of health technologies (www.eunethta.net). The aim was to not only create awareness about HTA among policy makers, but also to involve stakeholders. EUnetHTA has also developed practical tools for HTA projects, improved information systems, and managed to get the whole European HTA community to collaborate.

The conference took place in Stockholm on December 3, 2009, with the title “HTA Methodology Conference: How to assess health technologies with high quality, transparency and transferability – towards a common methodology”. More than 130 people from over twenty countries participated. Information about the conference is available on the SBU website: www.sbu.se/HTAconference2009.

As far as we know, the Swedish governmental agency, SBU, is the oldest existing HTA organisation in the world. But, regardless of our age and long experience, we will never be too old to learn more and to further improve our work and our methods. There are several reasons why we should focus on methodology, both in Europe as well as in the rest of the world.

- To share knowledge and information to reduce duplication of efforts, we must trust each others’ work. This will only be accomplished by transparent and high quality data and methods.
- Poor methods and unsystematic work increase the probability that we make wrong decisions and do not use Europe’s healthcare resources in the best way. Inefficient use of resources will cost us billions of euros, and is un-

ethical. Validated and robust scientific methods are required in order to know to what extent we can trust the results generated by medical research.

- The quality of our work can always be improved. In order to do so, we need continuous scientific reviews and critical discussions on best available methods to use.

Reflections on what we can learn from the Stockholm conference on methods in HTA

EUnetHTA is widely considered to be on the right track. Its core model and adaptation toolkits have improved transferability and transparency.

One topic of interest concerned validity and reliability of various study designs, especially in terms of randomised controlled trials (RCTs) and observational studies. Though RCTs are considered to be a ‘gold standard’ of clinical research, examples were presented of over-confidence in poorly conducted RCTs leading to unnecessary deaths. One conclusion from the conference was that observational studies, especially large longitudinal cohort studies, have been under-utilised in assessment of adverse effects of methods in health care.

A comprehensive assessment of medical, economical, ethical and social consequences of the scrutinised methods should be included in an HTA-report. Methods for applying economic, ethical and patient perspectives in the assessments were also discussed at the Stockholm conference. Some of the questions: Should we have a patient, a societal or a health-service perspective in cost-effectiveness analysis? What about threshold values in economic assessments in different European countries? How can we include ethical and patient perspectives in HTA? In what way can qualitative research contribute to HTA and how can we synthesise studies of qualitative methods in the best way?

The conference was highly appreciated by the participants and successfully achieved its key goals. Health care efficiency in all member states will improve by paying attention to higher quality in HTA. The eventual beneficiary will be Europe and its citizens.

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E-HEALTH AND ITS CHALLENGES

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E-Health promises to be a cost-effective and efficient way of providing healthcare at an affordable cost to patients who would otherwise be excluded or underserved. However, e-health also comes with a series of ethical and legal challenges which, if not met before its implementation, could undermine its success. Among other things, changes in the nature of the healthcare professional-patient relationship, informed consent requirements and in the apportionment of liability are implicated. Privacy concerns also arise and the position of health informatics professionals as well as of service providers is also affected. A further complicating factor is outsourcing.

Common perception and official pronouncements notwithstanding, what healthcare is delivered — and how — is not simply a function of health needs, financial resources and the number and training of available healthcare professionals. To a considerable degree, it is a matter of politics.

Politics, however, is not a rational enterprise nor is it driven by algorithms and formulae, healthcare economists and decision-theorists notwithstanding. It is driven by a mix of public attitudes and the values and agendas of politicians. This is a volatile mix that is subject to many influences. One of the most profound of these is the technological imperative: if something is technologically new, sophisticated and promises to provide a 'rational' solution to a particular problem, then it must be tried. The influence of this imperative is not confined to policy making. It can also be detected at the level of hands-on care.

Indeed, it has been suggested that, for one reason or another, modern healthcare as a whole is obsessed with technology, and that decision-makers and professionals alike cannot wait to apply technological innovations — much like children who must try out every new toy — and that e-health in particular is implicated.

E-Health and its Challenges

Of course such a sweeping view of e-health is unfair. If its proponents are to be believed, e-health has the potential of overcoming barriers of geography, professional availability, limitations of transportation and infrastructure, and even problems caused by socio-economic disparity. Moreover, it holds out the promise of maximizing effectiveness and efficiency at the lowest possible cost without seriously interfering in patients' lives. Arguably, therefore, e-health is not so much an instance of the technological imperative as the wise and considerate choice by responsible healthcare planners.

However, the fact remains that to allow technologically grounded effectiveness and efficiency considerations to be the

sole determinants of e-health planning is to fall prey to the technological imperative, because e-health comes with a number of potentially serious problems. These are not insurmountable. However, they should be addressed and solved prior to implementation, lest downstream difficulties undermine what otherwise would be a beneficial development.

Technical Reliability and Appropriateness

For example, there are challenges that are rooted in the technology itself. Device safety and standardisation are obviously important issues; as are the technology's ability to ensure data integrity and reliability and its power to gather and communicate data accurately with appropriate back-up measures to guard against malfunction or interruption.

As well, e-health is predicated on the assumption that the instrumentation will provide patient data without constant technical supervision, since this would constitute an intolerable intrusion into patient lives. Not only healthcare providers but also vendors and health informatics professionals (HIPs) are here affected.

While similar concerns exist in the standard healthcare setting, the fact that the relevant technology is expected to function independently and reliably in unsupervised and geographically removed settings adds new parameters to the traditional picture.

Privacy, EHRs and Unique Patient Identifiers

Privacy issues also acquire a new dimension. By and large, national laws and international conventions (such as the European Union Directive 96/46/EC) stipulate that healthcare professionals and institutions have a duty to protect the confidentiality of patient data to the best of their ability, and that breaches in this regard should be communicated to the subjects of the data in due time and in an appropriate manner.

Over the past few years, healthcare providers have been at

pains to ensure compliance with these requirements and have developed such things as authorisation protocols, password protection, encryption and the like. However, these techniques are geared to a professional context and to an institutionalised setting that can be finely adjusted and controlled. e-health introduces the patient and the patient's home environment into the mix. Here these measures may be neither possible nor appropriate. Nevertheless, the privacy requirements remain. Moreover, e-health uses electronic health records (EHRs). This means not only that the records must be accessible on an as-needed basis but also that they contain unique patient identifiers (UPIs) so as to guarantee that the right patient gets the right intervention at the right time. Quite aside from any technical issues about the implementation of an integrated EHR architecture, there is also the issue of UPIs themselves. Both ethical and legal concerns have been raised in this regard relative to such issues as possible 'function creep' in their use.

Patients as Co-Deliverers of Healthcare and Liability

However, challenges are not confined to the technical sector. It would be disastrous for healthcare providers to forget that e-health turns patients (and sometimes their significant others) into active co-participants in the delivery of care. With this, the issue of liability acquires an entirely new form.

That is to say, healthcare has traditionally been based on the assumption that the data underlying healthcare decision-making have been developed by healthcare professionals, and that control of the data gathering process lies in the hands of these professionals and of the technical staff who assist them. Data-related mistakes or misadventures, therefore, are a matter of professional care, diligence and competence.

With e-health, patients become involved in the care delivery process not simply as subjects but as participants. When e-health is not entirely automated through indwelling telemetry, patients have to report the relevant data — and they may make mistakes either in measuring or in reporting values. Even when the process is automatic, it may happen that patients accidentally interfere with these automated measurements or their transmission. Liability apportionment therefore assumes a new aspect, and when family members or significant others are involved the issue of their co-responsibility also arises.

To be sure, there are juridical precedents from other areas of healthcare when patients contribute to negative outcomes. However, these are predicated on the traditional model of the healthcare professional-patient relationship which is based on three premises: first, that healthcare involves a direct patient-professional encounter; second, that the patient's contribution to the functioning of the techniques and technologies employed by the professional is essentially non-existent; and third, that the professional's own expertise determines the availability and reliability of instrument-based patient data and is independent of the patient's skills in the use or functioning of these tools. e-health importantly changes this picture. Therefore it is doubtful that e-health can rely on the traditional approach to liability. Even the standard consent model may no longer be applicable.

E-health, therefore, requires not only the development of appropriate patient-training modules but also the development of

new consent and liability models that acknowledges the patient's (and the significant others') expanded agency in the care process.

Expanded Role of HIPs

Furthermore, HIPs play a much more expanded role in e-health since they are the technical lynch-pins of the whole. Of course HIPs are also integral to any intervention that uses electronic devices in standard healthcare. However, in e-health their role goes beyond providing technical support. The reason is that e-health requires patients to understand the functionally important aspects of the technology with which they are involved because their actions (or lack thereof) may importantly interfere with or alter the functioning of the relevant protocols and devices. True expertise in this regard does not lie in the domain of medicine and healthcare but in the arena of the health informatics. It would therefore be inappropriate to turn communication and patient training in this regard into an add-on responsibility for physicians. With this, however, HIPs now acquire an educational and informed-consent duty that supplements those of physicians. It goes almost without saying that the issue of liability apportionment also has to be revisited from this perspective.

Moreover, purely technical issues such as transmission characteristics, bandwidth issues etc. are significant factors in e-health. Decision-making about what is functionally appropriate in this regard is different from decision-making about whether to use an MRI or some other diagnostic device. The latter is a matter of physician expertise and responsibility; the former, however, is a matter of technical expertise. With e-health, therefore, the role of the HIP expands beyond the traditional scope of purely technical expert and includes giving advice on the choice of the technology itself — with attendant healthcare implications.

Interoperability and Legacy Systems

There is also the following consideration: While e-health is an innovation, it is not an innovation that supplants current healthcare delivery. It extends it. This means that e-health is not a stand-alone modality but something that has to integrate seamlessly into whatever system of healthcare delivery is in place.

This also has ethical and legal implications. First, the fact that e-health must function in an environment that involves distinct kinds material items and protocols means that it can be implemented only if it can be incorporated seamlessly into the legacy systems that form part of the established healthcare structure. Interoperability is therefore a necessary material condition for its success, since otherwise treatment may be impaired by the technology and the fiduciary obligation of the attendant healthcare professionals and institutions may be put at risk — with serious legal consequences. This goes beyond guaranteeing interoperability within the institutional setting that is hospital-based. It also includes the problem of integrating e-health with the databases and operating systems that are used by individual physicians and other healthcare providers whose patients participate in e-health.

Second, as a new modality, e-health is subject to close scrutiny regarding appropriateness, safety and the like. However, quality assurance being what it is, this means that such scrutiny will expand beyond the immediate context of e-health to include the existing healthcare structures, so that in case of unusual incidents the operational flaw can be correctly identified as belonging either to the existing structures or to e-health — or to the interface between them. While it is highly likely that sooner or later general quality assessment of existing structures would be undertaken anyway as a matter of continuous quality management, the introduction of e-health may well trigger and accelerate this process. The introduction of e-health, therefore, would not only have ethical and legal implications but financial ones as well that go beyond the costs associated with the development of e-health itself.

Third, like any electronics based technology, e-health is subject to Moore's law. Consequently, given the rapid changes in ICT, diagnostic technology etc. there lies a corresponding duty, rooted in the fiduciary nature of the healthcare provider-patient relationship, to ensure that e-health systems contain within themselves appropriate measures to ensure a seamless legacy structure that integrates as its various aspects, protocols and components as these become obsolete and are replaced. Planning for e-health, therefore, cannot ethically proceed without making appropriate plans in that direction. In other words, it is not a modality that is complete and can be "forgotten" once it is in place. Again, ethical, legal and financial implications stand in the wings.

Outsourcing and its Associated Problems

Another parameter that may deserve attention is outsourcing. Since the decision to become involved in e-health is usually based on cost-effectiveness and cost-benefit considerations, healthcare planners and administrators sooner or later turn to global players both for the applicable technology itself as well as for the provision of relevant services simply because, as a matter of scale and of disparate wages, global players are generally capable of providing the relevant technologies and services at a lower cost.

This means that international corporations specialising in information- and data-management may come to provide such services while themselves being headquartered or located in another jurisdiction. Also, because e-health requires intensive monitoring and a fast turn-around time, and because trained staff is scarce or unavailable on a constant basis, institutions may be tempted to turn to international medical diagnostic and consultative service providers. This is not a speculative scenario. It has already happened in other contexts and on several occasions that services that were originally provided by national or local agencies have become outsourced to international providers. Radiographs originating in Chicago have been read in Bangalore or Zurich, billings originating in Berlin or Mexico City have become outsourced to Bloomington or Chennai. Even medical notes that have been taken in one country have been outsourced for transcribing to other countries where the native language of the transcribing individuals is other than that of the note-taking medical professionals. In other words, there is the

distinct possibility that in order to employ the relevant technology cheaply, and purely for the sake of "rationalising" the associated costs that accompany the implementation e-health, outsourcing may become a major factor.

Such practices, however, raise privacy concerns to a whole new plateau. International technology- and service-providers are bound not simply by the contracts through which they provide their services but also by the laws of the countries in which they are based as corporate entities. This may make it impossible for the outsourcing parties to guarantee the privacy standards that are mandated within the jurisdiction in which they themselves are incorporated and in which they provide the services that they have outsourced.

Professional standards present another challenge in this connection. Patients expect, and healthcare providers are legally obligated to provide, care that meets the professional standards of the jurisdictions in which the care is actually provided. If outsourcing occurs, an effective and enforceable mechanism must be in place to ensure that there is some means for holding the distant party responsible if professional errors occur, where this mechanism will not be more burdensome or more cumbersome than what is in place in the outsourcing jurisdiction. Otherwise, outsourcing services will occur at the price of patient rights.

Conclusion

e-health is a technically sophisticated modality of healthcare that is designed not only to provide continuous care where none was possible before, but also to provide such care in a qualitatively unexceptionable manner and at a reasonable cost to a great variety of patients. Moreover, it presents the promise of rationalising health expenditures by limiting institutional admissions and interventions to truly appropriate cases rather than operating in a one-size-fits-all and cost-intensive manner and treating potentially ambulatory patients as institutional cases.

However, like any new modality, e-health is not without its challenges, and these are not merely technical in nature. They include value-issues that go to the very nature of healthcare itself, to the nature of the healthcare provider-patient relationship, to the role and responsibilities of the informatics professional, and they include such issues as informed consent, privacy and liability.

Finally, and perhaps above all, e-health presents a human challenge. Data show that while some patients welcome e-health as an indication of concern for patient well-being that is not limited by geographic boundaries, other patients reject it as an unacceptable medicalisation of the home environment and as an intolerable intrusion into their homes and private lives.

None of these issues detract from the promise of cost-effectiveness and efficiency that is presented by e-health. However, this promise should not blind anyone to the fact that, like any technological solution to an existing problem, the solution brings problems of its own, that these are not simply technical in nature — and that they must be addressed before the technology is applied. To forget this would indeed be to act on the basis of the technological imperative with potentially disastrous implications.

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NEW

USING GRID COMPUTING TECHNOLOGY WITH SILVERLIGHT TO CREATE RICH BUSINESS APPLICATIONS

AUTHOR

Henry Lee
Founder and
President of
New Age Solution

Information is vital in today's marketplace, not just as a record, but a means to gauge future trends. Nowhere is this more important than the healthcare industry. Today, medical information is no longer centralised to a hospital setting. On the contrary, healthcare has become highly decentralised in terms of patient services as well as service processing. One particular area witnessing significant growth is claims processing.

As one of the leaders in providing claims processing applications, MDI Holdings recognised early that as part of a full Service Healthcare risk management offering, it needed to provide applications which provided both access to real-time information and a feature-rich, interactive and efficient user interface. Towards this, MDI sought a partner with both the technical and business experience to deliver a solution, within budget and in a period of just six months.

MDI finally chose New Age Solution, a small Microsoft Gold Certified Partner specialized in Microsoft Silverlight, with a strong track record of bringing applications for the Web, Custom and Enterprise level to the marketplace.

Based on a collaborative effort, New Age Solution and MDI agreed on four key requirements for the project: scalability, real-time access to data, platform neutrality and an engaging and interactive user interface. To meet these requirements and fully utilize MDI's proprietary claims processing technologies, New Age Solution quickly identified the need to employ emerging technologies such as Grid Computing, WCF, Silverlight and IIS 7.0.

Claims Processing

Claims processing is a service that requires both significant skill and resources to manage fast growing volumes. At a high level, whenever a patient receives treatment for services (in-patient or outpatient), a claim is generated. This claim contains all information required for reimbursement.

At this point, claims processing takes over. It involves evaluating each claim against regulatory rules as well as those established by reimbursement providers for patient services by a particular healthcare facility.

When coupled to the ever-growing corpus of new regulations and reimbursement rules, the advantages of Grid Computing architecture become evident.

As each claim is presented to the system, computational resources are required to assist in its processing. When the volume of claims begins to increase, a Controller component 'calls up' additional computational resources on individual servers in order to process the claim against the business rules engine. On the other hand, as the volume of claims begins to decrease, the Controller begins to release servers from the session.

During a given day, week, month or year, such a cycle will be repeated hundreds of thousands of times.

It is important to note that these servers are not defined by a geographical boundary but by their connectivity to the system.

Project Requirements

As defined by the overall business objective, the Claims Assessment Service (CAS) needed to meet four main goals:

- Scalability;
- Real-Time access to claims processing data;
- Platform neutrality, and
- Engaging and Interactive user Interface.

Scalability

The first requirement of the project was for scalability, at the application and hardware level. Towards this, we determined that utilising Microsoft's Windows Server platform 2008 technology could yield scalability via Grid Computing.

This platform serves as the central piece of the Grid Computing platform architecture by providing the means to manage and scale computational resources, on demand, thus providing the proprietary technology with resources to meet claims processing requirements, in an efficient and timely manner.

Real Time Access

The application had to provide real time access to data provided by the Grid Computing component. Again, we looked at another technology from Microsoft, namely Windows Communication Foundation (WCF). For the project requirements, we selected a Publish and Subscribe Model. This allows the user interface, after making the initial connection, to immediately receive data as it is processed through the proprietary claims processing technology.

Platform Neutrality

The application had to run independently of the client operating system. The main reason for this is that in the market,

clients can and do run on different operating system environments, and as such it is inadvisable to limit solutions to a particular operating environment.

For this requirement, New Age Solution looked to the web. Rather than just any other web application, we decided on an application built using Silverlight.

Interactive User Interface

Our client believed that in order to be effective, a user interface must be engaging and effective, and we proposed Silverlight. Silverlight is both well established and provides functionality and features which make it a perfect component for such projects.

The Applications: C.A.S and E.A.R.L

C.A.S

Claims Assessment Service, CAS, is designed primarily as a risk management assessment and analysis tool for self-insured companies as well as third party Administrators (TPA). Claims processing involves Administrators having to spend considerable time shifting through and analysing large volumes of billing records for patient services. Often such claims contain coding errors, and lead to a claim being rejected for reimbursement, resulting in extra time and resources to re-process the same claim again. This is where CAS provides a truly unique service and the strength and functionality capable of processing millions of claims in short timeframe. At a high level, CAS is divided into four areas: grid computing, proprietary technology, communication and a graphical user interface.

Grid Computing

Grid computing provided the foundation in terms of providing scalability to meet 'on demand' needs for claims processing. In the marketplace, claims processing volumes are not consistent and as such Grid Computing allowed CAS to meet cyclic peak-and-trough demands by sharing computational resources, instead of investing capital for dedicated hardware which would be available at all times. Furthermore, Grid Computing also provided the hardware support for the proprietary claims processing technology.

Proprietary Technology

The claims processing 'engine' is the heart of the operation. This custom programming logic contains all the necessary information required to evaluate each claim against nearly 50,000 business and regulatory rules for reimbursement. This technology, coupled with the computational resources of Grid Computing, allows the heart of this application to achieve a rate of millions of claims processed in a short timeframe.

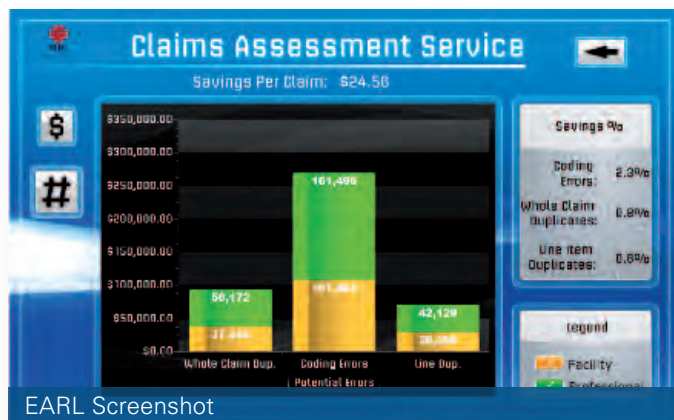
Communication

The communication layer of CAS provides the connectivity between the proprietary processing logic to the user interface. The communication layer complements the strengths of the custom logic and Grid Computing by being able to push that information to the user in real time as each claim is processed. This communication layer is not one way, but in fact is a continuous two way communication which allows the user to communicate back changes while receiving information.

Graphical User Interface

The graphical user interface completed the final layer of the application. User interfaces (UI) are frequently the facet of an application that determines success or failure in the marketplace. For the CAS, the user interface is a success in terms of its user focused design and simplicity. The UI meets all the requirements of the custom processing logic, Grid Computing computational resource management and the communication layer, combining them into a simple user driven design; this focuses the user on a variety of information compiled in merely a few pages. Information ranging from initiating a claims process job to processing statistics is presented in real-time, without the user having to continually request an update from the backend, via human intervention in the UI.

The signature of this design is the functional manner in which New Age Solution continues what begins in the process logic. Within the custom processing logic is the ability to allocate claims based coding error types. These coding events are propagated up from through the communications layer to the UI and displayed in a single page. Within this page, technology available in Silverlight allows a user to be part of the process, via animations and 3D graphics. It is through the use of technology that the user feels engaged and alerted to information that is only



EARL Screenshot



EARL Screenshot

relevant to each task needing to be performed. CAS is an application which takes a major leap forward in minimizing work load, while at the same time maximizing return on productivity for Administrators and Risk Management analysis.

EARL

Empowered Analysis Reporting Log (EARL) is a new application with patent pending. It takes a different approach to the same market as CAS. EARL seeks to position itself as a Business Intelligence Tool for sectors like Risk Management.

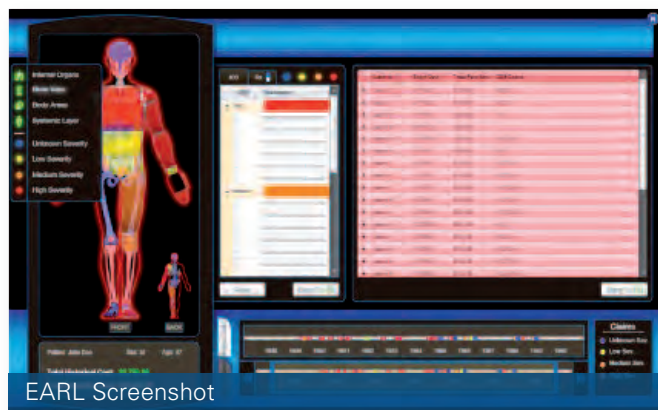
EARL is designed to put the Administrator in the 'driver's seat' and provide near real-time request claims information specific to a given patient. Since EARL is based on Silverlight, a rich interactive application is not bound to a specific client operating system, and can be viewed through any web browser.

EARL is similar to CAS, in that it shares the same architectural design: Grid Computing, proprietary technology and User Interface. However, there is one exception, namely the communication layer.

EARL, as noted, is a Business Intelligence Tool that requests information for review. The EARL request is made by an authorized person via the UI, whereas CAS is always 'on demand' and listening for new claims. Thus, information is not continually pushed to the client via the communication layer. As a result, the user request information, on a patient, is provided when it is needed.

Like CAS, EARL stands apart in the UI layer of the application, in terms of the way Silverlight technology is utilised. From a high level, the UI is laid out in a simple but efficient design. This allows a user to quickly determine both the intent of a page as well as the high level relationship that is depicted.

The user is presented with an anatomical form of the human body from a front and rear perspective. Components such as a list box, data grid and slider controls quickly provide a user with the ability to review severity, type, location, claim details as well as a calendar base timeline. Furthermore, controls such as the timeline and claim severity list, dynamically impact on other controls with dependent information. For example, moving the slider control or narrowing the range automatically update the other controls without having to retrieve data from the source. In reviewing the EARL application, it becomes evident that correctly combining appropriate technology with information leads to powerful Business Intelligence Tools which meet the demands of the marketplace for assessing trends for claims processing and more.



EARL Screenshot

Technology Behind the Applications

WCF

Windows Communication Foundation (WCF) provides functionality that is best suited for enterprise level applications as we move to a more Service Oriented Architecture (SOA). WCF focuses on providing the tools necessary to connect disparate systems of information across geographical boundaries. CAS and EARL, though using the communication platform, go about using these differently.

For CAS, as we have seen, the need is for real-time 'on demand' communication, and it was thus decided by us to utilize a duplexing message pattern.

Duplex message patterns are similar to peer-to-peer technology, in the sense that both ends, the Server and the Client, are acting as sender and receiver on separate channels. When the user logs into CAS, and has been authenticated, a connection is made directly to the Grid technology; the server instantaneously begins pushing information to the client and will continue to do so as long as information is being processed, within the Grid.

To improve the communication of information within WCF services, New Age Solution employed a programming technology, called Language Integrated Query (LINQ). By using LINQ, specifically LINQ to Object and LINQ to XML, we were able to improve performance for the demands that CAS made on claims processing.

The communication utilised for EARL took a different approach, based on the requirements of the application. EARL was designed on the Request/Response message pattern. For instance, the Administrator make a request via the UI for information related to a specific patient, by inputting appropriate data and committing an action that would submit the information, in the form of a message, to the service. The service would then provide a Response to the client returning the information, thus terminating the communication between the client and the service.

As a result, by using one service architecture platform, New Age Solution was able to provide two applications, with two different message exchange patterns. In the process, we reduced the overhead and resources that would have been required to maintain differing technologies.

Silverlight

Silverlight is categorised as a Rich Interactive Applications (RIA). Rich Interactive Applications live in a space between client OS-dependent applications and the web as seen through a browser. In the past, features present in Silverlight have only been available in client OS-specific applications.

This has now changed, because Silverlight draws on a feature rich subset of components found in Microsoft Windows Presentation Foundation (WPF).

Silverlight has become a well-established technology and is unique in how it shares the best of both worlds: OS client application, applications that run on an internet browser and in a mobile platform such as Windows Phone 7.

To begin, Silverlight runs in any internet browser on any operating system – Linux, MAC OSX or Windows, rather like Adobe's Flash player. Indeed, as with Flash, Silverlight only requires a small downloaded plugin.

Where Silverlight stands apart from its competitors is its ability to present the user with an experience that far surpasses standard HTML language programming with such features as graphics, animation and multithreading as well as integration with the .NET framework.

Rapid Development

These applications were developed in a relatively short time frame. Given the complexity of the data and the visual representation that was required by the UI, this was no small task. Developing with Silverlight has been made easier with the addition of a new component to Microsoft Expression Blend, Sketchflow.

For prototyping, we took advantage of Sketchflow for both applications, CAS and EARL. Sketchflow, part of Microsoft Expressions Blend, provides developers with the tools necessary for a relatively wide range of facilitators: easy mockup of pages with content, images and various other controls; the creation of actual page navigation (using SketchflowMap); visualizing animation using Storyboards; and the simulation of actual data for a more accurate representation.

However, the component's advantages do not stop there. Probably one of its most significant advantages is the ability to take a working example of a Sketchflow application and send it to the client for live viewing. During this review process, the client is able to provide comments, update the Sketchflow package and return it to the development team, thus significantly reducing the time to communicate development status and apply changes to the project.

Without this tool, prototyping and development of both CAS and EARL would have easily doubled development times, resulting in a possible loss of market share.

Multithreading

For CAS, it was important that the application be both scalable and provide functionality to allow users to monitor and respond to multiple coding errors simultaneously. To provide

this piece of functionality, we utilized multi-threading. Multi-threading is a central part of the .Net Framework and has been, until now, present in only such feature rich applications as those found in OS-specific applications, as WPF and Windows Form.

The advantage of multi-threading is its ability to execute more than one block at the same time. However, to benefit from this technology, there are hardware requirements. Much of the code behind today's enterprise level applications resides on the server. Programming an application, with Multi-threading, is dependent on the underlying hardware having multicore processors. Multicores allow the server, based on the application request, to allow 'threads' to be spread out so they may be executed simultaneously.

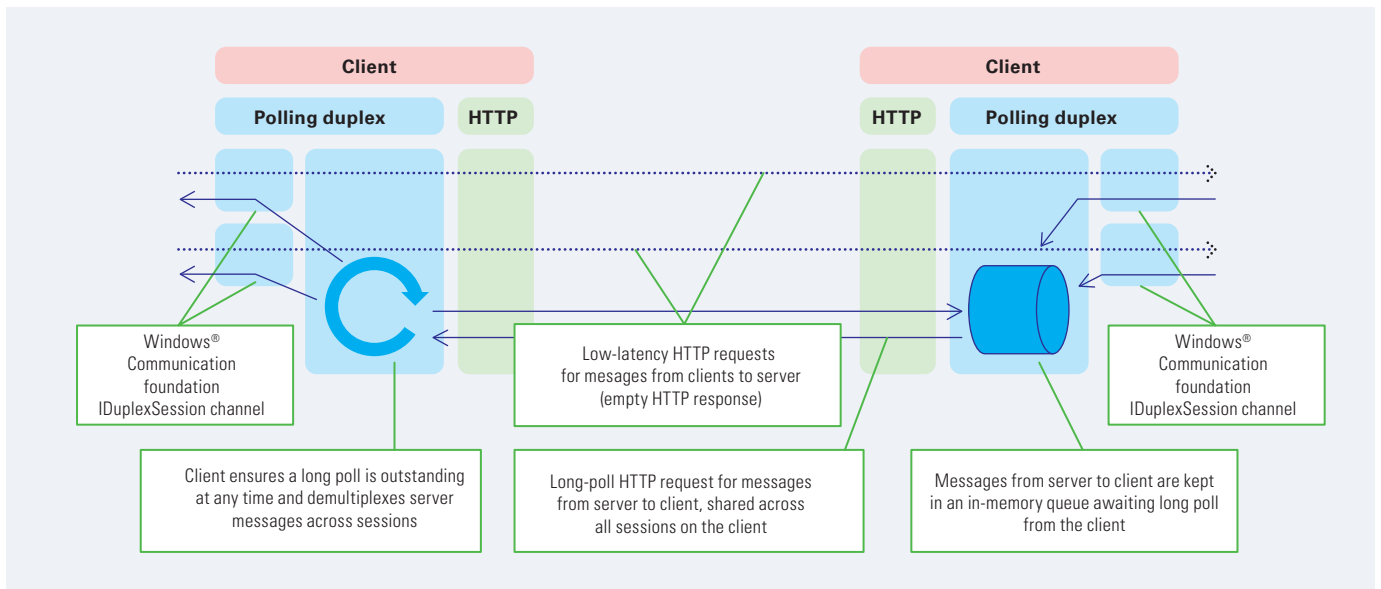
The CAS application, as mentioned, subscribed to multiple coding events, so as to provide the Administrator with a real-time assessment of the claims process, including statistics. Had this been a standard web application or a Flash-based application, such functionality would not be possible.

Graphics and Animations

Visually speaking, graphics and animation are what drive a truly interactive application experience. UI layout and design work can very often determine the successful or failure of an application. On the other hand, if a process is well founded and relayed throughout, as with Sketchflow, a UI design can achieve great success in the marketplace.

Throughout the development process, New Age Solution utilized the right balance of graphics and animations with tools such as Pixel Shader, 3-D Perspective, WriteableBitmap, Key Frame Animation and many others.

In each instance, the use of such classes allowed the user to focus on a specific area when the application required. A perfect example of this can be found in EARL, whose objective, as mentioned previously, is to provide timeline based information on a particular patient and all relevant claims.



THE HEALTHCARE SYSTEM IN AUSTRIA AND SWITZERLAND

An Overview

AUTHOR

Tosh Sheshabalaya,
HIT



	Austria	Date	Switzerland	Date
Population (million)	8.32	2007	7.55	2007
Live births/1,000 pop	9.3	2008	9.7	2007
Deaths/1,000 pop.	9.0	2008	8.5	2007
Life expectancy at birth (years)	77.3 (males) and 82.9 (females)	2007	79.5 (males) and 84.4 (females)	2007
GDP (billion EUR)	166.4	2008	1,088.5	2008
Total healthcare expenditure (% GDP)	10.1	2007	10.8	2007
Total healthcare expenditure per capita (USD PPP)	3,763	2007	4,417	2007
% of healthcare system financed by public funds	76.4	2007	59.3	2007
Number of CT scanners (per million inhabitants)	29.8	2007	18.7	2007
Number of MRIs (per million inhabitants)	17.7	2007	14.4	2007
Number of hospital beds (per 1,000 inhabitants)	7.8	2007	4.0	2007
Length of stay (average in days)	5.7	2007	7.8	2007
Number of practising physicians (per 1,000 inhabitants)	3.8	2007	3.9	2007
Number of practising nurses (per 1,000 inhabitants)	7.4	2007	14.9	2007
Number of Internet users (million)	2.04	2007	2.82	2007
Number of broadband users (million)	1.77	2008	2.52	2008

Source: OECD, Eurostat, Health for All Database, WHO, Health Ministries of Portugal and Spain, Nielsen and International Telecommunications Union (for Internet statistics).

HEALTHCARE IN AUSTRIA

Austria's Ausgedinge health and pension system for farmers and miners dates back to the Middle Ages and is considered by some to be the world's oldest welfare organization. The country's healthcare system is marked by a deeply-ingrained federal culture, dating back to the 130-year old 'Mittelbare Bundesverwaltung' (indirect federal administration) which assigned responsibility, from the Federal Minister through the provincial Governor to district and local health officials.

Distribution of Roles and Responsibilities

Austria's healthcare system is complex, with cross-stakeholder structures at the federal, Länder (provincial) and local government levels.

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

Nevertheless, as far as hospitals are concerned, the passage of laws and their implementation rests with the nine provincial governments.

Public Health Services

Public health services cover epidemiology, preventive health, infant-and-mother care, and school services. These are delegated by provincial governments to local authorities.

The work of the public health service is mainly carried out by district medical officers. Their number has remained at a level of about 300 in recent years, and they are on average responsible for between 30,000 and 60,000 inhabitants each. The district medical officers are as-

sisted by chemists, microbiologists and psychologists, food safety authorities, legal experts and social workers, speech therapists, etc. Their major source of support, however, consists of qualified nurses, who provide appraisals in hospitals, old-age homes and institutions for long-term care.

Hospitals and Beds

There has been a steady decrease in the number of both hospitals and beds in Austria over the past 25 years. In 2005, there were about 65,000 beds in 260 hospitals. This represents a fall by about 15% since 1980 in the number of hospitals (some 50 in total), and a sharper 28% decline in bed numbers over the period. As elsewhere, the bulk of cuts has been in the public sector. Bed numbers in private facilities, on the other hand, have grown.

About 40% of Austrian hospitals (110 in total) are general hospitals. These are larger facilities (accounting for over 60% of beds) and are predominantly operated by the Länder; the federal government and local governments own about 10 hospitals each.

One-third of hospitals (95) are specialist facilities, with a similar share in total bed capacity. The rest consist principally of sanatoria (35) and long-term care/convalescence units (20).

In terms of ownership, about half all hospitals (130) are public hospitals. These consist of both public (State) and private non-profit acute hospitals. Approximately 20% are owned by private profit making entities, 15% by religious orders and trusts, and the remaining 15% by insurance and pension funds.

Bed capacity at public hospitals in Austria amounted to 45,000 beds (or about 70% of the total), making them, on average, significantly larger than private for-profit hospitals. Given the dominance of Länder in ownership of public hospitals, they also account for the bulk of beds. Nevertheless, the density of bed distribution in public hospitals is pyramidal. 60% of hospitals have fewer than 200 beds, 25% have between 200 and 500 beds, 7% had 500 to 1,000 beds. Just 9 hospitals (led by the major university teaching hospitals of Graz, Innsbruck and Vienna) had over 1,000 beds each.

At the other end, only 8-10% of beds are provided at private hospitals, although their share in the total number of hospitals is 2-2.5 times higher.

Healthcare Financing and Reimbursement

Given its diffuse structure, modern Austria's healthcare system is financed in a complex manner by its various stakehold-

	1985	1990	1995	2000	2001	2002	2003
Hospitals	4.4	4.2	4.1	3.9	3.9	3.5	3.4
Acute care	2.9	2.6	2.5	2.3	2.3	2.3	2.2
other	1.5	1.6	1.6	1.6	1.6	1.2	1.2

HOSPITALS PER 100,000 INHABITANTS IN AUSTRIA: 1985, 1990, 1995, 2000-2003

Source: Based on data from Ministry of Health, Austria

country focus

	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
Acute care	7.0	6.6	6.3	6.3	6.2	6.1	6.2	6.1	6.1	6.1
Psychiatric care	1.0	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
Long-term and elderly care, other	1.2	1.2	1.1	1.1	0.9	0.9	1.0	1.1	1.0	1.1
TOTAL	9.2	8.6	7.9	7.8	7.6	7.5	7.7	7.7	7.6	7.8

BEDS PER 1,000 INHABITANTS IN AUSTRIA: 1990, 1995, 2000-2007 - Source: OECD, 2009

	2000	2001	2002	2003	2004	2005	2006	2007
Health spending as share of GDP in %	9.9	10.1	10.1	10.3	10.4	10.4	10.2	10.1
Health expenditures per inhabitant in USD (PPP)	2,824	2,874	3,057	3,200	3,392	3,472	3,608	3,763

HEALTH SPENDING IN AUSTRIA: THE NUMBERS - Source: OECD, 2009

ers. About half of all healthcare financing is borne by the social health insurance system, a quarter by the State (federal, Länder, and local governments) and the remaining quarter through private payments. The latter factor results in Austria ranking among the lower third of EU countries in terms of public share in healthcare expenditure.

Except for the jobless and casual workers, health insurance (through one of the country's 21 health insurance funds) is mandatory for all Austrian residents.

The compulsory insurance system covers those directly insured, as well as their family members and children. It extends from coverage of services to cash payments – for inability to work, as a result of illness, disability, or when preventive care is used.

Contributions to the funds are based on occupational status and/or place of residence. As a result, there is no competition between health insurance funds. Health insurance funds are responsible for payment of service providers. In most cases, terms are established with service providers on a contract basis. The use of health services provided by the mandatory health insurance system is independent of contributions.

Reforms since the late 1990s have resulted in a move away from integrated care provision towards a supply model, focused on decentralised contracts with all service providers.

In the outpatient sector, in particular, these contract relationships are almost exclusively shaped by health insurance funds and private service providers (the

latter obtain two-thirds of their revenues from the funds and federal grants).

In the inpatient sector, however, financing and services provision continues to reflect the heritage of the integrated provision model, and is regulated within the framework of Article 15a of the Austrian Federal Constitution. Each Länder specifies a list of 'Fund Hospitals'. These have a statutory requirement to admit and provide healthcare to all patients. In return, they receive subsidies from public sources for investments, maintenance and running costs.

Meanwhile, since 2002, Austria's private-sector hospitals have become eligible for financing support for inpatient services via a fund called PRIKRAF (Private Hospitals Financing Fund). PRIKRAF makes payments to private hospitals on a performance-and quality-oriented basis known as LKF (Leistungsorientiertes Krankenanstalten-Finanzierungssystem or Performance Related Hospital Financing System), which is essentially an Austrian DRG model.

Private Spending

Co-payments account for about 21% of healthcare spending in Austria. They take the form of both direct co-payments (contributions for benefits covered by social insurance) and indirect co-payments (out-of-pocket payments for private insurance in-patient cover). The share of the former is smaller, but has been rising steadily, from 6.5% of total health spending in 1995 to 7.3% in 2000 and are close to 8%

at present. Indirect co-payments, on the other hand, have seen a fall in share, from 14.6% in 1995 to 14.1% in 2000 and an estimated 13% at present.

Healthcare staffing

The bulk of healthcare staffing in Austria (over 80%) is concentrated in public hospitals. In 2005, the number of people working in the healthcare sector was about 175,000, or 5.6% of total employees in the country.

Physician density in Austria is in line with the EU average, at about 3.8 per 1,000 inhabitants in 2007. This is a significant increase from 1990 (3 per 1,000) and 1980 (2.3), when the level was 25% below the EU as a whole.

Of the country's total of 40,000 physicians, about 30% are GPs. The ratio of nursing staff, traditionally much lower than the EU average, doubled between 1980 and 1995 to 6 per 1,000 inhabitants, and has since risen to 7.4 in 2007; this is however still half that the level in neighbouring Switzerland.

Physician payment

60% of Austrian physicians work in individual capacities for outpatient services, while 40% have contractual relationships with one or more of the health insurance funds. Fees are established by routine negotiations between the funds and the physicians' chambers.

Physicians can obtain additional income by treating private patients in public hospitals.

According to estimates made by the Austrian Physicians' Chamber in 2003, gross initial pay for physicians amounts to around 50,000 Euros per year; after 10 years experience, this reaches 75,000 Euros.

Hospital Admissions: Europe's Highest

According to figures from the European Health for All database (2006), Austria's hospitalisation rate is 28 acute cases per 100 inhabitants, which makes it by far Europe's highest (three times over that of the Netherlands' 8.8 and well over the EU average of 17.5). The gap has, furthermore, increased since the 1980s.

The average 5.7 day length of stay in Austrian acute hospitals in 2007, on the other hand, is far closer to the EU average, and considerably below 7.8 days in neighbouring Switzerland.

The occupancy rate, at 76.2%, is slightly below the EU average of 77.5%, and has moreover fallen (unlike the latter) from almost 81% in 1980.

Outlook for the future

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

back to the early 1990s.

In 1993, a Long-Term Care Law stipulated that long-term healthcare be financed almost wholly from the federal budget. Long-term care has, however, seen a steady decline over the years, from about 10% of all healthcare spending in the early 1990s to 7.5% at present. Federal cooperation instruments are designed to ensure the uniformity of entitlement criteria and quality standards for institutions in this respect.

Nevertheless, a level of vagueness in separating acute and long-term care in the inpatient sector remains. One indicator is the establishment of 'acute geriatric' departments in the country, and the charging of a flat rate per case for geriatric med-

HEALTHCARE IN SWITZERLAND

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The healthcare system in Switzerland is a complex combination of public care, wholly private services and subsidised private care. The share of public spending is one of Europe's lowest, with Swiss law providing for the State to support healthcare only when the private sector cannot produce "satisfactory results". As a result, on a per capita basis, Switzerland operates the industrialized world's second most expensive healthcare system – behind the US.

Distribution of Roles and Responsibilities

Roles and responsibilities for Switzerland's healthcare system reflect the country's confederal State. Consequently, its 26 local (Cantonal) governments have strong powers. They are responsible for licensing and authorisation of health professionals, hospital regulations (including accreditation) as well as operating their own hospitals and negotiating fees with service providers.

There is, however, a uniquely Swiss el-

ement within the healthcare system. Switzerland's direct democracy means that citizens play a direct role in the healthcare system, for example by voting in referenda to expand hospitals.

Hospitals: Public and Private

As mentioned, most Cantons have their own hospitals (Kantonsspitals). Other major facilities include regional hospitals (Regionalspitals) and university hospitals. In addition, there are over 120 private med-

ical facilities (or Kliniken), with the bulk concentrated in and around the cities of Geneva, Zurich, Berne and Basel. They account for about 20% of bed-days (or about three millions in total).

The presence of private hospitals is especially strong in the psychiatric area, where they account for a share of about half. Nevertheless, the private hospital system in Switzerland faces considerable handicaps.

Both public and private hospitals negotiate tariffs with health insurance funds, but the latter are generally covered for no more than "85% of actual costs", according to the private hospital federation Private Hospitals Switzerland. In addition, says the federation, cantons assume "at least 50%" of the processing fee plan "in all cases" for public hospitals. Health insurance funds bear a share below 50%, and this is what appears on the hospital bill. As a result, the latter "does not even state of half

	2000	2001	2002	2003	2004	2005	2006	2007
Acute care	4.1	4.0	3.9	3.9	3.8	3.6	3.5	3.5
Psychiatric care	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
TOTAL	4.7	4.6	4.4	4.4	4.3	4.1	4.0	4.0

BEDS PER 1,000 INHABITANTS IN AUSTRIA: 1990, 1995, 2000-2007 - Source: OECD, 2009

country focus

	2000	2001	2002	2003	2004	2005	2006	2007
Health spending as share of GDP in %	10.2	10.6	10.9	11.3	11.3	11.2	10.8	10.8
Health expenditures per inhabitant in USD (PPP)	3,217	3,428	3,673	3,779	3,938	4,015	4,165	4,417

HEALTH SPENDING IN SWITZERLAND: THE NUMBERS

Source: OECD, 2009

the cost of treatment." Moreover, Cantons "also finance new buildings and equipment investment in public hospitals," which are not taken into account in the invoice sent to the patient but whose costs are borne by the latter as taxpayers.

Although significantly behind a major neighbouring country like Germany (3.6 beds per 1,000 in 2007) or neighbouring Austria (6.1), acute care hospital bed density in Switzerland (at 3.5), is approximately on par with the Western European average and another large neighbour France (3.6). The acute care bed density in Switzerland has also been declining in recent years, from 4.1 per 1,000 inhabitants in 2000 and 3.8 in 2004.

Healthcare Financing and Reimbursement

Healthcare finance in Switzerland is regulated by the Federal Health Insurance Act. Health insurance is compulsory for all persons resident in the country and covers a range of treatments. These are listed and described in considerable detail within the Federal Act so as to provide similar standards of healthcare throughout the country. Insurance companies cannot vary premiums on their compulsory policies – on the grounds of age, gender or health status. However, this does not apply to complementary insurance, where premiums are risk-based.

Insured persons retain full freedom of choice among recognised treatment providers. Costs of treatment and hospitalisation are covered by their insurance firm up to the level of the official tariff. The balance is borne personally through an annual 'franchise', and by a direct charge of 10% of the extra costs.

Insurance premiums depend on the insurance company, the chosen level of 'franchise', the insured person's place of residence and the degree of complementary benefits sought – for example, access to private wards in hospitals, dental care

etc. In the face of rising costs, Switzerland has sought to implement cost-containment and efficiency incentives, principally in the shape of HMO-style managed care solutions. However, their share remains small, largely due to the lack of US-style incentives to restrict consumption of healthcare services. Nonetheless, managed care is estimated to have resulted in cost savings of 10–25% as compared with the traditional fee-for-service systems.

Switzerland's principal social health insurers now all have HMO divisions. There also are a handful of physician-owned HMOs. Premiums for HMOs are 10-20% lower than those for standard policies.

As mentioned previously, the delivery of health services in Switzerland consists of public care, subsidised private care and wholly private services.

The public healthcare system in Switzerland is largely based on the mainstream northern European model, principally in terms of 'fund pooling' — by virtue of which individual payments are collected by one or several insurance/sickness funds, and grouped together (pooled). Healthcare expenditures are then paid out of it. Most Cantons operate their own hospitals, and some subsidise private hospitals. Cantonal authorities also endorse fees negotiated between service providers and health insurance funds. Many have begun to use global budgets since the mid-1990s, although implementation systems vary between Cantons.

Subsidised private care in Switzerland generally includes at-home paramedical services during pregnancy, after accidents and for the elderly (including nursing homes). Fully private care, on the other hand, involves treatment by doctors in private practice, at private clinics, and is far closer to the US model.

Private Spending

In Switzerland, co-payments on healthcare accounts for about 30.6% of spending,

equivalent to 1,350 USD on a purchasing power parity (PPP) basis.

Though it has declined slightly, from over 33% in 2000, the share of private spending is among the highest in the West.

Healthcare Staffing

According to 2007 statistics from the OECD, Switzerland had 3.9 physicians per 1,000 inhabitants (in line with the EU average). This is a slight rise from 3.5 in 2002. Nurse densities are high, at 14.9 per 1,000 inhabitants in 2007, up from 12.9 in 2000. This compares to levels of 7–10 per 1,000 in most Western countries (with the exception of Ireland's 15.5 and Norway's record of 33).

Hospital Stay on the Decline

The average length of acute care hospital stay in Switzerland has decreased steadily in recent years, from 9.3 days in 2000 and 8.8 days in 2004 to 7.8 days in 2007.

Outlook for the Future

In spite of efforts at cost containment, which saw healthcare spending decline from a peak of 11.3% of GDP in 2003 and 2004 to 10.8% in 2007, Switzerland still ranks second after the US as the West's highest per capita spender on health.

Further reforms to healthcare financing services are therefore inevitable. One method under discussion (and intense debate) is to move towards unitary financing of healthcare services, with a single final purchaser in the shape of the insurance firms. Public contributions would be paid directly to the health insurers and anchored within the matrix of basic health services. On their part, rather than providing a subsidy for services offered by public hospitals or for at-home care, the Cantons would pay a contribution determined in terms of a fixed percentage of all services covered by basic health insurance.

HEALTHCARE INFORMATION TECHNOLOGY IN AUSTRIA AND SWITZERLAND

AUSTRIA

E-health is seen in Austria in relatively pro-saic terms, as “a set of new business models and tools to enhance the delivery of healthcare services”. Its legal foundations include Austria’s Health Reform Act 2005 (a framework for quality strategies and national standards) and the Health Telematics Act (for the secure exchange of individual health data). Also relevant is the 2004 eGovernment Act (especially in its identity verification objectives) and the convergence vision of EU programmes such as i-2010.

The key driver of e-health in Austria is a stakeholder forum known as the eHealth Initiative (EHI), which brings together participants from government, hospitals, social and private insurance companies, universities, IT vendors and healthcare professional societies.

Austria’s e-health Strategy was officially unveiled in January 2007. It has seven key facets: Interoperability–standardisation, Patient identification and archiving, Network of the health care and social system, Customer related information systems, Health care system related information systems and Telemedicine. Its goal is to synergise experiences from isolated clusters of prior experience and continuously refine the national e-health strategy.

e-Prescription and e-Card

Practical steps achieved so far include a pilot e-Prescription project which demonstrated an increase in efficiency and quality for benefit both patients and payers. Another initiative is the Austrian e-Card, which has replaced paper health vouchers progressively since 2005. Based on a smartcard, and upgradeable upon a patient’s request to a Citizen Card, the e-Card has been used by private physicians

for a range of activities, from the identification of patients to payment for services. Patient data is verified, via a smart-card-reader, with a central social security database and, if necessary, updated. A VPN-based health information network GIN (Gesundheitsinformationsnetz), set up alongside roll-out of the e-Cards, provides the connectivity.

“The goal of Austria’s e-health vision is the implementation of a decentralised electronic health record system.”

Hospital Projects

Austrian hospitals have launched their own ambitious health IT projects.

The Allgemeines Krankenhaus Linz (AKH), one of Austria’s largest general hospitals, has equipped its nurses with smart-cards to identify themselves when working with the hospital information system, thus providing a higher level of control over access to patient data.

One of the most noteworthy independent, hospital initiatives, however, is NÖMED WAN, among Europe’s largest medical networking projects. This provides physicians and hospitals access to patient medical histories at 27 hospitals in Lower Austria, without the need to invest in new hospital information systems. At the moment, a half dozen hospitals are piloting an electronic medical history, with direct access to discharge letters. Patients

are identified, offline, by their e-Card. A key facet of is NÖMED WAN is its decentralised approach: medical data stays with individual hospitals rather than a central storage. Its proponents believe such a model addresses some of the most profound concerns on security and privacy, and could be replicated across Austria, and beyond.

NÖMED WAN’s philosophy of decentralisation is also reflected in the GIN health information network. This has been conceptualised as a ‘closed network’ with ‘open architecture’ – with the former limiting access (for privacy and security reasons) to a defined group of users, while the latter permits the seamless extension of services to the future medical information highway (including payments to physicians by health insurance funds and access by private physicians to databases).

To sum up, the goal of Austria’s e-health vision is the implementation of a decentralised electronic health record system. Within such a framework, patient data will remain with individual hospitals, but made accessible to physicians and patients via the e-Card. So too will be other medical applications such as e-prescriptions, medication data, lab results and discharge letters.

IT Infrastructure for e-Health

To accommodate such a vision, there is a general consensus in Austria that its healthcare IT infrastructure is service-oriented, with an open system in tune with the realities and requirements of both the country’s healthcare system and evolving EU-level e-health programmes.

Austria’s eHealth Initiative (EHI) has made recommendations on using SOAP, XML, SAML for messaging. In addition IHE XDS has been proposed as the fundamental architectural framework for data interchange. For semantic structuring of

country focus

the health records CEN prEN 13606, HL7 (V3), CDA, UN/CEFACT CoreComponents, and DICOM (for graphic data) are under consideration and evaluation.

Major developments are also under way at the University for Health Sciences, Medical Informatics and Technology (UMIT). Its priorities include cross-institutional information system architectures, the support of information exchange and management between different healthcare institutions.

One specific project at UMIT seeks to specify, develop and operate an EHR prototype. Its main focus is to demonstrate customised but simple solutions for networked online services and healthcare service offerings, ranging from the transfer of results right up to the comprehensive electronic health record, and including process-oriented tasks such as appointment and process planning.

This attention to use e-health to derive additional efficiencies in healthcare delivery is also on the radar of IIG, the Institute for Health Information Systems. In association with local industrial and hospital partners, IIG is conducting an investigation on process management in health care – with methods for comprehensive process analysis, modelling and assessment.

Switzerland

Switzerland's e-health Strategy was formally launched in 2007 for the period until 2015. The strategy, which seeks to implement electronic medical records (known as 'patient dossiers') at a national level by 2015, follows extensive wrangling between the federal government and the country's powerful Cantons, and between governments and health professionals.

Critics allege that the e-health Strategy leaves too much space for interpretation. Its supporters, however, counter that it was the best compromise, given the strongly federal system in the country. They also say that its bottom-up approach, based on working real-life solutions, reflects similar processes in neighbouring Austria, as well as major European countries such as France and Germany.

Key facets of the Swiss e-health Strategy include the following: a roadmap for the nation-wide implementation of regional smartcard-based EMRs in a phased manner by 2015, preceded by a Web-based nation-wide electronic health plat-

form in 2012. Part of the latter goal is aimed at strengthening the Swiss population's individual awareness about health-care, in order to drive overall efficiency from the side of personal demand and expectations. Outlined in a 58-page document, the e-health Strategy also provides information on targets and costs, priorities for action, partnerships and procedures as well as a timeline.

Underlying the 2007–2015 e-health Strategy is a framework agreement concluded between the Swiss Federal Department of Home Affairs and the Conference of Cantonal Ministers of Public Health. This agreement, which seeks to flesh out the e-health Strategy, has identified several tangible goals:

- Guarantee of interoperability throughout Switzerland of e-health projects and solutions.
- Networking of key healthcare players
- Development of higher-quality, safer and more cost-effective procedures
- Studying information exchanges between patients and healthcare specialists;
- The provision of health services irrespective of location and time, and
- The enhancement of individual competencies in health matters.

To achieve these goals, the framework agreement has set up a coordinating organisation to draw up e-health implementation plans. Its mandate includes not only further development of the e-health strategy, but also the definition of uniform standards and a nationwide e-health architecture for Switzerland. Under its remit too are proposals to amend the law at both federal and cantonal levels and coordinate the interoperability of cantonal pilot projects and promoting acceptance of e-health by the general public.

Examples of key enabling e-health projects are discussed briefly below.

The Swiss Insurance Card

An electronic health insurance card forms the foundations for Switzerland's e-health strategy. In February 2007, the federal government adopted a decree on the card for compulsory insurance. Its key purpose is to reduce administrative costs through an increase in the use of electronic – rather

than paper – data.

One interesting feature of the Swiss insurance card – in terms of its role as a gateway to e-health – is that it already functions as a light version of the electronic patient record.

Holders can agree for vital data (such as current illnesses, allergies and highlights of their medical history) to be stored on the card, and increase its utility, especially in emergencies. The personal data will not only be protected by the PIN (personal identification) code of the holder, but can also be deleted if requested by the holder. Crucially, insurers will not be provided access to the additional data.

E-Nursing

Switzerland has launched a wireless system to enable nurses and doctors at hospitals to use tablet PCs running electronic nursing documentation software, including an electronic medical chart which replaces paper-based solutions. The Swiss-developed workload management tool, known as LEP, has since been adopted in Germany.

GPS Patient Tacking

Switzerland has seen the launch of a personal safety and location system for patients known as AlarmTouch. The GPS-equipped remote care device includes a 'geofencing' feature, which sends an SMS or initiates a voice call to a monitoring centre or caregiver when the wearer wanders outside a specified zone. This identifies the caller's location, enabling immediate assistance.

E-Toile

Geneva-based e-toile is an advanced project centred on the electronic patient record. It is designed to be open to receiving and transmitting data from telemedicine treatments.

E-toile aims to eventually connect all healthcare facilities in Switzerland via a secure medical information network. The issue of privacy rights has also been taken on upfront. Patients can use a smart card to specify access rights to their data, as well as layer such rights. The project has cost an estimated CHF 50 million for development.

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www.healthgrid.org

July

HEALTHCOM '10
1–3 July 2010
Lyon, France
www.ieee-healthcom.org

**ADIS INTERNATIONAL
CONFERENCE E-HEALTH 2010**
29–31 July 2010
Freiburg, Germany
www.ehealth-conf.org

September

ICT 2010
27–29 September 2010
Brussels, Belgium
http://ec.europa.eu/information_society/events/cf/ict2010

**EUROPE HEALTH IT
LEADERSHIP SUMMIT**
29 September–1 October 2010
Rome, Italy
<http://hitleadershipsummit.eu>

October

IT @ NETWORKING AWARDS 2010
7–8 October
Brussels, Belgium
www.hitm.eu/awards Extra events

CIRSE 2010
2–6 October 2010
Valencia, Spain
www.cirse.org

November

RSNA 2010
28 November–3 December
Chicago, USA
www.rsna.org

MEDICA
7–20 November 2010
Dusseldorf, Germany
www.medica-tradefair.com



**HEALTHCARE IT
MANAGEMENT**

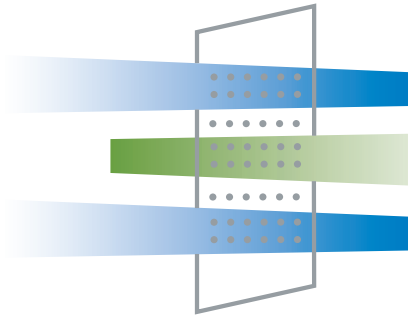
ISSUE 3, 2010

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VR in Healthcare
HIT and Clinical Trials
e-health and Africa
Healthcare IT in Europe: The Demographic Challenge

➤ **MANAGEMENT:**
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➤ **COUNTRY FOCUS:**
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European Association of HEALTHCARE IT MANAGERS

The European Association of Healthcare IT Managers (HITM) is a pan-European non-profit organisation unifying relevant healthcare IT associations and individuals.

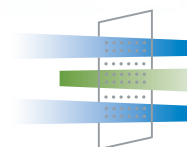
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- *The HITM invites you to be involved in a community to exchange opinions and experiences with like-minded colleagues. We defend your interests and make your voice heard, effectively.*
- *The HITM is a common voice in European Healthcare IT, especially important in the face of rapid technological change and growing socioeconomic pressures.*
- *The HITM supports and encourages the cross-national understanding and the emergence of common Healthcare IT standards at both EU and international levels.*

*If you are a CIO, CMIO or IT Manager
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www.itandnetworking.org